REPUBLIC OF ZAMBIA

MINISTRY OF HEALTH

DIGITAL HEALTH STRATEGY

2022-2026

FOREWORD

The Ministry of Health today recognises that digital technologies are going to be essential in enabling the attainment of Universal Health Coverage in our country.

In 2018, WHO member states unanimously adopted a World Health Assembly resolution that recognises the potential of digital health in supporting national efforts to achieve the health objectives outlined in the sustainable development goals (SDG 3). This Digital Health Strategy was developed considering the evidence that smart investments in healthcare will improve healthcare service delivery, research and education delivering the greatest dividends for Zambia. This sets the context for our decision to adopt the WHO framework for the assessment and development of the Digital Health Strategy 2022-2026.

The global pandemic has enabled the world to appreciate how advances in technology continue to provide the capacity for the healthcare system to better collect surveillance data and enable government to better respond to future pandemics. These investments will also provide Zambia the capacity to improve disease management, monitor adherence to treatment, and through telemedicine, provide health services in hard-to-reach areas. The investments will further improve education and awareness in our population, provide high quality healthcare data and insights to support healthcare delivery, research and policy making. This strategy captures our vision for the digital transformation for Zambia as enshrined in the New Dawn Manifesto.

The strategy development was driven through a participatory process that brought together public and private sector actors working in the fields of healthcare and information and communication technology. These stakeholders through a series of workshops reviewed the previous strategy and defined a common strategic vision that will guide the development of digital health over the next five years. A rigorous assessment of our current state was undertaken, taking stock of our existing strategies, engaged sector actors to define the future state and the desired outcomes, conducted a benchmark analysis to study global best practice as applied to digital health and learn from both high and low resource contexts to enable us to understand what is attainable in our own context. The outcome of this work is a clear Strategy, Implementation Plan and Monitoring and Evaluation Framework to ensure we are successful over the next 5 years laying the foundation for our healthcare transformation.

The success of digital health in Zambia will require relevant government agencies across multiple sectors to collaborate, including health, information and communication technology (ICT), economic, science, innovation, and data privacy and protection agencies. Our Government, development partners, and other stakeholders must coordinate investments in the digital health enabling environment to reduce fragmentation of digital health technologies and ensure that different ICT platforms and applications can connect and exchange health information with each other. While this may seem like a daunting challenge, our learning from our benchmarking provides us a view of how these enabling environments contribute to the success of digital health initiatives.

We are today taking a coordinated approach across all of Government to ensure that we work together in creating this enabling environment. This also comes at an opportune time as Zambia rolls out its Integrated National Registration Information System (INRIS) that will enable Zambians acquire an identity at birth in compliance with Chapter 51 of the Birth and Death Registration Act that makes birth registration compulsory for all Zambians and enables citizens enforce their rights and secure access to healthcare services.

Finally, I would like to thank the stakeholders that generously contributed to this work and look forward to your co-operation as we deliver quality healthcare services to the citizens of this great country.

Hon. Sylvia T. Masebo (MP)
MINISTER OF HEALTH

ACKNOWLEDGEMENT

The Zambia Digital Health Strategy was developed over a 6-month co-creation journey, led by the Ministry of Health and bringing together various government departments, development partners, and sector players. These stakeholders engaged in hours, days, weeks and months of rigorous consultation to discuss how we can apply digital health to manage care provision at a distance, reduce adverse drug events, provide for better co-ordination of care across the healthcare system, reduce the duplication of tests, enable research, and governance of digital health. Critical amongst all these consultations was how we build digital health workforce capabilities and skills in the country. We are indebted to the individuals who graciously invested time and their unique perspectives to enrich our planning.

The Strategy development was coordinated by the Ministry of Health ICT department with the support of the office of the Ministry of Health Digital Health Coordinator. Other departments in the Ministry also played a critical role and these include, departments of Planning, Monitoring and Evaluation and Clinical Care and Diagnostics. These provided invaluable content which shaped this Strategy.

Special gratitude also goes to officers from Smart Zambia Institute (SZI) and from the Ministry of Technology and Science, for the support and guidance rendered to the process which provided useful insight to the current Government regulatory framework around implementation of eGovernment solutions. Their personal commitment and engagement from the beginning of the process to the end was very commendable.

The Digital Health Technical Working Group (DH-TWG) members from various institutions also contributed immensely to this product especially with the review of the previous eHealth Strategy and I am grateful to the team for their participation in the consultative workshops.

Let me take this opportunity to pay a special tribute to our development partners and their implementation partners for their technical contributions toward the development of this strategy and for financing the consultative meetings throughout the process – The World Health Organisation (WHO), United States Agency for International Development (USAID), Centres for Disease Control and Prevention (CDC), Jhpiego, IHM Southern Africa, PATH, MSI Evidence for Health (E4H) and The Tony Blair Institute for Global Change (TBI). Your tireless efforts to ensure our new Strategy reflects the current global digital health landscape and Government aspirations of digital transformation in the delivery of health care services to the people of Zambia are well noted and greatly appreciated.

Finally, I would like to thank all the Ministry of Health staff and representatives of statutory bodies for their participation and support to the process of formulating this Digital Health Strategy.
Looking forward to the successful implementation of the Digital Health Strategy 2022-2026.

Prof. Lackson Kasonka
Permanent Secretary – Technical Services
MINISTRY OF HEALTH

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GLOSSARY OF TERMS

Digital Health – Digital Health is 'the combined use of electronic communication and information technology in the health sector'. In the MoH's practical use of eHealth, it means the use of ICTs to improve access to quality healthcare as close to the family as possible through the deployment and exploitation of ICTs and other modern technologies.

ICT Infrastructure - A generic term to mean computer hardware and peripheral devices, communication equipment including networks.

Information and Communications Technology - A generic term used to express the convergence of telecommunications, information, broadcasting, and communications such as computers and the internet, fixed and mobile telephone, high frequency radio, radio and television and related applications such as email, voicemail, and Voice over Internet Protocol (VoIP).

Information Systems - These are systems used in the health sector which involve the receipt of data and transforming it into information, examples are Health Management Information Systems, SmartCare, Supply Chain Manager and Integrated Financial Management Information Systems.
Health informatics is the intersection of information science, computer science, and health care (including health practice at the community level).

Health Information Exchange (HIE) - A HIE assists with the transfer and sharing of health-related information that is typically stored in multiple organizations, while maintaining the context and integrity of the information being exchanged. A HIE provides access and retrieval of patient information to authorized users to provide safe, efficient, effective, and timely patient care.

Health Management Information Systems (HMIS) - HMIS is an aggregate routine information system used for planning, monitoring and evaluation and decision making at all levels of the health sector. Health information management is the practice of maintenance and care of health records by traditional (paper-based) and electronic means in hospitals, physician's office clinics, health departments, health insurance companies, and other facilities that provide health care or maintenance of health records. With the widespread computerization of health records and other information sources, including hospital administration functions and health human resources information, health informatics and health information technology are being increasingly utilized in information management practices in the health care sector. HMIS is now called District Health Information System (DHIS).

Health Systems Architecture - Health information system architecture describes the fundamental organization of the system embodied in its components, standards, and principles governing its design and evaluation.

Interoperability - Interoperability describes the extent to which systems and devices can exchange data and interpret that shared data. For two systems to be interoperable, they must be able to exchange data and subsequently present that data such that it can be understood by a user.

Ministry of Health - All the departments, statutory bodies, and institutions recognised in the MoH structure will be referred to as MoH.

SmartCare - SmartCare is an electronic health record system developed in Zambia. It is an initiated nationally scalable Electronic Health Record System designed especially for low resource, disconnected settings. SmartCare has the objective of improving the quality of health care and health by providing support to deliver "Continuity of Care" where existing paper systems are failing to preserve a longitudinal data view, and where clinics may often have no telecommunications.

Telemedicine - The use of modern audio and video telecommunication, computers, and telemetry to deliver health services to remote patients and to facilitate information exchange between primary care physicians and specialists at some distance from each other.

Abbreviations and Acronyms

AIDS	Acquired immunodeficiency syndrome
CDISC	Clinical Data Interchange Standards Consortium
CDSS	Clinical Decision Support systems
CSO	Central Statistics Office
DATIM	Data for Accountability, Transparency and Impact Monitoring
DHIS2	District Health Information System 2
DISAI ab	multi-disciplinary and multi-lingual laboratory information system (LIS)
eLMIS	electronic Logistics Management Information System (eLMIS)
ESGP	Economic Stabilization and Growth Programme
FHIR	Fast Health Interoperability Resources
GDP	Gross Domestic Product
HIE Standards	Electronic health information exchange
HIV	human immunodeficiency virus
HL7	Health Level Seven
HMIS	Health Management Information System
ICD 10	International Classification of Diseases
ICT	Information & Communication Technologies
IHE	Integrating the Healthcare Enterprise
INRIS	Integrated National Registration Information System
MDAs	Ministries Departments & Agencies
OpenHIM	Open Health Information Mediator
OpenMRS	Open Medical Record System
REA	Rural Electrification Authority
SDG	Sustainable Development Goals
SNOMED	Systematized Nomenclature of Medicine -- Clinical Terms
STI's	Sexually Transmitted Infections
SZI	Smart Zambia Institute
TB	Tuberculosis
TWG	Technical Working Group
UNZA	The University of Zambia
WHO	World Health Organisation
ZABS	Zambia Bureau of Standards
ZDHS	Zambia Demographic & Health Survey
ZESCO	Zambia Electric Company
ZICTA	Zambia Information and Communications Technology Authority

1. Executive Summary

As set out in the National Development Plan, Zambia aims to become a prosperous, middle-income country by 2030. Human capital development, and the delivery of health care is essential to achieving that ambition. Zambia's National Health Strategy has clearly articulated the ambition to meet SDG 2030 Goal 3.8 (achieving Universal Health Coverage), and digital health will be essential to meet that life-changing target. Globally, health systems are changing at an unprecedented rate. COVID-19 and the world-wide disruption it caused have been a catalyst for this change, giving added momentum to the health industry's accelerated adoption of virtual care and transformation towards intelligent, digitally enhanced care systems. What began as a necessary shift towards remote care has driven a longer-term change to adopt smarter health approaches. In response to the pandemic, a deep vein of virtual care and tele-medicine has arisen, underlining the role of digital technologies in building more intelligent health systems.

Across the globe, countries are exploring which frameworks will best manage this change and how they can leverage digital strategies across government to benefit health systems delivery. This strategy will answer these questions - driven by the Zambian context - ensuring that over the next five years digital health delivers on the bold goals set out in the National Health Strategy. Aligned to the World Health Organisation's (WHO) 7-pillar framework, the digital health strategy sets out a comprehensive approach that considers the leadership and governance of digital health, investment and sustainability, workforce for digital health, legislation policy & compliance, standards & interoperability, national infrastructure and the application and services that are fundamental to the transformation of healthcare delivery in Zambia.

The Ministry of Health recognises that strengthening the country's health system is a long-term evolutionary process. Technology can make the health system more efficient, delivering high-value, high-quality care at a reasonable cost, and support continual improvements in care, through knowledge generation, enabling the development of a learning health system. But technology adoption for health care remains complex, and determining which innovations will provide the most cost-effective, patient-centred, quality care is multi-faceted. This strategy is therefore guided by a single vision, providing a clear articulation, around which all actors across the sector can coalesce:

"Improving health outcomes for all Zambians through a sustainable, secure and innovative digital ecosystem that is seamless in its operation

The 2017-2021 strategy focused on service delivery, research, e-learning and governance, and laid strong foundations on which the initiatives set out in this strategy will build. Key successes of 2017-2021 will be fully leveraged to drive forward Zambia's digital health journey. Ensuring the country builds off the outcomes of the last five years, will enable the successful delivery of this strategy, and the much-needed healthcare transformation across Zambia.

2. Introduction

The world is going through a significant transition and the digitalisation era has fully arrived. Covid-19 highlighted the key role digital technologies play across societies, providing nations with the capacity to adapt to emerging challenges. These enabling technologies will also play a fundamental role in accelerating progress toward the Sustainable Development Goals (SDGs) particularly to support health systems, by improving the quality and accessibility of health services including delivery of services at distance and providing affordable care.

Digitalisation is a key enabler to a myriad of improvements across health systems, from providing better patient care, disease surveillance, program monitoring and management, to delivering e-learning for patients and health care workers, improving overall efficiency in health service delivery, and increasing healthcare equity. A robust digital health strategy will transform the integration of key technologies in Zambia's healthcare delivery, providing better quality data for decision making and planning as well as providing robust capabilities to support delivery, whether improving health supply chains and logistics, management functions, or enabling healthcare research.

2.1. Country Context

Zambia is a land-linked country in the Sub-Saharan region. The country covers a land area of 752,612 square kilometers and shares boundaries with eight countries, namely Malawi, Mozambique, Zimbabwe, Botswana, Namibia, Angola, the Democratic Republic of the Congo and Tanzania. The country is divided into ten provinces and a total of 116 districts. Two of the ten provinces of Zambia are predominantly urban, namely Lusaka and Copperbelt, while the remaining eight provinces are largely rural (CSO, 2010). Western province (47%) has the most significant proportion of households in the poorest quintile, while Lusaka (51%) has the most significant proportion of households in the wealthiest quintile (ZDHS, 2018).

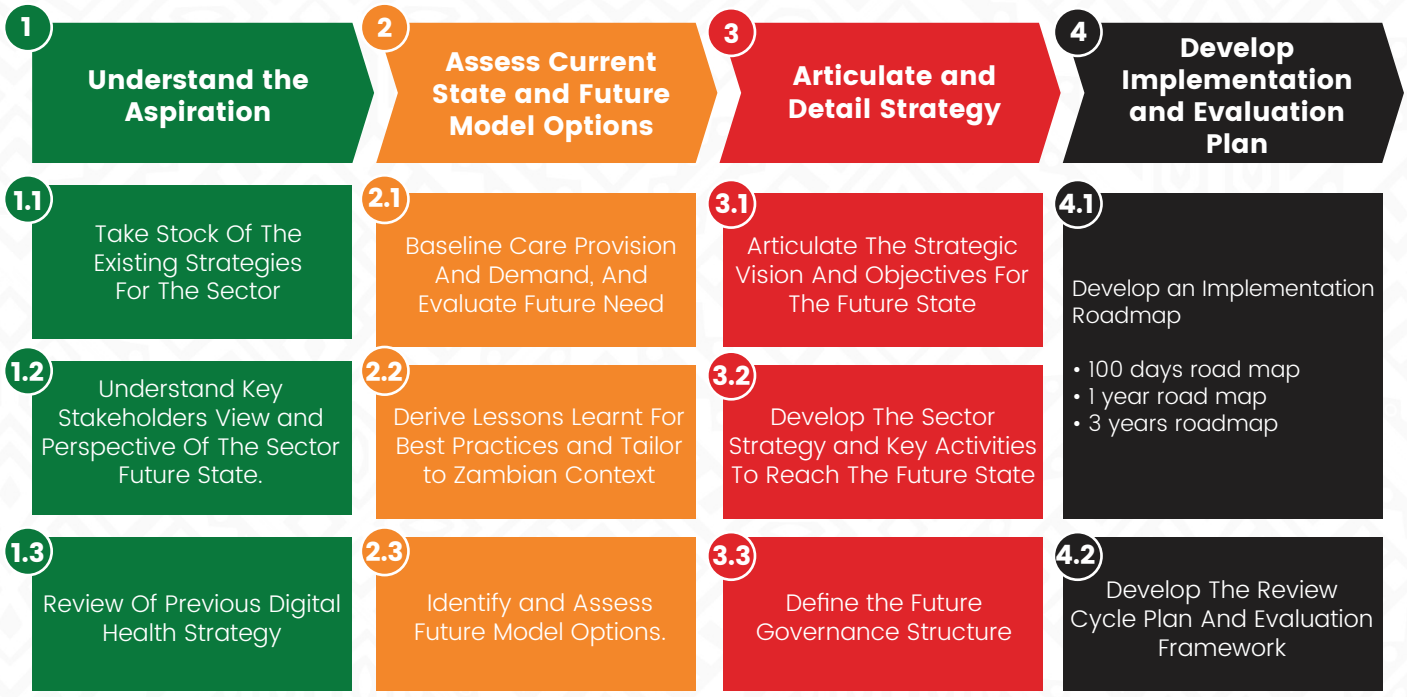
Zambia's population has continued to steadily increase from 4.1 million in 1969 to 18.4 million in 2021 at an annual population growth rate of 2.8 percent (CSO, 2012). The estimated total fertility rate was 4.7 births per woman in 2018, declining from 7.2 births per woman in 1980.
According to the Living Conditions Monitoring Survey of 2015, most of the Zambian population is affected by poverty. In 2010, Over half (61%) of the population lived below the poverty line (CSO, 2012). Poverty is more prevalent in rural areas, where 76.6 % of the rural population is classified as living below the poverty line compared with 23.4% in urban areas. In the Zambian context, poverty is defined as a "lack of access to income, employment opportunities, and entitlements, including freely determined consumption of goods and services, shelter, and other basic needs (CSO, 2014).

The Zambian economic growth has averaged over 6 percent annually since 2000, with considerable stability and inflation rates below 10 percent for much of the period in question. However, for the first accidents. And although there has been some progress in most of the critical areas of health service delivery and health support systems over the medium term, the health status of most, especially women and children, remains a challenge.

The maternal mortality ratio fell from 398 to 278 deaths per 100,000 live births between 2013/14 and 2018, but this reduction is insufficient compared to the SDG target of 70/100,000 by 2030. There had been progress in reducing under-five mortality, from 75 to 41 deaths per 1,000 live births between 2013/14 and 2018. And although stunting in under-five children has decreased from 40 percent in 2013/14 to 35 percent in 2018, this is very far from the SDG target of 2.2 percent. Zambia has reduced malaria morbidity and mortality in the past years. However, after 2018, the country started to experience increased mortality and morbidity. Malaria cases increased by 45 percent from 2018 to 2020. (i.e., 5,262,571 cases to 7,649,679 cases). Zambia attained epidemic control of HIV & AIDS of the 90.90.90 UNAIDS fast track targets in 2020 towards the commitment to end AIDS by 2030. However, there is a need to heighten the interventions to attain the 95.95.95 targets without leaving children, adolescent girls and young women, among other vulnerable groups, behind. As of the 3rd quarter of 2021, the national level cross-sectional HIV/AIDS cascade stood at 94.6%. 95.0%. and 94.2% (HMIS)

2.2. Strategy Development Approach

The development of the Digital Health Strategy followed a comprehensive four-stage process, built on wide engagement of relevant stakeholders to bring about the co-creation of the aspirational, yet pragmatic solutions contained in this strategy.



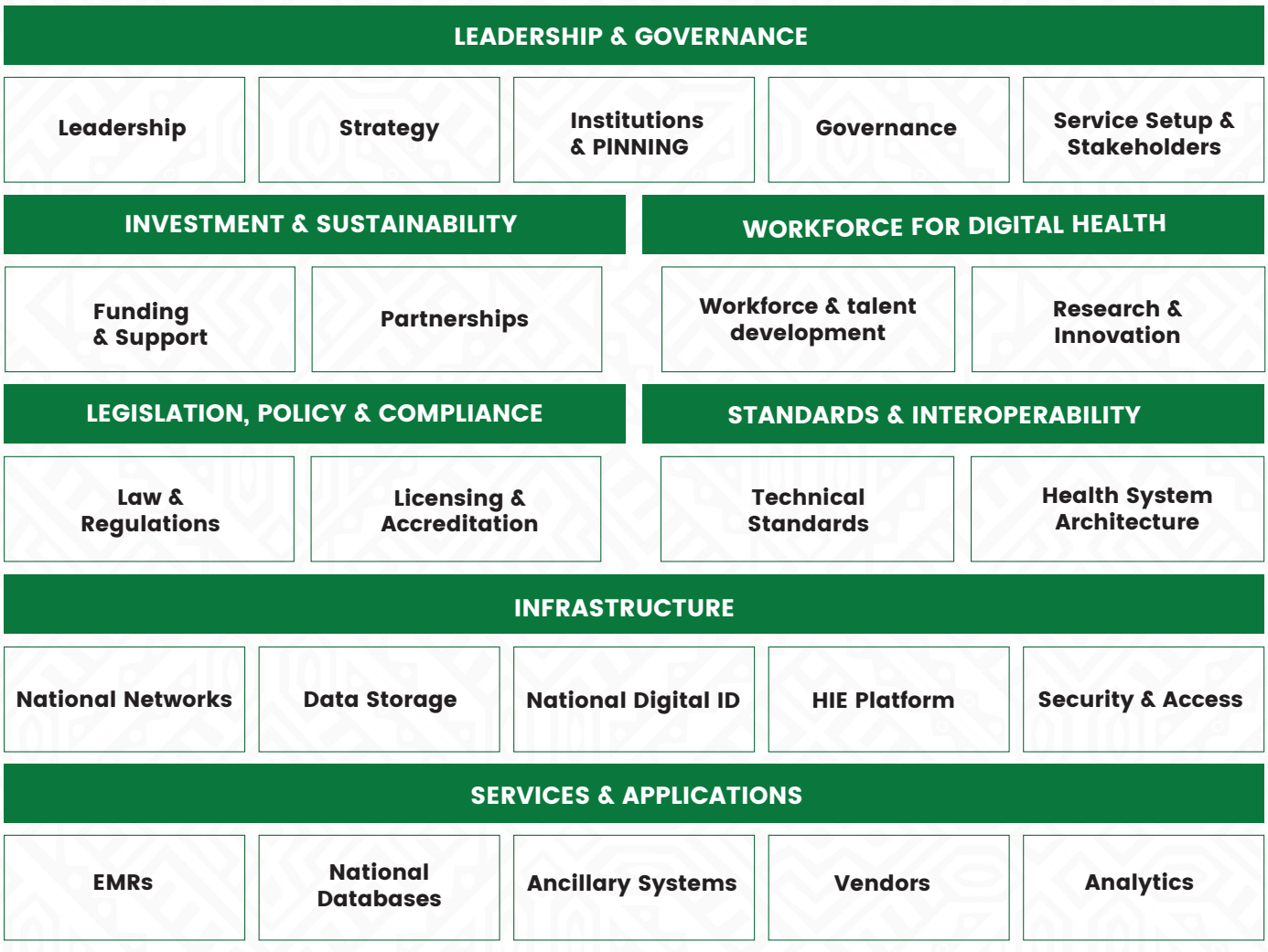
Stage 1 - Understand the Aspiration:
The strategy development process commenced with a comprehensive review of pre-existing strategies related to Zambia's digital health sector, as well as understanding the vision of the Government and aspirations of key stakeholders regarding the future state of Zambia's digital health sector. The former, which involved analysing the existing state of play, provided key insights to inform sector-specific mechanisms and methodologies informing strategic planning. A review of reports, policies, and strategies was undertaken to support this analysis. This included but was not limited to: Zambian MOH eHealth Strategy 2017-2021, National Health Facility Census Analytical Report - 2019, Proposed Approach for Interoperable Architectural Framework for Health, Zambia Data Protection Act 2021, The Digital Economy for Africa (DE4A) – Country Diagnostics Status Reports, and the Zambia National Health Strategic Plan 2017-2021.

Stage 2 - "Assessing Current State and Future Model Options":
Having understood the strategic state-of-play and sectoral aspirations of stakeholders, the next stage of developing the strategy focused on developing a baseline of care provision (i.e., digital health capabilities and capacities) to derive lessons based on previous and current experiences with digital health, including areas of challenge and potential. Insight into how a range of countries (South Africa, Kenya, Australia, Canada, India, UK and Singapore), were benchmarked on how they have implemented their digital health strategies against identified challenges and aspirations for Zambia. This will provide relevant operational insights needed to appropriately identify and assess options of the future model of Zambia's digital health system.

Stage 3 - "Articulate and Detail Strategy":
Based on the current state and options for a future model of digital health in Zambia, the strategic vision and objectives for the future state were outlined. Adopting an iterative approach with continual re-evaluation and re-adjustment, key areas of intervention were identified, and specific activities were proposed. Seeking to provide the foundation and pathway for attaining the future state objectives, the proposed areas of intervention were validated by actors across the health sector in Zambia and informed by experts. Central to this stage was the clear articulation of a governance process to guide such decision making, and eventually inform implementation.

Stage 4 - "Develop Implementation and Evaluation Plan":
Building on the outcomes of the previous stages, an implementation and evaluation plan was developed. Central to the implementation plan is a clear roadmap for three distinct but critical milestones: at the 100 days mark, 1-year mark, and 3 years mark. The implementation roadmap is intended to provide clarity on direction and prioritisation, as well as cementing sectoral alignment across stakeholders in order to attain their buy-in. In parallel to the roadmap, a review cycle plan and evaluation framework will facilitate the systematic monitoring and evaluation of the strategy against agreed targets and milestones.

Broadly aligned to the World Health Organization's digital health framework, the development of the 2022-2026 strategy has been substantially informed by a comprehensive series of engagements with stakeholders across the digital health ecosystem in Zambia. This engagement included officials from the Ministry of Health, implementing partners, as well as Smart Zambia and other Ministries Departments and Agencies (MDAs). The situational analysis which follows, informed by these consultations, provided the basis for a comprehensive assessment of where the sector is as of 2021 and defining the strategy's key initiatives, against the framework (depicted below).

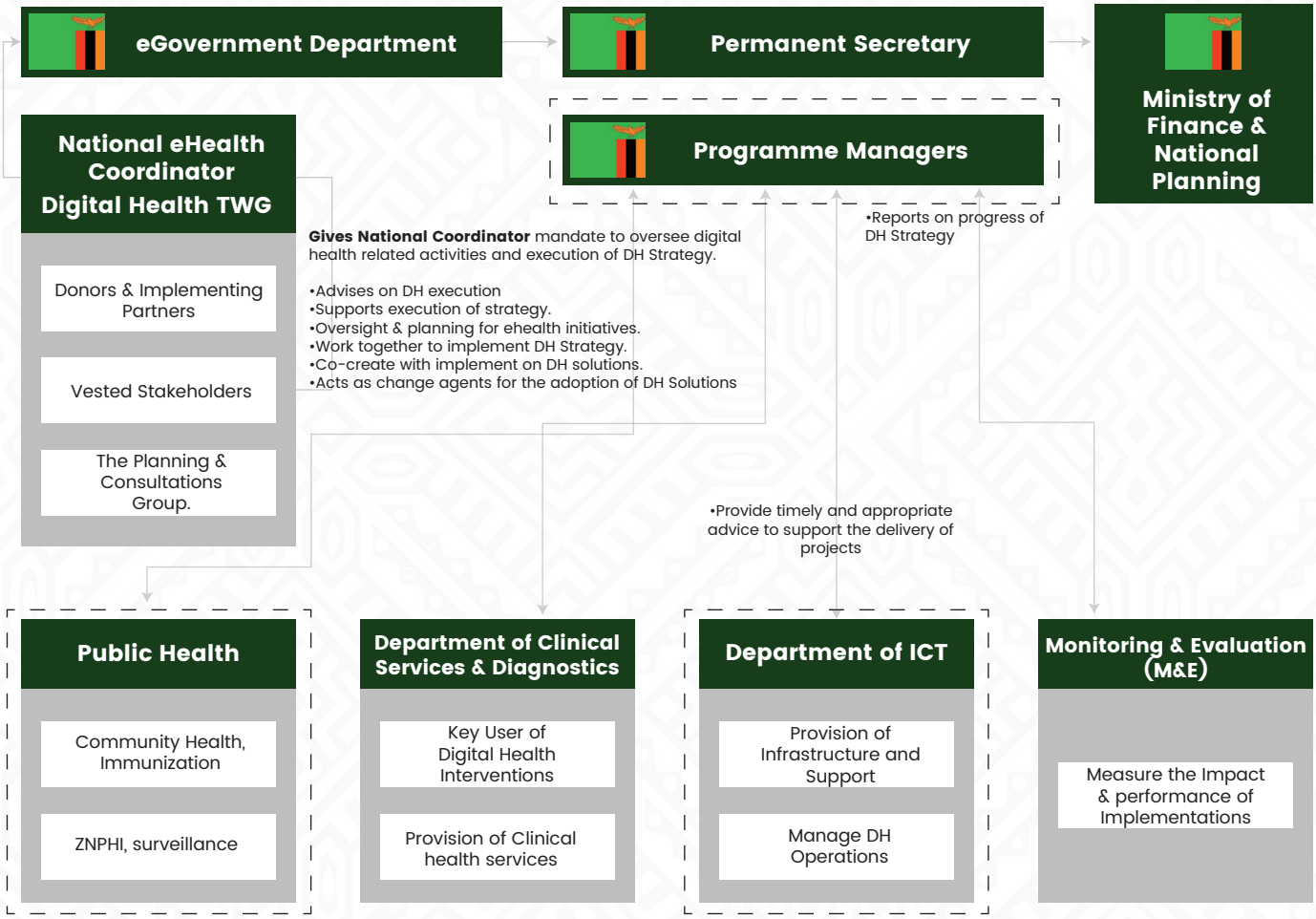


3. Situation Analysis

3.1. Leadership and Governance

Digital health in Zambia is managed under a single-tier governance structure under the Digital Health Technical Working Group (TWG), whose objective is to provide technical oversight, guidance, coordination, and monitoring of digital health system implementation in Zambia.
The Digital Health TWG works under the direction of the Ministry of Health (MoH) to ensure that MoH Information, Communication, and Technologies (ICT) are developed and maintained to be secure, deliver value and are effective in their contribution to achieving the goals of the National Digital Health Strategy and overall goals of the Ministry.

Governance setup of eHealth In Zambia



The Digital-Health TWG provides a forum for discussion, decision-making, and consensus on national e-health issues. Providing oversight and direction for Digital Health Systems, the TWG is responsible for:

i. Ensuring effective governance of digital health programs supporting MoH clinical and other operations.
ii. Guiding the application of best practices in the development, procurement and operation of all e-Health Systems deployed within the health sector, under MoH oversight.
iii. Reviewing, from a scientific and technical perspective, the digital health activities of MoH and partners in the context of service delivery, data use and reporting.
iv. Recommending evaluation frameworks and mechanisms for e-Health and contributing to an independent evaluation of Digital Health Systems and their impact in-country.
v. Promoting interoperability and standards in Digital Health Systems.
vi. Assisting in the identification of innovations and opportunities in the digital health field and ensuring that MoH takes full advantage of innovation and developments in information technology for the improvement of service delivery and service quality.
vii. Reviewing and making recommendations on priorities, new areas of work and partnership building in support of digital health programs.

3.2. Investment and Sustainability

Digital health initiatives in Zambia are supported by cooperating partners through program implementation for healthcare interventions. The public service budget currently does not contain sufficient budget to support health care systems development and maintenance and subsequent growth roadmaps.

The MoH has been consistent in developing digital health strategies with this document being its 3rd edition. Whilst the last National eHealth strategy (2016-2021) was launched and made publicly available it was not comprehensively costed. Implementation plans were also not articulated in detail at the outset, rendering it difficult to review and monitor, as well as impacting the ability to obtain cooperating partner funding for all initiatives.

Linked to the above, stakeholders consistently raised improved sustainability as a key element to be embedded in the strategy, allowing for successful and continued implementation of initiatives, even after cooperating partner funding has ceased.

Where sustainability plans have previously been embedded into interventions (such as the development and utilisation of open-source systems, as well as provision of training to public service staff in their use, maintenance, and development) the required follow-on actions (such as amending job descriptions to recognise additional or changed responsibilities) have often not been taken. As such interventions have been susceptible to reversion to the prior state after activities have concluded.

3.3. Workforce and Talent Development

Zambia has several academic and professional institutions that train and graduate ICT professionals. However, the development of health informatics as a speciality is nascent. Donors and implementing partners offer capacity-building opportunities for in-service and pre-service professionals, though these are often of narrow scope, focused on systems being implemented and not necessarily broader informatics concepts. In some instances, these initiatives have also been aligned to specific programs and not necessarily in line with the Ministry of Health's vision for the healthcare workforce. As such, there is a need to develop a strategy for digital healthcare skills development to enable better adoption, usage and consumption of digital health technology and its artefacts.
There is no assessment that has been done however, general observations on digital health capabilities and capacities across the health workforce show the following:
i. Digital health curriculum is implemented as part of in-service (continuing education) training for fewer health professionals in the workforce.
ii. There is no training in health informatics in the country.
iii. There is no workforce strategy, policy, or guide for digital health. The distribution of digital health workforce is ad hoc and is not based on the needs of facilities with health information systems requiring appropriately trained staff

iv. Currently there is no true assessment of the key number of staff required to manage, operate, and grow Informatics systems. For example, how many data scientists, Informaticians, Clinical Decision Support Systems (CDSS) content staff.
Stakeholders stressed the need for more Information Technology (IT) professionals at health facilities to support the regular operational & maintenance functions. Most health staff and users, especially in rural areas, do not have adequate digital skills.

These challenges are further compounded by the inability of many professionals across the health sector to find sufficient time to up-skill themselves on digital health. With a current doctor to patient ratio in Zambia of 1:12000 (against the WHO recommended 1:5000) many doctors and nurses believe that meeting ICT requirements is a burden that takes them away from their primary tasks. Current siloed systems can also require an individual health worker to enter similar information across several health information systems, including some that are still paper-based - making further demands on limited time. In some health facilities, health workers are computer-literate, but the available computers are not being effectively utilised to deliver efficiencies for routine technical tasks.

Technical expertise and Information Systems specialists are required to support digital health implementation initiatives and data analysis. The current level of ICT staff with specialist skills is deemed inadequate to support health informatics at envisaged levels.

3.4. Legislation, Policy and Compliance

Digital Health in Zambia is regulated by a comprehensive package of legislation and directed by a suite of policies and guidelines.

3.4.1. Legislation

Table 1 below shows a list of legal provisions with implications on the digital health ecosystem

Key Acts of Parliament	
eGovernment Act of 2021. An Act to provide the management and promotion of electronic Government services and processes; establish the Electronic Government Division in the office of the president and provide for it's powers and functions; facilitate access to electronic government services to improve service delivery, administrative functions and productivity in order to enhance citizens access to government services and information, and provide matters connected with, or incidental, to the foregoing.	**The Cyber Security and Cyber Crimes – Act No.2 of 2021** An Act to provide for cyber security in the Republic; provide for the constitution of the Zambia Computer Incidence Response Team and provide for its functions; provide for the constitution of the National Cyber Security Advisory and Coordinating council and provide for its functions; provide for the continuation of the Central Monitoring and Co-ordination Centre; provide for the protection of persons against cyber-crime; provide for child online protection; facilitate identification, declaration and protection of critical information infrastructure; provide for the collection of and preservation of evidence of computer and Network related crime; provide for the admission; in critical matters, of electronic evidence; provide for the registration of cyber security service providers; and provide for matters connected with, or incidental to, the foregoing.
The Data Protection – Act No. 3 of 2021. An Act to provide an effective system for the use and protection of personal data, regulate the collection, use, transmission, storage and otherwise processing of personal data; establish the office of the Data Protection Commissioner and provide for its functions; the registration of data controllers and licensing of data auditors; provide for the duties of data controllers and data processors; provide for the rights of data subjects; and provide for matters connected with, or incidental to, the foregoing.	**Electronic Communications and Transactions Act of 2021** An Act to provide a safe and effective environment for electronic transactions, promote secure electronic signatures; facilitate electronic filing of documents by public authorities; provide for the use, security, facilitation and regulation of electronic communications and transactions; promote legal certainty and confidence, and encourage investment and innovation in relation to electronic transactions; regulate the National Public Key Infrastructure; repeal and replace the Electronic Communications and transactions Act, 2009, and provide for matters connected with, or incidental, to the foregoing.

Whilst substantial legislative provisions are in place to govern Digital Health and ensure compliance, many of these provisions have only recently been enacted. As such, their impact, and the application of some of their recommendations have yet to comprehensively materialise. Some provisions, such as the office of Data Commissioner as enshrined in the Data Protection Act, under which oversight of the data governance for the health sector would be mandated, has not yet been established.

3.4.2. Policy, Standards and Guidelines

Beyond the legal framework, the digital health sector is predominantly guided by the National Health Policy 2013, Zambia National Health Strategic Plan 2017-2021, and the Smart Zambia Electronic Government Master Plan 2018-2030. Together these policies and legal frameworks consider several elements intrinsic to the day-to-day functioning of a digital health ecosystem, including obligations to keep records, patient confidentiality, access to and protection of health records. However, the legal and policy environment has not adequately provided guidance on data privacy and governance, medical confidentiality and cyber security, interoperability, data hosting, registration requirements for regulated activities and liability for organisations, users, and consumers of health information systems data.

Data Privacy	The current data privacy laws do not have adequate provisions to support the need for a fully functional digital health ecosystem. Data protection and privacy matters in Zambia currently fall under the scope of the Electronic Communications and Transactions Act, No.21 of 2009 (ECTA). Revised Data Protection Act of 2021.
Medical confidentiality & Cyber-Security	Public service Information security standard, is available but not adequate to cater for health sector needs.
Interoperability	– An interoperability framework & guidelines has been developed but are currently under review for adoption.
Data Hosting	Currently no data hosting guideline exists, although all data is expected to be hosted in the country on servers located in the country.
Registration requirements for regulated activities	There are currently no standard regulation guidelines for Health IT systems in place.
Liability	organizations in Zambia using electronic health data were not compelled to be compliant with any existing policy or legal provision in the discharge of their duties. There is insufficient legislation that governs liability of users and consumers of the system

3.5. Interoperability and Standards

The ability of different healthcare providers to use shared information with commonly understood meaning is a pre-condition for case-based surveillance, continuity of care, efficiency, data analytics, and positive patient experiences. Exchanging high-quality data between multiple health systems, trusting that the meaning will be interpreted the same way, requires "interoperability".

Given the importance of interoperability to digital health delivery, a draft Interoperability framework is in the process of being developed. Once finalised, efforts will be required to support the implementation of the framework, and adherence by all relevant parties.

To facilitate interoperability, stakeholders emphasised the requirement for a unified and consistent approach to clinical and data standards. The WHO backs several international standards to increase health systems' efficiency, quality, safety, and scalability. Some of the supported standards include Health Level 7/ Standard Fast Healthcare Interoperability Resources (HL7/FHIR); Integrating the Healthcare Enterprise (IHE); Clinical Data Interchange Standards (CDISC); Systematized Nomenclature of Medicine – Clinical Terms (SNOMED CT); and International Classification of Diseases (ICD). Allowing growth in non-standardisation becomes a limiting factor for digital health systems, impacting almost all aspects of the system, from health terminology and nomenclature to standardisation of drugs lists. Whilst the Zambia Bureau of Standards currently oversees the standards architecture in Zambia, there is no established model that governs interaction with leading public bodies in the digital health space, risking a disjointed approach.

3.6. Infrastructure

Infrastructure refers to physical technology (data centres & cloud infrastructure, national networks, such platforms (e.g., digital ID systems, health information exchange) and digital services (e.g., security & access), hardware (incl. computers, mobile devices and wearable gadgets) that support the digitalisation of the health sector in Zambia. Today Zambia has taken the policy intervention in

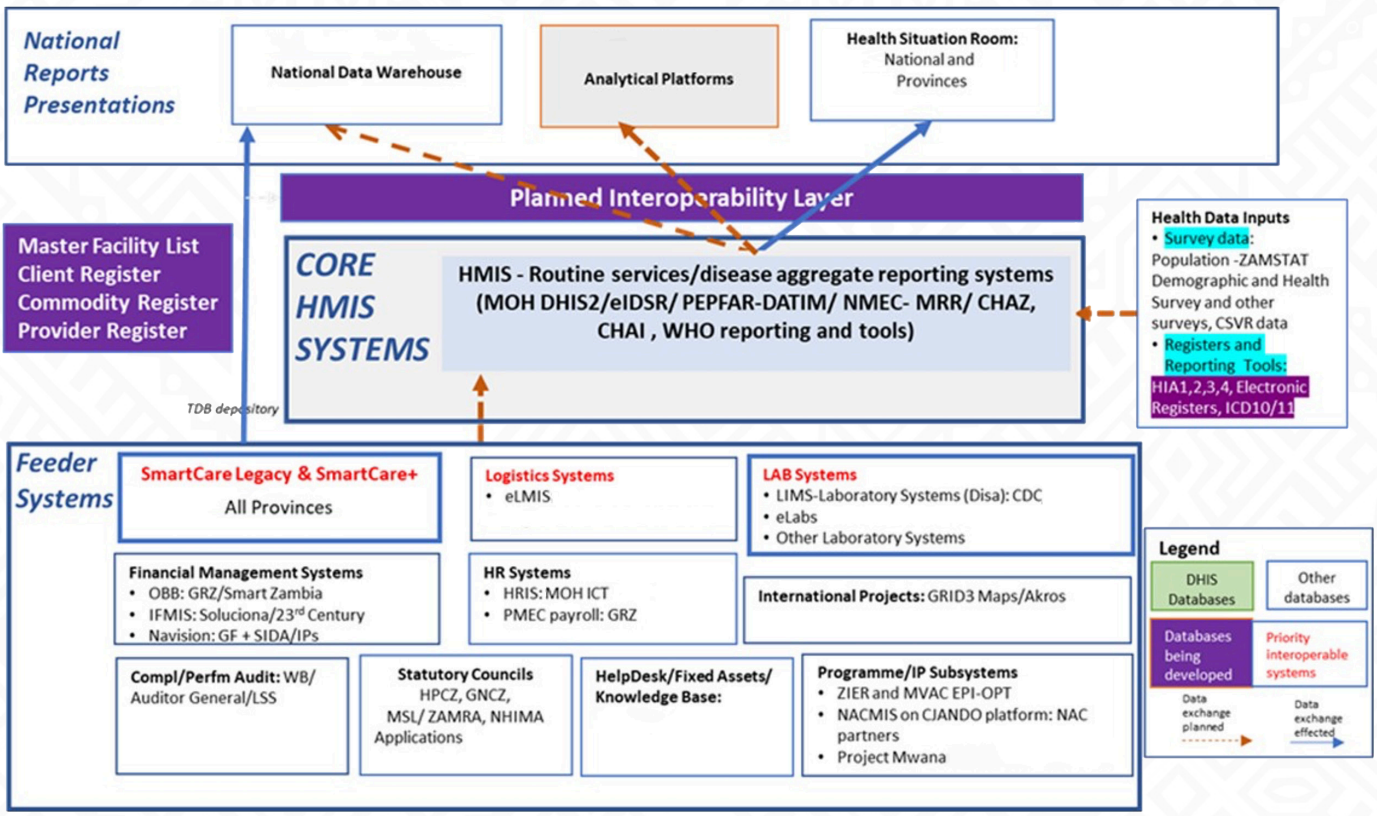
partially zero-rating ICT infrastructure to reduce the cost of purchasing infrastructure as the key to catalysing the adoption of technology across various sectors; this is useful for the successful implementation of digital health in Zambia. The government has also invested in building a national fibre optic network. The government network has reached significant regions in the country and currently provides connectivity to the government's administrative headquarters. This infrastructure will provide connectivity to some of the healthcare facilities across the country under the government-wide area network initiative, and as of August 2022, 17 hospitals were connected to the government area network.

The investment by mobile network operators provide an alternative for connecting hospitals. Zambia has an extensive 2G coverage, with 93% of the population under coverage; the country, however, has gaps in 3G (53% of the population under coverage) and 4G (43% of the population under coverage), which presents a challenge to providing broadband capacity to cover health facilities that service over half the population. Satellite communication infrastructure is an available alternative for remote service provision and presents an opportunity. Together these provide the network infrastructure needed to facilitate digital health. Power access remains a challenge to be overcome to enable the digital health agenda. According to the national health facilities census (MoH, 2019), 37% of the health facilities are connected to the national grid, with about 47% supported by solar energy infrastructure, 9% rely on generators to provide power, and 7% have no access to power. Though many hospitals have some form of power, there's a need to assess the reliability and capacity further to provide for the incremental load required to support digitalisation.

3.7. Services and Applications

Digital health applications and services involve the collection, processing, storage, and exchange of health information in an electronic environment. Widespread use of digital health applications and services within the MoH will improve the quality of health care, prevent medical errors, reduce health care costs, increase administrative efficiencies, decrease paperwork, and expand access to affordable health care to all Zambians. Digital health applications have the potential to drive universal health access starting from facilitating provision of health services in the community and provision of health services remotely to making health data readily available to decisions makers hence empowering them to appropriately plan for and deliver health services. Zambia has implemented digital health applications ranging from community-based applications to national data analytics applications.

The diagram below documents the existing systems in use within the MoH.



The functionality of the most prominent digital health initiatives, is depicted in figure 7

	System	Description
DHIS2 Systems in Use	Integrated National HMIS Instance (iNHMIS)	*Collect aggregate service delivery data. Supports MoH HIA reporting. Has dashboards to support data use. Uses DHIS2 platform*
	NMEP-Malaria	*Collect aggregate Malaria service delivery data. Uses DHIS2 platform*
	DATM	*Collect aggregate HIV/AIDS service delivery data for PEPFAR programs. Uses DHIS2 platform*
	ZNPHI	*National surveillance system to generate timely, high-quality data about all nationally notifiable and priority diseases*
Clinical Support Systems	SmartCare	*Supports patient care, OPD and limited IPD processes, produces HIA reports and PEPFAR reports. Integrates the Electronic Health Record system to provide continuity of care*
	OpenMRS	*Direct collection, secure storage and aggregate reporting information emanating out of Cervical Cancer screening*
	eLMIS	*Electronic Supply Chain Management System. It uses the uses the openLMIS framework to manage the supply chain for laboratory and essential medicines*
	DISA	*Laboratory Information management system. Used to aggregate laboratory data in a central repository.APHL.org is responsible for maintenance and changes. The LIS is DISA Lab system developed by Laboratory System Technologies. Also has reporting functionality*
Administrative Systems	SAP	*The Integrated Financial Management System is GRZ legacy system used to monitor how ministries, departments, and other state agencies spend funds on a real time basis to improve budget implementation. The system is complimentary to the more newly introduced NaVision*
	NaVision	*Assists with finance, analytics, and electronic commerce at District and Provincial administrative levels*
	Logistimo	*Supports logistics and inventory management for vaccines. Allows reporting for logistics.*
	IHRIS	*Supports MoH in designing a comprehensive HR strategy and managing its workforce effectively and efficiently*
National Data Warehouses	Zenysis	*Web-based analytics platform. Used to create pipelines between databases for dashboard analytics. The enterprise platform – Data Quality Lab (DQL) is also used for data extraction*
	National Data Warehouse	*Hosts big data for analytics and dashboards. Built using a MS platform. Integrates multiple systems for data analytics.*
	Palantir Foundry	*Used to integrate structured and unstructured data to provide search and discovery capabilities for knowledge management and collaboration. Proprietary software*

The global trend today is seeing Electronic Health Records (EHRs) integrated with existing health information infrastructures sometimes at national scale, using API's and health information exchanges. Although EHRs have largely been conceived and developed as organisation-centric information systems, new ways of integration are emerging that increasingly challenge this model (e.g., patient-centric, and platform-oriented architectures). The WHO advocates a platform-based approach for health systems to promote integration, underlying national infrastructure that brings different parts of health and social care information together in one place. Overall, in high-income nations, there is now a move towards large-scale EHR interoperability and a focus on creating learning health systems through data integration and advanced analytics. Implementation of EHRs as part of national health information infrastructures is often part of this. Such efforts are, however, hampered by social and organizational barriers to information sharing across settings and a lack of interoperability of existing systems.

In conformity to guidance provided in the eGovernment Masterplan 2030, a recent assessment of 15 information systems, found that seven adhere to open-source software principles, and seven have an API that can be utilised to support data exchange. There are, however, multiplicity of systems (two logistics management information systems and two financial information systems and multiple DHIS2 instances) that require further scrutiny to understand how integration can be fostered among the systems.

Information Systems Assessed to Date

- **DHIS2 systems:** (4) – used for the NHMIS, Malaria Elimination Program, DATIM, and a surveillance system utilised by Zambian Public Health Institute (ZNPHI).
- **Other clinical support systems**: (4) – SmartCare and Cervical Cancer Screening (OpenMRS), the eLMIS and DISA.
- **Administrative systems:** (4) – 2 Financial systems (IFMIS - SAP and Navision); 2 Logistics systems (Logistimo and eLMIS); and the iHRIS.
- **National Data Warehouses:** (3) – Zenysis, Palantir - Foundry, and the National Data Warehouse.

Source: MoH, 2020

To leverage the full potential of digital health applications and services, the ministry will provide enhanced leadership and co-ordination to ensure that applications meet a standard set of requirements before being deployed.

4. SWOT Analysis

Strengths, Weaknesses, Opportunities and Threats

Strengths
• Strong engagement and partnerships with both development partners through the technical working group. (TWG)
• Ministry of Health leadership supports digital health at the most senior level.
•Conceptual health system architecture designed already, though not yet implemented.
• The directorate of e-government (Smart Zambia) recognizes digital health as a priority area and is invested in alignment between digital health and the overall government digital transformation agenda.
• Existence of an electronic health information system to collect individual patient data, deployed in a number of facilities as well as investments in supporting systems.
• Existence of a national health information system for aggregated data collection; District Health Information System (DHIS2).

Weaknesses
• Existence of multiple and fragmented digital health solutions.
• Limited integration and interoperability between digital health solutions.
• There are inadequate training programs in the areas of digital health within Zambia, and the current workforce does not have the formal capabilities to meet the current and future demand.
• Insufficient public –private partnership for strengthening ICT's in the health sector.
• Shortage of qualified staff in the field of health informatics in the healthcare system.
• Inadequate continuing training for Health personnel in ICT, for in-service staff.
• Inadequate allocation of resources for research and innovation in digital health.
• Inadequate capacity of electricity and network connectivity in some remote health facilities aggregated data collection; District Health Information System (DHIS2).

Opportunities
• Existing government and private initiatives to improve energy access including renewable energy such as solar energy and affordable internet access.
• Leverage and invest in last mile to take advantage of Zambia's national fibre networks.
• Interest from Academia to continue investing in expanding health informatics courses.
• The emerging online education platforms that provide alternatives for rapid skills build-up.
• Investment taken by the government in developing INRIS the National Digital ID infrastructure.
• Adoption of laws on electronic communications, data privacy, cybersecurity and cybercrime lay a foundation for digital health.

Threats
• Limit to which the government hospitals are covered off the national electricity grid.
• Limited national networks capacity, most rural coverage is 2G and MNO's don't have a strong case to modernize.
• Possible resistance to changes and significant change management effort to ensure uptake of digital health solutions.
• Budget and financial constraints limit the government's ability to invest in digital health.
• Though we have a digital threat response unit, there's limited integration of this capability in the digital health ecosystem.

5. Vision and Guiding Principles

This digital health strategy has been developed alongside the 2022-2026 Health Sector Strategy. It has considered the National Development plan to facilitate the achievement of their respective objectives for SDG 3, which seeks to provide adequate healthcare for all.
The selected strategic initiatives are guided by the WHO framework, the assessment of the current state of digital health in Zambia and insights from the global benchmark analysis conducted that helped to inform the gap areas this strategy will address.

5.1. Vision

"Improved Health Outcomes for all Zambians through a sustainable, secure and innovative digital health ecosystem that is seamless in its operation"

5.2. Guiding Principles

The development of the strategy was based on the following guiding principles:

i. Develop a national strategy for 2022-2026 that is user and client centric;
ii. The strategy will be the collective vision from all stakeholders developed in a collaborative fashion;
iii. The strategy covers all national needs across the different sectors (MoH, other Government entities, private sector, other sectors);
iv. The strategy is national (i.e., it should be applicable to all ministries, providers, and related bodies);
v. The strategic objectives shall align with and complement the overarching vision for all healthcare and digital transformation in the country;
vi. The strategy shall be ambitious and actionable and implementable with a realistic roadmap and timeline and
vii. There will be prioritisation of initiatives for the short and midterm, however all required activities to enable the sector will be addressed.

6. Strategic Objectives and Initiatives

Based on the identified themes, seven key strategic objectives were identified that lay the foundation for the strategy.

6.1. Strategic Objectives

The strategic objectives each have a link to specific challenges identified in the current state analysis, best practices that have been adopted from the global benchmark as well as forward-looking strategies, to address the development of Zambia's digital health system to an envisioned future state.

i. Reform digital Health governance
ii. Improve sustainability of the digital health ecosystem
iii. Develop digital health workforce capacity and capabilities
iv. Strengthen Policy foundations in digital health
v. Enable integration of systems
vi. Scale-up digital health infrastructure
vii. Enhance digital health solutions

6.2. Strategic Initiatives

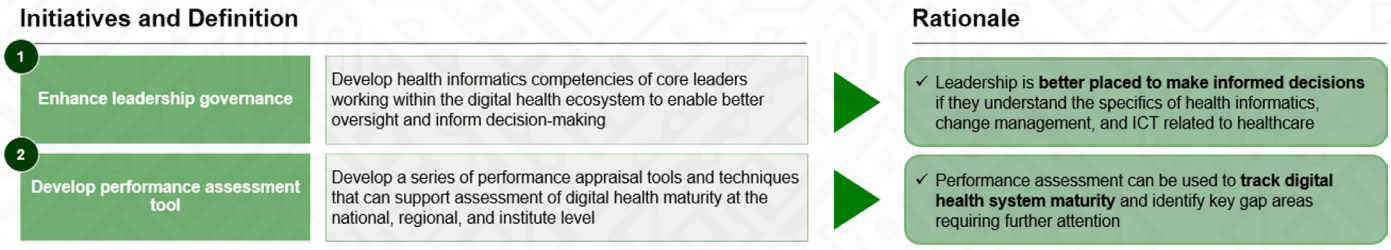
The following are the proposed strategic initiatives to be completed during the life cycle of the strategy.

1	Enhance leadership governance	Leadership & Governance
2	Develop performance assessment tool	
3	Develop financing plan for digital health	Investment & Sustainability
4	Coordinate donor funding	
5	Enhance change management competencies	Workforce
6	Enhance leadership capabilities	
7	Enhance current workforce capabilities	
8	Develop workforce competency framework	
9	Develop certification programs	
10	Develop undergraduate programs	
11	Develop graduate programs	
12	Improve access to online education	
13	Develop partnerships for R&D	
14	Develop national WF plan	
15	Implement standards and change mgmt framework	Policies & Regulations
16	Develop policy roadmap	
17	Address policy gaps	Policies & Regulations
18	Develop security policies	
19	Develop local skills transfer policy	
20	Enhance eHealth standards and accreditation body	Standards & Inter-operability
21	Develop interoperability framework	
22	Develop national health systems architecture	
23	Develop and implement data governance model	
24	Implement national ID for healthcare	
25	Ensure all healthcare facilities have adequate internet connectivity	Infrastructure
26	Ensure consistent power access to all healthcare facilities	
27	Develop healthcare cloud infrastructure	
28	Develop national EHR product roadmap	Services & Applications
29	Develop and implement a sunset program	
30	Enhance reporting and analytics capabilities	
31	Enhance clinical decision support (CDS)	
32	Develop Integrated Systems in healthcare	

6.2.1. Strategic Area 1: Leadership and Governance

Strategic Objective: Reform digital Health governance
In order to ensure Zambia is successful in the development of digital health across the sector, the Ministry of Health is focusing on improving governance and leadership in digital health, expanding the governance structure to include the national steering committee to create the two-tier structure envisioned in the 2017 strategy. The ministry also seeks to provide technical enablement in health informatics for the leaders in the healthcare system.

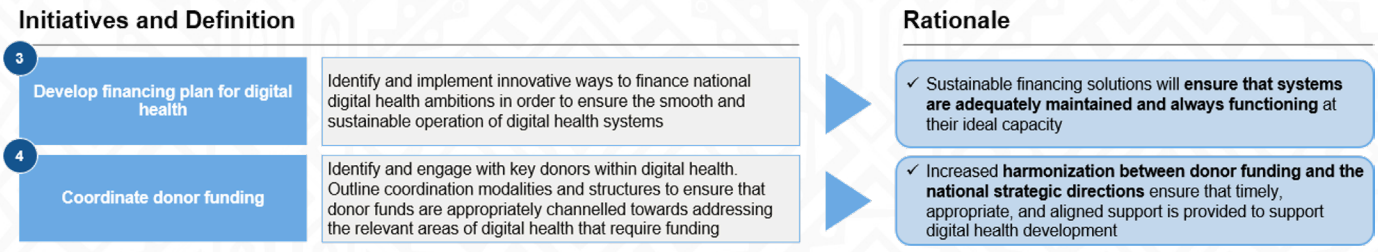
The concept of continuous improvement is implied in the strategy. To operationalise this, the development of a maturity model is proposed to assess the digital health system across the seven dimensions of the process to enable the continuous evaluation of the digital health system in Zambia



6.2.2. Strategic Area 2: Investment and Sustainability

Strategic Objective: Improve sustainability of the digital health ecosystem

One of the essential considerations in ensuring digital health drives transformation across the healthcare system, whether service delivery or insights and research data, is providing adequate digital health investment. The development partners make significant investments in digital health, and the return on these investments can be enhanced with better coordination. Together with the development and implementing partners, the ministry will also develop a financing plan to ensure technologies deployed in Zambia's healthcare system are budgeted for and there's a sustainability plan in place of a maturity model is proposed to assess the digital health system across the seven dimensions of the process to enable the continuous evaluation of the digital health system in Zambia,



6.2.3. Strategic Area 3: Workforce for Digital Health

Strategic Objective: Develop digital health workforce capacity and capabilities

The Ministry recognises that the healthcare workforce is a critical part of the healthcare system and the need for significant investments in the workforce to ensure successful change where the systems, processes, tools, and technology of digital health are embedded in the new way healthcare providers do their work. In order to do this, there is a need to enhance the change management capacity and develop a framework for change. The initiatives range from the investments in leadership and the team's enablement around change management. The need to continually invest in human capital by learning from global best practices is emphasised.

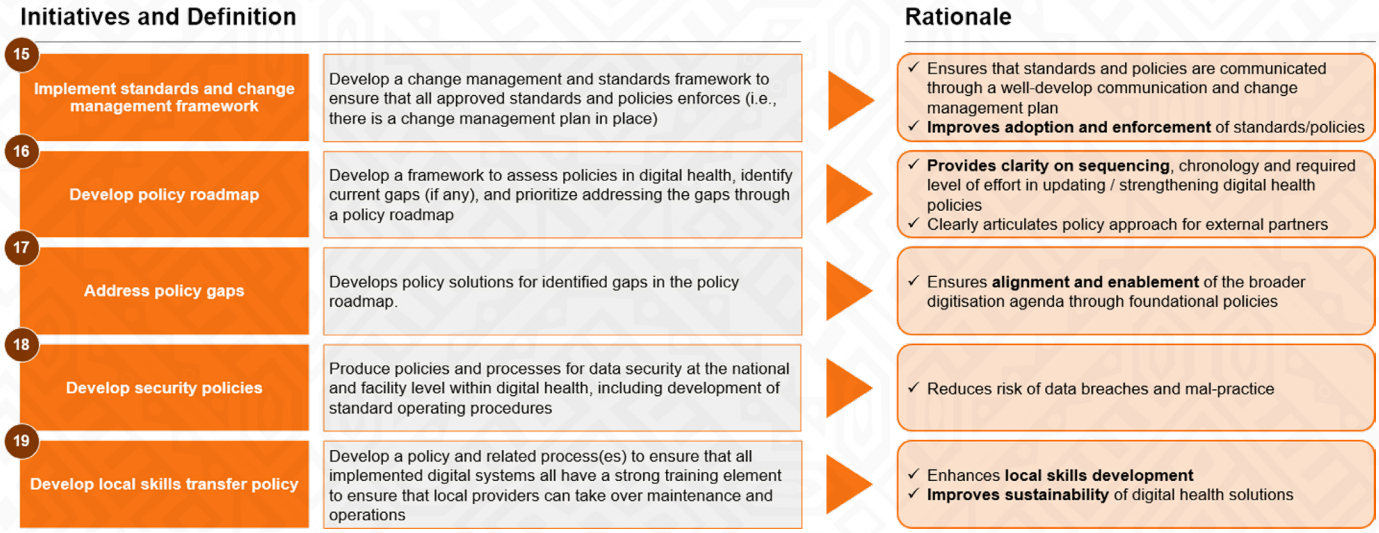
In this strategy, focus is on leveraging global advancements in education to incorporate online learning to complement in-person learning to meet the learning needs of the healthcare workforce in Zambia. In the long term, the ministry and industry stakeholders will partner with educational institutions to develop courses to ensure the pipeline of talent going through the education system have the requisite skills to work effectively in our healthcare system. There will also be provision for in-service and continuous education for the workforce.

Initiatives and Definition		Rationale
5 **Enhance Change Management Competencies**	Develop approach to embed change management skills across sector leadership (initially) and then the broader digital health ecosystem, including communication and strategy skills, and modelling behaviours across hierarchies.	✓ **Improves sustainability of change** and transformation ✓ **Reduces time to embed change**, allowing for faster realization of efficiencies ✓ **Ensure buy-in** from key stakeholders involved
6 **Enhance leadership capabilities**	Identify leadership capability requirements, and build managerial and technical expertise of senior leaders through formal trainings and workshops, skills development programmes, and on the job trainings.	✓ Continual improvement of leadership is intrinsic to the effective and efficient delivery of complex transformation programmes, allowing for **improved oversight, more informed decision making, and better strategic direction**
7 **Enhance current workforce capabilities**	Collaborate with education and training providers to develop continuous training programmes to enable the existing digital health workforce to upskill and reinforce best practices in digital health	✓ Continuous learning can **bolster the digital health workforce**, allowing for adoption of developing best practice ✓ Supports **improved resource utilization** through efficiencies
8 **Develop workforce competency framework**	Establish and review structural measures and KPIs of digital competency of all digital health professionals to better understand their capabilities deliver digital health functions	✓ Enable the **routine measurement and evaluation** ✓ **Aligns workforce capacity and capabilities** regarding strategic objectives and targets
9 **Develop certification programs**	Collaborate with education and training providers to develop certificate schemes that are accessible to healthcare workers and provide essential grounding in digital health skills	✓ Certificate programs can function as re-training or upskilling opportunities and **provide the workforce with in-demand professional skill sets**
10 **Develop undergraduate programs**	Collaborating with academic institutions to create undergraduate offering for students to acquire in-depth, work-relevant knowledge and skillsets needed to enter the digital health industry	✓ Developing a comprehensive digital health sector requires a workforce with a broad set of specific skills and expertise. ✓ Supporting the **development of formalized digital health competencies** is essential
11 **Develop graduate programs**	Work closely with universities to develop graduate level programmes that build on undergraduate foundation	✓ Provides **enhanced level practical and theoretical training** to master intricacies of digital health application and development
12 **Improve access to online education**	Identify gaps and opportunities with regards to accessing online education avenues	✓ Online education can **improve access can lead to an abundance of information and training resources**, supporting upskilling of those already in the workforce and those outside of formal programmes
13 **Develop partnerships for R&D**	Encourage local digital health research and development activities in universities, hospitals, and the private sector to enhance digital health R&D and innovation	✓ Improves understanding of **digital health evaluation and impact** ✓ Identifies **localized and innovative solutions**
14 **Develop national WF plan**	Identifying the supply vs demand of the current and future digital health workforce requirements, identifying skills and resource gaps.	✓ Enables **evidence-based long-term workforce planning** ✓ Supports improved resource allocation. ✓ Allows for prioritization of areas for investment and ensures up-to-date knowledge base

6.2.4. Strategic area 4: Legislation, Policy and Compliance

Strategic Objective: Strengthen Policy foundations in digital health

Technology remains highly dynamic, and with this constant change, there are emerging issues which require flexibility of plans to respond. In the past year, Zambia developed its data privacy law – the Data Protection Act 3 of 2021, the Cyber Security and Cyber-Crimes Act No.2 of 2021, the Electronic Communications and Transaction Act of 2021 and the eGovernment Act of 2021; all laying a foundation for digital health. The international benchmarking revealed that other countries were all working to develop regulations to address emerging issues that could be considered by legislators. In addition, sector-specific security policies ought to be developed to ensure safe data exchange across the healthcare system.



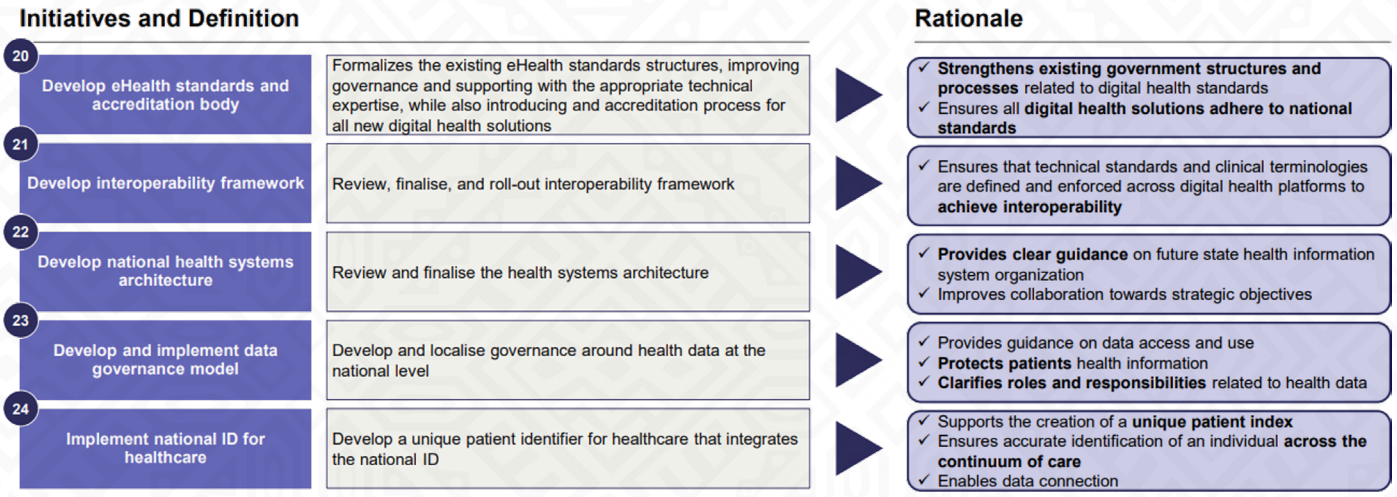
6.2.5. Strategic area 5: Standards and Interoperability

Strategic Objective: Enable integration of systems

To ensure the seamless exchange of data across the healthcare system, the Ministry of Health is developing an interoperability framework. The Zambian National Health Strategic Plan (NHSP) and e-Health Strategy 2017-2021 strongly support the integration of health information systems. The need for an architectural framework that supports interoperability is highlighted by the increasing pressure on national governments to share data between vertical information systems developed to serve a specific purpose (such as logistics, human resources (HR) or clinical patient management). These systems were not designed to port data to other systems in the past. However, over the last five years, the pressure to link patient records across several services has increased dramatically (for example, to support the COVID-19 response or initiatives to improve retention in care for anti-retroviral therapy (ART) services, identifiable patient data need to be shared across the laboratory, clinical and logistical information systems in both the public and private sectors).

In this strategy, the ministry of health takes this further to complete the interoperability framework and health system architecture, develop the working group within the TWG to develop an accreditation process for digital health technology.

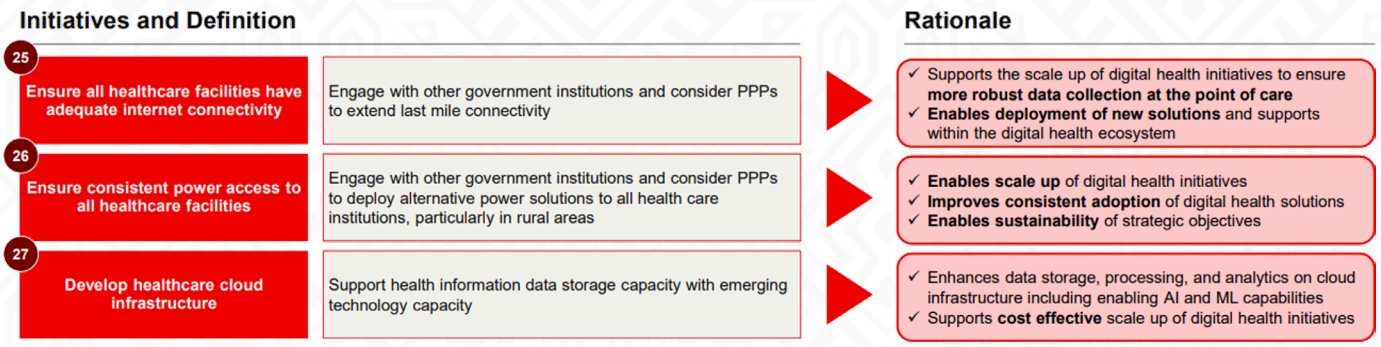
This strategy also focuses on developing a unique patient identifier for healthcare that integrates with the national identity number to ensure all recipients of healthcare services can be identified in laying the foundation for universal health coverage.



6.2.6. Strategic Area 6: Infrastructure

Strategic Objective: Scale-up digital health infrastructure

Infrastructure remains a foundational enabler for digital health, and the focus is on continuous investments to ensure the expansion of digital health services. Consideration was sought to look more closely at the coordination of investments by co-operating partners to ensure that the base infrastructure to support the healthcare systems is built. The insights on the status of the infrastructure are the National Health Facility Census Analytical Report (MoH, 2019), the World bank diagnostic on the digital economy (World Bank, 2019) and stakeholder discussions. In executing these initiatives, a further survey needs to be conducted to address qualitative aspects such as the adequacy and reliability of power and internet to meet the hospital's needs and support the additional digital health solutions deployed at these facilities.



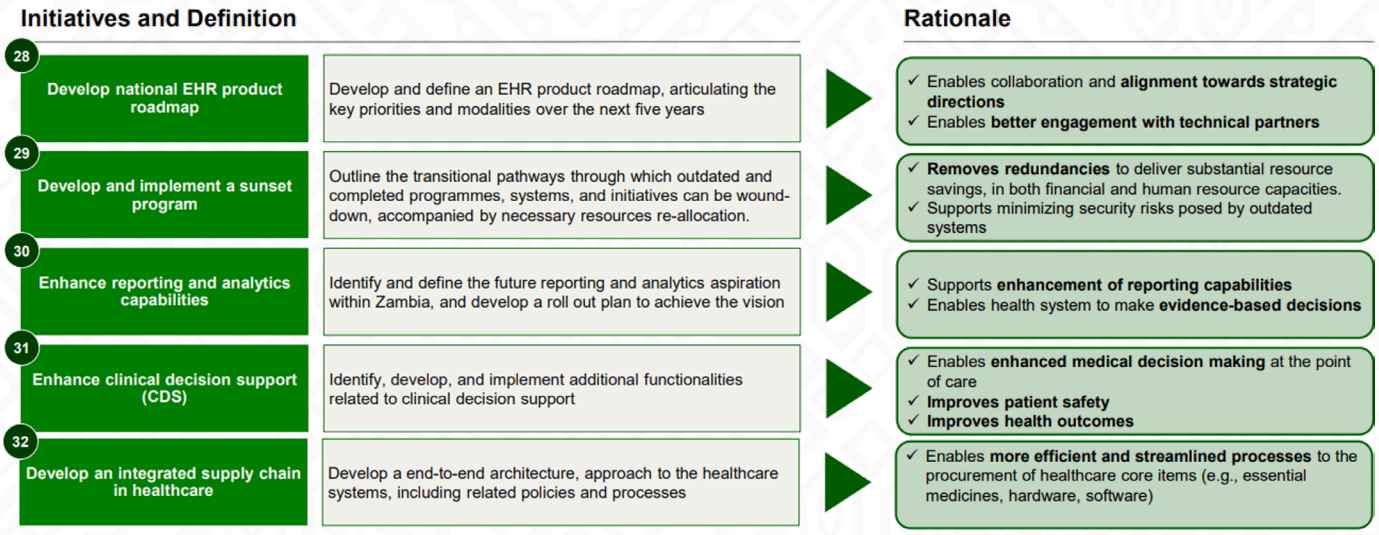
6.2.7. Strategic Area 7: Services and Applications

Strategic Objective: Enhance digital health solutions

Digital technology is revolutionizing healthcare delivery. Worldwide, digital tools are leading to better and faster healthcare – healthcare that is more empowering and accessible for patients, more efficient for providers and more cost-effective for health systems.

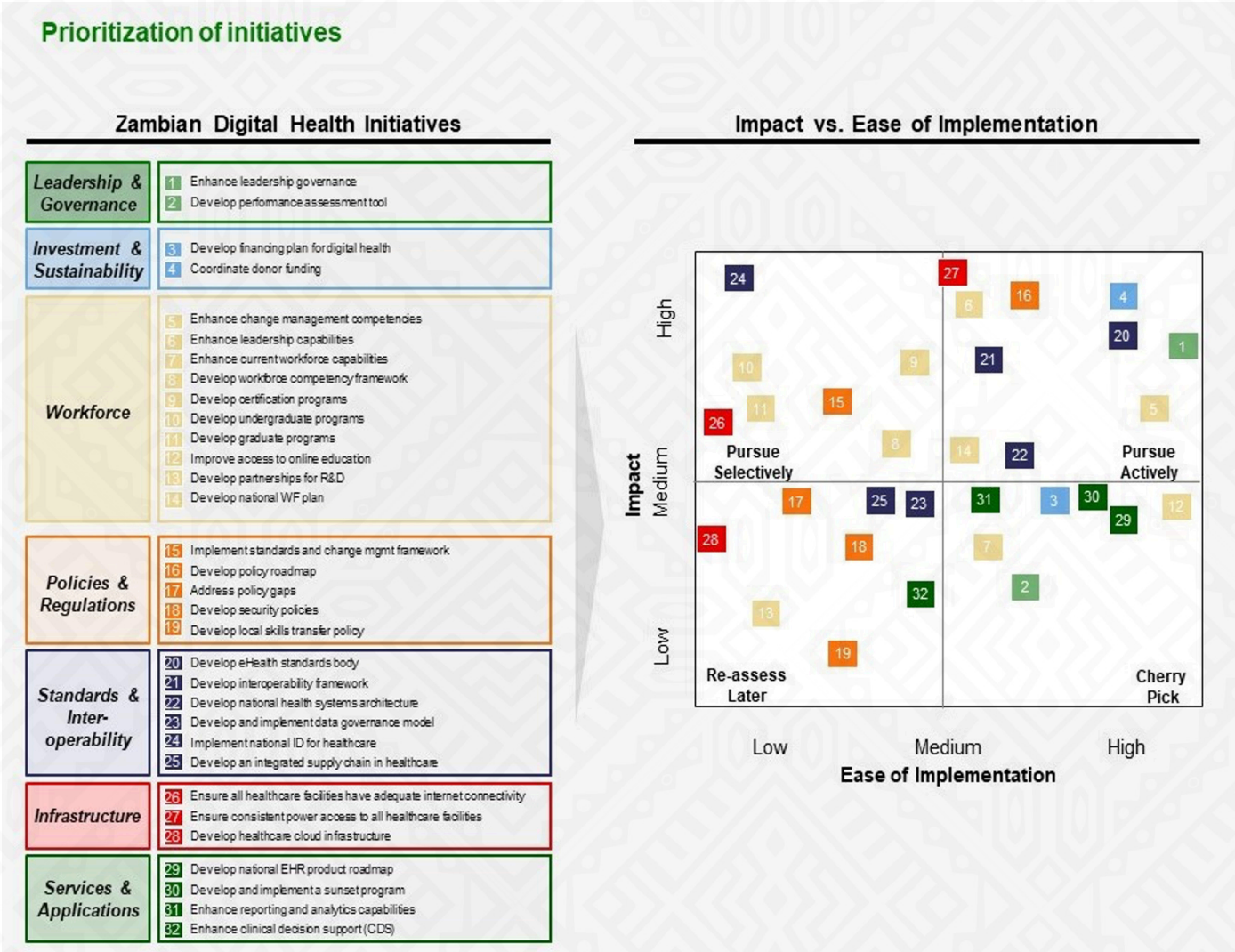
Digital health is probably the most powerful enabler that low- and middle-income communities can use to address and achieve universal health coverage. Ensuring all people can access the health services they need without suffering financial hardship is essential to achieving resilient communities – communities that are prepared for evolving health threats and enjoy greater economic prosperity, thanks to healthier and more productive workforces.

It is hoped that this strategy will provide a clear direction and purpose with sufficient support and alignment to national policies.



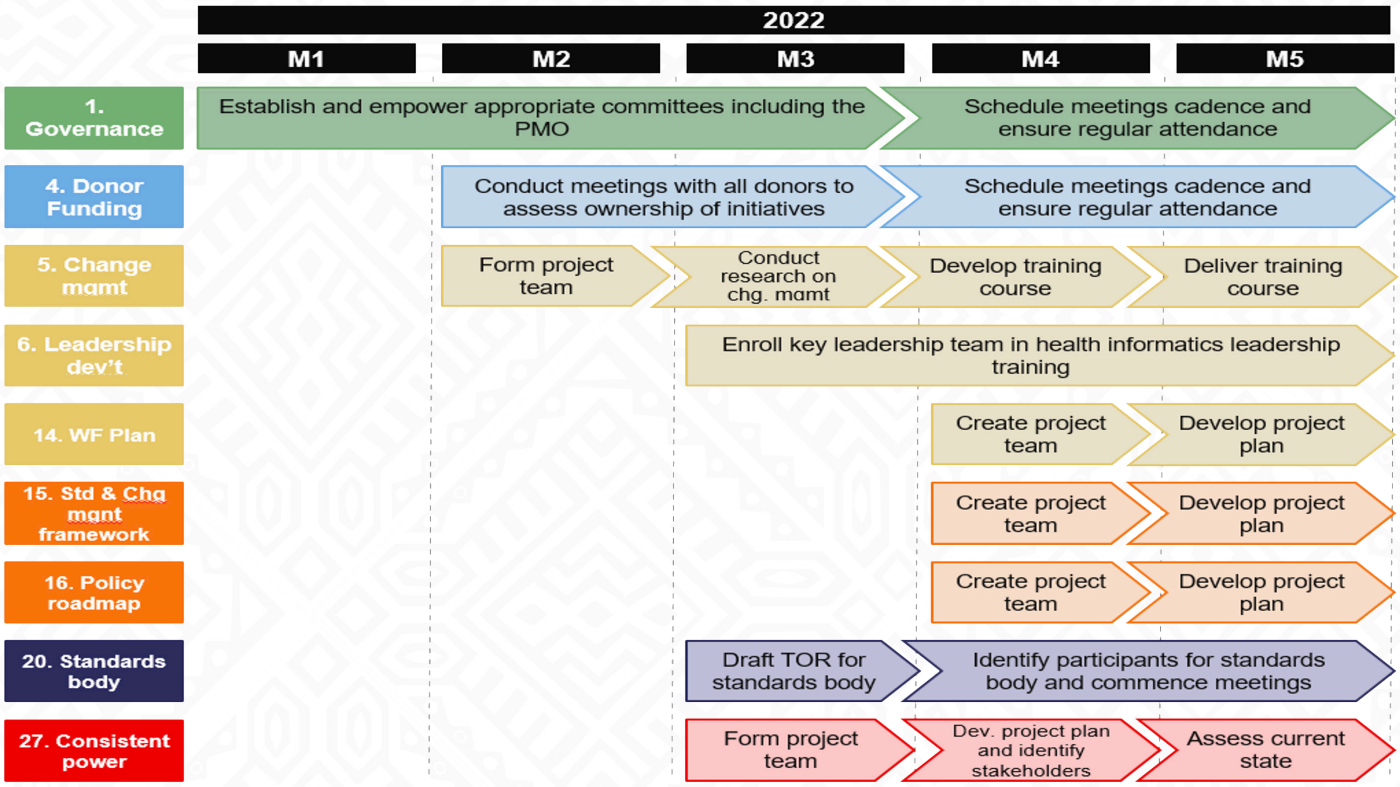
7. Implementation Plan

To prioritise and schedule activities for this strategy, a 2x2 Impact vs Ease of Implementation framework was developed and is illustrated below. A 4-phase roadmap was then developed based on assessing initiatives on Impact and feasibility



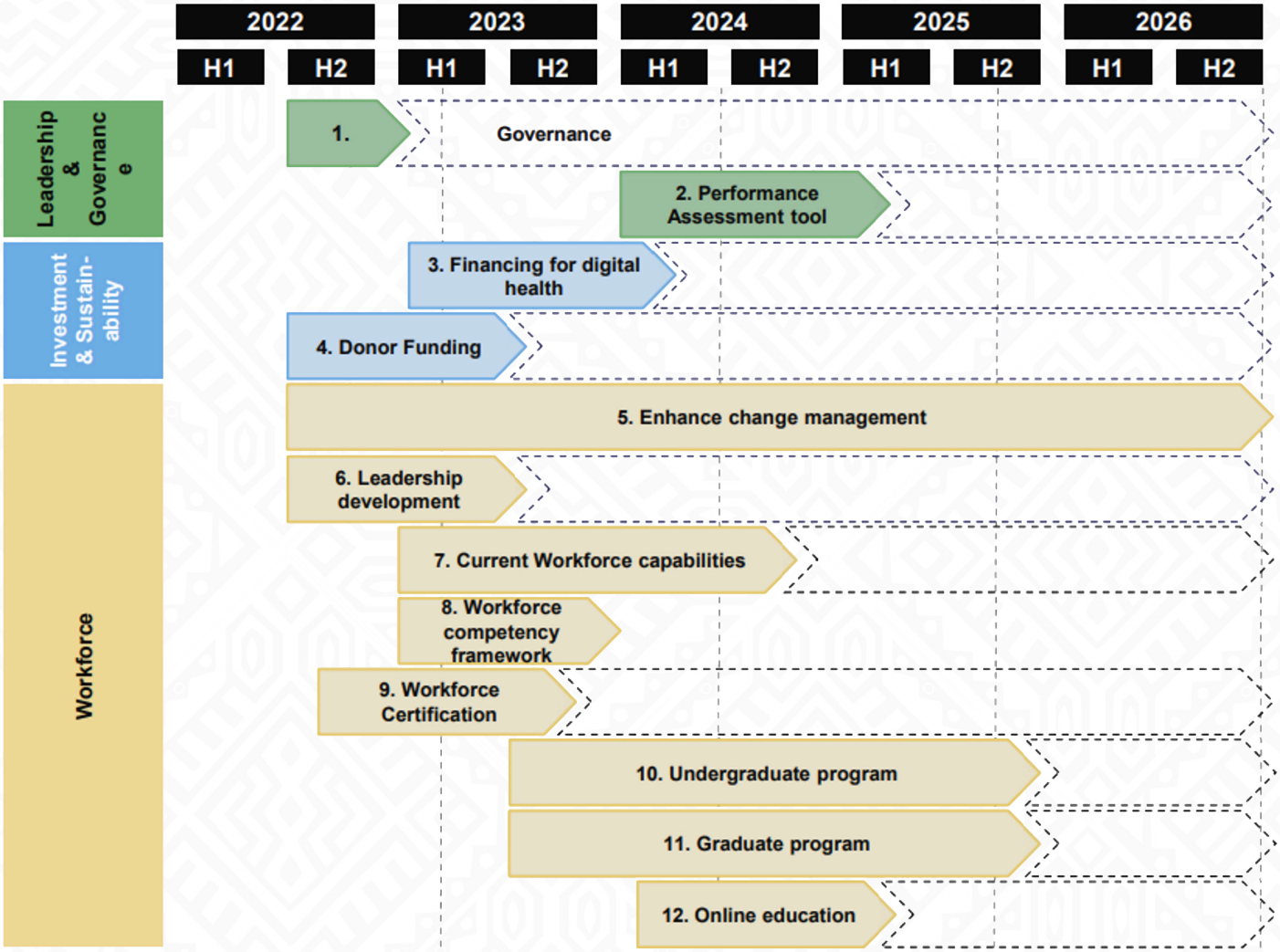
7.1. First 100 days roadmap

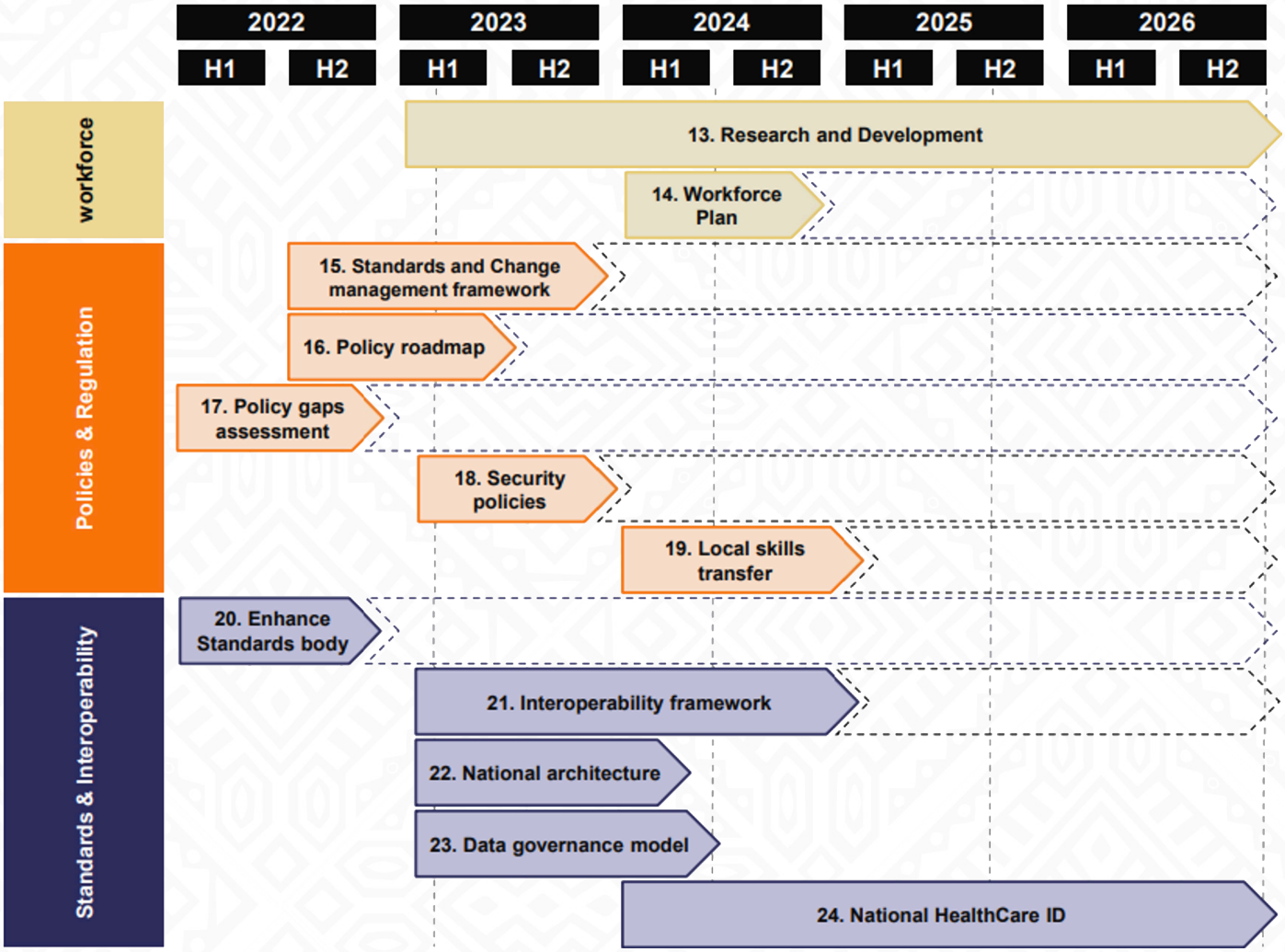
To kick off the strategy operationalisation process, a 100-day roadmap was developed as illustrated below. The road map consists of activities that prepare the strategy for success over the 5-year timeline

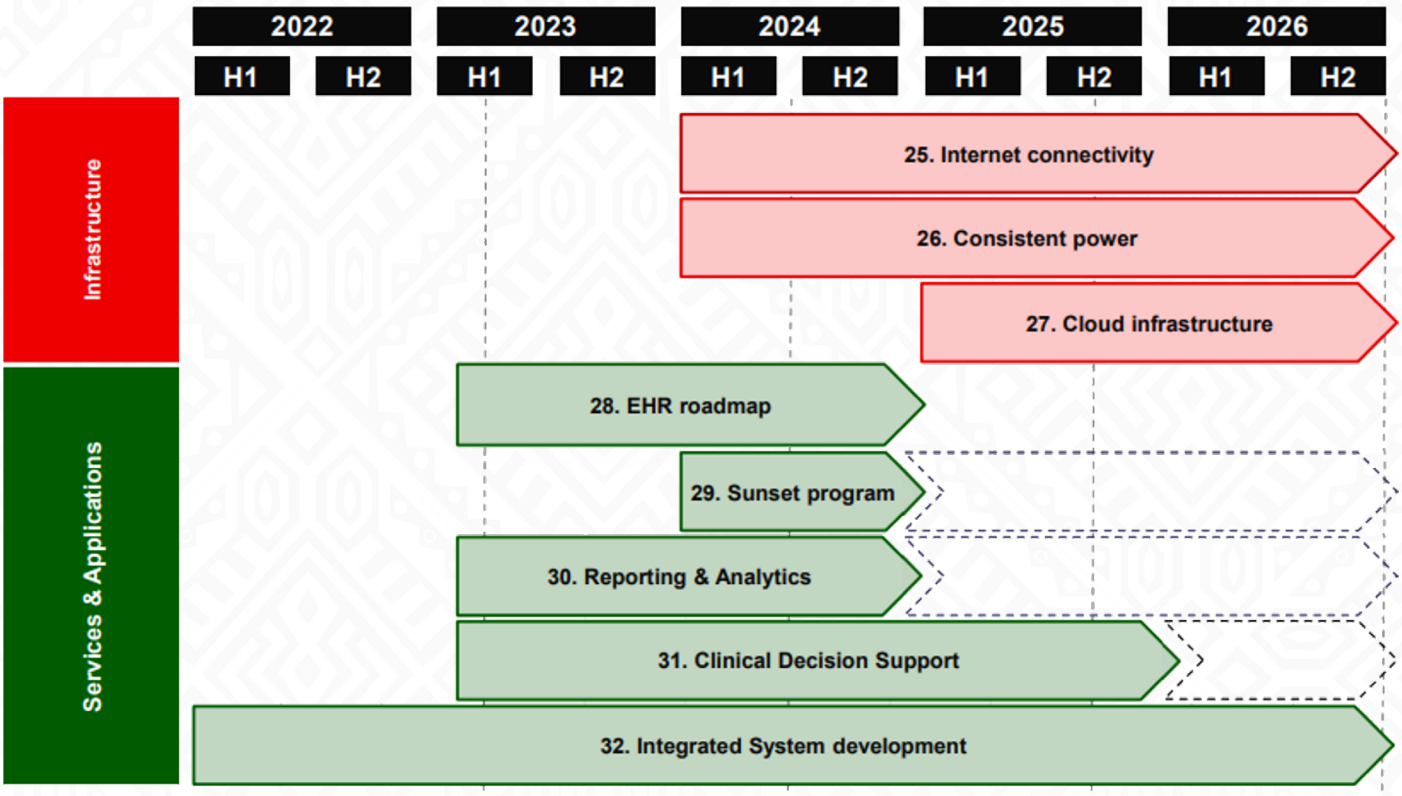


7.2. Digital Health Strategy Road map

The full digital health strategy 2022-2026 Implementation plan is provided below. The details of the work streams are provided in Project Charters for each identified strategic initiative.




2022
2023
2024
2025
2026
H1
H2
workforce
13. Research and Development
14. Workforce Plan
Policies & Regulation
15. Standards and Change management framework
16. Policy roadmap
17. Policy gaps assessment
18. Security policies
19. Local skills transfer
Standards & Interoperability
20. Enhance Standards body
21. Interoperability framework
22. National architecture
23. Data governance model
24. National HealthCare ID


2022
2023
2024
2025
2026
H1
H2
Infrastructure
25. Internet connectivity
26. Consistent power
27. Cloud infrastructure
Services & Applications
28. EHR roadmap
29. Sunset program
30. Reporting & Analytics
31. Clinical Decision Support
32. Integrated System development

8. Monitoring and Evaluation Framework

The performance against the strategies will be led by the Steering Committee and reviewed annually to ensure Zambia embraces the principle of continuous improvement in digital health and to also ensure the government is meeting the objectives set out in the strategy.

8.1. Strategic Objective: Reform Digital Health governance Improve governance and leadership in Digital Health to attain the strategic objectives						
8.1.1. Enhance Leadership Governance						
Output Indicator	**Annual Target**					**Method of Verification**
	Yr 1	**Yr 2**	**Yr 3**	**Yr 4**	**Yr 5**	
#. of leaders trained in health informatics related programmes	35	250	250	250	250	Training Reports
8.1.2. Develop performance assessment tools						
#. approved Performance Assessment Tools	0	1	0	0	0	Approved Assessment tool for Digital Health Systems
% Systems assessed with clearly articulated maturity modelling	0	35%	85%	100%	100%	Completed Information Systems Assessment Reports
# Annual Digital Health Strategy Reviews conducted	0	1	1	1	1	Annual Review Reports
8.2 Strategic Objective: Improve sustainability of the digital health ecosystem Increase digital health investment and financing						
8.2.1. Develop Financing Plan for digital health						
# Costed Digital Health Strategy	1	0	0	0	0	Completed and approved costed digital health strategy
#. Developed and approved Digital Health Financing Plan	1	0	0	0	0	Approved Digital Health Financing Plan
8.2.2. Coordinate donor funding						
% Stakeholders mapped in the sector	25%	100%	100%	100%	100%	Completed stakeholder mapping report
# Coordination mechanism developed and adopted for use	0	1	0	0	0	Approved coordination mechanism
# Stakeholder coordination engagements conducted	0	4	4	4	4	Meeting minutes/ reports from coordinated stakeholder engagements
% Proportion of developed projects that are in line with digital health strategy	0	0	50%	85%	100%	Completed Information Systems Assessment Tools
8.3. Strategic Objective: Develop digital health workforce capacity and capabilities Develop human resources needed for digital health implementation & the number of programs onboarded from global online programs or developed with the training institutions in Zambia						
8.3.1. Enhance change management competencies						
# Change Management strategy developed and approved	0	1	0	0	0	Developed and approved Change Management strategy/Framework

% Adoption of digital health initiatives (cumulative)	0	10%	30%	65%	100%	Maturity Assessment tool for Digital Health Systems
# Unique staff trained per program (cumulative)	0	500	1,500	3,000	5,000	Training Reports
8.3.2. Enhance leadership capabilities						
# Leaders with capability to utilise digital platforms and run analytics	0	250	250	250	250	Training Reports
# Leaders able to supervise in digital health programmes	0	250	250	250	250	Mentorship reports
% Trained leaders utilising digital platforms (cumulative)	0	15%	20%	30%	50%	Digital platforms user audit reports
% Reports used in planning and meeting reporting (cumulative)	0	15%	20%	30%	50%	• Digital platforms user audit reports • Meeting minutes reports
8.3.3. Enhance current workforce capabilities						
# MoUs with Training Providers	0	5	5	0	0	Signed MoUs
# Online programs developed and approved	0	10	10	5	5	Approval letters for online programs
# Programs accredited for CPDs	0	10	10	5	5	CPD Accreditation certificates from NMCZ (Nurses and Midwifery Council of Zambia) / HPCZ (Health Professionals Council of Zambia) and other related professional associations
8.3.4. Develop Workforce Competencies Framework						
# Developed and approved Workforce Competences framework for digital health	0	1	0	0	0	Approved Workforce Competences Framework for digital health
8.3.5. Develop digital health certification programs						
# MoUs with Training providers	0	0	2	0	0	Signed MoUs
# Digital health certification programs offered	0	0	2	0	0	Approved curriculum
# Students trained	0	0	0	15	30	Certificates of completion/ reports
8.3.6. Develop digital health undergraduate programs						
# MoUs with Training Institutions offering undergraduate programs in Digital Health	1	1	0	0	0	Signed MoUs
# Undergraduate programs in digital health offered	1	1	0	0	0	Approved curriculum
# Students enrolled	0	100	100	100	150	Enrolment reports from Tis
% Enrolled students graduating	0	0	0	80%	90%	Certificates of completion/ reports
% Undergraduate students employed in public service institutions	0	0	0	0	50%	i) Public Service Job adverts i) PSMD reports
8.3.7. Develop digital health graduate programs						
# MoUs with Training Institutions offering graduate programs in Digital Health	0	1	1	0	0	Signed MoUs

#Graduate programs in digital health offered	0	1	1	0	0	Approved curriculum
# Students enrolled	0	30	50	50	50	Enrolment reports from TIs
% Enrolled students graduating	0	0	80%	90%	90%	Certificates of completion/ reports
8.3.8. Improve access to online education						
# Online programs developed/ identified	0	2	5	0	0	Online Programs developed/ identified
# MoUs with Training providers	0	2	5	0	0	MoUs signed with Tis for delivery of Online digital health content and certification
# Staff trained through Online platforms	0	1,000	3,500	5,500	10,000	Online training portal reports
8.3.9. Develop partnerships for Research and Development (R&D)						
# Identified R&D priority areas established	0	1	0	0	0	R&D Strategy developed
# R&D Partnerships established	0	0	2	3	0	MoUs signed
# Zambian Digital Health related research presented at national, regional and global research symposiums/ fora	0	0	2	5	5	Digital Health Research papers, Posters available in the Research Repository at Research Authority and other Academic media outlets
8.3.10. Develop national digital health workforce plan						
# Developed and approved Digital Health Workforce plan	0	1	0	0	0	Approved Digital Health Workforce plan
8.4. Strategic Objective: Enhance policy foundations in digital health Strengthen the digital health legal and regulatory framework						
8.4.1. Implement standards and change management framework						
# Developed and approved Compliance tool to monitor Change management in health facilities	0	1	0	0	0	Developed and approved Compliance tool to monitor Change management in health facilities
% Facilities complying to standards and policies	0	10%	25%	45%	70%	Compliance tool updates and reports
8.4.2. Develop policy roadmap						
# Developed and approved policy roadmap	0	0	1	0	0	Approved policy roadmap
8.4.3. Address policy gaps						
# Policy gap assessments conducted	1	1	1	1	1	Policy Gaps Assessment reports
% Identified policy gap solutions developed	80%	80%	80%	80%	80%	Policy gaps solutions developed and approved
8.4.4. Develop security policies						
# Assessments for data security policy gaps at National and facility level within the digital health space	0	1	0	0	0	A report on findings from the assessments for data security policy gaps at National and facility level within the digital health

% Policies for Data Security policies and SOPs developed	0	50%	50%	0	0	Approved Policies and SOPs developed based on assessments recommendations
11.4.5. Develop local skills transfer policy						
# Local Skills Transfer SOPs developed and approved	0	1	0	0	0	Local Transfer Skills transfer SOPs developed and approved
# HIS specific local skills transfer plans submitted to TWG	0	0	1	1	1	HIS Specific local skills transfer plans submitted
8.5. Strategic Objective: Enable Integration of systems Develop standards and interoperability components to improve the collection and exchange of consistent and accurate health information across the healthcare system						
8.5.1. Enhance digital health standards and accreditation body						
# National Digital Health Steering Committee	1	0	0	0	0	Established and operational Digital Health Steering Committee
# Revised ToRs for existing TWG with inclusion of digital health initiatives accreditation process	1	0	0	0	0	Revised and approved ToRs for existing TWG
# Develop HIS accreditation Framework	0	1	0	0	0	Developed and approved HIS accreditation Framework
8.5.2. Develop Interoperability Framework						
# Interoperability frameworks developed and approved	1	0	0	0	0	Approved interoperability framework
# Interoperability framework Implementation plan developed	0	1	0	0	0	Approved Interoperability framework Implementation Plan
% Proportion of systems integrated using the Interoperability Framework (cumulative)	0	25%	50%	75%	100%	Interoperable HIS for full data exchange
8.5.3. Develop National Health System Architecture						
# National Health Systems Architecture frameworks developed and approved	0	1	0	0	0	Approved National Health Systems Architecture frameworks
% Proportion of systems conforming to the National Health Systems Architecture Framework (cumulative)	0	25%	50%	75%	100%	Seamless data exchange and governance in all accredited HIS
8.5.4. Develop and Implement data governance model						
# Data Governance models developed and approved	0	1	0	0	0	Data Governance models developed and approved
%Institutions sharing data according to data governance models (cumulative)	0	30%	60%	90%	100%	Data governance compliance reports and updates

8.5.5. Implement national ID for health care						
# Approved national health care identifier integrated with digital national ID	0	0	1	0	0	Developed and approved patient identifier system that integrates with the national digital ID
8.6. Strategic Objective: Scale-up up digital health infrastructure Develop the health information processing and sharing infrastructure between health structures and communities at the national and international levels						
8.6.1. Ensure all healthcare facilities have adequate internet connectivity						
# Healthcare facilities with reliable connectivity (cumulative)	1,600	1,800	2,000	2,200	2,500	Updated Health facility census reports on connectivity for health facilities
8.6.2. Ensure consistent power access to all healthcare facilities						
# Power capacity requirements models developed and approved	0	0	1	0	0	Power capacity requirements models developed and approved
# Health facilities assessed that have national grid power that meets power capacity requirements for that facility	0	0	1	1	1	Updated Health facility census reports on national grid power
# Health facilities assessed with alternative power that meets power capacity requirements for that facility	0	0	1	1	1	Updated Health facility census reports on alternative power
8.6.3. Develop healthcare cloud infrastructure						
% Approved digital health applications using cloud infrastructure (cumulative)	0	0	0	50%	100%	Cloud infrastructure host reports
8.6.4 Develop a management and maintenance plan for computer hardware and network infrastructure.						
Management and maintenance plan for computer hardware and network infrastructure developed		1				Approved management and maintenance plan for computer hardware and network infrastructure
8.7. Strategic Objective: Enhance digital health solutions Develop services and applications that meet the needs of stakeholders in the health ecosystem and develop roadmaps and sunset plans for all critical systems and systems no longer in use. Suitability of essential systems						
8.7.1. Develop national EHR Product Roadmap						
# Developed and approved national EHR product roadmap	0	1	0	0	0	Approved EHR roadmap available
8.7.2. Develop and implement a sunset program						
# SOPs developed and approved to sunset HIS no longer in use	0	0	1	0	0	SOPs developed and approved to sunset HIS
% Proportion of sunset programs meeting compliance requirements of the SOPs	0	0	10%	30%	50%	Proportion of sunset programs meeting compliance requirements
8.7.3. Enhance reporting and Analytics capabilities						
# Reporting and Analytics capabilities established for MoH visibility (cumulative)	1	3	5	10	10	Reporting and Analytics capabilities established

# Situation Rooms established (cumulative)	1	3	3	3	3	Functional Situation rooms in use
8.7.4. Enhance Clinical Decision Support (CDS)						
# Assessment of Clinical Decision Support requirements	0	1	1	1	1	Documented Clinical Support Requirements for available HIS
% Clinical decision support Recommendations developed	0	10%	25%	50%	75%	Clinical Decision Support Implemented
8.7.5. Develop integrated systems in healthcare						
# Assessment for System Integration in healthcare conducted	1	1	1	1	1	Approved Recommendations for System Integration
% System Integration recommendations developed	10%	25%	50%	75%	75%	i) Integrated systems in health care developed i) System update documentation

Appendix A

List of participants to the development of the Digital Health Strategy 2022-2026

1	Dr. Sydney Shampile MD	National Digital Health Coordinator	MOH
2	Kasali Musenge	Director - Policy and Standards	SZI
3	Nkula Mwanza	Director - EGovernment	SZI
4	Milner Makuni	Director - Communications	MOTS
5	Kalamatila Ngoi	Acting Assistant Director - Standards	SZI
6	Dr. Chibala Makala DBA	Assistant Director Policy	SZI
7	Dr. Jonathan K Mwansa MD	Senior Medical Superintendent - ADCH	MOH
8	Dr. Chibwela Shumba MD	Senior Medical Superintendent - Heart Hospital	MOH
9	Dr. Daniel Makawa MD	Medical Doctor	MOH
10	Rita Mwale	Assistant Director - ICT	MOH
11	Innocent Chiboma	Principal ICT Officer - eHealth	MOH
12	Sam Phiri	Principal ICT Officer - Hardware and Networks	MOH
13	Virginia Simushi	Principal ICT Officer - Software & Applications	MOH
14	Trust Mufune	Chief M&E Officer	MOH
15	Tshiya Mpenge	Senior Policy and Standards Officer	SZI
16	Andrew Chaziya		MOH
17	Beenzu Muleya	Provincial ICT Officer - Central Province	MOH
18	Chimuka Sianyinda	Senior M&E Officer	MOH
19	Chisanga Siwale	Applications Development Officer	MOH
20	Dr. Sam Msariri MD	Medical Doctor	MOH
21	Simon Mhone	ICT-FP Luapula Province Health Office	MOH
22	Liswaniso Liswaniso	Senior ICT Officer - Application Development	MOH
23	Moses Mutabwa	Senior ICT Officer	MOH
24	Mrs. Namwiinga Choobe	Senior Planner	MOH
25	Richard Tumeo	Senior ICT Officer	MOH
26	Samson Lungu	Senior Planner	MOH
27	Stanley Banda	Health Care Financing Unit	MOH
28	Tedson Simwanza	M&E officer	MOH
29	Chisanga Siwale	Data Analytics	MOH
30	Prince Munyati	Systems Deployment Officer	MOH
31	Caleb Milambo	Provincial ICT Officer - Southern Province	MOH
32	Dipo K. Mbewe	Provincial ICT Officer - Copperbelt Province	MOH
33	John Kabwe	Provincial ICT Officer - Luapula Province	MOH
34	Kakwesha Phiri	Provincial ICT Officer - Lusaka Province	MOH
35	Shem Kabesha	Health Informatics Specialists	MOH
36	Choolwe Moono	ICT Officer	UTH
37	Dr. Jackson Phiri PhD	Lecturer	UNZA
38	Dr.Nyirenda PhD	Lecturer	UNZA
39	Dr. Denise Giles PhD	Project Officer CDC	CDC
40	Dr. Bwalya Chiteba PHD	Health Informatics Branch Chief	CDC
41	Dr. Mphatso Mudenda PHD	Health Informatics Systems Manager	CDC
42	Gift Lyoko	System Development Manager	CDC
43	Biko Soko	PEPFAR Strategic Information Specialist	DOD
44	Arthur Kachemba	Senior Manager - Data Management	USAID

45	P Heston	Strategic Information	UNAIDS
46	Cynthia Antwi	Health Services Delivery Manager	TBI
47	Felix Ochoro	Head of Tech - Zambia	TBI
48	James Mullen	Head of Tech - Western Balkans	TBI
49	Kendrick Chan	Tech Policy Advisor	TBI
50	Owen Berry	Programme Integrator	TBI
51	Sheila V Mumbi	Tech Transformation Advisor	TBI
52	Clement Phiri	Country Director	APHL
53	Joseph Phiri	Data Management Specialist	CHAZ
54	Gordon Mwanza	ICT Operations Manager	CIDRZ
55	Mwansa Lumpa	Head Strategic Information	CIDRZ
56	Paul Kaumba	Data Manager	CIDRZ
57	Patrick Saili	M&E/IT Manager	CRS
58	Bwalya Chileya	Project Manager	IHM Southern Africa
59	Dr. Sam Miti MD	Business and Analysis Lead	IHM Southern Africa
60	Hilary Francis Mwale	Government and Capacity Building Lead	IHM Southern Africa
61	Kelvin Sikwebele	CEO/Project Director	IHM Southern Africa
62	Lissa Ngenda Mwenda	Partner Engagement Specialist	IHM Southern Africa
63	Patrick Shabanga	Technical Director	IHM Southern Africa
64	Vimbai Tsododo	Project Manager	IHM Southern Africa
65	Christopher Mbinji	Director - M&E	Jhpiego
66	George Muyunda	Information Systems Specialist	Jhpiego
67	Chris Opit	Director - Systems and Data Management	JSH
68	Wendy Bomett	Director	JSH
69	Ruth M'kala	AI and Health Communications Officer	Macro Eyes
70	Simon Muyambo	HMIS Advisor	MSI - E4H
71	Dr Vincent Shaw	Interoperability Consultant	MSI - E4H
72	Lameck Nyirenda	Senior HMIS Advisor	MSI – E4H
73	Christopher Chishimba	ICT Officer	NMCZ
74	Catherine Muyawala	Peer Learning Coordinator	PATH
75	Dr. Joseph Kayaya MD	Product Manager	PATH
76	Mandy Dube	Project Director - Digital Community Health	PATH
77	Daniel Ng'andu	Project Officer Digital Tools	PATH
78	Mercy Mwanza	Global Health Corp Fellow M&E	PATH
79	Brian Chibale	Head of ICT	Right-To-Care
80	Kaluba Mataka	Regional Director for Delivery	ZENSYS
81	Mwamulimba Aaron Mutinta	User Engagement Specialist	ZENSYS

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