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MINISTRY OF PUBLIC HEALTH

THE 2020 - 2024 NATIONAL DIGITAL HEALTH STRATEGIC PLAN

MOH

CDC
PEPFAR
I-TECH International Training & Education Center for Health
JOHNS HOPKINS CAMEROON PROGRAM

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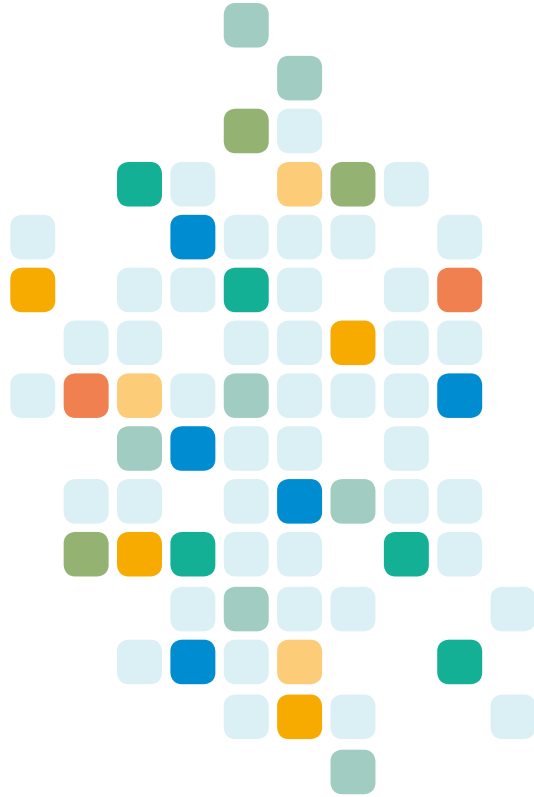

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PREFACE

By Dr. MANAOUDA MALACHIE

The World Health Assembly Resolution on eHealth, unanimously endorsed by World Health Organization (WHO) Member States in May 2018, which recognizes the value of digital technologies to help advance universal health coverage and other health objectives of the Sustainable Development Goals (SDGs), specifically tasked WHO to provide Member States with normative guidance in digital health on the most up-to-date evidence and advice to enable them to make the smartest investments and achieve the biggest gains in health.

In accordance with the WHO resolution, the Ministry of Public Health of Cameroon (MOH) and its development partners started the drafting process of the National eHealth Strategic Plan in June 2018. The actual drafting phase, which began in July 2019 under the auspices of the Health Information Unit and the IT Unit in collaboration with I-TECH/University of Washington in synergy with Johns Hopkins Cameroon Program (JHCP) and CDC-PEPFAR was preceded by a situation analysis carried out in 2018.
The drafting of the plan was a participatory process that involved public and private sector actors working in the field of health and information and communication technologies (ICTs) in Cameroon. The consensus reached after several workshops led to the definition of a common strategic vision for the development of eHealth for the next five years.

Technological developments continue to push the boundaries of disease management. Mobile Health (mHealth) can be used to collect surveillance data, monitor real-time patient health status, provide therapeutic assistance and health advice, monitor treatment adherence or carry out education and awareness campaigns in the field of health. Telemedicine provides opportunities for people living in areas where access to services is limited, to benefit from safe and quality care, through real-time interaction between the patient and the healthcare provider, through video conferencing and other forms of online and remote communication. All of this fit perfectly with the vision of transformation of the health system envisioned by President of the Republic S.E Paul BIYA.

Digital health will help:

- To meet the health needs of the population and improve living conditions through access to the best health care;

- To ensure patients make good decisions about their health status and enjoy effective, efficient and personalized health care;

- To promote Universal Health Coverage (UHC), which will contribute effectively to better patient care and surveillance of emerging diseases;

- To strengthen the urbanization of health information systems;

- To ensure a sustainable, secure, and efficient flow of data within the health information system;

- To ensure the standardized implementation of system tools and software;

- To improve the ICT infrastructure that is the bedrock of the health information system;

- To promote strong use of data for clinical service management, individual health decision making, and public health planning.

The main challenges facing our health system, such as geographic inaccessibility, low demand for services, delay in care delivery, poor adherence to clinical protocols, and costs borne by individuals, can be mitigated through the contribution of digital health interventions.

This National Strategic Plan now constitutes for all national and external stakeholders the unique reference framework for all interventions in the field of digital health, as a decisive contribution to achieving Universal Health Coverage in Cameroon. The Government is depending on the commitment of all for the effective implementation of this plan.

EXECUTIVE SUMMARY

Universal Health Coverage aims to ensure that all people have access to the preventive, curative, palliative, rehabilitation and health promotion services they need and that these services are of sufficient quality to be efficient, without the cost being a burden to its users.

The World Health Assembly Resolution on Digital Health, unanimously endorsed by Member States in May 2018, highlights the value of digital technologies, contributing to the advancement of universal health coverage. The resolution urges ministries of health to «evaluate their use of digital technologies for health, including health information systems at the national and subnational levels, to identify areas for improvement and prioritize the development, evaluation, utilization, scale-up and expansion of digital technologies, in order to promote equitable access, financially affordable and universal health for all, including the special needs of vulnerable groups in the context of digital health.» Digital technologies hold great potential for advancing sustainable development goals, particularly in support of health systems, improving the quality of health services and the accessibility of health services, both geographic and financial.

Two approaches have been used to describe the state of digital health in Cameroon: a desk study and an interactive exchange between key players in the health system during workshops organized for this purpose, including HIS specialists, high-level experts from the Ministry of Health (MOH), Ministry of Communication (MINCOM) and Ministry of Post and Telecommunications (MINPOSTEL).

An analysis of each component of digital health in Cameroon was conducted using the tool Stage of Continuous Improvement Tool Kit (SOCI), which helps to assess different levels of development. This situation analysis identified priorities for digital health, and defined a strategic framework with a new vision, goals, strategies and priority actions to operationalize digital health activities in Cameroon.

The vision is to ensure that by 2024, digital health contributes effectively to Universal Health Coverage (UHC), through informed decision-making at all levels of the health pyramid, through reliable, robust, secure and interoperable systems.

The budget for the National Strategic Plan of Digital Health amounts to 11,327,570,000 XAF ($19,037,933) over a period of five years, and is distributed among the following seven strategic areas:

AREA 1: Leadership and Governance:
277,600,000 XAF ($466,555)

AREA 2: Legislation, Policy and Compliance:
75,000,000 XAF ($126,050)

AREA 3: Human Resources:
233,000,000 XAF ($391,597)

AREA 4: Strategy and Investments:
1,000,000 XAF ($1681)

AREA 5: Infrastructure:
6,024,670,000 XAF ($10,125,496)

AREA 6: Standards and Interoperability:
480,900,000 XAF ($808,235)

AREA 7: Services and Applications:
4,235,400,000 XAF ($7,118,319)

ACRONYMS AND ABBREVIATIONS

ADX	Aggregate Data eXchange is a profile that supports interoperable public health reporting of aggregate health data. These most typically take the form of routine reports (weekly, monthly, quarterly etc.) from a health facility to some administrative jurisdiction such as a health district, though there are numerous other use cases such as international reporting and community health worker reporting.
ANTIC	National Agency for Information and Communication Technologies
ART	Telecommunications Regulatory Board
CAMTEL	Cameroon Telecommunications
CBCHS	Cameroon Baptist Convention Health Services
CDC	Centers for Disease Control and Prevention
CDE	Camerounaise des eaux (Cameroonian Water)
CHDC	Cameroon Health Data Collaborative
CI	IT Unit
CIU	Code Identifiant Unique du Patient (Unique Patient Identifier)
CPP/DEP	Planning and Programming Unit / Studies and Projects Division
CT3	Technical Adviser No. 3 at the MOH

DAJC	Division of Legal Affairs and Litigations
DCOOP	Cooperation Division
DLMEP	Department of Disease, Epidemic and Pandemic Control
DOSTS	Department of Care Organization and Health Technologies
DPML	Department of Pharmacy, Drugs and Laboratories
ENEO	Electrical Utility of Cameroon
FHIR	Fast Healthcare Interoperability Resource is a draft data standard developed and nurtured by HL7 International. FHIR addresses the complexity of healthcare data, and takes a modern, internet-based approach to connecting different discrete elements.
GIZ	German Society for International Cooperation
HIS	Health Information System
HIU	Health Information Unit
HL7	Health Language Seven is a messaging and interoperability oriented standard and organization of health data. It is the most common standard set for exchanging data between clinical systems.
HSS	Health Sector Strategy
IAI	African Institute of Computer Sciences
ICD	The International Classification of Diseases was developed and is managed by the World Health Organization.
I-TECH	The International Training and Education Center for Health

ITO	International Telecommunications Organization
JHCP	Johns Hopkins Cameroon Program
LOINC	Logical Observation Identifiers Names and Codes is a standard classification system used primarily for laboratory and clinical observations. It was developed by the Regenstrief Institute
MINAS	Ministry of Social Affairs
MINCOM	Ministry of Communication
MINEFI	Ministry of Economy and Finance
MINPOSTEL	Ministry of Post and Telecommunications
MINPROFF	Ministry for the Advancement of Women and Families
MOH	Ministry of Public Health
MTEF	Medium-Term Expenditure Framework
NACC	National AIDS Control Committee
NEHSP	National eHealth Strategic Plan
NPHO	National Public Health Observatory
PISE	Integrated Monitoring and Evaluation Plan
SIGIPES	Computerized system for the integrated management of state personnel and payroll

SNOMED	Systematized Nomenclature of Medicine is a comprehensive vocabulary that covers almost every aspect of clinical care - ranging from anatomy to diagnoses to observations and procedures.
SOP	Standard Operating Procedure
SWOT	Strengths, Weaknesses, Opportunities and Threats
UCSF	University of California – San Francisco
UHC	Universal Health Coverage
WHO	World Health Organization
PDRH	Universal Health Coverage
PSNSN	World Health Organization
PTA	Partenaires Techniques et Financières
SIGIPES	Système Informatique de Gestion Intégrée du Personnel de l'Etat et de la Solde
SIS	Système d'Information Sanitaire
SNOMED	Systematized Nomenclature of Medicine est un vocabulaire complet qui couvre presque tous les aspects des soins cliniques - de l'anatomie au diagnostic, en passant par les observations et les procédures.
SOP	Standard Operating Procedure (Procédure d'opération standard)
UCSF	University of California – San Francisco

DEFINITION OF KEY WORDS

Table 1: Definition of Key Words

CONTINUITY OF AN ACTIVITY	Implementation of planning, monitoring and evaluation systems to ensure continuity of care and operational services.
CONTINUOUS IMPROVEMENT	A gradual and decisive improvement of products, services or processes. These efforts may seek a "progressive" improvement over time or a "revolutionary" improvement in a short space of time.
CYBERHEALTH/E-HEALTH / DIGITAL HEALTH	See "Digital Health"
DIGITAL HEALTH	Use of information and communication technologies (ICTs) in support of health and related fields, including health services, health surveillance, health and education literature, knowledge and health research.
INFORMATION SYSTEM	Technical and human resources that ensure the storage, computer processing, distribution and communication of information required by all or part of the organizational unit (in this case, the health system).
INFORMATIVE TELEMEDICINE	Organizes the dissemination of medical knowledge and protocols for patient management and care in order to support and improve the medical activity.
MATURITY MODEL	The maturity model is used to measure the capacity of an organization or government entity, such as the Ministry of Public Health, to continuously improve in a specific discipline until it reaches the desired level of development or maturity
MEDICAL RESPONSE	Provided within the framework of medical regulation of emergencies or the continuity of care
MEDICAL TELEASSISTANCE	A medical doctor remotely assists another health professional in performing a medical act;
MEDICAL TELEMONITORING	A doctor remotely interprets the data necessary for the medical follow-up of a patient and, if necessary, makes the decisions relating to his management. The recording and transmission of data can be automated or performed by the patient himself, or a health professional.
TECHNOLOGY	The application of scientific knowledge for practical purposes, especially in industry. This includes machinery and equipment developed from the application of scientific knowledge.
TELECONSULTATION	A doctor consults a patient remotely. A health professional or psychologist may be present with the patient and, where appropriate, assists the doctor during this act.
TELEEXPERTISE	A doctor remotely seeks the opinion of one or more of his colleagues based on their training or specialty, for information related to the management of the patient.
TELEMEDICINE	Allows health professionals to remotely perform medical acts for patients.

INTRODUCTION

Universal Health Coverage aims to ensure that the population has access to the preventive, curative, palliative, rehabilitation and health promotion services they need and that these services are of satisfactory quality to be efficient, without the cost being a burden to users.

Health system challenges, such as geographical inaccessibility, low demand for services, delayed care delivery, poor adherence to clinical protocols and costs borne by individuals, contribute to an additional drop in health system performance, with a negative cumulative impact on the health of individuals.

These shortcomings limit the ability to fill gaps in coverage, quality and affordability, and undermine the potential for achieving Universal Health Coverage.

It is from this perspective that the World Health Assembly Resolution on Digital Health, unanimously endorsed by Member States in May 2018, highlights the collective recognition of the value of digital technologies in contributing to the progress of universal health coverage. The resolution urges ministries of health to "assess their use of digital technologies for health, including in health information systems at the national and subnational levels, in order to identify areas of improvement, and to prioritize, as appropriate, the development, evaluation, utilization, scale-up and expansion of digital technologies, as a means of promoting equitable, affordable and universal access to health for all, including the special needs of vulnerable groups in the context of digital health."

Several emerging digital health interventions can help address the challenges of the health system at different levels, throughout the process leading to universal health coverage. Nevertheless, as is the case with the introduction of any innovation or new approach, digital health interventions require behavior changes and transitions to new practices. Success can only be guaranteed if the proposed technology is adopted by users, adds value and facilitates the desired change or action. Thus, persons charged with implementation need to be aware of the motivations, barriers and resistance to the disruption of the status quo, which can affect deployment fidelity, and understand that this will mitigate the potential benefits of digital health interventions.

This digital health strategy is based on interventions whose benefits, drawbacks, acceptability, feasibility, resource utilization and equity have been evaluated.

CHAPTER I : BACKGROUND

1.1. GEOGRAPHICAL, ADMINISTRATIVE AND POLITICAL SITUATION

Cameroon is a Central African country located on the Gulf of Guinea between latitudes 2° and 13° north and longitudes 9° and 16° east. It covers a surface area of 475,440 square km., extends approximately 1200 km. from north to south and over 800 km. from west to east. It shares boundaries with Nigeria to the west, Chad to the northeast, the Central African Republic to the east, and Congo, Gabon and Equatorial Guinea to the south. In the southwest, the country faces the Atlantic Ocean. The country is divided into ten regions, with Yaoundé as its political capital and Douala its economic capital.

Cameroon is a democratic state which practices political pluralism and individual and collective freedoms. It is a bilingual country, with English and French spoken by 30% and 70% of Cameroonians, respectively. Cameroon is a secular state where Christianity is practiced by 40% of the population, animism by 40%, and Islam by 20%. Its population is a mixture of more than 250 ethnic groups with different customs and traditions, whose socio-cultural weight influences patients' therapeutic route. It is divided into 10 Administrative Regions, 58 Divisions, 360 Sub-Divisions and 374 Regional and Local Authorities (councils and urban communities).

1.2. SOCIO-ECONOMIC CONTEXT

In Cameroon, the percentage of people living below the poverty line dropped from 40.2% in 2001 to 39.9% in 2007, reaching 37.5% in 2014. Poverty remains a common phenomenon in rural areas despite efforts made through public development policies. The rural poverty rate in 2014 was 56.8% compared to 55.7% in 2007.
Moreover, rural areas contain the bulk of the poor population (90.4%). Four regions have particularly high poverty rates: Far North (74.3%), North (67.9%), North West (55.3%) and Adamawa (47.1%). The other regions have rates below the national poverty rate: South (34.1%), Centre excluding Yaoundé (30.3%), East (30.0%), West (21.7%), Littoral excluding Douala (19.5%) and South West (18.2%). The two largest cities have the lowest rates: 5.4% in Yaoundé and 4.2% in Douala. Distributing the poor according to region, the Far North (35.8%), North (20.1%) and North-West (13.2%) accounted for about 70% of the poor population in Cameroon in 2014, given their demographic weight and high poverty rates.

With regard to access to basic infrastructure, households are located at an average distance of about 3.6 km from the nearest Electrical Utility of Cameroon (ENEO) electricity pole, and 1.6 km from the nearest connection point of the Camerounaise des eaux (CDE) water distribution network. Long distances (an average 6.9 km) are mainly observed in rural areas with regard to electricity. Generally, a household is located at an average distance of 7.6 km from the nearest civil status registration center, 6.8 km from the nearest district hospital or medicalized health center, 5.2 km from the nearest pharmacy or pro-pharmacy. This basic infrastructure is more accessible to urban households than to rural households.

1.3. DEMOGRAPHIC CONTEXT

The population of Cameroon is estimated at 25,492,353 inhabitants in 2019. There is a high concentration in the cities of Douala and Yaoundé. The North and West plateau have high population densities. With a life expectancy of 52 years, the population is composed of 43% young people under 15, and only 3.5% of people over 65 years.

1.4. INTRODUCTION OF THE CAMEROON HEALTH SYSTEM

At the institutional level, the health system is structured at three levels, namely: the central level, the intermediate level and the peripheral level. It also has three sub-sectors: a public sub-sector, a private sub-sector and a traditional sub-sector that are all under the responsibility of the Ministry of Public Health (MOH), in accordance with Decree No. 2013/093 of 3 April 2013 on the organization of this institution. According to this document, the MOH is responsible for the development and implementation of the Government's public health policy .

Basic care, such as malaria management, is provided in 4,432 health facilities, immunization in 3,818 health facilities and tuberculosis management in 256 health facilities.

Table 2: Distribution of the total population of Cameroon by region estimated over the period 2020 - 2024

Region	Total population in 2020	Total population in 2021	Total population in 2022	Total population in 2023	Total population in 2024
Adamawa	1,345,934	1,381,714	1,420,545	1,460,928	1,500,728
Centre	4,846,002	4,967,833	5,095,147	5,225,915	5,355,618
East	1,146,981	1,172,028	1,198,736	1,226,797	1,255,231
Far North	4,734,875	4,874,303	5,023,545	5,178,810	5,336,892
Littoral	3,987,222	4,085,142	4,188,368	4,291,250	4,393,388
North	2,964,768	3,074,326	3,173,916	3,276,891	3,380,994
North West	2,278,503	2,307,319	2,338,843	2,369,058	2,398,488
West	2,113,367	2,136,430	2,160,133	2,184,726	2,208,514
South	818,190	830,612	844,135	857,642	871,260
South West	1,897,193	1,935,815	1,975,769	2,016,828	2,057,390
CAMEROON	**26,133,035**	**26,765,522**	**27,419,137**	**28,088,845**	**28,758,503**

Table 3: Health facilities providing malaria management, tuberculosis management and vaccination services

REGION	Health facilities providing malaria management	Health facilities providing vaccination services	Health facilities providing tuberculosis management
Adamawa	167	166	9
Centre	1139	833	55
East	242	232	21
Far North	403	417	31
Littoral	679	529	39
North	258	258	21
North West	353	318	21
West	623	609	20
South	261	203	19
South West	307	253	20
TOTAL	**4,432**	**3,818**	**256**

The 2016-2027 Health Sector Strategy (HSS) sets the course for the main guidelines in the health domain, and is also a fundamental lever for advocacy and resource mobilization for the development of the health sector. It has 5 strategic objectives which are:

- ***Encourage the population to adopt healthy behaviors;***
- ***Reduce premature mortality caused by preventable diseases;***
- ***Reduce overall mortality and lethality in health facilities and in the community;***
- ***Improve the institutional capacity of health facilities for sustainable and equitable access of the population to quality health care and services;***
- ***Improve health system performance at all levels.***

CHAPTER II : METHODOLOGICAL NOTE

2.1. APPROACH

Since 2017, major actors in the Ministry of Public Health have deemed it necessary to develop a digital health strategic plan. With CDC funding, the MOH sent some key actors to the Intergovernmental Learning Exchange for Advanced Data Driven Decision Making - I-LEAD meetings held in Atlanta in June 2018. During these meetings, a maturity-based assessment model was created. This model served as a tool for describing the situation analysis of digital health in Cameroon. The methodological framework for this drafting process is provided by the MOH in partnership with WHO and the US CDC.

2.2. REFERENCE DOCUMENTS

The main reference documents used to describe the state of digital health are:
• The Cameroon HIS Evaluation Report presented by the University of Washington and the University of California -San Francisco in 2017;

• The mapping of information subsystems and investments in the NHIS in Cameroon presented by WHO;

• The self-assessment of computerized organizations presented at the Intergovernmental Learning Exchange sponsored by the CDC to advance data-driven decision-making (I-LEAD);

• The National eHealth Strategy Toolkit. This is the methodological reference used for the drafting of this document. The guide highlights the different steps that have marked the process of developing national cyberhealth plans;

• The Cameroon Strategic Planning Guide 2012 Edition.

2.3. METHODOLOGY USED IN DESCRIBING THE STATE OF DIGITAL HEALTH AND IDENTIFYING PROBLEMS

Two approaches were used in describing the state of digital health in Cameroon: Literature review and interactive exchanges with key actors in the health system during workshops organized for this purpose (HIS specialists, high-level experts from the MOH, MINCOM and MINPOSTEL).

2.4. DRAFTING PROCESS OF THIS STRATEGY

For the development of this document, stakeholders from different ministries and partners engaged in a participatory process comprising four successive steps which are:

• The development of an initial draft of the plan with the following sections: (i) a methodological note, (ii) situation analysis; (iii) a vision of digital health in Cameroon with its guiding principles; (iv) strategic areas and objectives; (v) a detailed and costed action plan including key performance indicators and a realistic timetable.

• The revision of the digital health strategic plan during a workshop to improve and fine-tune the initial work (technical validation). During this working session, several questions about the quality of the document and its implementation were discussed: do the strategic objectives align with the shortcomings identified in the situation analysis? Is the plan realistic in terms of timing and required resources? Does the plan promote appropriation of the implementation process by the government?

• Organization of a working session to finalize this work. This step will allow stakeholders to review the English and French versions of the document and submit them officially to the Minister of Public Health for adoption.

• The organization of an official adoption ceremony of the National eHealth Plan and the effective start of its dissemination and implementation.

CHAPTER III : SITUATION ANALYSIS OF DIGITAL HEALTH IN CAMEROON

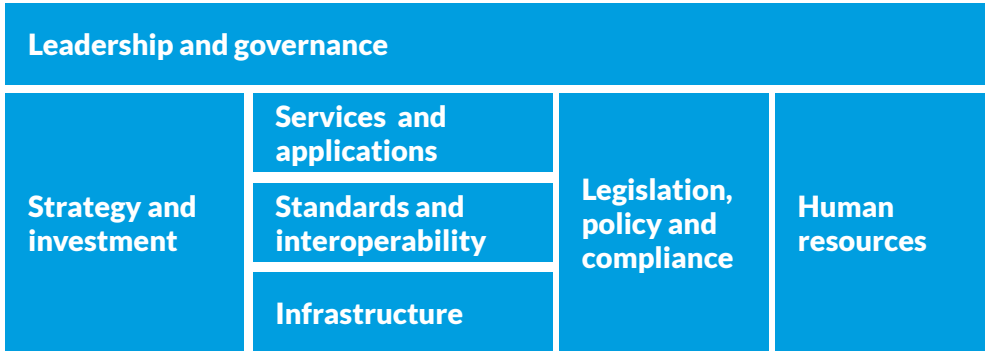
Digital technologies hold great potential for progress towards sustainable development goals, particularly to support health systems, by improving the quality and accessibility of health services in both geographic and financial terms.

In Cameroon in 2016, 6% of households had access to the internet and 4% had fixed broadband access at home (at least 2 Mbps).

With regard to the use of the internet by region, three groups of regions were observed: those with lower rates (the three northern and the North-West regions) with less than 10% of individuals having used the Internet, other regions (South-West, Yaoundé, Douala) with record proportions of 19%, 49% and 35% for the same figure, and finally, regions that recorded between 11% and 14% of individuals who had used the Internet. This is the case of the Center region except Yaoundé, the Littoral except Douala and the West.

One of the limitations in access to ICT is the cost; the average cost of Mbps per month was 23,000 FCFA on average in 2016. Under these conditions, the poor whose income is below the SMIG (36,270 XAF) cannot easily access e-Health services.

Figure 1: eHealth Components



The analysis of each component of digital health in Cameroon was conducted using the Stage of Continuous Improvement Tool Kit (SOCI) tool that facilitates the assessment of different levels of development (see Table 4) .

Each level of maturity, ranked 1 to 5, corresponds to a level of development of the component. Score 1 means no implementation (low maturity) while score 5 indicates optimal implementation of the component, which means that the country has unmistakable capacities for the implementation of digital health. In sum, this strategic plan is structured according to a maturity model, which allows stakeholders to consider the development of the digital health ecosystem as a process of continuous improvement and to define a common vision advocating optimization of the current system.

The purpose of using this maturity model is to identify the shortcomings of each component and then evaluate the efforts required for its optimization.

Table 4: Assessment of the maturity level of components

Level	Level description
Level 0: Absent	The component does not exist
Level 1: Emerging	Efforts are made in the component, but are occasional or isolated
Level 2: Development	The component exists, but ICTs used and compliance are inconsistent.
Level 3: Defined	The component exists and is used systematically at all levels of the health system.
Level 4: Institutionalized	The component exists and is supported by governance structures to monitor ICT usage and compliance.
Level 5: Optimized	Best practices are documented, the system frequently improves processes, data collected to monitor usage and compliance with the component are used, future challenges are anticipated and a plan put in place to address them.

3.1. LEADERSHIP AND GOVERNANCE

Within the Ministry of Public Health, there are three structures with clearly defined missions related to digital health in the organizational chart , with no real framework for coordinating interventions:

The Directorate of Healthcare Organization and Medical Technology leads:
- Applying government policy to the acquisition and maintenance of medical equipment;
- Specifying standard equipment for health facilities;
- Developing equipment maintenance and depreciation programs and monitoring their application;
- Technological oversight in health matters; the preparation of technical consultation documents for companies for the requisition of biomedical equipment;
- Ensuring compliance of equipment ordered;
- Improving technical platforms for health facilities (public and private)
- Maintaining medical equipment files

The IT Unit leads:
- Designing and implementing the ministry's IT master plan;
- Selecting IT equipment and operating systems;
- Setting up databanks and databases related to the various computer sub-systems of the Ministry;
- Ensuring the security, availability and integrity of the computer system;
- Benchmarking on Information Communication Technology
- Promoting information and communication technologies;
- Studying the development, operation and maintenance of the ministry's applications and computer network:
- Promoting e-government.

The Health Information Unit leads:
- Designing and monitoring the implementation of the health information system;
- Collecting and processing statistical health data, in collaboration with the National Public Health Observatory (NPHO);
- Establishing databanks and databases relating to public health;
- Developing national health indicators;
- Preparing the National Public Health Accounts, in collaboration with the NPHO;

- Updating the health map;
- Ensuring the security and availability of statistical data, in collaboration with the NPHO;
- Publishing health data, in collaboration with the NPHO.

These three entities do not yet possess the required tools and capacities to effectively implement digital health across multiple sectors or to fulfill the vision of a digital Cameroon by 2020 and the HSS 2016-2027. Several partners and donors support the development of health information systems that respond to the specific needs of different health programs. However, some of these programs have indicators that are not aligned with the 2016-2027 HSS. As a result, there are several information digitization systems that will neither be aligned with the 2020 National Digital Health Strategy nor the 2016-2020 Integrated Monitoring and Evaluation Plan (IMEP).

Nevertheless, the National Public Health Observatory (NPHO) and the Cameroon Health Data Collaborative are now working to bring together various partners for a collective contribution to the HIS development vision.

The country has a ministry in charge of telecommunications (MINPOSTEL) and structures under its supervision in charge of regulation (ART) and the national agency of ICTs (ANTIC). However, the collaborative link between the MINPOSTEL, incubator of the Cameroon Digital Strategy 2020, the MOH and ANTIC is neither structured nor regulated.

There are two structures related to digital health, whose missions are clearly defined in decree n ° 2013/093 of 03 April 2013 on the organization of the Ministry of Public Health, but without a real cooperative framework for intervention. These are the Computer Unit and the Health Information Unit.

3.2. LEGISLATION, POLICY AND COMPLIANCE

This component examines the normative framework, that is, the legal and regulatory provisions that govern digital health in Cameroon. While the implementation of the sector strategy cannot function without a digital component, it is important to point out that this digital use has privacy and/or individual freedoms risks, as there is no adequate law on digital health in Cameroon. However, the country has some legal and regulatory instruments that regulate ICT, including Decree No. 2012/180 of 10 April 2012 on the organization and functioning of the National Agency for Information and Communication Technologies (ANTIC) whose missions include:

• Regulate, control and monitor activities related to the security of information systems and electronic communication networks, as well as electronic certification, in collaboration with the Telecommunications Regulatory Agency (ART)

• Promote ICTs.

A draft instrument on telemedicine is being finalized at the MOH; generally, there are legal loopholes in the implementation of health interventions in Cameroon, including the absence of instruments guaranteeing confidentiality and the right to privacy.

There is a national ethics committee for research on human health, as well as review committees that promote medical and biomedical ethics in the country. However, Cameroon does not yet have a regulatory and ethical framework for the implementation of digital health interventions. The sharing of health data between sources has more benefits for the improvement of care, than risks of intrusion into the privacy of individuals.

It is therefore necessary to have regulatory tools validated by a multi-sector body to regulate all digital health practices in Cameroon.

3.3. HUMAN RESOURCES

Cameroon has several academic and professional institutions that train and graduate ICT technicians and engineers into the job market every year. However, a formal assessment and definition of skills and competencies required to support the growing digital health ecosystem should be conducted. Donors and specific partners offer capacity-building opportunities to meet their health data needs that may not always be in line with the vision of a Digital Cameroon by 2020.

Human resources for digital health include primarily health workers, IT professionals and developers of electronic content.

There are insufficient numbers of IT professionals responsible for managing and maintaining computer equipment and assisting health workers in using computer equipment and systems, especially in health facilities at the operational level.

However, it is worth noting that IT professionals are more plentiful at central and intermediate levels.

One of the main problems faced by health care institutions is their limited ability to attract and retain IT professionals and, more specifically, digital health professionals. Most health staff and users, especially those in rural areas, do not have computer skills. In addition, many doctors and nurses are primarily engaged in their technical work and feel that ICT is an additional burden that takes them away from their main tasks. In other health facilities, health workers are computer-literate, but the available computers are not used for routine technical tasks.

At the national level, MOH has local expertise in health information automation (DHIS2) and deployment of ICT infrastructure which ensures comprehensive visibility of the distribution of health districts across the country, performance assessment in promptness and completeness and finally, a reliable source of data to analyze the health situation in Cameroon based on the indicators of certain health programs (Malaria, HIV, AIDS et
c.).
However, there is no provisional management of digital health skills, nor a capacity-building plan in digital health developed by the MOH. Today, it is clear that the implementation of digital health in Cameroon at all levels of the health pyramid is facing a qualitative and quantitative shortage of competent and available human resources.

3.4. STRATEGY AND INVESTMENT

Cameroon has not yet developed an eHealth financing plan. Today, most of the funding obtained for eHealth is short-term. The government and Technical and Financial Partners, as well as some private sector actors, have invested in the procurement of ICT infrastructure and the training of healthcare providers as part of their support to the eHealth system. However, it is difficult today to assess high-level political commitment to adequate funding of eHealth in Cameroon. eHealth funds are dispersed among various ministries.

Moreover, in the absence of a body in charge of steering, coordinating, and monitoring the use of eHealth funds by the MOH and other ministries (MINCOM, MINEFI, MINAS, MINPROFF, MINPOSTEL, etc.), it will be difficult to assess the exhaustiveness of the funds mobilized and to rationally evaluate their long-term impact.

3.5. SERVICES AND APPLICATIONS

The DHIS2 provides a non-exhaustive list of the structures that make up the health pyramid. In the eHealth market in Cameroon, there are eHealth applications (CardioPad, GiftedMum, Dama, EMR) for the management of remote health interventions. But no provision, however embryonic, has yet been made for the establishment of an eHealth pyramid or a Cameroonian eHealth ecosystem integrating and organizing current initiatives. However, the government has prepared the Digital Cameroon 2020 development strategy that includes "digital health" as an important subcomponent for the development of the digital economy in Cameroon.

There is a National Public Health Observatory (NPHO) at the Ministry of Public Health in charge of disseminating health information, mainly collected at health facilities, and coordinating the Cameroon Health Data Collaborative (CHDC), which is a network of structures that produce and use health data. However, there is low use and harnessing of this data to improve the quality of decision-making at all levels of the health pyramid. Data collection tools and methods are not yet aligned with an effective standard reference model, but rather with specific, sometimes individual, approaches that do not always follow data search and cleanup frameworks. Despite this situation, NPHO in collaboration with the Department of Disease, Epidemics and Pandemics Control (DLMEP), carries out health oversight and monitoring, and conducts epidemiological and user satisfaction surveys in collaboration with the structures involved.

The MOH has a Division of Operational Research in Health (DROS) in charge of promoting operational research in health by disseminating research results through the Centre for Digital Documentation of the Health Sector (CDNSS), as well as the translation of these results into concrete proposals for action. As part of the CHDC, DROS and NPHO ensure the quality and use of health data produced. Collaboration between MOH, MINRESI and Universities for the promotion of Technological Innovation in the field of eHealth is still very insufficient.

3.6. INFRASTRUCTURE

Infrastructure refers to both physical technology and platforms or digital services that support information sharing within the health sector. The innovative approach in ICT takes into account the need for policy interventions in purchasing infrastructure as the key to successful implementation of eHealth systems. In this respect, the government has initiated infrastructural projects such as submarine optical fiber cables and their deployment in the main regions of the country. Thanks to public-private partnership, the government continues to promote the availability of and access to a reliable and affordable wireless broadband connectivity. These initiatives, coupled with the increasing penetration of mobile technologies, will provide the infrastructural impetus needed for the implementation of eHealth systems. Though the Ministry of Public Health has a national system for collecting aggregate health data (DHIS2) and some new applications (DAMA, EMR, eHealth, CardioPad etc.), it does not yet have a centralized and highly secured infrastructure that enables both synchronization of data and centralized oversight of all the entities of the health pyramid. Also, there is neither a proactive policy nor any strategies to establish an appropriate system for maintenance and depreciation of infrastructure.

In terms of health structures equipped with ICT at the national level, only 32.1% of health facilities have their own computers, while 16.8 % use private computers, with internet access limited to 27% of health facilities. Concerning information and communication, private mobile phones purchased by staff but used by the health facility are the most commonly used means of communication by health facilities (52.7%), followed by mobile phones belonging to the facility (33.2%), and private mobile phones with airtime paid for by the health facility (23.1%).

3.7. STANDARDS AND INTEROPERABILITY

For effective health data sharing, the software used must "speak the same language." Interoperability must be technical, specifying shared formats in order to enable the interconnection of different applications used in the health system. Without interoperability, there is no data sharing, and therefore no value-added services from this data.

Interoperability enables increased use of digital health data in an organized environment. To ensure secure health data-sharing, interoperability relies on the identification and authentication of those who access it. Today, this hard and soft infrastructure foundation is a "trusted environment" in line with public health objectives. It enables a generation of new services that are patient-oriented and based specifically on the use of structured data.

Interoperability is achieved by adhering to HL7, ADX, and FHIR Standard or Protocols to standardize data exchange between systems. The FHIR is an improved version of the HL7. It also includes clinical coding standards as well as medical terminology standards such as ICD, SNOMED, and LOINC. Its effectiveness lies in taking into account the Patient's Unique Identifier Code, the Patient's Index Number, a HF Master List, norms and standards, and finally, standard messages.

In Cameroon, the DHIS2 implemented by the Health Information Unit provides a non-exhaustive list of the structures making up the health pyramid, which is a prerequisite for the implementation of interoperability.

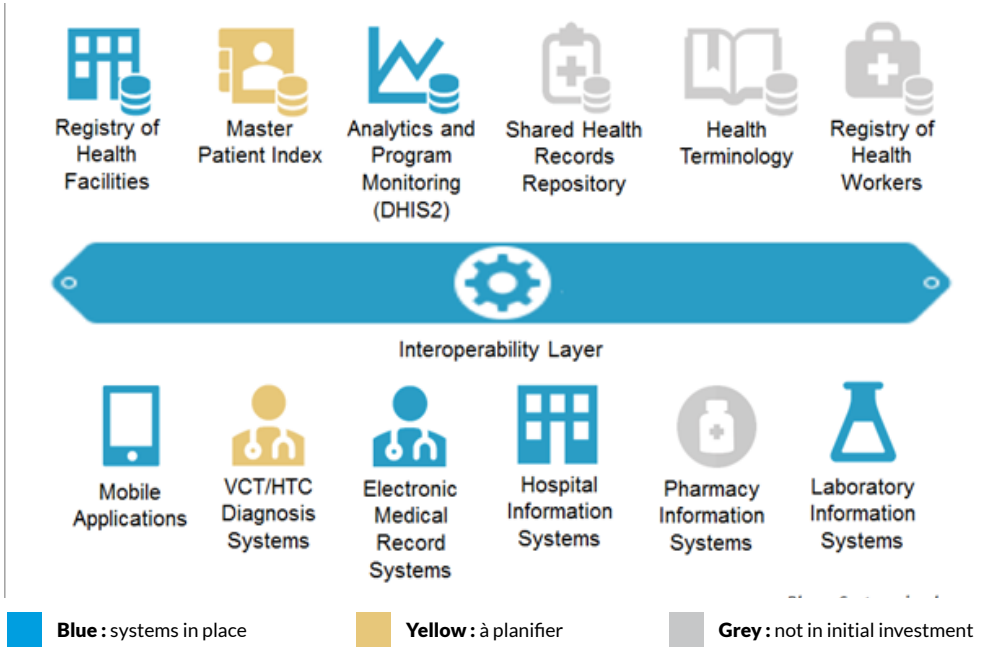
In Cameroon, health applications are developed according to a set of specifications that does not always take into account the existence of parallel solutions or operational integrity constraints (HL7) in relation to interoperability. The component-oriented development approach is still underused, and this leads to a proliferation of applications that often address the same issues and use the same data in the same health structures (SIH, DAMA, FUSCHIA, OpenMRS-Bahmni, etc.).

Therefore, the eHealth strategy should serve as a catalyst to produce guidelines on standards and interoperability to ensure their implementation and monitoring.

The DHIS2 implemented in Cameroon enables data sharing between the health districts and the central level. Data flow is mainly unidirectional, that is, from the base to the central level. This may cause control problems related to data quality and sources. It should be noted that MOH does not yet have an ICT infrastructure ensuring the interconnection of all the components of Cameroon's health pyramid. Although MINPOSTEL is the governing body responsible for issues related to data exchange, and given the existence of telecommunications operators (CAMTEL, Orange, MTN, Nexttel), there is no protocol or technical infrastructure like a data warehouse for health data sharing. The eHealth strategy could contribute to filling this gap.

All of these disparities and shortcomings, both technical and managerial, are not conducive to the development of eHealth in Cameroon.

Figure 2: Major Components of an Ecosystem of Interoperability



3.8. STRENGTHS, WEAKNESSES, OPPORTUNITIES, AND THREATS

Strengths

- Political will in the Cameroon government to promote ICT, in order to improve the effectiveness and efficiency of healthcare provision and services.
- Collaboration between partners interested in evaluation and management of population health issues through ICTs (NGOs, donors, etc.)
- Several existing training facilities for health personnel (nursing and paramedical schools, Faculties of Medicine, Pharmacy, Dentistry and Biomedical Sciences, etc.)
- Several existing institutions and data-generating and consuming agencies of health information.
- Section in the e-Government master plan recognizing e-health as a priority area (e-health component of the Cameroon 2020 Digital Strategic Plan).
- Existing data collection systems for epidemiological surveillance in health facilities.
- Existence of a national health information system to collect individual patient data.
- Existence of a national health information system for aggregated data collection: District Health Information System (DHIS2).
- Availability of new mHealth applications: CARDIOPAD, Gifted Mom, DAMA.
- Availability of a national indicator protocol.

Weaknesses

- Lack of a unified vision and strategy for digital health among health sector actors.
- Absence of an MOH information system master plan and framework to monitor stakeholders' compliance with regulations.
- Low allocation of financial resources to strengthen the health information system.
- Poor coordination of the various actors producing health data.
- Absence of regulatory framework governing electronic medical records
- Insufficient public-private partnership for strengthening ICTs in the health sector.
- Absence of intra- and intersectoral management measures for health information sharing.
- Shortage of qualified staff in the field of medical informatics and biomedical engineering.
- Lack of continuing training of health personnel in ICT.
- Low integration of ICT modules in the continuing education of health personnel.
- Low allocation of resources for research and innovation in eHealth.
- Low capacity of electricity and internet supply in some remote health facilities.
- Insufficient patient data integration system.
- Absence of interoperability

- Existence of a national ethics committee for research and use of health data.

- Existence of a Cameroonian association of telemedicine and medical informatics

Opportunities

- Existence of training facilities for ICT experts (Schools for Computer and Telecommunications Engineers, etc.)

- Existence of a Cameroon association of telemedicine and medical informatics.

- Adoption of laws on electronic communications, cybersecurity and cybercrime.

- Development partners that support digital health programs and projects.

- Institutional support for the development of new technologies.

- Presence of young ICT innovators.

- Existing government and private initiatives to improve energy supply and green energy and internet coverage (4G) at affordable rates.

- Inter-ministerial collaboration (Ministries of Posts and Telecommunications, Higher Education, Scientific Research and Innovation etc.).

- Possibility to grant training scholarships to health personnel in the field of ICT.

- Wide range of IT and telecommunication specialties.

- Lack of existing system inventory (Digital Health Atlas).
- Non-exhaustive list of codified HFs
- A bsence of a complete clinical terminology of the health system.
- Absence of a unified patient record.
- Absence of the unique patient identifier code.
- Absence of an HIS oriented architecture
- Multiplicity of actors in HIS producing short-term data.
- Incomplete process for the harmonization of data collection tools

Threats

- Low implementation of national cybersecurity policy in the health information system.

- Budget and financial constraints limiting the government's ability to intervene in digital health.

- Possible resistance to changes in the implementation of eHealth applications.

- Cyberattacks .

- Weak institutional capacity for investigation and legal proceedings of cyberattacks.

- Corruption.

- Only 70% coverage of the national territory by 3G and 4G networks .

- Lack of ICT experts.

- Insufficient supply of electric power at the national level.

CHAPTER IV : CONCEPTUAL FRAMEWORK

This National eHealth Strategy aligns with the 2016-2027 Health Sector Strategy (HSS) and the Digital Cameroon 2020 vision in order to facilitate the achievement of their respective objectives for universal health coverage. The selected interventions are in line with WHO recommendations based on a critical assessment of factual data on emerging eHealth interventions, contributing to an improved health system and taking into consideration advantages, disadvantages, acceptability, feasibility, resource utilization and equity.

4.1. VISION

By 2024, Digital Health will effectively contribute to Universal Health Coverage (UHC) through informed decision-making at all levels of the health pyramid, and through reliable, robust, secure, and interoperable systems.

4.2. GUIDING PRINCIPLES

Table 5: Guiding Principles

Continuous improvement (maturity model)	It is necessary to develop eHealth in a continuous improvement process. This orientation makes it possible to set achievable goals.
Priority given to interventions with proven effectiveness	Selected interventions are based on a critical evaluation of the evidence, with consideration to the advantages, the disadvantages, the acceptability, the feasibility, the use of resources and equity
Patient-centered care	The patient is the ultimate beneficiary of digital health.
Data-based decisions	Evidence-based decisions ensure better patient care.
Transparency and accountability	eHealth governance protects beneficiaries and increases trust in electronic systems.
Quality assurance	Standards and procedures are important for quality assurance because nothing is more fragile than human lives affected by digital health.
Alignment of interventions by Technical and Financial Partners	The strategy provides a roadmap for Technical and Financial Partners to invest in the most important priorities for the country.

4.3. GENERAL OBJECTIVE

By 2024, improve the performance of the health system through optimal use of effective digital technologies at all levels of the health pyramid.

4.4. STRATEGIC ORIENTATION

Digital health has the potential to help address problems such as distance and access, but still shares many of the underlying challenges faced by health system interventions in general, including poor management, insufficient training, infrastructural limitations, and poor access to equipment and supplies. These considerations need to be addressed in addition to the specific implementation requirements introduced by digital health.

As with any introduction of innovations and new approaches, digital health interventions require changes in behavior and transitions to new practices. One example is moving away from entrenched paper-based systems to digital approaches. Implementations will succeed only if the digital health intervention is adopted by users, adds value, and facilitates the desired change or action. As such, implementers must be aware of the motivations, barriers and resistance to the disruption of the status quo that may affect fidelity of deployment, and understand that this will temper the possible benefits of digital health interventions.

The World Health Assembly Resolution on Digital Health unanimously approved by WHO Member States in May 2018, recognizing the value of digital technologies to contribute to advancing universal health coverage and other health aims of the Sustainable Development Goals (SDGs), **tasked the WHO to provide Member States with normative guidance in digital health on the most up-to-date evidence and advice to enable them to make the smartest investments and achieve the biggest gains in health.**

It is in this context that the WHO published **guidelines with recommendations based on a crtical evaluation of the factual data** on the emerging digital health interventions that are contributing to health system improvement, taking into account **benefits, drawbacks, acceptability, feasibility, resource use and equity.**

This document, which aims to strengthen evidence-based decision-making, encourages the integration and institutionalization of effective eHealth interventions:

1. Birth notification
2. Death notification
3. Stock notification and commodity management
4. Client-to-provider telemedicine
5. Provider-to-provider telemedicine
6. Targeted client communication
7. Patient/client health status tracking
8. Health worker decision support
9. Provision of training and educational content to health workers

These digital health interventions, available via mobile devices, are able to meet the challenges of the health system at different levels of coverage, throughout the process leading to Universal Health Coverage.

The strategic areas aim to create an ecosystem conducive to their implementation.

Table 6: Digital health interventions recommended by WHO based on evidence from impact assessments

DIGITAL HEALTH INTERVENTIONS	DEFINITION	SYNONYMES ET AUTRES DESCRIPTIONS
Provider to-provider Telemedicine	Provision of health services at a distance; delivery of health services where two or more health workers are separated by distance.	• Consultations for case management among health workers • Consulting with other health workers, • Particularly specialists, for patient case management and second opinion
Targeted client communication (targeted communication to individuals and patients)	i. Transmission of customized health information for different audience segments (often based on health status or demographic categories). Targeted client communication may include: ii. transmission of health event alerts to a specified population group; iii. transmission of health information based on health status or demographics; iv. alerts and reminders to clients v. transmission of diagnostic results (or of the availability of results)	• Notifications and reminders for appointments, medication adherence, or follow-up services • Notification of health events to specific populations based on demographic characteristics • Health education, behavior change communication, health promotion communication based on a known client's health status or clinical history • Alerts for preventive services and wellness
Health worker decision support	Digitized job aids that combine an individual's health information with the health worker's knowledge and clinical protocols to assist health workers in making diagnosis and treatment decisions.	• Clinical decision support systems • Job aid and assessment tools to support service delivery, may or may not be linked to a digital health record. • Algorithms to support service delivery according to care plans and protocol
Tracking patient/ client health status and services within a health record (digital tracking)	Digitized record used by health workers to capture and store health information on clients/patients in order to follow up their health status and services received. This may include digital service records, digital forms of paper-based registers for longitudinal health programs and case management logs within specific target populations, including migrant populations.	• Digital versions of paper-based registers for specific health domains • Digitized registers for longitudinal health programs, including tracking of migrant populations' benefits and health status • Case management logs within specific target populations, including migrant population.
Provision of educational content and training to health workers	The management and provision of education and training content in electronic format for health professionals. Unlike decision support, mLearning does not need to be used at the point of care.	

STRATEGIC AREA 1 : LEADERSHIP AND GOVERNANCE

STRATEGIC OBJECTIVE 1 : By 2024, improve governance and leadership in eHealth.

SPECIFIC OBJECTIVE 1.1: By 2021, establish a national committee to supervise and coordinate eHealth activities.

ACTIVITIES :
- Establish a working group to develop a draft instrument to create the National Committee for the Supervision and Coordination of eHealth.

- Organize workshops to validate the draft instruments.

SPECIFIC OBJECTIVE 1.2: By 2024, define processes and procedures to ensure compliance of eHealth interventions with standards, policies and the legislative and regulatory framework.

ACTIVITIES :
- Prepare the national digital health blueprint.
- Organize convention signing ceremonies.

SPECIFIC OBJECTIVE 1.3: By 2024, develop and disseminate the eHealth clinical safety policy document, including the legislative and regulatory framework for digital health.

ACTIVITIES :
- Develop the clinical safety policy document
- Disseminate the clinical safety policy document

SPECIFIC OBJECTIVE 1.4:
By 2024, have a strategic document for the management of availability, incidents, accessibility, service delivery and change.

ACTIVITIES :
- Develop a strategic document describing the management of availability, incidents, accessibility, service delivery and change.

- Disseminate the strategy document describing the management of availability, incidents, accessibility, service delivery and change.

SPECIFIC OBJECTIVE 1.5:
By 2020, develop a Monitoring/Evaluation Plan for the implementation of the eHealth Strategic Plan.

ACTIVITIES :
- Develop a Monitoring/Evaluation Plan for the implementation of the eHealth Strategic Plan.

- Disseminate the Monitoring/Evaluation Plan for the implementation of the eHealth Strategic Plan

STRATEGIC AREA 2: LEGISLATION, POLICY AND COMPLIANCE

STRATEGIC OBJECTIVE 2 : By 2024, strengthen the eHealth legal and regulatory framework.

SPECIFIC OBJECTIVE 2.1:
By 2024, improve policy and ethics in eHealth.

ACTIVITIES :
- Develop policy and ethics documents.
- Disseminate the policy and ethics documents.

SPECIFIC OBJECTIVE 2.2: By 2024, update and draft the instruments required to create an appropriate legal and institutional environment for partnership and contractual relations in eHealth.

ACTIVITIES:
- Develop legal instruments on digital health
- Disseminate legal instruments on digital health

STRATEGIC AREA 3: HUMAN RESOURCES

STRATEGIC OBJECTIVE 3:

By 2024, develop quantitative and qualitative human resources needed for digital health implementation.

SPECIFIC OBJECTIVE 3.1:
By 2020, assess the quantity and quality needs of health personnel who are to use the eHealth system.

ACTIVITY:
- Census of health personnel

SPECIFIC OBJECTIVE 3.2:
By 2022, have target personnel trained in the use of the computer tool.

ACTIVITIES:
- Provide first-level training to health personnel in IT
- Assess the level of the trained personnel
- Provide second-level training of health personnel in IT

SPECIFIC OBJECTIVE 3.3:
By 2024, have at least one ICT specialist in every district hospital.

ACTIVITY:
- Recruitment and capacity building of ICT specialists

SPECIFIC OBJECTIVE 3.4:
By 2022, have at least 10 eHealth application developers and 10 system administrators at the central level.

ACTIVITIES:
- Capacity building in eHealth applications development
- Capacity building in systems administration in digital health

STRATEGIC AREA 4: STRATEGY AND INVESTMENT

STRATEGIC OBJECTIVE 4

By 2024, strengthen investment and financing of eHealth

SPECIFIC OBJECTIVE 4.1:
Ensure the mobilization of national resources to finance the provision of eHealth services

ACTIVITIES:
- Develop an eHealth Annual Financing Plan (AFP)
- eHealth Financing Programming (Mobilizing matching funds)
- Budget eHealth financing

SPECIFIC OBJECTIVE 4.2:
Strengthen national and international partnership for eHealth.

ACTIVITIES:
- Organize advocacy meetings to mobilize financial resources for digital health
- Sign agreements (MOU) with private companies, CSOs, TFPs and partner administrations to mobilize funds for digital health.

SPECIFIC OBJECTIVE 4.3:
Establish a Digital Health Investment Fund

ACTIVITY:
- Establish a Digital Health Investment Fund

STRATEGIC AREA 5: SERVICES AND APPLICATIONS

STRATEGIC OBJECTIVE 5:

By 2024, develop services and applications that meet the needs of individuals, healthcare providers, managers and administrators of health facilities.

SPECIFIC OBJECTIVE 5.1:
By 2024, establish a UHC information management system in 50% of health facilities.

ACTIVITIES :
- Develop IT tools for medical, administrative and financial management of UHC.
- Deploy tools developed in the targeted structures.

SPECIFIC OBJECTIVE 5.2:
By 2024, set up a national integrated computer management system in 70% of health facilities.

ACTIVITIES :
- Develop an Electronic Medical Record.
- Develop tools for the logistics management of laboratories, finances, drugs, and vaccines.
- Longitudinal monitoring of patients of targeted program.
- Set up a public health event notification system.

SPECIFIC OBJECTIVE 5.3:
By 2024, develop telemedicine and mobile applications for the community, patients and service providers, and health care.

ACTIVITIES :
- Establish a telemedicine platform in Cameroon.
- Establish MOH communication mechanisms with target populations via mobile technologies.

STRATEGIC AREA 6: INFRASTRUCTURE

STRATEGIC OBJECTIVE 6:

By 2024, develop health information processing and sharing infrastructure between health structures and communities at the national and international levels.

SPECIFIC OBJECTIVE 6.1:
By 2022, ensure the availability of quality physical technological infrastructure in 70% of targeted health facilities.

ACTIVITIES:
- Strengthen broadband connectivity in targeted health facilities
- Increase IT equipment in targeted health structures
- Improve interconnection among targeted health structures
- Improve the maintenance of IT equipment and networks
- Establish alternative mechanisms to ensure the availability of electricity

SPECIFIC OBJECTIVE 6.2:
By 2023, ensure availability of cloud-based platforms or services in 70% of targeted health facilities.

ACTIVITY:
- Develop secure systems for health data storage

STRATEGIC AREA 7: STANDARDS AND INTEROPERABILITY

STRATEGIC OBJECTIVE 7:

By 2024, develop standards and interoperability components to improve the collection and exchange of consistent and accurate health information across geographical and sectoral boundaries.

SPECIFIC OBJECTIVE 7.1: By 2022, ensure the availability and application of ICT standards in 80% of health facilities at all levels of the health pyramid.

ACTIVITIES:
- Draft a standards framework.

SPECIFIC OBJECTIVE 7.2: By 2022, ensure the interoperability of IT systems in 80% of health facilities at all levels of the health pyramid.

ACTIVITIES:
- Ensure the secure exchange of data
- Set up a software accreditation /certification system
- Develop systems interoperability frameworks

It's all about highlighting

1 **Digital health for strengthening the health system and universal health coverage**

2 **The main services offered are**

- Automation of birth declarations
- Automation of death declarations
- Stock notifications and management of products
- Telemedicine
- Patient-targeted communication
- Digital monitoring of the health status of patients and services
- Assisting health professionals in decision making
- Mobile learning for health professionals ...

3 **This requires the implementation of the following major activities**

- Definition of the national digital health architecture
- Putting in place a national digital health committee
- Establishing the regulatory and legislative framework
- Training health personel in digital health
- Establishing a digital health investment fund
- Telemedicine for patients and the community
- Integrated electronic hospital management system
- Interconnection and provision of IT equipment for 3,000 health facilities
- Definition of the interoperability framework and the software accreditation process .....

CHAPTER V : INTERVENTION FRAMEWORK AND BUDGET

The National eHealth Strategic Plan (NEHSP) introduces a national framework for the development of digital health services over the next five years (2020-2024) to improve health promotion, disease prevention, case management, health system strengthening and governance, and strategic management of the health system. This Plan proposes specific activities in seven strategic areas to strengthen digital health in the country:

- **Leadership and governance**
- **Legislation, policy and compliance**
- **Human resources**
- **Strategy and investments in digital health**
- **eHealth services and applications**
- **Infrastructure**
- **Standards and interoperability**

The paragraph below describes the methodology used for NEHSP costing and a summary of the results of the cost estimate.

The costing covers a period of five years, from 2020 to 2024.

5.1. COSTING METHODOLOGY

An activity-based costing approach was used to estimate the funding required to implement the National eHealth Strategic Plan (NEHSP). On the basis of the general objective and the specific objectives, different activities were outlined. For each activity, cost elements were allocated in collaboration with stakeholders. All costs were calculated to obtain the total cost of the activity. Costs were presented in CFA Franc of Central Africa (XAF).

5.2. UNIT COSTS AND ASSUMPTIONS

Unit costs were obtained from various sources, including the use of documents and quotes from MOH, implementing partners, and quotes from IT and telecommunications suppliers. Cost estimates in dollars (US$) were converted to XAF at an exchange rate of XAF 595 per US dollar based on the average daily exchange rate (BEAC).

5.3. COST OF IMPLEMENTATION OF THE NATIONAL DIGITAL HEALTH STRATEGY

The NEHSP 2020-2024 is intended to address key challenges facing our health system, such as geographic inaccessibility, low demand for services, delayed delivery of care, poor adherence to clinical protocols, and costs incurred by individuals. To achieve this goal, an amount of 11,327,570,000 FCFA is required over the next five years, i.e. US $19,037,933. The table below summarizes the estimated costs for achieving the seven strategic objectives set out in NEHSP 2020-2024.

Table 7: Five-Year Budget for Implementation of the National eHealth Strategic Plan

	ANNUAL COST						
Strategic Objective	**2020**	**2021**	**2022**	**2023**	**2024**	**Total (XAF)**	**Total (USD)**
1. By 2024, improve governance and leadership in digital health.	135,500,000	62,900,000	28,400,000	28,400,000	22,400,000	**277,600,000**	**$466,555**
2. By 2024, strengthen the legal and regulatory framework for digital health.	3000,000	36,000,000	13,000,000	13,000,000	10,000,000	**75,000,000**	**$126,050**
3. By 2024, develop the quantity and quality of human resources needed to implement digital health.	46,000,000	113,000,000	11,000,000	55,000,000	8,000,000	**233,000,000**	**$391,597**
4. By 2024, strengthen investment and funding for digital health.	200,000	200,000	200,000	200,000	200,000	**1,000,000**	**$1,681**
5. By 2024, develop services and applications to meet the needs of individuals, healthcare providers, managers and administrators of health structures.	610,025,000	1,322,762,500	1,065,862,500	622,800,000	613,950,000	**4,235,400,000**	**$7,118,319**
6. By 2024, develop health information processing and sharing infrastructures between health structures and communities at national and international levels.	1,686,750,000	2,000,680,000	1,738,280,000	384,180,000	214,780,000	**6,024,670,000**	**$10,125,496**
7. By 2024, develop standards and interoperability components to improve the collection and exchange of consistent and accurate health information across geographical and sectoral boundaries.	197,800,000	175,600,000	40,833,333	48,833,333	17,833,333	**480,900,000**	**$808,235**
TOTAL	**2,679,275,000**	**3,711,142,500**	**2,897,575,833**	**1,152,413,333**	**887,163,333**	**11,327,570,000**	**$19,037,933**

Table 8: Budgeted Action Plan for Governance and Leadership Component (SO1)

1. By 2024, improve governance and leadership in digital health

	ANNUAL COST					
Strategic Objective	**2020**	**2021**	**2022**	**2023**	**2024**	**Total (CFA)**
1.1 By 2021, establish a national committee for oversight and coordination of digital health activities	7,500,000	-	-	-	-	**17,500,000**
1.2 By 2024, define processes and procedures to ensure compliance of digital health interventions with standards, policies and the legislative and regulatory framework	52,400,000	6,400,000	6,400,000	6,400,000	6,400,000	**78,000,000**
1.3 By 2024, develop and disseminate the clinical safety policy document for digital health, including the legislative and regulatory framework for digital health (Promoting clinical safety in digital health)	-	38,500,000	22,000,000	22,000,000	16,000,000	**98,500,000**
1.4 By 2024, have a strategic document on Availability, Incident Management, Accessibility, Service Delivery and Change Management	-	18,000,000	-	-	-	**18,000,000**
1.5 By the end of 2020, develop a Monitoring Plan - Evaluation of the implementation of the Strategic Digital Health Plan	65,600,000	-	-	-	-	**65,600,000**
TOTAL	**135,500,000**	**62,900,000**	**28,400,000**	**28,400,000**	**22,400,000**	**277,600,000**

Table 9: Budgeted Action Plan for the Legislation, Policies and Compliance Component (SO2)

2. By 2024, strengthen the eHealth legal and regulatory framework

	ANNUAL COST					
Strategic Objective	**2020**	**2021**	**2022**	**2023**	**2024**	**Total (CFA)**
By 2024, update and draft the instruments required to create an appropriate legal and institutional environment for partnership and contractual relations in eHealth.	3,000,000	36,000,000	13,000,000	13,000,000	10,000,000	**75,000,000**
TOTAL	**3 000 000**	**36 000 000**	**13 000 000**	**13 000 000**	**10 000 000**	**75 000 000**

Table 10: Budgeted Action Plan for the Human Resources Component (SO3)

3. By 2024, develop the quantity and quality of human resources needed to implement digital health.

	ANNUAL COST					
Strategic Objective	**2020**	**2021**	**2022**	**2023**	**2024**	**Total (CFA)**
3.1 Evaluate the quantity and quality needs for health personnel to use the digital health system by 2020	26 000 000	-	-	-	-	**26 000 000**
3.2 Have target personnel trained to use the computer tool by 2022.	6 000 000	75 000 000	-	43 000 000	-	**124 000 000**
3.3 Have at least one ICT expert in every District Hospital (4th Category) by 2023	-	-	3 000 000	4 000 000	-	**7 000 000**
3.4 Have at least 10 application developers in the digital health field at the central level by 2023.	7 000 000	34 000 000	4 000 000	4 000 000	4 000 000	**53 000 000**
3.4 Have at least 10 system administrators at the central level by 2023.	7 000 000	4 000 000	4 000 000	4 000 000	4 000 000	**23 000 000**
TOTAL	**46 000 000**	**113 000 000**	**11 000 000**	**55 000 000**	**8 000 000**	**233 000 000**

Table 11: Budgeted Action Plan for the Strategy and Investments Component (SO4)

4. By 2024, strengthen investment and funding for digital health

	ANNUAL COST					
Specific Objective	**2020**	**2021**	**2022**	**2023**	**2024**	**Total (CFA)**
4.1 Ensure mobilization of national resources for financing the provision of digital health services	-	-	-	-	-	**-**
4.2 Strengthen the national and international partnership for digital health	200 000	200 000	200 000	200 000	200 000	**1 000 000**
4.3 Establish a Digital Health Investment Fund	-	-	-	-	-	**-**
TOTAL	**200 000**	**200 000**	**200 000**	**200 000**	**200 000**	**1 000 000**

Table 12: Budgeted Action Plan for the Services and Applications Component (SO5)

5. By 2024, develop services and applications to meet the needs of individuals, healthcare providers, managers and administrators of health structures

	ANNUAL COST					
Specific Objectives	**2020**	**2021**	**2022**	**2023**	**2024**	**Total (CFA)**
5.1 By 2024, establish a UHC computer management system in 50% of health facilities	38 100 000	229 600 000	29 600 000	29 600 000	29 600 000	**356 500 000**
5.2 By 2024, establish an integrated national computer management system in 70% of health facilities	533 825 000	1 001 912 500	939 137 500	560 637 500	580 887 500	**3 616 400 000**
5.3 By 2024, develop telemedicine and mobile applications for the benefit of the community, patients and service providers, and healthcare	38 100 000	91 250 000	97 125 000	32 562 500	3 462 500	**262 500 000**
TOTAL	**610 025 000**	**1 322 762 500**	**1 065 862 500**	**622 800 000**	**613 950 000**	**4 235 400 000**

Table 13: Budgeted Action Plan of the Infrastructure Component (SO6)

6. By 2024, develop health information processing and sharing infrastructures between health structures and communities at national and international levels

	ANNUAL COST					
Specific Objective	**2020**	**2021**	**2022**	**2023**	**2024**	**Total (CFA)**
6.1 By 2022, ensure the availability of quality physical technology infrastructure in 70% of targeted health facilities	1 616 700 000	1 985 680 000	1 723 280 000	384 180 000	214 780 000	**5 924 620 000**
6.2 By 2023, ensure availability of cloud-based platforms or services in 70% of targeted health facilities	70 050 000	15 000 000	15 000 000	0	0	**100 050 000**
TOTAL	**1 686 750 000**	**2 000 680 000**	**1 738 280 000**	**384 180 000**	**214 780 000**	**6 024 670 000**

Table 14: Budgeted Action Plan for the Standards and Interoperability Component (SO7)

7. By 2024, develop standards and interoperability components to improve the collection and exchange of consistent and accurate health information across geographical and sectoral boundaries.

	ANNUAL COST					
Specific Objective	**2020**	**2021**	**2022**	**2023**	**2024**	**Total (CFA)**
7.1 By 2022, ensure the availability and application of ICT standards in 80% of health facilities at all levels of the health pyramid	116 000 000	-	-	-	-	**116 000 000**
7.2 By 2022, Ensure the interoperability of information systems in 80% of health facilities and at all levels of the health pyramid	81 800 000	175 600 000	40 833 333	48 833 333	17 833 333	**364 900 000**
TOTAL	**197 800 000**	**175 600 000**	**40 833 333**	**48 833 333**	**17 833 333**	**480 900 000**

CHAPTER VI :
MONITORING AND EVALUATION FRAMEWORK

Table 15: Performance indicators and targets by strategic objective

Strategic Area	Specific objectives	Indicators	Baseline values			Targets					Source	Methodology	Structure in charge
			Value	Source	Year	2020	2021	2022	2023	2024			
1. Leadership and Governance	By 2024, improve governance and leadership in eHealth	Achievement rate of the objectives of the eHealth strategic plan	ND	ND	2019	30%	50%	70%	80%	100%	Annual report	NOR/NOT	MOH
2. Legislation, Policy and Compliance	By 2024, strengthen the eHealth legal and regulatory framework.	Proportion of draft policies and legal instruments on digital health developed and validated	ND	ND	2019	30%	30%	20%	10%	10%	Workshop report	Estimation	MOH
3. Human Resources	By 2024, develop quantitative and qualitative human resources needed for digital health implementation.	Proportion of human resources trained in digital health	ND	ND	2019	40%	60%	100%	100%	100%	Annual report	Survey	IT Unit/DRH
4. Strategy and Investments	By 2024, increase digital health investment and financing	Proportion of the NeHP budget mobilized	0	ND	2019	15%	15%	30%	20%	20%	Annual report	Mobilized Budget / Total Budget	MOH
5. Services and Applications	By 2024, develop services and applications that meet the needs of individuals, healthcare providers, managers and administrators of health facilities	Proportion of health facilities using digital health services and applications	ND	ND	2019	0%	10%	20%	30%	50%	Report	Survey	IT Unit
6. Infrastructure	By 2024, develop the health information processing and sharing infrastructure between health structures and communities at the national and international levels	Proportion of health facilities equipped with digital health infrastructure	NA	NA	NA	0%	50%	70%	80%	100%	Report	Survey	IT Unit
7. Standards and Interoperability	By 2024, develop standards and interoperability components to improve the collection and exchange of consistent and accurate health information across geographical and sectoral boundaries	Proportion of targeted health facilities having accredited interoperable systems	ND	ND	ND	0%	50%	80%	90%	100%	Report	Survey	IT Unit

Table 16: Indicators and Targets by Specific Objective

STRATEGIC OBJECTIVE 1: BY 2024, IMPROVE GOVERNANCE AND LEADERSHIP IN DIGITAL HEALTH

Specific objectives	Indicators	Baseline values			Targets					Source	Method	Structure in charge
		Value	Source	Year	2020	2021	2022	2023	2024			
1.1 By 2021, set up a national committee to supervise and coordinate digital health activities	Number of committees set up	0	ND	2019	1	0	0	0	0	Decree to establish the committee	MONITORING	MOH
1.2 By 2024, define processes and procedures to ensure compliance of eHealth interventions with standards, policies and the legislative and regulatory framework	Number of procedures manuals validated	0%	ND	2019	800	800	800	800	800	Annual report	MONITORING	MOH
	Number of conventions signed	0%	ND	2019						Annual report	MONITORING	MOH
1.3 By 2024, develop and disseminate the eHealth clinical safety policy document, including the legislative and regulatory framework for digital health	Clinical security policy document validated and available	4000	ND	2019		1000	1000	1000	1000	Annual report	MONITORING	MOH
1.4 By 2024, have a strategic document for the management of availability, incidents, accessibility, service delivery and change management	Strategic document for the management of availability, incidents, accessibility, service delivery and change management available	0	ND	2019	0	1	0	0	0	Annual report	MONITORING	MOH
1.5 By 2020, develop a Monitoring/Evaluation Plan for the implementation of the eHealth Strategic Plan	Monitoring/Evaluation Plan for the implementation of the eHealth Strategic Plan available	0	ND	2019	200	0	0	0	0	Annual report	MONITORING	MOH

STRATEGIC OBJECTIVE 2: BY 2024, STRENGTHEN THE EHEALTH LEGAL AND REGULATORY FRAMEWORK

Specific objectives	Indicators	Baseline values			Targets					Source	Method	Structure in charge
		Value	Source	Year	2020	2021	2022	2023	2024			
2.1 By 2024, improve policy and ethics in eHealth	Policy and Ethics documents validated and available	ND	ND	2019	1	0	0	0	0	Annual report	Evaluation	MOH
2.2 By 2024, update and draft instruments required to create an appropriate legal and institutional environment for partnership and contractual relations in eHealth	Number of instruments signed	0%	ND	2019	5	5	5	5	5	Official gazette and Compendium	Evaluation	MOH

STRATEGIC OBJECTIVE 3: BY 2024, DEVELOP QUANTITATIVE AND QUALITATIVE HUMAN RESOURCES NEEDED FOR THE IMPLEMENTATION OF DIGITAL HEALTH

Specific objectives	Indicators	Baseline values			Targets					Source	Method	Structure in charge
		Value	Source	Year	2020	2021	2022	2023	2024			
3.1 By 2020, assess the quantity and quality needs of health personnel who will use the eHealth system	Document on needs assessment available	0	ND	2019	100%	0	0	0	0	Annual report	Census	MOH
3.2 By 2022, have target personnel trained in using the computer tool	Proportion of target staff effectively trained in IT by 2021	0	Census report 2020	2019	0	100%	0	0	0	Annual report	Evaluation	MOH
	Record available of all target staff effectively trained to use the digital health system by 2022	0	Evaluation report 2021	2019	0	0	100%	0	0	Annual report	Evaluation	MOH
3.3 Have at least one ICT specialist in every district hospital	Proportion of DHs which have at least one ICT expert	0	ND	2019	0		50%	100%	0	Annual report	Evaluation	MOH
3.4 Have at least 10 system administrators at the central level	Proportion of digital health application developers trained at the central level	0	ND	2019	0	0	50%	100%	0	Annual report	Evaluation	MOH

STRATEGIC OBJECTIVE 4: BY 2024, STRENGTHEN INVESTMENT AND FINANCING OF EHEALTH

Specific objectives	Indicators	Baseline values			Targets					Source	Method	Structure in charge
		Value	Source	Year	2020	2021	2022	2023	2024			
4.1 Ensure mobilization of national resources to finance the provision of eHealth services	Proportion of the national budget allocated to digital health	0	ND	2019	0%	5%	5%	5%	5%	Annual performance report / Annual monitoring report on convention implementation	State budget mobilized/ total budget	MOH
4.2 Strengthen national and international partnership for eHealth	Proportion of the NeHP funded by partners	0	ND	2019	15%	10%	25%	15%	15%	Annual performance report / Annual monitoring report on convention implementation	Partners budget / total budget	MOH
4.3 Establish a Digital Health Investment Fund	Number of eHealth investment funds in place	0	ND	2019	1					Annual performance report / Annual monitoring report on convention implementation		PR

STRATEGIC OBJECTIVE 5: DEVELOP SERVICES AND APPLICATIONS THAT MEET THE NEEDS OF INDIVIDUALS, HEALTHCARE PROVIDERS, MANAGERS AND ADMINISTRATORS OF HEALTH FACILITIES.

Specific objectives	Indicators	Baseline values			Targets					Source	Method	Structure in charge
		Value	Source	Year	2020	2021	2022	2023	2024			
5.1 By 2024, establish a UHC information management system in 50% of health facilities	Proportion of target health facilities with a UHC information management system	0	ND	2019	0%	5%	5%	5%	5%	Report	Survey	IT Unit
5.2 By 2024, set up a nationally integrated computer management system in 70% of health facilities	Proportion of targeted health facilities that have set up an integrated computer management system	NA	NA	NA	0%	10%	30%	15%	15%	Report	Survey	IT Unit
5.3 By 2024, develop telemedicine and mobile applications for the community, patients and service providers, and health care	Proportion of health facilities having developed telemedicine and mobile applications for patients	NA	NA	NA	0%	10%	30%	50%	70%	Report	Survey	IT Unit

STRATEGIC OBJECTIVE 6: BY 2024, DEVELOP HEALTH INFORMATION PROCESSING AND SHARING INFRASTRUCTURE BETWEEN HEALTH STRUCTURES AND COMMUNITIES AT THE NATIONAL AND INTERNATIONAL LEVELS.

Specific objectives	Indicators	Baseline values			Targets					Source	Method	Structure in charge
		Value	Source	Year	2020	2021	2022	2023	2024			
6.1 By 2022, ensure the availability of quality physical technological infrastructure in 70% of targeted health facilities.	Proportion of health facilities having good physical and technological infrastructure	NA	NA	NA	0%	50%	70%	80%	100%	Report	Survey	IT Unit
6.2 By 2023, ensure the availability of platforms or digital services in 70% of targeted health facilities	Proportion of targeted health facilities having a backup system for health data	NA	NA	NA	0%	20%	50%	70%	80%	Report	Survey	IT Unit

STRATEGIC OBJECTIVE 7: DEVELOP STANDARDS AND INTEROPERABILITY COMPONENTS TO IMPROVE THE COLLECTION AND EXCHANGE OF CONSISTENT AND ACCURATE HEALTH INFORMATION ACROSS GEOGRAPHICAL AND SECTORAL BOUNDARIES

Specific objectives	Indicators	Baseline values			Targets					Source	Method	Structure in charge
		Value	Source	Year	2020	2021	2022	2023	2024			
7.1 By 2022, ensure the availability and application of ICT standards in 80% of health facilities at all levels of the health pyramid.	Proportion of targeted health facilities enforcing the adopted standards	NA	NA	NA	0%	50%	80%	90%	100%	Report	Survey	IT Unit
7.2 By 2022, ensure the interoperability of IT systems in 80% of health facilities at all levels of the health pyramid	Proportion of targeted health facilities having accredited interoperable systems	NA	NA	NA	0%	50%	80%	90%	100%	Report	Survey	IT Unit

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APPENDIX

Table 17: Detailed Budget for the Governance and Leadership Component (SO1)

1. BY 2024, IMPROVE GOVERNANCE AND LEADERSHIP IN DIGITAL HEALTH

						ANNUAL COST				
Specific Objective	**Activities**	**Task**	**Quantity**	**Unit Cost**	**Total Cost**	**2020**	**2021**	**2022**	**2023**	**2024**
1.1 By 2021, establish a national committee for oversight and coordination of digital health activities	Develop a draft act creating the national committee to oversee digital health coordination	Organize a drafting workshop for the draft act to create the National Committee for the Supervision of Digital Health Coordination	1	3 000 000	3 000 000	3 000 000	-	-	-	-
	Establishment of a digital health communication plan	Organize a workshop to develop RDTs for the recruitment of a consultant to develop a communication plan for digital health	1	3 000 000	3 000 000	3 000 000	-	-	-	-
		Recruit a consultant for the development of the digital health communication plan	1	8 500 000	8 500 000	8 500 000	-	-	-	-
		Organize a validation workshop for the eHealth communication plan	1	3 000 000	3 000 000	3 000 000				
1.2 By 2024, define processes and procedures to ensure compliance of digital health interventions with standards, policies and the legislative and regulatory framework	Preparation of the national digital health blueprint	Organize a workshop to develop RDTs for the recruitment of a research firm	1	3 000 000	3 000 000	3 000 000				
		Recruit a research firm to develop the national digital health blueprint	1	40 000 000	40 000 000	40 000 000				
		Organize a workshop to validate the national digital health blueprint	1	3 000 000	3 000 000	3 000 000				
		Disseminate the national digital health blueprint	4 000	8 000	32 000 000	6 400 000	6 400 000	6 400 000	6 400 000	6 400 000

						ANNUAL COST				
Specific Objective	**Activities**	**Task**	**Quantity**	**Unit Cost**	**Total Cost**	**2020**	**2021**	**2022**	**2023**	**2024**
	Organization of convention signing ceremonies	Organize a workshop to develop draft conventions (for informational purposes only)	-	-	-	-	-	-	-	-
		Organize conventions signing ceremonies (for informational purposes only)	-	-	-	-	-	-	-	-
1.3 By 2024, develop and disseminate the clinical safety policy document for digital health, including the legislative and regulatory framework for digital health (Promoting clinical safety in digital health)	Development of the clinical safety policy document	Organization of a workshop to develop RDTs for the recruitment of a consultant	1	3 000 000	3 000 000	-	3 000 000	-	-	-
		Recruitment of a consultant to support the development process of the clinical safety policy document on digital health	1	10 500 000	10 500 000	-	10 500 000	-	-	-
		Organization of validation workshops for the clinical safety policy document	1	3 000 000	3 000 000	-	3 000 000	-	-	-
		Produce the clinical safety policy document	4 000	4 000	16 000 000		4 000 000	4 000 000	4 000 000	4 000 000
	Dissemination of the clinical safety policy document	Organize extension workshops	11	6 000 000	66 000 000		18 000 000	18 000 000	18 000 000	12 000 000
1.4 By 2024, have a strategic document on Availability, Incident Management, Accessibility, Service Delivery and Change Management	Development of the strategic document describing the management of availability, incidents, accessibility, service delivery and change	Organize a TOR preparation workshop for the recruitment of an international expert	1	3 000 000	3 000 000		3 000 000			

						ANNUAL COST				
Specific Objective	**Activities**	**Task**	**Quantity**	**Unit Cost**	**Total Cost**	**2020**	**2021**	**2022**	**2023**	**2024**
1.4 By 2024, have a strategic document on Availability, Incident Management, Accessibility, Service Delivery and Change Management	Development of the strategic document describing the management of availability, incidents, accessibility, service delivery and change	Recruit a consultant to support the process of developing the strategic document describing the management of availability, incidents, accessibility, service delivery and change	1	10 500 000	10 500 000		10 500 000			
		Organize a strategic document validation workshop describing the management of availability, incidents, accessibility, service delivery and change	1	3 000 000	3 000 000		3 000 000			
		Organize a strategic document retrieval meeting describing the management of availability, incidents, accessibility, service delivery and change	1	1 500 000	1 500 000		1 500 000			
1.5 By the end of 2020, develop a Monitoring Plan - Evaluation of the implementation of the Strategic Digital Health Plan.	Development of the Monitoring Plan - Evaluation of the implementation of the Strategic Digital Health Plan.	Organize a workshop for the development of TORs for the recruitment of a firm	1	3 000 000	3 000 000	3 000 000				
		Recruit a research firm for the development of the Monitoring Plan - Evaluation of the implementation of the Strategic Plan for Digital Health	1	10 500 000	10 500 000	10 500 000				

						ANNUAL COST				
Specific Objective	**Activities**	**Task**	**Quantity**	**Unit Cost**	**Total Cost**	**2020**	**2021**	**2022**	**2023**	**2024**
1.5 By the end of 2020, develop a Monitoring Plan - Evaluation of the implementation of the Strategic Digital Health Plan.	Development of the Monitoring Plan - Evaluation of the implementation of the Strategic Digital Health Plan.	Organize a validation workshop for the Monitoring Plan - Evaluation of the implementation of the Strategic Plan for Digital Health	1	3 000 000	3 000 000	3 000 000				
		Produce the monitoring and evaluation plan document	200	4 000	800 000	800 000				
		Disseminate the monitoring and evaluation plan	11	3 000 000	33 000 000	33 000 000				
	Development of the sustainability plan for project achievements	Organize a workshop to develop TORs for the recruitment of a consultant	1	3 000 000	3 000 000	3 000 000				
		Recruit a consultant for preparation of the sustainability plan (funding, human resources and infrastructure)	1	8 500 000	8 500 000	8 500 000				
		Organize a validation workshop for the sustainability plan	1	3 000 000	3 000 000	3 000 000				
		Produce and disseminate the sustainability plan document	100	8 000	800 000	800 000				
TOTAL					**277 600 000**	**135 500 000**	**62 900 000**	**28 400 000**	**28 400 000**	**22 400 000**

Table 18: Detailed Budget for the Legislation, Policies and Compliance Component (SO2)

2. BY 2024, STRENGTHEN THE LEGAL AND REGULATORY FRAMEWORK FOR DIGITAL HEALTH.

						ANNUAL COST				
Specific Objective	**Activities**	**Task**	**Quantity**	**Unit Cost**	**Total Cost**	**2020**	**2021**	**2022**	**2023**	**2024**
2.1 By 2024, develop and disseminate the clinical safety policy document for digital health, including the legislative and regulatory framework for digital health (Promoting clinical safety in digital health)	Development of ethical promotion document for digital health	Organize a TOR preparation workshop for the recruitment of a consultant	1	3 000 000	3 000 000	-	3 000 000	-	-	-
		Recruit a consultant to support the process of developing the ethical health promotion document for digital health	1	8 500 000	8 500 000	-	8 500 000	-	-	-
		Organize a validation workshop for the policy and ethics document	1	3 000 000	3 000 000	-	3 000 000	-	-	-
		Produce the document promoting ethics in digital health	4 000	4 000	16 000 000		4 000 000	4 000 000	4 000 000	4 000 000
		Organize dissemination workshops	11	3 000 000	33 000 000		9 000 000	9 000 000	9 000 000	6 000 000
	Development of draft legal texts in digital health	Recruit a consultant to evaluate the legal framework in the digital health field	1	8 500 000	8 500 000	-	8 500 000			
		Organize a validation workshop for the document detailing digital health needs and draft legislation in Cameroon	1	3 000 000	3 000 000	3 000 000	-			
TOTAL					**75 000 000**	**3 000 000**	**36 000 000**	**13 000 000**	**13 000 000**	**10 000 000**

Table 19: Detailed Budget for the Human Resources Component (SO3)

						ANNUAL COST				
Specific Objective	**Activities**	**Task**	**Quantity**	**Unit Cost**	**Total Cost**	**2020**	**2021**	**2022**	**2023**	**2024**
3.1 By 2020, assess the quantity and quality needs of health personnel who are to use the eHealth system.	Census of health personnel	Organize a workshop to develop TORs for health sector staffing			-	-				
		Conduct census of health sector staff	1	20 000 000	20 000 000	20 000 000				
		Organize a workshop to prepare the survey report	1	3 000 000	3 000 000	3 000 000				
3.2 By 2022, have target personnel trained in the use of the computer tool.		Organize a workshop to develop the staff capacity-building plan	1	3 000 000	3 000 000	3 000 000				
		Organize a workshop to develop TORs for training in the use of the 1st-level computer tool	1	3 000 000	3 000 000	3 000 000				
		Organize training sessions for health personnel on the use of computers at all levels of the health pyramid	10	7 500 000	75 000 000		75 000 000			
			10	4 000 000	40 000 000	0	0		40 000 000	
		Organize a workshop for to revise training curricula for computer and health professionals	2	3 000 000	6 000 000	3 000 000			3 000 000	

						ANNUAL COST				
Specific Objective	**Activities**	**Task**	**Quantity**	**Unit Cost**	**Total Cost**	**2020**	**2021**	**2022**	**2023**	**2024**
3.3 By 2024, have at least one ICT specialist in every district hospital.	Capacity-building for ICT professionals in computer maintenance	Organize a workshop to develop TORs for the training of trainers	1	3,000,000	3,000,000			3,000,000		
		Organize training of trainers sessions	1	4,000,000	4,000,000				4,000,000	
3.4 By 2022, have at least 10 eHealth application developers and 10 system administrators at the central level.	Capacity-building for application developers in the digital health field	Acquisition of digital health application development platforms	1	30 000 000	30 000 000	0	15 000 000			
		Organize a workshop for the development of training TORs	1	3 000 000	3 000 000	3 000 000				
		Organize refresher training sessions to build the capacity of digital health application developers	5	4 000 000	20 000 000	4 000 000	4 000 000	4 000 000	4 000 000	4 000 000
	Capacity-building for system administrators in the digital health field	Organize a workshop for the development of training TORs	1	3 000 000	3 000 000	3 000 000				
		Organize refresher training sessions for capacity building of system administrators	5	4 000 000	20 000 000	4 000 000	4 000 000	4 000 000	4 000 000	4 000 000
	TOTAL				**233 000 000**	**46 000 000**	**98 000 000**	**11 000 000**	**55 000 000**	**8 000 000**

Table 20: Detailed Budget for the Strategy and Investments Component (SO4)

						ANNUAL COST				
Specific Objective	**Activities**	**Task**	**Quantity**	**Unit Cost**	**Total Cost**	**2020**	**2021**	**2022**	**2023**	**2024**
4.1 Ensure the mobilization of national resources for financing the provision of digital health services	Program Digital Health Financing (Mobilizing Matching Funds) (for guidance purposes)	Organize a workshop for the development of annual digital health funding plans			-		-	-	-	-
	Program Digital Health Financing (Mobilizing Matching Funds) (for guidance purposes)	Develop digital health investment projects		-	-					
		Include well-developed investment projects in digital health in the Medium Term Expenditure Framework (MTEF)		-	-					
	Create a digital health financing budget (for guidance purposes)	Budget for digital health investment projects		-	-					
4.2 Strengthen the national and international partnership for digital health	Organization of advocacy meetings to mobilize financial resources for digital health (for guidance purposes)	Develop a map and a directory of stakeholders in the financing of digital health			-	-				
		Organize 5 advocacy meetings to mobilize financial resources for digital health	5	200 000	1 000 000	200 000	200 000	200 000	200 000	200 000

						ANNUAL COST				
Specific Objective	**Activities**	**Task**	**Quantity**	**Unit Cost**	**Total Cost**	**2020**	**2021**	**2022**	**2023**	**2024**
4.2 Strengthen the national and international partnership for digital health	Sign agreements (MOU) with private companies, CSOs, TFPs and partner administrations to mobilize funding for digital health	Organize agreement validation workshops with private companies, CSOs, TFPs and partner administrations to mobilize funding for digital health.		-	-	-				
		Organize ceremonies to sign agreements with private companies, CSOs, PTFs and partner administrations to mobilize funding for digital health.		-	-	-	-	-	-	-
4.3 Establish a Digital Health Investment Fund	Establishment of a Digital Health Investment Fund (On an indicative basis)	Develop the formal framework for creating the Digital Health Investment Fund		-	-					
		Develop investment fund follow-up tools for digital health			-	-				
	TOTAL				**1 000 000**	**200 000**	**200 000**	**200 000**	**200 000**	**200 000**

Table 21: Detailed Budget for the Services and Applications Component (SO5)

5. BY 2024, DEVELOP SERVICES AND APPLICATIONS TO MEET THE NEEDS OF INDIVIDUALS, CAREGIVERS, MANAGERS AND ADMINISTRATORS

						ANNUAL COST				
Specific Objective	**Activities**	**Task**	**Quantity**	**Unit Cost**	**Total Cost**	**2020**	**2021**	**2022**	**2023**	**2024**
5.1 By 2024, establish a UHC information management system in 50% of health facilities.	Develop IT tools for the medical, administrative and financial management of the UHC	Organize a working session with 20 participants to prepare consultant TORs	1	1 000 000	1 000 000	1 000 000				
		Recruit a consultant to design and adapt the chosen application (30 days)	30	250 000	7 500 000	7 500 000				
		Organize a workshop to review and validate the consultant's work (20persx10day)	20	1 000 000	20 000 000	20 000 000				
	Roll out the tools developed in the targeted structures	Host and introduce the tools developed (monthly over 5 years)	60	800 000	48 000 000	9 600 000	9 600 000	9 600 000	9 600 000	9 600 000
		Organize a training of trainers workshop on the development, deployment and configuration of medical, administrative and financial management of the CSU (200 people x 10 days per DS)	200	1 000 000	200 000 000		200 000 000			
		Organize a training workshop for users of the application at the FOSA level (2persx3day / DS)	400	150 000	60 000 000		12 000 000	12 000 000	12 000 000	12 000 000
		Ensure corrective annual maintenance and scalable tools developed	4	5 000 000	20 000 000		50 000 000	50 000 000	50 000 000	50 000 000

						ANNUAL COST				
Specific Objective	**Activities**	**Task**	**Qty**	**Unit Cost**	**Total Cost**	**2020**	**2021**	**2022**	**2023**	**2024**
5.2 By 2024, put in place an integrated national HMIS management system in 70% of health facilities	Expand implementation of the Electronic Medical Record (EMR)	Recruitment of a consultant to develop a map of existing patient management software in Cameroon for accreditation (DAMA, Vindata, OpenMrs, etc.) (30days)	30	250 000	7 500 000	7 500 000				
		Develop specifications for the EMR		PM						
		Organize a working session with 30 participants to adopt specifications for the EMR	1	1 000 000	1 000 000	1 000 000				
		Recruit a consultant to develop EMR (90days) interoperable with existing subsystems	180	250 000	45 000 000	45 000 000				
		Organize a workshop to pretest and validate the tools developed (15persx7days)	15	700 000	10 500 000	10 500 000				
		Organize a training of trainers workshop on the development, deployment and configuration of the EMR (1persx200DSx5days)	200	250 000	50 000 000	50 000 000				
		Organize a training workshop for users of the DME application at the FOSA level (2persx3000FOSAx2days)	6000	100 000	600 000 000		5 250 000	5 250 000		
		Server settings in the 10 regions (3persx5days)	30	600 000	18 000 000	9 000 000	9 000 000			
		Install and cascade the DME into the FOSA (2persx2daysx3000FOSA)	3000	50 000	150 000 000		150 000 000	150 000 000	150 000 000	150 000 000

						ANNUAL COST				
Specific Objective	**Activities**	**Task**	**Qty**	**Unit Cost**	**Total Cost**	**2020**	**2021**	**2022**	**2023**	**2024**
5.2 By 2024, put in place an integrated national HMIS management system in 70% of health facilities	Expand implementation of the Electronic Medical Record (EMR)	Workshop to validate SOP and DME user manuals (30persx3days)	30	450 000	13 500 000	13 500 000				
		Develop a proposal to set up 10 regional pools to support FOSA EMR users		PM	-					
		Quarterly supervisory training mission of the EMR in the 10 regions (2persx5days)	20	2 000 000	40 000 000		3 375 000	3 375 000	3 375 000	3 375 000
		Recruit a consultant to develop the complementary health facility management modules over 30days (logistics of laboratories, finances, pharmaceuticals, and vaccines)	30	500 000	15 000 000		7 500 000		7 500 000	
	Develop tools for the logistics management of laboratories, pharmaceuticals, and vaccines	Training workshop for actors from central and regional levels to utilize GIS web platform data. (35persX5days)	35	250 000	8 750 000	4 375 000	4 375 000			
		Recruitment of an IT firm for corrective and scalable maintenance of the SIGLe modules at the DPML and FRPS levels.	1	16 000 000	16 000 000	16 000 000				
		Workshop to develop computer procedures and training in the administration and securing of the SIGLe data extraction module and SAGE 100c v4 software in FRPS and CENAME. (30persX8days)	30	400 000	12 000 000	6 000 000		6 000 000		
		Regional workshops to strengthen the capacities of FRPS staff in the operation and installation of the Commercial Management, Accounting and Pilot Edition modules of the SAGE 100 C software under SQL SERVER / EXPRESS. (12persX5daysX3regions)	36	250 000	9 000 000	2 250 000	2 250 000	2 250 000	2 250 000	

						ANNUAL COST				
Specific Objective	**Activities**	**Task**	**Qty**	**Unit Cost**	**Total Cost**	**2020**	**2021**	**2022**	**2023**	**2024**
5.2 By 2024, put in place an integrated national HMIS management system in 70% of health facilities	Develop tools for the logistics management of laboratories, pharmaceuticals, and vaccines	Computer specifications development workshop specifying the requirements for a SIGLe integrated into the FOSA. (20persX10days)	20	500 000	10 000 000	10 000 000				
		Recruitment of a IT firm in charge of GIS development / configuration	1	50 000 000	50 000 000	50 000 000				
		Training workshop for administrators and trainers on GIS software systems (20persX10days)	20	500 000	10 000 000		5 000 000		5 000 000	
		Software systems deployment missions to the operating sites (20persX15days)	20	750 000	15 000 000	3 000 000	3 000 000	3 000 000	3 000 000	3 000 000
		Training of SIGLe users at all levels of the health pyramid. (25persX4daysX5regions)	125	200 000	25 000 000	5 000 000	5 000 000	5 000 000	5 000 000	5 000 000
		Implementation of a support contract for corrective and scalable maintenance of GIS software systems	1	20 000 000	20 000 000			10 000 000		10 000 000
	Provide longitudinal follow-up of patients in target programs	Workshop for configuration of the electronic directories in the software DHIS2 tracker (15persx10days)	15	1 500 000	22 500 000					
		Develop the procedures manual and training modules for the DHIS2 tracker module (15persx4days)	30	450 000	13 500 000					
		Organize a training of trainers workshop for the DHIS2 tracker module (15persx5days)	15	750 000	11 250 000					
		Organize user training for the DHIS2 tracker module (2persx3daysx3000FOSA)	6000	100 000	600 000 000		150 000 000	150 000 000	150 000 000	150 000 000

						ANNUAL COST				
Specific Objective	**Activities**	**Task**	**Qty**	**Unit Cost**	**Total Cost**	**2020**	**2021**	**2022**	**2023**	**2024**
5.2 By 2024, put in place an integrated national HMIS management system in 70% of health facilities	Provide longitudinal follow-up of patients in target programs	Quarterly supervisory training mission for the DHIS2-Tracker in the 10 regions (2persx2daysxsite)	20	600 000	12 000 000					
		Organize annual scalable maintenance workshops for the DHIS2-Tracker software (15persx5days)	15	750 000	11 250 000		150 000 000	150 000 000	150 000 000	150 000 000
	Set up an automated system for reporting vital events (births and deaths)	Standardization Workshop for Birth and Death Declaration Forms (20persx3days)	20	450 000	9 000 000	9 000 000				
		Recruitment of a consultant for the implementation of a unique patient identification system (90 days)	90	250 000	22 500 000		22 500 000			
		Develop the procedures manual and training modules for the birth and death registration module (15persx4days)	15	600 000	9 000 000	9 000 000				
		Workshop to configure the electronic directories in the software DHIS2 tracker (15persx10days)	15	1 500 000	22 500 000	22 500 000				
		Organize a training of trainers workshop on the birth and the death declaration module (15persx5days)	15	750 000	11 250 000					
		Organize training of users on the birth and death declaration module (2persx3daysx3000FOSA)	6000	100 000	600 000 000		150 000 000	150 000 000	150 000 000	150 000 000
	Set up a notification system for public health events	Public health events notification system configuration workshop (15persx10days)	15	1 500 000	22 500 000	22 500 000				
		Workshop to develop the procedures manual for the public health events notification system (15persx4days)	15	600 000	9 000 000	9 000 000				

						ANNUAL COST				
Specific Objective	**Activities**	**Task**	**Qty**	**Unit Cost**	**Total Cost**	**2020**	**2021**	**2022**	**2023**	**2024**
5.2 By 2024, put in place an integrated national HMIS management system in 70% of health facilities	Set up a notification system for public health events	Cascade training on public health event risk mapping (2pers x 190 districts x 2days)	380	80 000	30 400 000		30 400 000			
		Organize joint (MOH/MINATD) public health event risk mapping missions in the 10 regions (5pers x 190 districts x 10days)	950	250 000	237 500 000		2 250 000	2 250 000	2 250 000	2 250 000
		Joint supervisory training mission for the public health events notification system in the 10 regions (2persx2daysxsite)	20	600 000	12 000 000		7 600 000	7 600 000	7 600 000	7 600 000
	Integrate all parallel systems for health data collection at the SNIS	Identify existing health data collection systems								
	Ensure the continued operation of all data storage platforms	Workshop to adopt national indicators to be integrated into the SNIS (20 prs x 3days)	20	300 000	6 000 000	6 000 000				
		Workshop to integrate new indicators into the national system (15prs x 5days)	15	500 000	7 500 000	7 500 000				
		Workshop to import historical data on the new indicators into the national system (15prs x 5days)	15	500 000	7 500 000	7 500 000				
		Pay hosting fees for the national data management and storage platform ($1000 x 12months x 5 years)	60	500 000	30 000 000	6 000 000	6 000 000	6 000 000	6 000 000	6 000 000
		Document functional maintenance of the national data storage platform		PM	-					
		Pay internet connection fees for actors at all levels (HD, region) to manage data (190 HD +10 Regions X 25,000/month)	60	5 000 000	300 000 000	60 000 000	60 000 000	60 000 000	60 000 000	60 000 000

						ANNUAL COST				
Specific Objective	**Activities**	**Task**	**Qty**	**Unit Cost**	**Total Cost**	**2020**	**2021**	**2022**	**2023**	**2024**
5.2 By 2024, put in place an integrated national HMIS management system in 70% of health facilities	Ensure the continued operation of all data storage platforms	Produce the data storage platform SOP manual (500 copies) HD, Regions, programs, technical departments, safety stock)	500	20 000	10 000 000		10 000 000			
		Distribute the data storage platform SOP manual		PM						
	Ensure data quality at all levels of the pyramid	Organize quarterly oversight missions on data quality from the district to the FOSA level (20 persx5days)	20	1 000 000	20 000 000	4 000 000	4 000 000	4 000 000	4 000 000	4 000 000
		Organize quarterly oversight missions on data quality from the regions to the districts	20	1 000 000	20 000 000	4 000 000	4 000 000	4 000 000	4 000 000	4 000 000
		Organize quarterly oversight missions on data quality from the central level to the regions	20	1 500 000	30 000 000	6 000 000	6 000 000	6 000 000	6 000 000	6 000 000
	Ensure data validation at all levels	Organize quarterly regional data validation workshops (4pools, 50 persx3days)	200	300 000	60 000 000	12 000 000	12 000 000	12 000 000	12 000 000	12 000 000
		Organize quarterly data validation workshops at the central level (30 persx3days)	30	1 200 000	36 000 000	7 200 000	7 200 000	7 200 000	7 200 000	7 200 000
	Develop a management manual and data quality assurance	Develop data management and quality assurance manual (20 prs x5 days)	20	500 000	10 000 000			10 000 000		
		Produce data management and quality assurance manual (500 copies)	500	10 000	5 000 000			5 000 000		
		Distribute data management and quality assurance procedures manual at all levels		-	-					

						ANNUAL COST				
Specific Objective	**Activities**	**Task**	**Qty**	**Unit Cost**	**Total Cost**	**2020**	**2021**	**2022**	**2023**	**2024**
5.2 By 2024, put in place an integrated national HMIS management system in 70% of health facilities	Train decision makers at different levels of the health pyramid to use data (decision support tools)	Organize data usage training sessions for decision makers at the HD and regional levels (200 pers *3days)	200	150 000	30 000 000			30 000 000		
		Organize data usage training sessions for decision makers at the central level (50 pers*2days)	50	200 000	10 000 000			10 000 000		
		Hold quarterly meetings of the Cameroon Health Data Colaborative (CHDC)	250	100 000	25 000 000	5 000 000	5 000 000	5 000 000	5 000 000	5 000 000
		Hold biannual data usage best practices meetings with HDs (4pools, 50persx1day)	200	100 000	20 000 000	4 000 000	4 000 000	4 000 000	4 000 000	4 000 000
	Build capacity in data management and analysis at all levels of the pyramid	Develop a data management training needs map	PM		-					
		Organize training of trainers workshops on data management	20	500 000	10 000 000		10 000 000			
		Organize capacity-building workshops for HDs on data entry and analysis	200	200 000	40 000 000		20 000 000	20 000 000		
	Promote, disseminate health data and results of health research	Workshops to develop digital portals (NPHO, CDNSS) for data dissemination	50	1 000 000	50 000 000	20 000 000	15 000 000	5 000 000	5 000 000	5 000 000
		Produce quarterly epidemiological bulletins	1000	20 000	20 000 000	4 000 000	4 000 000	4 000 000	4 000 000	4 000 000
		Produce and distribute monitoring report on 100 key health indicators	500	50 000	25 000 000	5 000 000	5 000 000	5 000 000	5 000 000	5 000 000
		Hold a conference on health data every two years		PM	-					
		Conduct two evaluations (mid-project and final) on the impact of data usage on health indicators	2	25 000 000	50 000 000		25 000 000			25 000 000

						ANNUAL COST				
Specific Objective	**Activities**	**Task**	**Qty**	**Unit Cost**	**Total Cost**	**2020**	**2021**	**2022**	**2023**	**2024**
5.3 By 2024, develop telemedicine and mobile applications for the community, patients and service providers, and health care	Set up a telemedicine platform in Cameroon	Workshop to define and prioritize telemedicine service offerings (30persx3days)	30	450 000	13 500 000	13 500 000				
		Award 10 grants to Cameroonian start-ups to develop applications dedicated to priority telemedicine service offerings	10	5 000 000	50 000 000		25 000 000		25 000 000	
		Mass-media campaign (television, radio, newspapers, posters) to publicize telemedicine offerings in Cameroon	1	10 000 000	10 000 000		5 000 000		5 000 000	
		Capacity-building workshop for health personnel on optimal telemedicine usage in the 10 regions (30persx3days)	300	450 000	135 000 000					
	Set up mechanisms for MOH to communicate with target populations through mobile technologies	Workshop to identify needs and priority communication and content development media (information and alerts) to be distributed: medical information to physicians, researchers and patients (30persx3days)	30	300 000	9 000 000	4 500 000		4 500 000		
		Mass media campaign (television, radio, newspapers, posters), educational and awareness-raising campaigns in the area of digital health	2	10 000 000	20 000 000		10 000 000		10 000 000	
		Sign agreements with mobile providers to send push messages	5	5 000 000	25 000 000	1 800 000	1 800 000	1 800 000	1 800 000	1 800 000
	TOTAL				**4 235 400 000**	**521 225 000**	**1 220 912 500**	**922 637 500**	**874 387 500**	**854 637 500**

Table 22: Detailed Budget for the Infrastructure Component (SO6)

6. BY 2024, DEVELOP HEALTH INFORMATION PROCESSING AND SHARING INFRASTRUCTURES BETWEEN HEALTH STRUCTURES AND COMMUNITIES AT NATIONAL AND INTERNATIONAL LEVELS

						ANNUAL COST				
Specific Objective	**Activities**	**Task**	**Qty**	**Unit Cost**	**Total Cost**	**2020**	**2021**	**2022**	**2023**	**2024**
6.1 By 2022, ensure the availability of quality physical technology infrastructure in 70% of targeted health facilities	Strengthen high and medium throughput connectivity in targeted health facilities	Make an inventory of existing network infrastructures at all levels of the health pyramid (3pers x 4 days x 40,000)	1	1 000 000	1 000 000	1 000 000				
		(regional decentralization to internet service providers)	80	2 000 000	160 000 000	64 000 000	48 000 000	16 000 000	32 000 000	
		Acquisition and installation of high-speed interconnection infrastructures for the 80 target health structures (3,000,000 equipment / site x 80 sites)	80	24 000 000	1 920 000 000		768 000 000	768 000 000	192 000 000	192 000 000
		Annual 2Mbps broadband interconnection fee for the 80 target health structures (6,000,000 / yr. royalty over 4yrs x 80 sites)	60	800 000	48 000 000	9 600 000	9 600 000	9 600 000	9 600 000	9 600 000
		Acquire, deploy and put into service infrastructures and services for the 2500 health structures according to identified priority needs (acquisition SIM DATA 200,000,000 + monthly payment 250,000,000)			237 000 000	94 800 000	71 100 000	23 700 000	47 400 000	
	Strengthen the computer stock in the targeted health structures	Define minimum requirements in services and computer equipment at all levels of the health pyramid (localized in the 3000 targeted health structures: 2pers x 190DS x 5 days x 25,000)	2	23 750 000	47 500 000	19 000 000	28 500 000			
		Installation of the CAD for the acquisition and commissioning of computer equipment in the targeted health structures (organize a work session with 10 participants)	PM	PM						

						ANNUAL COST				
Specific Objective	**Activities**	**Task**	**Qty**	**Unit Cost**	**Total Cost**	**2020**	**2021**	**2022**	**2023**	**2024**
6.1 By 2022, ensure the availability of quality physical technology infrastructure in 70% of targeted health facilities	Strengthen the computer stock in the targeted health structures	Acquisition and commissioning of IT equipment in targeted health facilities: HR, HD, CMA (3,000,000 / sites x 500)	500	3 000 000	1 500 000 000	600 000 000	450 000 000	450 000 000		
		Acquisition and commissioning of IT equipment in targeted health facilities: CSI (500,000 / sites x 2500)	2 500	500 000	1 250 000 000	500 000 000	375 000 000	375 000 000		
	Strengthen interconnection (intranet / messaging) between health structures	Organize a working session to develop the terms of reference and the call for applications document for the design and implementation of an interconnection platform (messaging / intranet)	2	100 000	200 000	200 000				
		Recruit a consultant to implement the contract requirements (identification of interconnection points and specification of technical characteristics necessary for physical and logical interfaces) (90 days x 300,000)	90	300 000	27 000 000	13 500 000	5 400 000	5 400 000	1 350 000	1 350 000
		Acquisition of computer hardware for deployment of the interconnection platform (50,000,000)	1	50 000 000	50 000 000	25 000 000	25 000 000			
	Strengthen the maintenance of IT equipment and networks	Conduct an assessment of equipment maintenance (localized in the 3000 targeted health facilities: 2 x 190pers x 5 days x 25,000)	5	9 500 000	47 500 000	19 000 000	14 250 000	4 750 000	4 750 000	4 750 000
		Installation of the CAD to contract maintenance (to develop a maintenance plan for computer equipment and networks)	1	100 000	100 000	100 000				
		Contract out computer and network equipment maintenance (50,000 / year x 3000)	1	150 000 000	150 000 000	60 000 000	45 000 000	15 000 000	15 000 000	15 000 000
		Monitor / evaluate quarterly implementation of computer and network equipment maintenance (2pers / 10R x 25,000) + (1pers x 25,000)	21	400 000	8 400 000	1 680 000	1 680 000	1 680 000	1 680 000	1 680 000

						ANNUAL COST				
Specific Objective	**Activities**	**Task**	**Qty**	**Unit Cost**	**Total Cost**	**2020**	**2021**	**2022**	**2023**	**2024**
6.1 By 2022, ensure the availability of quality physical technology infrastructure in 70% of targeted health facilities	Set up alternative mechanisms to ensure the availability of electrical energy	Conduct an assessment of the availability and level of energy consumption in health facilities and alternative solutions (1 x 25,000 x 3000)	3 000	25 000	75 000 000	37 500 000	18 750 000	18 750 000		
		Organize a working session with 10 participants to validate the infrastructure evaluation report	PM	PM	0					
		Installation of the CAD for the acquisition and implementation of solutions for electrical energy services and backup	PM	PM	0					
		Acquire, install and implement solutions for electrical energy services and backup	PM	PM						
		Contract out the maintenance of electricity installations	PM	PM						
		Monitor the implementation of computer and network equipment maintenance	PM	PM						
6.2 By 2023, ensure availability of cloud-based platforms or services in 70% of targeted health facilities	Develop secure systems for storing health data	Conduct a study to identify health data storage solutions (CAMTEL, CAMPOST) (2pers x 25,000 x 1)	1	50 000	50 000	50 000				
		Organize a working session to analyze the study findings			0					
		Install the CAD for the acquisition and implementation of health data storage solutions at the central level			0					
		Acquire and install health data storage equipment at the central level	1	100 000 000	100 000 000	70 000 000	15 000 000	15 000 000		
	TOTAL				**6 024 670 000**	**1 686 750 000**	**2 000 680 000**	**1 738 280 000**	**384 180 000**	**214 780 000**

Table 23: Detailed Budget for the Standards and Interoperability Component (SO7)

7. BY 2024, DEVELOP THE STANDARDS AND INTEROPERABILITY COMPONENTS TO IMPROVE THE COLLECTION AND EXCHANGE OF CONSISTENT AND ACCURATE HEALTH INFORMATION ACROSS GEOGRAPHICAL AND SECTORAL BOUNDARIES.

						ANNUAL COST				
Specific Objective	**Activities**	**Task**	**Qty**	**Unit Cost**	**Total Cost**	**2020**	**2021**	**2022**	**2023**	**2024**
7.1 By 2022, ensure the availability and application of ICT standards in 80% of health facilities at all levels of the health pyramid	Develop the standards framework	Organize a non-resident workshop to identify equipment, systems, services and data format to be standardized (30pers x 3 days)	30	300 000	9 000 000	9 000 000				
		Recruit a national consultant to assess existing standards (20 days)	20	250 000	5 000 000	5 000 000				
		Organize 2 workshops to develop standards where none exist and contextualize existing ones (30 pers x 3 days)	60	300 000	18 000 000	18 000 000				
		Organize a workshop to adopt the norms that suit our environment (30persx3days)	30	300 000	9 000 000	9 000 000				
		Produce, copy, and distribute validated standards (3 standards of 100 pages each, 5000 copies / standard)	15000	5 000	75 000 000	75 000 000				
By 2022, ensure the availability and application of ICT standards in 80% of health facilities at all levels of the health pyramid	Ensuring the secure exchange of data	Organize a workshop to develop secure transmission protocols (30persx3days)	30	300 000	9 000 000			9 000 000		
		Organize a validation workshop for secure transmission protocols (30persx3days)	30	300 000	9 000 000			9 000 000		
		Recruit a consultant to develop the security policy for data exchange (1 consultant x 45 days)	45	250 000	11 250 000		11 250 000			
		Organize a validation workshop for the secure data exchange policy	30	300 000	9 000 000		9 000 000			

						ANNUAL COST				
Specific Objective	**Activities**	**Task**	**Qty**	**Unit Cost**	**Total Cost**	**2020**	**2021**	**2022**	**2023**	**2024**
By 2022, ensure the availability and application of ICT standards in 80% of health facilities at all levels of the health pyramid	Ensuring the secure exchange of data	Recruit a consultant to configure messaging and develop usage and administration procedures (1 consultant x 30 days)	45	250 000	11 250 000	11 250 000				
		Organize 2 technical preparatory meetings	40	15 000	600 000	600 000				
		Organize a workshop to configure messaging and develop usage and administration procedures (management rules)	30	300 000	9 000 000	9 000 000				
		Commission (effective deployment) Secure Messaging	1	2 000 000	2 000 000	2 000 000				
		Organize a workshop to develop user and administration manuals for secure messaging (30persx3days)	30	300 000	9 000 000	9 000 000				
		Organize a non-resident training of trainers workshop in use of secure messaging (30persx3days)	30	300 000	9 000 000	9 000 000				
		Organize 10 regional workshops to train users of secure messaging (30persx1day)	30	150 000	4 500 000	4 500 000				
		Issue payment to network security and information systems auditors/ experts	20	350 000	7 000 000				7 000 000	
		Carry out security audit missions of data exchange systems	30	50 000	1 500 000				1 500 000	
		Ensure physical security and logical data security (Acquire security certificates)	1	5 000 000	5 000 000			5 000 000		

						ANNUAL COST				
Specific Objective	**Activities**	**Task**	**Qty**	**Unit Cost**	**Total Cost**	**2020**	**2021**	**2022**	**2023**	**2024**
By 2022, ensure the availability and application of ICT standards in 80% of health facilities at all levels of the health pyramid	Set up a software accreditation / certification system	Organize a workshop to develop the Manual of Software Accreditation Procedures (30persx3days)	30	300 000	9 000 000		9 000 000			
		Organize a validation workshop for software accreditation procedures manual (30persx3days)	30	300 000	9 000 000		9 000 000			
		Organize a meeting to adopt the Software Accreditation Procedures Manual (30persx1day)	30	15 000	450 000		450 000			
		Recruit a consultant to develop a platform for managing software accreditations	1	50 000 000	50 000 000		50 000 000			
		Organize software operations audit missions	200	200 000	40 000 000			13 333 333	13 333 333	13 333 333
	Develop systems interoperability standards	Organize a coding adoption workshop for the unique patient identifier (30persx3day)	30	300 000	9 000 000	9 000 000				
		Organize a national standard drug coding review workshop (30persx3day)	30	300 000	9 000 000	9 000 000				
		Organize a meeting to adopt a codified list of health facilities (30persx “day)	30	300 000	9 000 000		9 000 000			
		Organize a workshop to review and update the consolidated list of health facilities (30persx1day)	30	300 000	9 000 000				9 000 000	
		Organize a workshop to develop a dictionary of health data and metadata (30persx3days)	30	300 000	9 000 000		9 000 000			
		Organize a validation workshop for the dictionary of data and health metadata (30persx3days)	30	300 000	9 000 000		9 000 000			

						ANNUAL COST				
Specific Objective	**Activities**	**Task**	**Qty**	**Unit Cost**	**Total Cost**	**2020**	**2021**	**2022**	**2023**	**2024**
By 2022, ensure the availability and application of ICT standards in 80% of health facilities at all levels of the health pyramid	Develop systems interoperability standards	Organize a meeting to adopt the dictionary of health data and metadata (30persx1day)	30	15 000	450 000		450 000			
		Organize a workshop to review and update the data and health metadata dictionary (30persx3days)	30	300 000	9 000 000				9 000 000	
		Organize a workshop to develop the standardized document of health terminology (30persx3days)	30	300 000	9 000 000	9 000 000				
		Organize a validation workshop for the standardized health terminology document (30persx3days)	30	300 000	9 000 000	9 000 000				
		Organize a meeting to adopt the standardized document on health terminology (30persx1jour)	30	15 000	450 000	450 000				
		Organize a workshop to review and update the standardized document of health terminology (30persx3days)	30	300 000	9 000 000			4 500 000		4 500 000
		Recruit a consultant to develop a national registry of health personnel (1 consultant x 45 days)	1	50 000 000	50 000 000		50 000 000			
		Organize a validation workshop for the national registry of health personnel (30persx3days)	30	300 000	9 000 000		9 000 000			
		Organize a meeting to adopt the national registry of health personnel (30persx1day)	30	15 000	450 000		450 000			
		Organize a workshop to review and update the national registry of health personnel (30persx3days)	30	300 000	9 000 000				9 000 000	
	TOTAL				**480 900 000**	**197 800 000**	**175 600 000**	**40 833 333**	**48 833 333**	**17 833 333**

Table 24 ; Availability of Mobile Phones Observed per Region and by Type of Health Facility

	Mobile phone belonging to the health facility (A*)	Mobile phone belonging to the health facility (O**)	Private mobile phone, but airtime paid by the health facility (A)	Private mobile phone, but airtime paid by the health facility (O)	Private mobile phone bought by the owner but used by the health facility (A)	Private mobile phone bought by the owner but used by the health facility (O)
Region						
Adamawa	42,6	85,8	10,8	81,8	49,0	91,4
Centre (Yaoundé excluded)	14,3	76,8	15,6	83,4	78,2	90,1
East	43,1	59,8	18,7	82,0	46,7	96,3
Far North	41,0	62,4	20,5	71,7	72,6	85,8
Littoral (Douala excluded)	60,4	100,0	26,8	100,0	53,2	100,0
North	43,2	80,2	16,5	100,0	63,0	94,6
North West	81,6	91,5	15,5	86,3	23,8	90,7
West	20,6	88,3	13,0	88,4	61,8	94,3
South	7,4	63,6	9,1	100,0	46,2	92,1
South West	74,2	76,6	18,3	80,1	20,1	100,0
Douala	41,5	82,3	39,0	76,9	33,0	57,4
Yaoundé	23,1	75,4	34,5	77,7	49,9	82,7
Category of health facility						
IHC / Infirmary	28,2	78,4	18,6	82,4	57,9	87,1
MHC	46,3	82,5	42,5	84,8	31,5	88,1
District Hospitals / Military Hospitals	49,8	92,4	13,9	72,0	51,9	97,0
Clinics / Private practice/ Other	48,2	89,6	33,7	75,9	42,0	76,0
Health Facility Status						
Public	33,8	78,1	13,3	82,7	58,4	91,5
Private non-profit	41,8	81,4	28,9	89,2	54,4	88,6
Private for-profit	28,1	86,7	33,1	77,7	44,3	76,4
All	**33,2**	**81,3**	**23,1**	**81,6**	**52,7**	**86,3**

**A = Available, **O = Operational*

Source: IFORD: Survey of Health Services Delivery Indicators – Health Facility Assessment (SDI/HFA) 2018

Table 25 : Availability of Computers and the Internet Observed per Region and per Type of HF

	Computer belonging to the health facility (A)	Computer belonging to the health facility (O)	Private computer, but used by the health facility (A)	Private computer, but used by the health facility (O)	Access to the Internet by the health facility (A)	Access to the Internet by the health facility (O)
Region						
Adamawa	19,1	78,1	50,1	66,2	56,2	67,0
Centre (Yaoundé Excl)	16,5	76,6	20,1	52,8	24,3	65,4
East	31,1	70,4	19,4	85,1	26,9	75,6
Far North	28,8	83,7	17,1	76,5	25,7	88,7
Littoral (Douala excl.)	45,4	85,2	16,7	92,5	37,6	75,6
North	19,8	100,0	15,9	79,4	15,2	100,0
North West	45,1	87,1	14,1	84,5	22,0	88,5
West	12,2	82,9	9,8	74,1	18,7	98,0
South	21,8	86,8	13,0	100,0	14,4	100,0
South West	55,9	81,7	9,1	39,1	30,4	100,0
Douala	52,3	83,3	17,0	83,2	32,5	83,9
Yaoundé	42,5	76,7	21,1	74,8	33,3	63,7
Category of health facility						
IHC / Infirmary	22,1	78,1	12,5	68,1	21,8	73,7
MHC	60,8	79,9	30,0	68,5	37,4	76,7
District Hospitals / Military Hospitals	76,5	89,9	27,5	96,5	41,7	91,5
Clinics / Private practice / Other	57,3	89,7	28,1	80,4	46,8	92,7
Health Facility Status						
Public	18,4	75,7	14,1	69,9	17,1	78,1
Private non-profit	46,9	83,8	24,8	82,4	40,6	90,7
Private for-profit	42,9	83,6	16,3	65,1	33,4	72,1
All	**32,1**	**81,5**	**16,8**	**71,3**	**27,0**	**78,3**

** A = Available, ** O = Operational*

IFORD. 2018. Survey on Health Services Delivery Indicators – Health Facility Assessment (SDI/HFA).

Table 26: List of applications used in Cameroon

FUNCTIONALITY OF EXISTING SYSTEMS			
Data System	**System Summary**	**Current Status**	**SOP status**
Community and facility based systems			
1. OpenMRS EMR (Electronic Medical Record)	OpenMRS-based electronic medical record system called Bahmni, locally configured for the Cameroon health system patient-level data.	Planning for 10 sites	None
2. DAMA (Patient Registry Data Manager)	Electronic version of GRC health registers built in Microsoft C#.NET programming language that generates reports for MoH and PEPFAR	Functional in PEPFAR area, 154 sites	No documentation
3. BLIS (Basic Lab Information System)	Laboratory based software for electronic lab results and quality assurance	Functional in 10 labs of high volume sites	Documentation/SOPs in progress with C4G
4. N-SAMBA/ CommCare	Dimagi/Commcare developed platform for beneficiary registration and case management; data collection on smartphones/tablets to flow to cloud-based server	Functional pilot in 8 drop-in centers	SOPs in place for data collection and analysis, not data use
5. VINDATA	Java/Linux-based software needing LAN connection for HIV drug/stock management	Functional in PEPFAR area, 29 high volume sites	Training manuals but no SOPs
National/Sub-national information systems			
6. OSP-SIDA	Regional level web-based reporting on pharmacy/supply counts at facilities	Scaled up in all 10 regions	
7. DHIS 2-CIS	Web based software that permits compilation and analysis of health indicators at district, regional, national level	Scaled up in all districts, about 6000 facilities	Data collection guideline in place
8. DHIS 2 -NACC	Web-based software that permits compilation and analysis of HIV indicators at district, regional, national level	Scaled up in all districts, about 6000 facilities	User guide exists but not used at scale

Tableau 27 : Summary of System Functionalities

	DAMA	BLIS	NSAMBA	DHIS2	BAHMNI EMR	VINDATA
Licensing	Proprietary under CoAg	Open Source	Mixed, charged to IP	Open Source	Open Source	Proprietary, charged direct to health facility or NACC
Number of facilities implementing	154	10	8	1	0	29
Number of partners using system	1, CBC	1, GHSS	1, CHAMP	2, NACC AND CIS	1, ICAP	1, VINDATA SOLUTIONS
Interface software	C#.NET	PHP	Commcare	Java	Java	Java, Struts
Database software	SQL Express	MySQL	MySQL	MySQL	MySQL	Unknown
Use of international data standards	No standards incorporated to date	No standards incorporated to date	No standards incorporated to date	SDMX-HD API	Internationally coded concept dictionary, HL7 and FHIR APIs	No standards incorporated to date
Potential interoperability	Need additional development	Some development done	Need additional development	Available	Available	Need additional development
Data Addressed	HIV C&T Registers, MCH Registers, Lab Results Registers	Lab Results	Linkage to Care	Indicators	HIV C&T Data	Dispensing
Documentation de système	Guide de utilisateur en cours	Aide intégré	Inconnu	Documentation en ligne, guide de utilisateur du Cameroun	Inconnu	Aucun

[35] Flowers, J, L Buback, and P Hazelton. 2018 February.
Cameroon HIS Landscape Assessment and Recommendations Report. Prepared for the US Centers for Disease Control and Prevention.

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