THE REPUBLIC OF LIBERIA
SUPPLY CHAIN MASTER PLAN 2023–2028

THE GLOBAL FUND
MINISTRY OF HEALTH
Republic of Liberia
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<td>average monthly consumption</td>
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<td>Community Health Assistant</td>
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<td>FEFO</td>
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<td>HMER</td>
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<td>long-lasting insecticidal nets</td>
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<td>MSL</td>
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<td>National Public Health Institute of Liberia</td>
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<td>NQTC</td>
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<td>OTIF</td>
<td>On-time and in-full</td>
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<td>performance-based financing</td>
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<td>primary healthcare</td>
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<td>warehouse management system</td>
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FOREWORD

The Ministry of Health (MoH) is committed to continuing to rebuild Liberia’s healthcare system after the shocks of Ebola and COVID-19. Access to healthcare is a basic human right and the mission of the MoH is to work toward an effective, efficient, and equitable system that provides universal health coverage to every Liberian. This new Supply Chain Master Plan (SCMP) 2023–2028 builds on the achievements of the previous SCMP 2010–2020 and provides a framework to guide the future growth and development of public health supply chains in Liberia.

Already, impacted by years of civil war, political instability, and economic underdevelopment, the health sector of Liberia is still striving to improve its infrastructures, obtain necessary medical resources, and ensure the availability of adequately trained healthcare professionals. Supply chain management gaps have consistently undermined efforts to guarantee commodity security, resulting in less-than-optimal outcomes for the people of Liberia. Governance within the system is fragmented, with lines of accountability and decision-making unclear. This new SCMP, if implemented in coordination with other national policies and guidance, aims to address these challenges and increase the efficiency of the delivery of health products to support health service delivery in Liberia. This document lays out the path to building, from top to bottom, a collaborative system with a single chain of accountability that is capable of ensuring that products are available at health service delivery points when needed and that healthcare workers can focus on patient care.

Informed both by global best practices of end-to-end supply chain management and by multiple rounds of local consultation, this SCMP marks a crucial step forward for Liberia. Successful implementation of SCMP 2023–2028 will result in improved supply chain outcomes, reduced stockouts, and increased product availability at service delivery points. This will boost access to quality health services, particularly for the poor and vulnerable among the population.

The MoH of Liberia will work in collaboration with key partners at international, national, and local levels to disseminate, implement, and monitor the impact of this SCMP on the health supply chain system. We thank all stakeholders for their contributions to the development of the SCMP 2023–2028 and continued support in delivering on the vision of the Liberia National Health Policy 2022–2031 of a healthy population underpinning equitable growth and sustainable development in the future.

Dr. Wilhemina Jallah

Minister of Health, R.L.
PREFACE

As the MoH embarks on a new era of transformation in Liberia's health sector, the emphasis on a unified and robust supply chain strategy becomes ever more important. The vision encapsulated within Liberia's Supply Chain Master Plan (SCMP) is not just about creating a robust supply chain infrastructure, but about fostering an integrated, dynamic, and financially sustainable system that aligns with our country's broader health goals and objectives. This alignment is crucial in consolidating resources, channeling our focus, and guiding our financial decisions, thus ensuring the efficacy and responsiveness of our supply chain operations.

In the diverse and rapidly changing landscape of healthcare delivery, supply chain management forms a cornerstone of our ability to deliver efficient, high-quality care. It is within this context that we must emphasize the importance of having a unified supply chain strategy. It enables us to align our interests - from the largest hospital networks to the most remote health clinics - and serves as the backbone to our commitment to reach every citizen with timely, affordable, and quality health services.

The SCMP 2023-2028 outlines a strategic roadmap for enhancing Liberia's healthcare supply chain over the coming years. It underpins our broader health system strategy and development plans, ensuring that every decision we make is in alignment with our overarching objectives. The strategy outlined in this SCMP fosters financial soundness and sustainability by promoting the efficient use of resources, reducing waste, and improving procurement procedures.

Ultimately, our goal is to enhance the performance and resilience of Liberia's healthcare supply chain. This involves boosting our capacity for strategic procurement, improving the management and distribution of health commodities, and fostering accountability at all levels of the supply chain. We believe that an integrated and streamlined supply chain will enable us to adapt to future challenges, improve health outcomes, and promote the wellbeing of all Liberians.

In this journey, we invite all stakeholders - government agencies, international partners, health professionals, and the community at large - to join us in the realization of our vision. Together, we can create a more responsive, effective, and financially sound supply chain that meets our nation's health needs today and for generations to come.

Francis M. Katch, MD, MHA, MPS/HSL., FLCP
Deputy Minister for Health Services / Chief Medical Officer, R.L.
ACKNOWLEDGEMENTS

The MoH and the supporting authors would like to express their heartfelt thanks to all those who contributed to the planning, composition, execution, and finalization of SCMP 2023–2028.

Special thanks go to the Minister of Health, the Honourable Dr Wilhelmina Jallah, the Deputy Minister for Health Services / Chief Medical Officer, Dr Francis N Kateh for their leadership and support throughout the development of SCMP 2023–2028.

We would also like to thank the Global Fund to Fight AIDS, Tuberculosis, and Malaria (GFATM) for its funding, guidance, and technical oversight.

Lastly, our thanks and appreciation to all the participants who provided critical insight to SCMP 2023–2028 during the inception meeting, review workshop, and validation workshop (Annex 1).

John T. Harris B. Pharm, RPh, MSc, Pharm Mgmt, MSc PLSCM, mCIPS, mCILT

PLSCM Program Manager / Chief Pharmacist, R.L.
SUPPLY CHAIN MASTER PLAN (SCMP) OBJECTIVES

The purpose of this document is to serve as an implementation guide for the Liberian public sector supply chain for pharmaceutical and health products. It is designed to complement already-existing strategic documents. The objectives of this 5-year Supply Chain Master Plan (SCMP) 2023–2028 are as follow:

1. Establish a collaborative system that ensures a seamless chain of accountability from top to bottom.
2. Ensure products are available at service delivery points when needed.
3. Enhance healthcare workers’ patient care capabilities by reducing their involvement in supply chain management activities.

CROSS-CUTTING ELEMENTS

Several cross-cutting elements require improvement and strengthening which span all proposed strategic interventions and apply to all departments, organizations, and teams within the Ministry of Health (MOH). These five elements include 1) governance; 2) transparency, accountability, and commodity security; 3) human resources; 4) collaboration and communication; and 5) regulatory oversight. The SCMP sets forth specific targets for improvement within these elements, which include:

- Strengthening healthcare supply chain leadership and developing capacity to effectively manage the supply chain.
- Expanding performance monitoring, communication, and oversight to improve governance by increasing transparency among stakeholders.
- Bolstering accountability at all levels of the healthcare supply chain.
- Increasing effective, and routine communication between stakeholders to encourage coordination, avoid duplication of efforts, and minimize gaps.
- Improving commodity security at all levels of the supply chain.
- Establishing, and enforcing standards, policies, and regulations.

OVERVIEW OF MAJOR RECOMMENDATIONS

To achieve significant improvement in Liberia’s pharmaceutical and health product supply chain over the next five years, critical interventions are necessary at various levels. The following levels with their corresponding high-level activities have been identified as essential:
Figure 1. Overview of SCMP major recommendations at each level of the supply chain
PROPOSED STRATEGIC GOALS

The SCMP 2023–2028 presents 23 strategic goals. Executing the activities and achieving the objectives will eliminate the current supply chain performance issues and support the delivery of the Ministry of Health’s (MOH) overarching mission.

Pharmaceutical and health products supply chain management

**Strategic goal 1:** Strengthen and harmonize the national and sub-national forecasting and supply planning of health products by ensuring decisions are informed by high-quality data to support the procurement of health commodities cost-effectively across the public sector.

**Strategic goal 2:** Align the selection of health products, commodities, and supplies with the priorities and needs of the population.

**Strategic goal 3:** Strengthen and streamline in-country procurement mechanisms for health commodities with the use of digital technologies.

**Strategic goal 4:** Establish importation and customs clearance guidelines for health commodities and enforce regulatory oversight of health commodities’ entry into the country.

**Strategic goal 5:** Enhance quality assurance practices to monitor health commodities entering the public sector supply chain and ensure health commodities within the supply chain are stored, handled, and managed appropriately to maintain their physical integrity.

**Strategic goal 6:** Improve pharmacovigilance practices to adequately capture adverse events and other health commodity-related issues.

Supply chain policy and execution

**Strategic goal 7:** Introduce proactive communication and coordination of public sector healthcare supply chain stakeholders.

**Strategic goal 8:** Develop Central Medical Stores (CMS) as an autonomous primary distribution centre within the country, optimizing the flow of commodities from the port of entry to the point of use to improve operational and cost efficiencies.

**Strategic goal 9:** Ensure the availability of sufficient, reliable, and easily accessible data to inform decision-making in forecasting, supply planning, distribution, and replenishment of health commodities through established communication mechanisms with the Supply Chain Management Unit (SCMU).

**Strategic goal 10:** Reduce the administrative and supply chain management burden of County Health Teams (CHTs) caused by delayed or incomplete delivery of health commodities.

**Strategic goal 11:** Strengthen the supervision of health facilities to improve the availability of high-quality data for decision-making, quantification, and capacity development.

**Strategic goal 12:** Strengthen community health commodity availability and accountability at all levels in line with supply chain standard operating procedures (SOPs).
**Information systems**

**Strategic goal 13:** Create interoperable management information systems (MISs) to facilitate access to data.

**Strategic goal 14:** Reconfigure the warehouse management system (mSupply) to improve system performance, provide correct stock-on-hand quantities, and produce reports with accurate information.

**Strategic goal 15:** Strengthen the logistics management information system (LMIS) for routine data collection and reporting to produce high-quality data to inform decision-making and support performance monitoring, traceability, visibility, and accountability.

**Strategic goal 16:** Centralize data from all available information systems and ensure its accessibility for decision-making purposes.

**In-country warehousing and distribution**

**Strategic goal 17:** Strengthen storage and infrastructure at both county and health facility levels to support efficient handling inventory control practices.

**Strategic goal 18:** Enhance infrastructure to maintain the cold chain at all levels within the supply chain and strengthen policies, procedures, and protocols to reflect global best practices.

**Strategic goal 19:** Efficiently manage warehousing practices at the Central Medical Stores (CMS) to expand services to deliver health commodities reliably to the last mile without delays or service gaps.

**Strategic goal 20:** Establish a process for reverse logistics to increase the efficiency of storage capacity at county depots and health facilities.

**Strategic goal 21:** Improve contract management skills to effectively manage outsourced contracts and obtain the desired levels of service performance and cost-effectiveness

**Waste management**

**Strategic goal 22:** Develop a healthcare waste management system with corresponding policies, procedures, practices, and guidelines.

**Emergencies**

**Strategic goal 23:** Create emergency stock holdings and enhance emergency planning processes to maintain adequate supplies of emergency health commodities.
1. INTRODUCTION

The public health supply chain is a critical component of the country's healthcare system, which plays a crucial role in ensuring the delivery of essential medicines and medical supplies to the population. The supply chain encompasses the procurement, storage, and distribution of pharmaceutical products, medical equipment, and other healthcare commodities throughout the country.

Over the years, the supply chain has undergone significant reforms, driven by the implementation of several policies and initiatives aimed at strengthening the system. Despite the challenges posed by limited infrastructure and resources, significant strides have been made in improving the efficiency and effectiveness of the supply chain. However, there is still much work to be done to address the persistent challenges, including stockouts, inadequate infrastructure and transportation networks, and insufficient funding and resources to sustain the supply chain in the long term.

Furthermore, the COVID-19 pandemic has exacerbated these challenges, resulting in disruptions to the supply chain and delays in delivering essential medicines and medical supplies. Addressing these challenges requires sustained investments in the supply chain, fostering strong partnerships among stakeholders, and implementing innovative solutions to improve the system's efficiency and effectiveness.
1.1. BACKGROUND

1.1.1. Review of the previous SCMP and supporting documents

Both the original Supply Chain Master Plan (SCMP) 2010–2022 and the SCMP 2015 Review outlined similar good/best practices in supply chain management, including:

- A wide span of management control by the supply chain organization
- A streamlined distribution network incorporating fewer stockholding points
- Management information systems, undefined in detail, but outlined in general terms to support both operational activities and strategic decision making
- Outsourcing logistics services as and when considered appropriate

When evaluating the relevance of the original SCMP 2010–2022 for the future Ministry of Health (MOH) supply chain, it is essential to assess whether the current supply chain management issues mirror those from 2010. The Global Fund (GF) 2018 Assessment identified challenges related to the six rights of supply chain management, which include:

1. The right products
2. In the right quantity
3. In the right place
4. At the right time
5. In the right condition
6. At the right cost

While the assessment highlighted issues within each of these six categories, they can be summarized as follows:

- Standard processes are not fully defined and implemented at all levels of the supply chain network.
- The absence of automated tools to undertake inventory management and warehouse activities, particularly at the Central Medical Store (CMS), has created a highly inefficient supply chain network.
- Logistics management information systems (LMIS) and other information systems do not deliver timely and actionable information to drive decision-making at any level of the supply chain.
- Training and/or supervision at the lower levels of the supply chain is either inadequate or inappropriate.
- The SCMU lines of authority throughout the supply chain are not well defined.
- Previous data entry training efforts of users at both county and district levels have demonstrated improvements in entering data into the LMIS system, but the timely accessing of data is still a critical issue.
- Funds for facility repairs, maintenance, and upgrades are lacking.
- End Use Verification Surveys (EUVSs), which were conducted over several years for maternal, newborn and child health (MNCH), malaria, and family planning commodities programs, revealed significant zero stock balances of key pharmaceutical products at all levels in the supply chain; while unexpected increases in demand accounted for some of the zero stock balances, the primary reasons were reported as:
o Non-receipt of items ordered by the health facilities and county depots
o Receipt of smaller quantities than were ordered
o Late deliveries from warehouses and depots to the health facilities
o Lack of availability of inventory at the CMS and county depots
o Additional supply chain challenges reported at both the county and health facility levels included:
  o Inadequate staffing levels at the facilities to undertake inventory management activities
  o Limited inventory management skills at the health facility level
  o Amount and quality of the storage facilities, especially for temperature-controlled products

Several of the above issues were further highlighted in a report where spot checks were undertaken to verify the last-mile deliveries made to county depots and health facilities.

The documents also showed the importance of leadership and coordination between the Health Monitoring, Evaluation and Research Unit (HMER) and the SCMU for the effective functioning of the LMIS. Moreover, human capacity and data quality management are two areas that require support and technical assistance.

Furthermore, the documents already identified that the LMIS requires infrastructure support, such as computers and internet access; system redesign to accommodate monthly reporting; continued capacity building for users; enhanced analytics capabilities; and interoperability with other systems, such as mSupply and DHIS2.

The information systems within the MOH are relatively new, with most implementations occurring in the past four years. This means that the users are still relatively inexperienced and changing the organizational culture to depend on information systems is a work in progress.

Moreover, there is limited information and analysis available on the warehouse management system (WMS) in general, and there has been minimal documented support or analysis of the health management information system (HMIS) in recent years. This raises concerns about the potential lack of coordination between DHIS2 and the HMER and the SCMU.

### 1.1.2. SCMP goal and objectives

The SCMP 2023–2028 aims to provide a conceptual layout to guide the growth and development of public health supply chains in Liberia. This document, in conjunction with other national guidance documents and policies, outlines the framework for achieving efficient and timely delivery of health commodities to meet the needs of patients at health facilities. The SCMP 2023–2028 sets forth the following objectives:

1. Establish a collaborative system that ensures a seamless chain of accountability from top to bottom.
2. Ensure products are available at service delivery points when needed.
3. Enhance healthcare workers’ patient care capabilities by reducing their involvement in supply chain management activities.

Successful implementation of SCMP 2023–2028 will result in improved supply chain outcomes, reduced stockouts, and increased product availability at service delivery points.
1.1.3. SCMP 2023–2028 organization and layout

The SCMP 2023–2028 is organized into five key sections. These sections are as follows:

1. Introduction: This section provides an overview of the current health system in Liberia and identifies the goals and objectives of the SCMP 2023–2028. It also orients users to the contents of this document and provides insight into the contextual factors that may influence its success but are outside the scope of the plan.

2. Cross-Cutting Elements: This section highlights the multisectoral issues that supersede individual departments, institutions, and organizations. These elements require a holistic and systematic approach for improvement, involving all partners working in the public health supply chain, parallel supply chains (e.g., vaccines), and the private sector.

3. Strategic Interventions: This section breaks down the components of SCMP 2023–2028 into five parts: objective, current state, goal state, key implementation plan activities, and key performance indicators (KPIs). Each strategic intervention addresses a specific problem and provides a summary of the current state at the time the plan was drafted. It also outlines the desired end goal to be achieved in the next five years.

4. Financial Implications: This section outlines the cost of key implementation plan activities and identifies the resources, both human and financial, necessary for the successful implementation of the SCMP 2023–2028. It also outlines how those activities will be financed.

5. Performance Monitoring and Evaluation: This section provides a framework for monitoring and evaluating the progress of the SCMP 2023–2028. It delves deeper into specific KPIs associated with each strategic intervention.
1.2. SCMP 2023–2028 DEVELOPMENT PROCESS

The development of the SCMP 2023–2028 involved a collaborative process that spanned six months and was led by the Partnership for Improving Supply Chain Management in Africa (PICMA) on behalf of the GF to support the Liberian MOH.

The PICMA team conducted three in-country visits during the development process. The first visit lasted two weeks and involved engaging with various stakeholders, including MOH staff, disease program staff, government entities, partners, and donors. An inception meeting was held on July 28, 2022, in Monrovia, with over 60 participants. The second week involved visiting county health depots and health facilities in Bong and Gbarpolu counties.

Following the initial visit, PICMA developed a preliminary draft of the SCMP 2023–2028 developed remotely. This draft was then shared with key stakeholders one week before the review workshops.

The second two-week visit by the PICMA team included additional stakeholder meetings and review workshops in Buchanan and Monrovia, with over 100 participants, including a large representation of CHTs. Stakeholders provided feedback and input on the preliminary draft during these workshops.

Feedback from the review workshop, as well as written feedback and conversations with key stakeholders, were incorporated into the development of the second draft of the SCMP 2023–2028.

The second draft was circulated for further revisions. A subsequent validation workshop was held on April 5-6, 2023, in Monrovia, with over 40 participants. The purpose of this workshop was to validate the third draft of the SCMP 2023–2028.

The SCMP 2023–2028 was formally presented to representatives from the MOH, GF, and other key stakeholders on May 9, 2023, at the MOH building in Monrovia.

1.3. CONTEXTUAL FACTORS

There are a variety of contextual factors that are unable to be addressed directly by the SCMP 2023–2028, but that have an impact on the plan’s ability to be successful. This section outlines topics that may pose challenges as the SCMP 2023–2028 is implemented.

1.3.1. Health system

The health system in Liberia is coordinated and managed by the MOH. The MOH is mandated to reform and manage the health sector, aiming to deliver effective and efficient quality healthcare services that are equitable, accessible, and sustainable for all people in Liberia. Health services are provided at three levels: tertiary, secondary, and primary. Healthcare has been decentralized to the counties and is managed by County Health Teams.

The mission of the MOH is to transform the health sector into an effective, efficient, and equitable system for delivering quality health services, to achieve universal health coverage. The MOH envisions a nation with improved health status and equity in health, regarding health as a basic human right. It is dedicated to
ensuring that every Liberian has access to health services, regardless of economic status, origin, religion, gender, or geographic location.

To align its priorities, the MOH has developed a five-year Health Policy and Plan 2007–2011, the 10-year Health Policy and Plan 2012-2021, and the most recent National Health Policy 2022–2031. These plans focus on primary health care, decentralization, community empowerment, and partnerships for health.

The vision of the National Health Policy 2022–2031 is to have a healthy population, with a particular focus on protecting the poor and vulnerable, for the attainment of equitable growth and sustainable development. The plan has four main objectives: devolve management responsibilities, resources, and authority to subnational levels; ensure the availability and retention of highly skilled and well-motivated health workforce; improve access to and utilization of quality essential health services through standardized, integrated, and sustainably financed health programs; and guarantee health security.

The National Health Policy 2022–2031 introduces a new service delivery package, known as Essential Package of Health Services (EPHS-II), which aims to strengthen primary healthcare, improve the quality of care across seven dimensions (safety, timeliness, efficiency, effectiveness, equity, people-centred care, and integration) and expand the national referral network by upgrading Jackson F. Doe Hospital. This plan also builds on the EPHS and aims to establish a mechanism for self-finance of the healthcare system, transitioning from free universal care to targeted free care. This includes supporting a revolving drug fund and secondary cost sharing. Vulnerable populations are exempted from these mechanisms, with donor-funded programs and MOH financial support. Over time, mandatory contributions from the formal employment sector and non-vulnerable workers from the informal sector, through premiums and earmarked taxes, will finance the national health insurance, the Liberia Health Equity Fund (LHEF).

In response to the Ebola outbreak of 2014–2015, the Investment Plan for Building a Resilient Health System in Liberia was developed. This plan prioritizes improving access to and utilization of quality essential health services, strengthening health systems, ensuring resilience to outbreaks and epidemics, and creating an enabling environment through community involvement, good governance, and strengthened leadership at all levels. It is important to note that Liberia maintains a two-pronged approach to healthcare delivery. The MOH is responsible for routine and preventative care, while outbreak and epidemic preparedness is managed by the National Public Health Institute of Liberia (NPHIL).

**Tertiary care**

John F. Kennedy Medical Center (JFKMC), the National Referral Hospital, is an autonomous specialized referral facility and teaching hospital. It is managed by a board of directors in collaboration with regional-level facilities for physicians, sub-specialists, and allied health professionals. With advanced laboratory and radiology capabilities, JFKMC has a capacity of approximately 500 beds.

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2 Ibid.
3 Ibid.
4 Ibid.
5 Ibid.
6 Ibid.
7 Ibid.
Regional hospitals receive referrals from three to five county hospitals that are located within a reasonable distance of them. Each regional hospital has a bed capacity of approximately 250 beds and serves a catchment population of over 500,000 people. These facilities actively contribute to capacity building in county hospitals and serve as training sites that complement the National Referral Hospital. In cases where larger county hospitals are upgraded, they also function as territorial referral hospitals and receive referrals from the district level.

Secondary care

District health systems serve as the primary providers of secondary care, offering services such as general practice, internal medicine, basic emergency obstetrics, and newborn care. They receive referrals from the community system to the health centres. The district system has a catchment population of 25,000 to 40,000 and includes the following components:

- Health centres: These facilities receive referrals from four to five clinics within the district. They have up to 40 beds and are equipped with a level-one laboratory. In some cases, health centres may be upgraded to district hospitals with higher clinical capacity, including emergency surgery and maternal health services.
- District hospitals: These hospitals serve areas with dense catchment populations and a large network of clinics, often located a considerable distance from a county hospital. They are established based on the need for such facilities.

The county health system delivers expanded services at the secondary level of care. It consists of one or more county hospitals, which serve as referral centres for district hospitals, and health centres. The county hospital has a catchment population of about 200,000 and offers a range of services, including general surgery, paediatrics, general medicine, obstetrics, and gynaecological services. It has approximately 100 beds, an intensive care unit, a level two laboratory and basic radiology services. To ensure an effective referral system and appropriate use of hospital services, county hospitals also have a detached outpatient facility for the provision of primary care.

Primary care

The community health system serves as the primary care provider, with a focus on delivering essential healthcare services to its population. It involves various healthcare professionals, including Household Health Promoters, Community Health Promoters (CHPs), Community Health Service Supervisors (CHSSs), and Community Health Assistants (CHAs).

Maternal and child health (MCH) level one clinic focuses on basic maternal, infant, and child healthcare, as well as family planning services. These clinics primarily serve isolated clustered communities with a population of up to 3,500 people. They also provide basic primary care services to their catchment population.

Basic primary healthcare (PHC) clinics cover a larger catchment population of 3,500 to 12,000 people within a 5-kilometre radius. They also provide outreach services to areas beyond this radius, which are more than five kilometres away from an MCH clinic. Integrated Outreach Programs, based at PHC clinics, focus on delivering basic primary care to isolated catchment communities that are more than five kilometres from the clinic.
1.3.2. Decentralization

The SCMP 2010–2020 emphasized the importance of decentralization, aiming to shift activities to the county level and prioritize patient-centric care. It was recommended that the supply chain management team have a wide span of control to provide accountability and oversight, a recommendation that is echoed in SCMP 2023–2028. Under this approach, counties retain control of patient-related activities, including reporting requirements and submitting replenishment requisitions to the central supply chain management team.

However, as part of a strategic change, the supply chain management team would now be responsible for physical distribution-related functions, including managing the county depots and last-mile deliveries. This change aims to establish an integrated distribution operation and a single point of accountability for the distribution service provided to patient-facing MOH staff.

The recent focus on the Community Health Assistant Program (CHAP) has further highlighted the need to distinguish between patient-facing activities and physical distribution activities. With the CHAP program in place, there is a greater need to ensure that resources and attention are appropriately allocated to both aspects of healthcare delivery. By introducing this distinction, the supply chain management team can better align their efforts and resources to meet the specific requirements of patient care and distribution operations.

Despite the guidelines outlined in the SCMP 2010–2020 and the increased need for focus, accountability, and decentralization in supply chain management, there have been limited changes in these areas over the years. The Central Medical Stores’ (CMS) continues to manage the central facility at Caldwell and liaises with the World Food Programme (WFP), which currently serves as a third-party logistics provider (3PL, 4PL or LLP) with support from the Global Fund. They are responsible for moving pharmaceuticals to county depots, regional and county reference hospitals, and health facilities within Montserrado and Margibi counties. Meanwhile, United States Agency for International Development (USAID)’s Global Health Supply Chain Program - Procurement and Supply Management (GHSC-PSM) implements last-mile distribution of long-lasting insecticidal nets (LLINs) to health facilities and schools. At the county level, CHTs continue to manage the activities at the county depots and oversee last-mile distribution (LMD) to health facilities and CHAs. However, CHTs face ongoing challenges in conducting LMD due to inadequate support and/or lack of resources, posing difficulties in ensuring timely and efficient delivery of essential supplies to the intended recipients.

1.3.3. Healthcare financing policy

Healthcare services are currently provided free of charge to Liberian citizens, with essential medicines and vaccines funded and supplied by donors. There is a heavy reliance on donor and external financing, as only 7% of healthcare expenditures are financed by domestic revenue. Liberia’s National Health and Social

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* The Central Medical Stores (CMS) was formerly known as the National Drug Service (NDS). NDS was dissolved in 2015, but the name is still used for official business.


Welfare Financing Policy and Plan 2011-2021 aimed to make health and social welfare services affordable for the government and prevent catastrophic household expenditures\(^9\). The objectives of this plan included:

- Increasing the mobilization and predictability of adequate, sustainable financial resources for health and social welfare
- Improving the planning, budgeting, and accounting for equitable resource allocations
- Enhancing the efficiency of resource utilization
- Promoting systemic efficiency and equity through a harmonized provider payment mechanism
- Strengthening the financial evidence base for management and policy decision-making\(^10\)

While some components of this plan were successfully implemented, there is still a significant reliance on donor funding and the target of 85% service delivery coverage for the population\(^11\) has not been achieved due to infrastructure constraints.

The Government of Liberia (GOL) is exploring the establishment of LHEF as an insurance scheme. The primary objectives of the LHEF are to reduce catastrophic health expenditures, improve sustainable revenue collection and increase the quality of available healthcare\(^12\). The financing for the LHEF is meant to be tax-based, with mandatory prepayment as a key mechanism to reduce direct out-of-pocket payments at service delivery points and enable the pooling of risks among the population\(^13\). Currently, the public sector is the largest contributor to the prepaid pooled funds through the MOH budget allocations to programs and semi-autonomous entities.

To improve service quality, performance-based financing (PBF) pilot programs have been launched to guide decision-making for the adoption of PBF on a national level. However, the availability of healthcare commodities at the last mile remains a challenge. To address this issue, the implementation of a revolving drug fund (RDF) has been proposed. The RDF would allow CHTs to directly procure healthcare commodities and distribute them within their respective counties. At the time of drafting this document, there was significant enthusiasm from the MOH and CHTs to drive this initiative forward, but no donors or partners had committed to seed funding.

### 1.3.4. Health products

The focus of the SCMP 2010-2020 and the subsequent SCMP 2015 Review has primarily been on medications associated with the eleven major healthcare programs and essential medicines defined by the MOH. However, there are several other categories of related health products which are not currently managed by the MOH supply chain and, therefore, have not been incorporated in previous SCMPs. Through discussion with donors, partners, and stakeholders, the following priority areas for health products have been identified:

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\(^10\) Ibid.

\(^11\) Ibid.

\(^12\) Liberia Ministry of Health. National Health Policy 2022-2031.

\(^13\) Ibid.
- Laboratory equipment and supplies: While some items in this category are handled by the CMS, they represent a very small percentage of the total volume procured and distributed.
- Pharmaceuticals used in the treatment of non-communicable diseases.
- Medical oxygen gas and oxygen technologies, including concentrators, pulse oximeters, and the transportation of both filled and empty cylinders. The lack of national guidance regarding the procurement and distribution of oxygen technologies and supplies requires the establishment of a procurement and supply management (PSM) process for oxygen.
- Manual vacuum aspiration kits, medical and surgical instruments, and consumables.
- Bio-medical equipment.
- Blood products.
- Nutritional products.
- Assistive technologies (AT) are listed on the National Priority Assistive Products List14 (APL), such as spectacles and wheelchairs.

While some of the above products could be combined with the MOH distribution network alongside pharmaceuticals, others would require different handling, storage, and transportation resources (e.g., oxygen, AT). From an implementation plan perspective, it is advisable to focus on effectively implementing the current proposals before considering the inclusion of a significant number of additional products into the MOH supply chain. However, increasing attention should be given to these items, as their inclusion is critical for a functioning and efficient health system.

### 1.3.5. Private sector

The SCMP 2010–2020 highlighted the mechanisms for collaborating with the MOH as an outsourcing partner. In particular, the distribution of products from the county depots was identified as a potential target for outsourcing. This has been implemented, but it is not managed by local CHTs but rather by the CMS management team. While large international, high-profile private logistics organizations like DHL operate in Liberia, they typically only offer parcel and courier services through authorized agents and not specifically for healthcare products.

The MOH supply chain currently employs a transport outsourcing strategy to move products from the CMS to both county depots and health facilities. The WFP organizes the movement of products from the CMS to health facilities in Montserrado and Margibi counties, county depots in 13 counties, and major hospitals in those counties. However, CHTs rely on local companies that they directly manage for delivering products to health facilities and CHAs. Regrettably, CHTs still have to deal with non-patient-facing supply chain management activities that were supposed to be eliminated in the SCMP 2010-2020. The proposed interventions in the SCMP 2023–2028 aim to alleviate many of the supply chain challenges faced by the CHTs and incorporate best practices in outsourced relationships.

Outsourcing is a sensible strategy, often adopted by leading supply chain management practitioners, given the infrequent distribution cycles that result in long periods of low vehicle utilization. Additionally, funding the maintenance of the MOH fleet in the difficult operating conditions experienced in Liberia is a challenge.

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Therefore, turning to the private sector for transport services, when necessary and in a best-practice manner, is an appropriate approach for the MOH.

Although transport assets can be easily hired by deploying a lead 3PL, warehouse capacity that meets the required standards for pharmaceuticals is not as readily available. Outside of the private sector, non-profit organizations may also play a role in the SCMP 2023–2028. Addressing issues related to funding the maintenance of delivery vehicles, staff transport vehicles, mechanical handling equipment (MHE), and cold chain equipment can be eased by adopting an outsourcing strategy for equipment provision and maintenance. The private sector, through a commercial approach, can procure, maintain, and replace capital assets more sustainably than the current sporadic funding for capital items and irregular flow of funds for repairs and maintenance. Alternatively, the public sector could charge the various programs for the supply chain services provided to finance and operate the supply chain assets on their behalf. However, adopting a fee-for-service strategy by the public sector carries the risk of competition from the private sector market.

With the introduction of an RDF by the MOH and the implementation of a cost-sharing policy that incorporates procurement at the county level, the SCMP 2023–2028 needs to recognize that local private-sector pharmaceutical importers and wholesalers will play a more significant role in the healthcare supply chain over time, especially if the RDF is successful. This situation could result in lower volumes of products flowing through the MOH supply chain as the volumes obtained locally from wholesalers and distributors increases.

### 1.3.6. Energy and sanitation

**Energy**

Reliable energy sources are crucial for a modern supply chain, especially for warehouses that require consistent access to power for temperature-controlled areas and computer management systems. Liberia has one of the lowest rates of electricity access globally, with only two per cent of the population having electrification in 2016. Moreover, electricity tariffs in Liberia are among the highest globally, with a cost of 50 cents per kilowatt hour (compared to the global average of 14 cents per kilowatt hour). This poses significant challenges for hospitals in maintaining a secure electricity supply and an efficient cold chain to store vaccines. Studies have shown that increased access to electricity can improve access to health information, health-seeking behaviours, and utilization of health services, including vaccination rates in children and antenatal care for pregnant women.

To address the energy shortage in Liberia, the Millennium Challenge Corporation partnered with the Liberian government in 2015 on the $257 million Liberia Compact (2016–2021) aimed at promoting economic growth and addressing energy challenges. This initiative was further divided into the $202 million Liberia Energy Project, which focused on improving Liberia’s energy network.

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18 Ibid.
The rehabilitated Mt Coffee Hydroelectric Plant, which became fully functional in July 2017, now provides all of the Liberia Electricity Corporation’s (LEC) electricity. Mt Coffee can now generate 88 megawatts of power, with the potential to expand to 126 megawatts as electrification efforts continue throughout the country. However, distribution challenges need to be addressed to fully utilize the increased capacity.

Regarding physical supply chain infrastructure, inconsistent electricity poses challenges in maintaining the cold chain and executing supply chain activities. For example, the CMS at Caldwell experiences interruptions in its power supply, discouraging organizations like Gavi or the Expanded Program on Immunization (EPI) from utilizing the CMS to store vaccines. At the county level, electrification is less common and many CHTs report a lack of resources to provide a reliable supply of fuel for generators at county depots and health facilities.

**Water and sanitation**

Water and sanitation, while not directly impacting the healthcare supply chain itself, indirectly contribute to the burden on the healthcare system and the supply chain workforce. Lack of access to clean water and sanitation services increases the spread of disease, resulting in missed workdays for supply chain staff either due to their illness or the need to care for family members. In Liberia, less than 10 per cent of the population has access to safely managed drinking water and sanitation services, and approximately 42 per cent of the population practices open defecation.

In 2017, the National Water Supply and Sanitation Commission Act was passed, establishing the Water and Sanitation Regulatory Authority responsible for regulating tariffs, licenses, and service standards in Liberia. Increased regulation and oversight should improve access to clean water and sanitation over time.

### 1.4. SUMMARY

The introduction provides an overview of the Liberian healthcare supply chain and highlights key challenges and strategies outlined in the SCMP documents. It emphasizes the need for a well-functioning supply chain to ensure the availability and timely delivery of healthcare commodities and services. While progress has been made in certain areas, such as the centralization of supply chain functions and the implementation of performance-based financing, there are still significant challenges that need to be addressed. The upcoming section will delve into the cross-cutting elements that are crucial for the success of the healthcare supply chain in Liberia. These elements include governance; transparency, accountability, and commodity security; human resources; collaboration and communication; and product quality and regulatory oversight.

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19 Ibid.
2. CROSS-CUTTING ELEMENTS

Governance, communication and collaboration, investment in human resources, transparency and accountability, and quality assurance span all areas of the supply chain and are embedded within each of the strategic goals. Crucial to the successful management of the supply chains is an effective governance framework, which enables the alignment of stakeholders, promotes ethical behaviour and ensures accountability. Transparency and accountability in public health supply chains are pivotal for fostering trust, enhancing performance, and mitigating corruption, ensuring that healthcare resources are allocated effectively and equitably. The security of health commodities, on the other hand, guarantees the reliable delivery of essential medical supplies, thereby improving access to healthcare services and patient outcomes while also instilling confidence in the system among all stakeholders. The assurance of product quality in public health supply chains is paramount to ensuring the safety, efficacy, and reliability of medical products, directly impacting patient outcomes and public trust in the healthcare system. Regulatory oversight plays a crucial role in maintaining these quality standards, mitigating risks of substandard or counterfeit products, and fostering compliance with best practices, thus protecting public health and enhancing the overall effectiveness of the healthcare supply chain. Equally important is fostering open communication and collaborative culture among all stakeholders in the supply chain, alongside a robust investment in human resources addressing staffing, skills, motivation, and work conditions.
2.1. GOVERNANCE

Governance in the public healthcare supply chain in Liberia is a crucial issue that must be addressed to improve the quality and accessibility of healthcare in the country. The healthcare system has been significantly impacted by years of civil war, political instability, and economic underdevelopment. These factors have led to poor infrastructure, a lack of medical resources and a shortage of trained healthcare professionals.

Governance plays a crucial role in the success of supply chain management. A well-designed governance framework can ensure that all stakeholders involved in the supply chain are aligned with the organization’s objectives and goals. It provides a structure for decision-making, accountability, and transparency, which are essential for the efficient functioning of the supply chain. Effective governance helps to manage risks, ensure compliance with regulations and standards, and promote ethical behaviour. With governance, organizations can mitigate supply chain disruptions, enhance their reputation, and build trust with customers, suppliers, and partners. One of the key benefits of governance in supply chain management is risk management. Liberia’s supply chain is a complex network of activities involving multiple parties, which makes it difficult to coordinate during natural disasters, disease outbreaks, and other public health emergencies.

Governance in the public healthcare supply chain is essential to ensure the availability and affordability of healthcare services. The government and healthcare providers must work together to prevent inconsistencies, promote transparency, and increase accountability to improve the quality and accessibility of healthcare in the country.

2.2. TRANSPARENCY, ACCOUNTABILITY AND COMMODITY SECURITY

One of the commonly cited challenges facing governance in the public healthcare supply chain in Liberia is a lack of accountability. Threats to governance and accountability can take many forms including egregious practices like embezzlement, bribery, and nepotism, which can significantly impact the availability and affordability of healthcare services. Transparency aids in holding healthcare providers, suppliers, and government officials accountable for their actions. To combat these issues, it is essential to establish and enforce strict rules and regulations, and to create a culture of transparency and culpability. Transparency is imperative as it ensures that all healthcare-related activities are well-documented and that information is easily accessible to the public. The supply chain system has over the years experienced challenges in transparency and accountability including reports of missing commodities.22 Besides the limited supervision, the system has not been monitored or supervised to an appreciable extent. The community in which the health facilities, clinics, and hospitals are located is not fully involved in understanding how commodities are dispensed when commodities arrive and generally holding the structures accountable for the supply chain activities. There is no broad public awareness of supply chain challenges. These challenges only cycle within the supply chain space, therefore contributing to the limited

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knowledge the public has on supply chain issues. External independent audits of supply chain systems and the involvement of stakeholders like local communities, civil society organizations, and watchdog groups can enhance supply chain monitoring and oversight.

Pharmaceutical crime and the physical security of health commodities are crucial to ensuring patients have access to medication when they need it. Reliable security systems and operational processes in the warehouse to prevent theft, routine inventories, measures to prevent expiries, and improved fire prevention measures will aid in ensuring health commodities are available for use at health facilities and from CHAs.

It is critical to build and develop systems that hold structures and supply chain actors accountable. For example, hotlines to report theft and fraud related to supply chain commodities would allow for anonymous reporting. Coordination with law enforcement and the Ministry of Justice to support the investigation and prosecution of the theft and misuse of supply chain commodities and resources at all levels will encourage accountability.

To address these challenges, several initiatives and programs have been put in place to improve governance in the public healthcare supply chain in Liberia. For example, the government has established a national procurement agency that is responsible for managing the procurement of medical supplies and it has also implemented an electronic procurement system (EPS) to improve transparency and reduce the risk of corruption. Additionally, the Liberian Ministry of Health has implemented an e-health system that allows for the tracking of patient information, inventory, and supply chain and improves accountability and transparency. Despite these efforts, there is still a need to develop additional systems and processes that can holistically address system-wide inadequacies, ineffective systems and poor data quality.

### 2.3. HUMAN RESOURCES

Human resources play a vital role in the successful management of public sector healthcare supply chains in low- and middle-income countries. To ensure that healthcare supply chains can operate efficiently and effectively, four essential areas require investment: staffing, skills, motivation, and working conditions.

It is imperative to have the right staff in place who possess the necessary skills and motivation to do their work in appropriate working conditions. One of the most prevalent challenges in public health supply chains is that healthcare professionals are mandated to act as supply chain professionals. It is critical to strike a balance in maintaining oversight and control of supply chain functions within MOH by outsourcing non-core areas to the private sector as they have the capacity and financial incentives to achieve specified outcomes.

Within Liberia, human resources play a pivotal role in supply chain management, particularly in addressing the numerous challenges faced by the country. One significant issue is the lack of clear roles and responsibilities, which can result in confusion and inefficiencies within the supply chain. Additionally, there is a dearth of clearly defined job descriptions, which hinders effective task allocation and performance evaluation. As a result, staff find themselves performing tasks outside their scope of work (e.g., county pharmacists performing data entry). Limited financial resources further exacerbate these problems, making...
it challenging to attract and retain skilled personnel who can contribute to the smooth functioning of the supply chain.

Another hurdle is weak or insufficient systems and processes. This leads to a lack of accountability, where individuals are not held responsible for their performance or any failures within the supply chain. Consequently, there are no mechanisms to promote effective communication, collaboration, or coordination between different tiers of the supply chain. The absence of a centralized chain of accountability further compounds the problem, as it becomes difficult to identify and rectify performance issues or reward exceptional achievements.

Addressing these challenges requires a comprehensive approach. Firstly, focusing on skills development is crucial. Investing in training programs and workshops can equip the supply chain workforce with the necessary knowledge and expertise to fulfill their roles effectively. This will help mitigate the issues arising from unclear responsibilities and ensure that each individual understands their tasks and performs them efficiently.

Motivation is another key aspect. Implementing performance-based incentives, and recognition programs, and fostering a supportive work environment can enhance motivation among supply chain personnel. By acknowledging and rewarding good performance, individuals are more likely to be motivated to excel in their roles. Additionally, creating avenues for open communication and collaboration can foster a sense of purpose and engagement within the supply chain workforce.

Addressing workforce challenges is key. Developing clearly defined job descriptions is vital to allocate responsibilities appropriately and avoid overlapping roles. Recruitment efforts should focus on attracting and retaining skilled individuals who can contribute to the efficient functioning of the supply chain. It is also crucial to have the appropriate number of staff with the necessary qualifications and experience to perform the various roles within the supply chain\textsuperscript{25}. This includes not only healthcare professionals such as doctors and nurses but also logistics and supply chain management staff. To maintain and support a robust and healthy supply chain, sufficient funds must be available to pay staff regularly\textsuperscript{26}. A well-staffed workforce can effectively handle the complexities inherent in supply chain management and deliver improved outcomes.

Lastly, working conditions and overall system improvements are essential. Establishing effective communication channels, coordination mechanisms, and a clear chain of accountability can address the existing gaps in the supply chain management structure. This will facilitate seamless collaboration between different tiers of the supply chain and ensure that all stakeholders are accountable for their actions. Strengthening working conditions and implementing systems that promote transparency and accountability will result in enhanced supply chain performance. Staff who work in poor conditions are more likely to have higher absenteeism and turnover rates, which can harm the ability of products to reach the last mile\textsuperscript{27}.

During the development of this document, workshop participants continuously reinforced their need for safe and healthy working conditions that had appropriate facilities, transportation, equipment, and resources like modern technologies, tools, and software.

\textsuperscript{25} Ibid.
\textsuperscript{26} Ibid.
\textsuperscript{27} Ibid.
Ideally, a comprehensive assessment of human resources, like People that Deliver’s Human Resources for Supply Chain Management (HR4SCM) Rapid Diagnostic Tool and Training Needs Assessment, should be performed at the onset of the development of each SCMP to inform human resource needs. However, when funds are not available, supervisors at all levels should review the current makeup of their teams, and assess employee roles, responsibilities, and levels of motivation on an annual basis to determine what areas require additional support to bridge gaps.

2.4. COLLABORATION AND COMMUNICATION

Effective collaboration and communication are essential for the successful management of public sector healthcare supply chains. Liberia has limited resources and a lack of infrastructure, making it difficult to ensure the availability and accessibility of healthcare services. To overcome these challenges, it is essential to establish clear lines of communication and to foster a culture of collaboration among all stakeholders involved in the healthcare supply chain.

Mechanisms for communication and collaboration should be established. Communication within organizations should be systematic and well-organized, with regular touchpoints and check-ins. All departments should establish mechanisms for both routine and urgent communication, such as regular memos, meetings, bulletins, emails, newsletters, and more. To emphasize the importance of regular communication, supply chain meetings should be scheduled annually and documented in a communication strategy diary that includes clear goals, objectives, and comprehensive agendas. Similar communication formats should be followed when interacting between departments, organizations, or different levels of the supply chain. If meetings are the preferred method of communication, agendas should be circulated at least 48 business hours in advance. Technology can aid in this process. For example, electronic data interchange (EDI) platforms can be used to facilitate communication and coordination among stakeholders. EDI platforms allow for the exchange of electronic documents, such as purchase orders and invoices, in a standardized format. This can enhance the speed and accuracy of communication, reducing the risk of errors and delays.

Clear delineation of roles and responsibilities for stakeholders’ aids in aligning expectations for supply chain management. It helps prevent duplication of efforts and decreases the potential for gaps. Once roles and responsibilities are defined and integrated into established systems and processes, supply chain management committees can be created. These committees serve as a mechanism for checks and balances, promoting communication and collaboration among various stakeholder groups. These committees are composed of representatives from donors and partners, government agencies, healthcare providers, nonprofit organizations, and suppliers. By bringing together stakeholders from different sectors, these committees facilitate improved communication, coordination, and efficiency within the healthcare supply chain.

2.5. PRODUCT QUALITY AND REGULATORY OVERSIGHT

The quality of pharmaceuticals remains a global concern and the lack of reliable drug quality assurance systems often contributes to the devastation of diseases. The availability of substandard and falsified
medical products on the market can result in profound health implications including treatment failure, adverse effects, increased morbidity, mortality, development of drug resistance, and wasted resources.

The Liberia Medicines and Health Products Regulatory Authority (LMHRA) is mandated and responsible for ensuring all pharmaceutical products within Liberia are safe and efficacious. Provisions of the National Drug Policy paved the way for the establishment of a medicines regulatory authority, LMHRA, in 2010. LMHRA’s mandate is to enact and update medicines regulations to oversee the pharmaceutical sector and establish a national quality control laboratory. However, in May 2017, the LMHRA quality control laboratory was gutted by fire and all pharmaceutical analysis equipment was destroyed, which limited LMHRA’s quality control capabilities. This also affected LMHRA’s capacity to perform effective post-marketing surveillance. As a result, quality assurance testing was referred to third parties, especially Ghana, in the interim period.

The restoration of the in-country quality assurance and testing capacity of LMHRA has been supported by USAID over the years through the procurement of necessary laboratory equipment and consumables. There has been a focus in recent years on building sound infrastructure within LMHRA by developing a suite of policies and standard operating procedures (SOPs) (e.g., Treatment and Disposal of Unfit Medicine and Health Products, Donation of Medicines and Health Products, Import and Export of Medicines), capacity development, and training of LMHRA staff. In 2022, LMHRA resumed basic in-country testing and is currently in the process of constructing a multi-purpose building that will house a full-scale laboratory.

The importance of quality assurance in the supply chain of health products cannot be overstated, as it plays a crucial role in ensuring the safety, efficacy, and reliability of these essential commodities. The establishment of national supply chain infrastructure standards for the storage and transportation of pharmaceutical products will maintain the physical integrity of health products, which is vital as it directly impacts their performance and user trust. A robust quality assurance system helps to mitigate the risks associated with counterfeit, contaminated or damaged products that could potentially compromise patient outcomes and public health. Furthermore, it guarantees that health products adhere to stringent regulatory standards and best practices, thereby fostering trust among healthcare professionals and consumers alike. In this context, quality assurance serves as a critical line of defense that safeguards the health and well-being of millions, while also promoting the ethical and responsible distribution of healthcare resources within the global supply chain.

2.6. SUMMARY

As we transition into the next section of SCMP 2023–2028, we delve deeper into the specifics of strategic goals and the blueprint for their implementation. It's clear that effective governance, alongside transparency, accountability, and commodity security, underpins the pillars of our strategic vision. However, these elements alone, crucial as they are, do not constitute the entirety of the vision. To realize the full potential of our public health supply chain, a comprehensive approach must be adopted, one that encapsulates the key elements of human resources, collaboration and communication, product quality, and regulatory oversight.
3. **STRATEGIC INTERVENTIONS**

This section presents strategic objectives and their current state within the supply chain. It outlines the desired goal state and prioritizes key activities for implementation in three phases. Phase 1 refers to activities that should be undertaken before the end of 2024; phase 2 focuses on targets for 2025-2026; and phase 3 addresses goals for 2027-2028. Additionally, the section highlights the corresponding KPIs, which are described in greater detail in the Performance Management section.
3.1. PHARMACEUTICAL AND HEALTH PRODUCTS SUPPLY CHAIN MANAGEMENT

3.1.1. Forecasting and supply planning

Strategic goal 1: Strengthen and harmonize the national and sub-national forecasting and supply planning of health products by ensuring decisions are informed by high-quality data to support the procurement of health commodities across cost-effective the public sector.

Forecasting national health needs and translating them into a supply plan to determine procurement requirements is a crucial aspect of supply chain management. These activities link facility-level information on services and commodities with national-level program policies and procedures. By providing accurate data on product quantities and timing, informed decisions can be made on the financing and procurement of commodities. The National Quantification Technical Working Group and the National Quantification Technical Committee (NQTC), situated within the SCMU, are responsible for overseeing this process within the public health supply chain.

Current state

The forecasting and supply planning process, although overseen by the SCMU through the NQTC, is led by individual disease programs, with assumptions generated at the program level. However, the reliability of data is compromised due to weakness in the current eLMIS, resulting in non-harmonized and inconsistent tools being used, producing varying results for the country’s needs. Although the SCMP 2010-2020 proposed the establishment of SOPs and guidelines for forecasting, this has only been partially implemented for well-funded programs, such as HIV, malaria, TB, and family planning. Programs that lack donor funding, such as those for oxygen and AT, have not fully adopted these forecasting practices. National forecasts are often conducted using a mix of program-specific tools (e.g., Quantimed and Quan-TB for HIV and TB, respectively) and customized MS Excel spreadsheets.

For monitoring shipments and stock status, Liberia uses various platforms such as the Global Family Planning Visibility and Analytics Network (GFPVAN) for family planning products, the Procurement Planning and Monitoring Report for malaria commodities for USAID-procured health products and the Wambo procurement platform for Global Fund-procured health commodities. In 2022, the NQTC adopted the use of the Quantification Analytics Tool, a modernized online platform that enhances data visibility, dissemination, and use for health product supply planning and shipment monitoring by the programs.
Goal state

Logistics data, especially consumption, is fundamental to improving accuracy in forecasting. The timing of the forecasting and supply planning is aligned across all programs and tools are standardized and harmonized. CHTs adopt a bottom-up approach, using data from the field to estimate new requirements. Updated guidelines and SOPs are in place for national disease programs and essential medicines, which are updated regularly and consistently followed. Emerging programs for health products and medical devices like blood, medical oxygen, and AT are developed and quantification of cross-cutting medical instruments and supplies required for various programs are harmonized. Regular evaluation of data and sharing of lessons learned occur across different disease areas to guide process enhancements.

Key implementation plan activities

**Phase 1 (2024)**

- Incorporate checks for physical copies of policies, guidelines, and SOPs in supportive supervisory visits.
- Standardize SOPs for forecasting and supply planning across programmatic areas and facility levels.
- Introduce and standardize the use of modern forecasting tools, where applicable.

**Phase 2 (2025-2026)**

- Update the national quantification guidelines, including KPIs to monitor forecast accuracy.
- Consolidate forecasting and supply planning activities from various programs to a central coordinating body.

**Phase 3 (2027-2028)**

- Strengthen the generation of logistics data from the health facility levels and involvement of the CHTs.

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**Key performance indicators (KPIs)**

- Annual forecasting accurate percentage (forecasted quantity vs actual consumption)
- Percentage of health facilities reporting complete consumption data to central level by functional program area
- Percentage of forecast review meeting held according to schedule
3.1.2. Health products selection

Strategic goal 2: Align the selection of health products, commodities, and supplies with the priorities and needs of the population.

Current state
Appropriate product selection is essential in ensuring access to high-quality medicines and supplies, making it a vital function within the supply chain. The selection process is primarily based on national standard treatment guidelines (STGs) and World Health Organization (WHO)-recommended treatment guidelines, with a case-by-case analysis. The MOH, with support from its partners, developed two Essential Medicines Lists (EMLs), the first in 2011 and the second edition in 2017, to guide the programs in product selection. The most recent update to the EML was completed in 2023.

Currently, individual disease programs, such as malaria, HIV, and TB, lead the product selection process. They are guided by the EML and WHO guidelines to select products that align with the diagnosis and treatment of prevalent diseases, considering evidence-based practices and cost-effectiveness. However, it has been observed that obsolete and discontinued products often remain recorded in the supply chain’s transactional records, such as the stock status and requisition reports (SSRR) from the health facilities, without regular updates.

Goal state
The supply is fully aligned with the healthcare needs and priorities of its population. This will be achieved by establishing a robust and flexible procurement system that prioritizes and matches the selection of health products, commodities, and supplies to the identified needs of the populace. This system will be guided by STGs and EML to ensure that the selection of products aligns with best practices in patient care and disease management. As a result, the supply chain will ensure the consistent availability and accessibility of these crucial items across the country's healthcare facilities, directly responding to Liberia's healthcare challenges and population health demands.

Key implementation plan activities

Phase 1 (2024)

- Use 2023 updated EML and STGs and institute a mechanism for annual reviews to assess the relevance and usefulness of this key policy document by developing SOPs and scorecards specifically designed for the annual reviews.
- Ensure awareness and availability of these national policies at all levels of the healthcare system.

KPIs
- Percentage of health products that are based on approved EML
- Percentage of health facilities with updated SOPs and EML
3.1.3. Procurement

Strategic goal 3: Strengthen and streamline in-country procurement mechanisms for health commodities with the use of digital technologies.

Procurement is a critical function within the supply chain and effective management is essential for ensuring the availability of medicines and supplies when and where they are needed. The purchase of required drugs is one of the most significant expenditures in the national health budget, often only second to personnel costs. Good procurement practices ensure high-quality medicines and supplies are procured at the lowest possible price. The SCMP 2015 Review envisioned the establishment of an autonomous National Drugs Service (NDS) to provide procurement services for pharmaceuticals and related health products on behalf of the MOH by establishing a procurement unit/committee and relevant bodies in line with Public Procurement and Concession Commission (PPCC) guidelines. However, this vision has been archived and the procurement of health products currently remains within MOH structures.

Current state

At present, the MOH procurement unit is responsible for contracting and procuring essential medicines as part of national procurement. Framework contracting for HIV/AIDS, malaria, TB, and family planning is conducted under multiple donor legal frameworks through donor-supported technical assistance. Challenges such as procurement and customs clearance delays, inadequate coordination among the parties involved and uncoordinated receipts at CMS are frequently encountered. Moreover, procurement and delivery of commodities often do not adhere to a minimum remaining shelf-life requirements for health products, either due to delays in customs clearance and/or limited shelf-life at shipment, resulting in significant expiries of health products within the country.

Goal state

The GOL, through the CMS, are responsible for implementing framework contracts for all essential medicines and health products, including program-specific for HIV, malaria, TB, and family planning. The GOL co-financed health commodities in areas that were previously fully funded by donors, transitioning to use Liberia’s national legal framework. Transparent and responsive procurement systems are established with clear intercoms. Customs clearance processes are well-documented and efficient.

The revised procurement contract framework establishes a platform for approved in-country pharmaceutical distributors and/or wholesalers to offer cost-effective pricing for health commodities to service delivery points as part of the national RDF scheme, improving access to quality-assured and affordable pharmaceutical products and consumables for the patients.

KPIs

- Annual percentage of the GOL contribution to the procurement of essential medicines in the forecasted budget
- Percentage of procurement completed (ordered quantities) in accordance with the procurement plan
The SCMP promotes e-procurement at all levels to enhance transparency. Capacity-building initiatives are undertaken to train procurement entities at all levels in best practices, including e-procurement. Mechanisms are developed to promote regular procurement monitoring at all levels, including vendor performance evaluation. Strict adherence to prevailing procurement laws and guidelines is enforced to improve transparency and streamline customs processes to reduce clearance time and expenditures.

A critical element in achieving the desired future procurement state is gaining the agreement and buy-in of all partners. It is essential to transition the implementation of the procurement function to GOL through CMS once donor quality assurance processes and requirements are met.

**Key implementation plan activities**

**Phase 1 (2024)**

- Prepare a roadmap for transitioning from the MOH and the duplicative partner procurement systems to the national procurement system of the CMS for health commodities.
  - Advocate for incremental annual funding for GOL to procure health commodities from the present time to 2028.
  - Begin the delegated procurement implementation process, allowing GOL to procure commodities co-financed by development partners.

**Phase 2 (2025-2026)**

- Align procurement practices with existing procurement laws through legislative action and enable the CMS to take on its core responsibilities and establish its legal status.
  - Define clear roles and responsibilities for the MOH and the CMS procurement teams, avoiding duplication in health commodities procurement.
  - Develop comprehensive procurement procedures and SOPs and disseminate them to all entities involved in procurement.
  - Create scorecards to monitor the implementation of the framework arrangement at all levels, including the introduction of the drug revolving fund.
- Plan and roll out an integrated EPS.
  - Provide training to procurement personnel at the central and CHT levels on the use of Liberia’s EPS.
  - Ensure that the EPS includes project management tools and document filing, and evaluate the availability of off-the-shelf complementary software and government eSystems.
**Phase 3 (2027-2028)**

- Establish transparent oversight processes for procurement with clearly defined roles and responsibilities at all levels.
  - Institute a monitoring mechanism and issue guidelines for facilities and other entities to strictly adhere to the framework contracting arrangement tenets.
  - Ensure compliance with the PPCC Act and regulations.
  - Develop and monitor KPIs concerning vendor (supplier) performance for the framework contracting mechanisms.
  - Develop and monitor guidelines to impose sanctions on entities within the system for non-compliance with procurement processes and regulations.

### 3.1.4. Importation and customs clearance

**Strategic goal 4:** Establish importation and customs clearance guidelines for health commodities and enforce regulatory oversight of health commodities’ entry into the country.

**Current state**

The process of bringing pharmaceuticals and medical products into the country is known as importation, regardless of the mode of transport. This process is governed by the regulations set by both the Department of Customs and Excise and LMHRA. The associated costs are determined by the international commercial terms agreed between the procurement entity (either a donor or the MOH) and the supplier.

In keeping with international best practices, suppliers submit the necessary documentation in advance of the arrival of the goods at the port of entry in Liberia. Advance shipping notifications (ASNs) are used to inform various parties within the supply chain about the pending arrival of the goods. However, it has been observed that the ASNs do not always reach all relevant members of the supply chain management team, especially in terms of unit price, expiry dates, and shipment volumetrics for space planning. Although the importation process is generally executed successfully, delays in customs clearance do occur and unannounced arrivals at the CMS as well as simultaneous arrivals put pressure on the warehouses. Future iterations of the SCMP will seek to address these challenges through improved communication and management information systems.

Customs clearance is a key activity within the overall importation process, where the Customs and Excise Department accepts the consignment for entry into Liberia. As per international best practices, this activity is undertaken by a local customs clearance agent. Regardless of the procuring entity, the MOH is always the consignee, even if the process is outsourced. A better understanding of the customs clearance process by MOH team members will help minimize delays experienced in clearing incoming goods. The process involves presenting required documents, including any specific documentation required by LMHRA for pharmaceuticals and medical products. It should be noted that in some instances, while the products
procured for or by the MOH can be cleared and imported into Liberia, they cannot be distributed for use until laboratory tests are completed to the satisfaction of LMHRA. The current procedure involves exporting samples to Ghana and receiving a satisfactory test result before the quarantine status of the consignment can be changed to free stock. In the short term, future SCMP proposals would maintain the existing testing arrangements despite the delays incurred. However, it is understood that the delays in customs clearance highlighted above are primarily the result of incomplete or inaccurate documentation. In many instances, waivers will be granted for products registered by LMHRA and procured by the MOH and donors to expedite port clearance, even if post-shipment testing is required.

**Goal state**

Health products entering the country flow smoothly through sea and airports of entry due to streamlined processes established by the LMHRA and the MOH. ASNs are distributed promptly, allowing all stakeholders to adequately prepare for the arrival of health products. Regular communication among the vested parties ensures that delays resulting from clearance issues or simultaneous arrivals are promptly addressed. The level of post-shipment testing is reduced through the establishment of in-country testing facilities and the procurement from pre-qualified, quality-assured manufacturers.

**Key implementation plan activities**

**Phase 1 (2024)**

- Collaborate with LMHRA and other regulatory bodies to introduce stricter importation processes and procedures for health commodities.

### 3.1.5. Quality assurance

**Strategic goal 5:** Enhance quality assurance practices to monitor health commodities entering the public sector supply chain and ensure health commodities within the supply chain are stored, handled, and managed appropriately to maintain their physical integrity.

**Current state**

The quality of pharmaceuticals remains a global concern and the lack of reliable drug quality assurance systems often contributes to the spread of diseases. Poor-quality medicines fail to meet official standards in terms of strength, quality, purity, packaging, and labelling. These medicines can be legally registered branded or generic products, or they can be counterfeits—deliberately mislabeled regarding their identity, strength or source. Whether unintentionally substandard, spurious, falsely labelled, falsified or counterfeit, poor-quality drugs can have serious health implications, including treatment failure, adverse effects, increased morbidity mortality, development of drug resistance, and wasted resources.
The LMHRA is responsible for ensuring all pharmaceutical products within Liberia are safe and efficacious. It was established to enact and update medicines regulations, regulate the pharmaceutical sector and establish a national quality control laboratory. However, the establishment of the quality control laboratory has not been achieved and the country depends on other countries, like Ghana, to conduct the required tests.

Once the products have cleared customs and entered the in-country supply chain, they are not always transported and stored securely or under conditions that maintain their effectiveness when used in patient care. While physical losses are evident through discrepancies between the stock levels in the stores and the records in the logistics information systems, the impact of transporting and storing products outside of the required temperature ranges is often overlooked. Consequently, although products may not have reached their expiry date, their effectiveness may be compromised, leading to unintended consequences when administered.

**Goal state**

Through coordinated leadership at the MOH, clear structures for monitoring pharmaceutical products structures are established, enabling the central level MOH and sister agencies (LMHRA and Customs Authority) to monitor and regulate the importation of quality and efficacious products. Regular updates are made to key policies, guidelines, and SOPs. Donors receive clear guidance and regular communication regarding the medications needed based on usage data and forecasting. There is also a process for refusing pharmaceutical products from donors or other organizations if they have an expiry date that is less than three months from the date of receipt. Protocols are established to document county or municipal-level donations.

Over the next five years, the LMHRA will take steps to establish a minilab quality control laboratory in Monrovia to undertake basic quality control tests, while outsourcing complex tests. A roadmap will be created for the development of a fully-fledged laboratory.

Priority is given to the proper storage, handling, and management of pharmaceutical products to ensure their safety and efficacy, thereby enhancing trust in the healthcare system. Implementation of standardized handling procedures is essential to minimize the risk of damage or contamination, especially for products that require temperature-controlled storage and transport conditions (refer to the Cold Chain section for corresponding implementation activities). As more products are developed that require temperature-controlled environments, this becomes increasingly important. By investing in robust monitoring and tracking systems and regulatory oversight, the MOH and the LMHRA can proactively identify and address potential supply chain bottlenecks, ensuring the continuous availability of high-quality health products for the population.

**Key implementation plan activities**

**Phase 1 (2024)**

- Develop policies and procedures for conducting inspections of all health commodities upon arrival at the CMS and conducting periodic inspections thereafter to assess for water damage, breakage, pest damage and other areas of concern.

**KPIs**

- Percentage of health products that are based on the approved EML
- Percentage of health facilities with updated SOPs and the EML
Phase 2 (2025-2026)

- Establish clear pharmaceutical product monitoring structures to enable the central level MOH and sister agencies (LMHRA and Customs Authority) to monitor and regulate the importation of healthcare commodities.
- Establish regular communication channels with donors to provide them with updated information on the medications that are needed based on usage data and forecasting.
- Establish processes for enforcing the refusal of pharmaceutical products from donors or other organizations if their expiry date is less than three months from the date of receipt.
- Establish a minilab to undertake basic quality control tests for pharmaceutical products.

3.1.6. Pharmacovigilance and rational use of medicines

Strategic goal 6: Improve pharmacovigilance practices to adequately capture adverse events and other health commodity-related issues.

Effective management of the supply chain in healthcare systems requires the rational use of medicines, which entails utilizing medications following established clinical guidelines and evidence-based practices while minimizing associated risks. Rational use ensures that the procurement, storage, distribution, and utilization of medicines are effectively managed, leading to an optimized system. Conversely, the irrational use of medicines can cause unexpected fluctuations in demand and pose significant challenges to supply chain management. This can result in high levels of expired stock, zero stock balances, or overstocking, adversely impacting the efficiency and effectiveness of the system. Furthermore, irrational use of medicines can lead to the emergence of drug-resistant infections, posing a considerable public health threat. For example, the overuse and misuse of antibiotics can lead to antibiotic resistance, rendering infections more difficult to treat. By promoting the rational use of medicines, supply chain managers can guarantee the availability of appropriate quantities of the right medicines at the right time, ensuring patients receive optimal treatments while reducing costs associated with waste and inappropriate use of medicines, ultimately improving health outcomes.

Current state

The objective of effective medicines selection is to establish a national list of medicines chosen to promote therapeutically sound prescribing and ensure the prudent use of resources. These lists are linked to evidence-based clinical guidelines and must be revised regularly. They serve as the basis of drug selection by primary, secondary, and tertiary public healthcare institutions. During the development of the SCMP 2023–2028, the current EML and STGs were found to be outdated and were revised with support from the WHO. Currently, LMHRA is underfunded and lacks sufficient staff, resources, and tools to adequately perform pharmacovigilance activities. Adverse events are not captured at a sufficient level and if captured, the system is slow to respond. Prescribing practices are not reflective of global best practices, especially regarding the prevention of antibiotic resistance.
Goal state

The system will be equipped with an adequately funded national regulatory agency and well-trained professionals to timely identify, analyze, and respond to adverse drug reactions and other safety concerns linked to health commodities. Healthcare providers and the public are regularly updated about potential health risks associated with the use of various commodities. The SCMP 2023–2028 advocates for the rational use of medicines based on WHO guidelines and these principles will be incorporated into product selection, forecasting, and procurement of medicines for public sector use.

Key implementation plan activities

**Phase 1 (2024)**

- Utilize the 2023 updated EML and STGs and establish a mechanism for conducting annual reviews to assess their relevance and effectiveness.
- Develop SOPs and scorecards to facilitate annual reviews.
- Promote awareness and ensure the availability of these national policies at all levels of the healthcare system.

## 3.2. SUPPLY CHAIN POLICY, GOVERNANCE AND EXECUTION

### 3.2.1. The Supply Chain Management Unit (SCMU)

**Strategic goal 7:** Introduce proactive communication and coordination of public sector healthcare supply chain stakeholders.

**Current state**

Since its establishment in 2015, the SCMU has been responsible for overseeing all supply chain activities within the Liberia public health supply chain. The goal of the SCMU is to maximize customer service by facilitating seamless linkages and coordination between organizations and functions involved in the supply chain. This includes increasing data visibility throughout the system, facilitating stakeholder coordination, and aligning demand with supply through data-based quantifications and unified procurement plans.
However, the current state of the SCMU lacks effective customer service and communication. Information exchange between organizations is currently lacking. The SCMU is not consistently communicating essential information to other stakeholders, such as health facilities, CHTs, procurement departments, and programs. Regular communication regarding stockouts, upcoming expiries, shipment delays, and delays of quarterly requisitions is critical for a well-coordinated and efficient supply chain.

**Goal state**

Invest in developing the capacity of the SCMU to serve as a supervisory body, ensuring adherence to good supply chain practices throughout the supply chain. Improve data availability and visibility by implementing a central database for the LMIS. Coordinate stakeholders in an active, rather than reactive, manner. Improve procurement and quantification practices to ensure appropriate stock levels.

**Key implementation plan activities**

**Phase 1 (2024)**

- Invest in developing the capacity of the SCMU to:
  - Serve in a supervisory role.
  - Use reliable, high-quality data for decision-making.
  - Ensure adherence to good supply chain practices throughout the supply chain.

- Create a supply chain governance document that guides SCMU functions, sets expectations and defines the roles and responsibilities of all organizations interacting with the SCMU at each level.

**Phase 2 (2025-2026)**

- Ensure sufficient human resources with the necessary skills, tools, defined processes, and oversight to execute their roles and responsibilities.
- Establish a central database to store all LMIS data, enabling the production of unified and integrated reports nationwide.

**Phase 3 (2027-2028)**

- Emphasize the importance of oversight and supervision of the SCMU and develop KPIs to monitor and measure the progress of SCMU teams.
- Create a training and mentoring plan to expand the knowledge base and expertise of SCMU in areas that need improvement.

**KPIs**

- Percentage of planned meetings held as scheduled
- Percentage of required attendees attending meetings
- Number of supply chain actors that have a copy of the supply chain governance document (online or paper-based) readily available
3.2.2. Central Medical Stores (CMS)

Strategic goal 8: Develop Central Medical Stores (CMS) as an autonomous primary distribution centre within the country, optimizing the flow of commodities from the port of entry to the point of use to improve operational and cost efficiencies.

Current state

CMS operates from a purpose-built warehouse facility in Caldwell and is a non-autonomous government agency reporting to the MOH. Its responsibilities include storing and distributing medicines and medical supplies to clinics, health centres, and hospitals in thirteen counties nationwide. The lack of autonomy poses challenges in responding to issues promptly due to bureaucratic processes and difficulty in recruiting experienced supply chain managers. Caldwell directly services health facilities in both Montserrado and Margibi counties. Transportation activities, both primary and last-mile distribution, are outsourced through a contract with WFP. The high-quality warehouse facilities at Caldwell include significant temperature-controlled capacity and are supported by an internationally used WMS. However, the CMS has not been able to achieve the performance target of four distribution cycles per year for several years. Factors contributing to this failure are beyond the control of the CMS management team, such as changes in the service provided, complex processes involving the various Program Units and the SCMU, limited information technology (IT) system interoperability, and inadequate funding for equipment maintenance.

Goal state

Establish an integrated operation that covers procurement, the receipt of inbound purchases, bulk storage, order picking, primary transport, and last-mile distribution, meeting service-level requirements cost-effectively. The establishment of an autonomous CMS will facilitate the attraction and retention of experienced staff and contract resources by operating as a best practice lead logistics service provider (LLP), achieving a cost and service balance. Although a phased introduction of changes is planned, the ultimate goal is the execution of the end-to-end public sector healthcare supply chain.

Key implementation plan activities

Phase 2 (2025-2026)

- Establish the legal status of the CMS as an autonomous organization.
- Develop a phased implementation plan for the management of the end-to-end international and in-country supply chain by an outsourcing partner (3PL).

KPIs

- Percentage of health facilities with all products in stock (on-shelf product availability percentage)
- Conformance to CMS operating budget
- Identify potential outsourcing partners and commence an engagement and selection process, clearly defining the joint service specification to be delivered by the MOH and the logistics service provider.
- Undertake a review of the warehouse processes, to streamline operations, particularly for the cross-docking technique pilot.
- Conduct research to resolve system issues between the WMS and MOH business systems.
- Define KPIs, SOPs, and service level agreements (SLAs) to enable the effective supervision of the outsourced relationship by the SCMU, following best practices.

### 3.2.3. Program Units

**Strategic goal 9:** Ensure the availability of sufficient, reliable, and easily accessible data to inform decision-making in forecasting, supply planning, distribution, and replenishment of health commodities through established communication mechanisms with the DPS-SCM.

**Current state**

The health system in Liberia operates through different parallel programs such as malaria, TB, HIV, family planning, vaccines, and essential medicines. Each program operates independently within its department and with a high degree of independence. However, the logistics of medicines and medical materials are centralized and directed by the SCMU.

Programs have limited information on the status of each distribution cycle due to delivery timings and uncertainties regarding actual quantities and products that will be delivered. Often, the products received are different from the originally requested product. Stock on-hand (SOH) information obtained by programs from the CMS is often incorrect and outdated, leading to delays, stockouts, unnecessary orders, and system inefficiencies. The DHIS2 system, which powers most programs, does not share the same facility codes and product codes, requiring additional effort and manpower to translate the data between systems. There is a lack of coordination and cooperation between the programs, the CMS and the SCMU. Programs do not receive adequate information in response to their requisitions, resulting in uncertainty regarding ordered products, quantities received, and delivery delays. Some programs resort to sending their stock to avoid stockouts, while others experience delays in procuring emergency stock due to a lack of awareness about impending stockouts. These issues contribute to long reaction times and a lack of interdependency. Additionally, it is currently not possible to cross-reference or triangulate data from multiple sources in any of the management information systems.
Goal state

Programs are informed on the status of the quarterly replenishment cycle, including information on what each county will receive, delivery delays, shipment timings, and more. Access to reliable LMIS data is necessary to provide programs with accurate stock-on-hand information, reliable average monthly consumption (AMC), months of stock left (MSL), and lists of products at risk of expiry and stockout. All MOH systems holding, collecting or storing LMIS data are interoperable. Regular coordination between programs and the SCMU will enable quick problem resolution and troubleshooting. Data is triangulated, accessible, and regularly checked. For example, it will be possible to check that the number of pills consumed in a health facility is equal to the number of patients treated in the same period.

Key implementation plan activities

**Phase 1 (2024)**

- Assign responsible parties and establish timelines for inventory reporting, forecast production, and distribution cycle planning and execution.
- Revise the requisition process to reduce authorization and subsequent procurement lead times.
- Review the SOPs for the replenishment cycle.

**Phase 2 (2025-2026)**

- Introduce indicators and timelines for each action and hold parties accountable through reports and performance-based financing.
- Ensure that all programs have access to reliable LMIS data.
- Review, approve, and implement new roles and responsibilities for programs, the CMS, the SCMU, and the HMER unit.
- Achieve interoperability among information systems.
- Institutionalize the cooperation and coordination between programs and the replenishment cycle.
- Develop tools to facilitate the triangulation of supply chain and service delivery data with minimal effort.

KPIs

- Percentage of Program Units that submit inventory reports within the specified timeline
- Average time taken from requisition submission to authorization and subsequent procurement lead times
- Percentage of Program Units that have access to accurate and up-to-date LMIS data
3.2.4. County Health Teams

Strategic goal 10: Reduce the administrative and supply chain management burden of County Health Teams (CHTs) caused by delayed or incomplete delivery of health commodities.

Current state

Each county operates with a dedicated health team responsible for patient-facing activities and supply chain tasks. However, supply chain responsibilities placed on the teams, particularly at service delivery points, become burdensome. These burdens include manual record keeping of stock balances, item usage, and the increased focus on ensuring supplies reach CHAs. Furthermore, County Pharmacists are tasked with managing the county depot and arranging deliveries to health facilities. While the healthcare staff should be involved in the requisitioning process to understand local patient needs, they should not spend a significant amount of their time handling boxes, chasing undelivered medicines, and seeking information on overdue quarterly deliveries due to limited communication from the SCMU and CMS. The supply chain management tasks allotted to the CHTs are performed under unfavourable working conditions that hinder optimal performance. Field visits and feedback from the review workshop highlighted challenges such as limited IT capacity, irregular electricity supply, lack of cold chain equipment supplies, poor lighting, inadequate temperature control/air conditioning, and lack of IT equipment. Storage spaces and offices also require repairs, particularly the roofs, and better pest control. Despite these difficulties and the impact on staff morale, they are managing to serve their patients. However, frustrations arise when serving CHAs due to limited supplies and the need to allocate them among various types of health facilities. Recognizing that CHTs are customers of the healthcare supply chain, the SCMP 2023–2028 should reflect this situation, ensuring that products requisitioned by CHTs arrive are scheduled and in usable condition.

Goal state

The objective is to significantly lessen the administrative and supply chain management strain experienced by CHTs due to postponed or incomplete delivery of health commodities. There is an aim to create an efficient, reliable, and predictable supply chain system capable of delivering essential health commodities on time and in full. The plan involves investing in robust planning and forecasting tools, optimizing logistics and transportation systems, and implementing real-time tracking of health commodities. The intended outcome is to enhance the productivity of CHTs, allowing them to concentrate more on delivering healthcare services and less on managing supply chain issues.

Key implementation plan activities

Phase 1 (2024)

KPIs

- Percentage of total orders/requisitions delivered on time in a quarter
- Percentage of total orders/requisitions delivered in full in a quarter
• Provide adequate systems support to facilitate the regular, on-time, and accurate production of the required usage and forecast demand data.
• Establish communication procedures to inform CHTs promptly if planned activities by the central supply chain functions deviate from the initial plan.
• Separate the planning of product quantities required by CHAs from the county replenishment order to avoid rationing in case volumes received at county depots are lower than anticipated.

**Strategic goal 11: Strengthen the supervision of health facilities to improve the availability of high-quality data for decision-making, quantification, and capacity development.**

**Current state**

In Liberia, the healthcare supply chain serves various types of health facilities through a network of storage facilities at the county level, supported by the CMS as detailed above. Generally, there are three types of health facilities:

- Hospitals: These can be general hospitals that treat a broad range of diseases or specialized hospitals focused on specific issues, such as maternity care.
- Health centres: Smaller than hospitals, these facilities provide healthcare services for a wide range of illnesses and conditions.
- Clinics and outpatient health facilities: These facilities primarily provide outpatient care.

Larger hospitals have dedicated pharmacies and dispensaries that are replenished directly from the CMS. Clinics located near the CMS in Montserrado and Margibi counties are also supplied by the CMS. However, all other clinics are supported by county depots in their respective counties. Health facilities submit pharmaceutical usage and stock balance data, typically using a paper-based system, to the district-level management team. The data being is then aggregated at the county level before an authorized replenishment instruction is sent to the CMS from the SCMU at the MOH.

**Goal state**

All health facilities will have streamlined and digitized reporting mechanisms, enabling more precise, real-time data collection and management. Larger hospitals will continue to be replenished directly from the CMS and there will be increased efficiency in supplying clinics across various counties through enhanced coordination with county depots. The process of health facilities submitting pharmaceutical usage and stock balance data will transition from a primarily paper-based system to a digital one, with robust data aggregation at county and district levels. This will provide the SCMU with timely and accurate data, ultimately improving the efficiency and effectiveness of replenishment instructions issued to the CMS to foster a responsive, agile, and data-driven healthcare supply chain.

**KPIs**

- Number of mentoring and supervisory visits conducted by CHTs
Key implementation plan activities

**Phase 2 (2025-2026)**

- Increase the frequency of mentoring and supervisory visits and ensure that planned visits are executed and reported promptly using a structured checklist.
- Enhance the coordination of CHAs’ activities within the CHTs’ overall management role, in line with the interventions outlined in the National Community Health Program Policy\(^28\) and National Community Health Program Strategy,\(^29\) launched in March 2023.

### 3.2.5. Community level

**Strategic goal 12: Strengthen community health commodity availability and accountability at all levels in line with supply chain standard operating procedures (SOPs).**

**Current state**

CHAs, while associated with a particular health facility for administrative purposes, have a mobile role within their community and are not based on the facility itself. Currently, when counties receive their quarterly supplies, they develop a distribution plan to deliver the commodities to individual facilities using a rationing process sometimes based on past reporting trends. When supplies are delivered to the health facilities, they encourage allocating 20% of the approved tracer commodities for use by the CHAs. However, this approach results in several challenges, including:

- Inadequate visibility and accountability for commodities distributed to CHAs
- Diversion of commodities
- Inconsistent resupply quantities and procedures

As mentioned earlier, this situation presents challenges in delivering kits to CHAs regularly. While separate quantities of products are not allocated specifically for CHAs, their needs are met by a certain percentage of the total goods sent to the counties. If the county does not receive the total amount of goods requested, rationing becomes necessary to allocate a specific amount to CHAs. This not only adds to the supply chain management burden for the CHTs, but also requires considerable time for communication between CHTs, CHAs, and health facilities acting as interim transit points between the county depot and CHAs. Most pharmaceutical products within kits are essential medicines procured by the central government, which has historically faced inconsistent supply challenges.

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\(^{28}\) Liberian Ministry of Health (2023). National Community Health Program Policy. 2023-2032.

Goal state

The National Community Health Program (NCHP) serves communities located more than five kilometres away from the nearest community. Since the catchment population and accessibility of these communities varies, a customized delivery system is established to ensure the availability and accessibility of commodities allocated to CHAPs. Additionally, the right medicine formulations and strengths are procured to reduce medication errors at the community level. CHAs are recognized as a supply chain tier in the national public health supply chain system, receive adequate financing, and are supplied with health commodities for the provision of PHC services. To achieve this and minimize the diversion of commodities allocated to CHAP, kits are packaged for CHAs at the CMS. This ensures that health commodities are not tampered with at any point during transportation and increases visibility at the national level regarding the quantities and needs of commodities supplied to CHAP. The kit delivery system uses the individual CHA logistics data collected through the electronic Community-Based Information System (eCBIS) and is interoperable with the eLMIS to ensure easy processing of requisitions and informing kit resupply quantities.

Key implementation plan activities

Phase 1 (2024)

- Update the community health supply chain SOPs to align with the national supply chain SOPs.
- Print and disseminate SOPs, including guidelines for forecasting and quantification of forecasting community health commodities.
- Develop and update inventory management training materials for CHA commodities.
- Identify and train more trainers of trainers for the kit delivery system.
- Review pilot results to identify areas for improvement and assess scalability.

Phase 2 (2025-2026)

- Conduct commodity quantifications for CHAP in line with the national SOP.
- Conduct quarterly pipeline monitoring and reviews of CHAP to ensure the commodity stock status is known to inform the kit delivery process.
- Procure commodities based on the CHAP commodity specifications and formulations.
- Revise and digitize the paper-based logistics data collection and reporting tools for CHAs.
- Distribute commodities to CHAs using kits quarterly.
- Document lessons learned from the kit delivery system.

Phase 3 (2027-2028)

- Based on the lessons learned from the kit delivery system, develop a nationwide scale-up plan.
- Revise the CMS warehouse operations SOPs to include the kitting process.

KPIs

- Percentage of CHAs who receive their required health commodities in full and on time on a quarterly basis
- Percentage of kit distributions completed per county per year
- Percentage of CHAs accurately reporting logistics data through the eCBIS
3.3. INFORMATION SYSTEMS

3.3.1. Master product list

Strategic goal 13: Create interoperable management information systems (MISs) to facilitate access to data.

Current state

There is currently no available master product list and each system uses different sets of products, codes, and descriptions. The lack of interoperability between the information systems such as mSupply and LMIS creates challenges, as supply orders cannot be seamlessly imported from one system to another and require manual entry. As a result, comparing stock-on-hand reports between systems requires manual data manipulation, leading to significant delays and inaccurate information for decision-making.

A health product master code list is essential to capture all the necessary information needed to access product availability and storage data while supporting interoperability among MIS systems. Currently, there are limited code lists for products and health facilities, hindering system interoperability. Five different sets of product codes exist, including:

- **ATC codes:** These codes classify active substances into different groups according to the organ or system on which they act and their therapeutic, pharmacological, and chemical properties. However, these codes cannot be used in isolation as active ingredients alone are not enough to identify a product for supply chain or LMIS management. The minimum required data sets for product identification include active ingredient, dosage, and pharmaceutical form.
- **SSRR form codes:** These paper forms have lists of products per program but cannot act as the master code list. Products lack codes and are identified, sorted, and searched by their description. Currently, the lists are incomplete, outdated, and sort products by pack size, which creates issues as health facilities should order in the smallest unit possible (e.g., tablets or capsules). Also, the available packs listed are limited and some are no longer available.
- **eLMIS codes:** These codes are not a functional option for a master code list as the product database has not been updated since the creation of the eLMIS tool. Furthermore, some products use pack sizes rather than the smallest possible unit.
- **DHIS2 codes:** This list is not comprehensive, requires users to choose a pack size and is not aligned with the eLMIS system, making it difficult to translate supply orders when sent to the eLMIS or mSupply system.
- **mSupply codes:** The product lists and codes used in mSupply are not usable as a master product list because they are not aligned with other systems. They use different codes for different packs, manufacturers, and, in some cases, for different donors.
**Goal state**

All MIS must be interoperable with one another. To facilitate this, a master product list and master facility list with shared codes across all MIS are generated. This allows:

- Comparability of SOH reports
- Visibility of SOH at a national level
- Reporting of LMIS data like AMC, MSL, and SOH across all MISs
- Importing and exporting of supply orders between systems
- Access to accurate SOH data from all MISs

New product and facility master code lists are developed and coded using a parent-child coding scheme to ensure uniform product management and communication between MISs.

Parent codes include product name, strength, and dosage form (e.g., Parent Code A: Paracetamol, 500mg, Tablets). These codes are in units of one, meaning that the quantities in SOH reports and supply orders are in singles, ignoring the packs available in the warehouse. LMIS and HMIS systems primarily use parent codes for reporting. Having product quantities within a parent code provides programs and stakeholders with a clear indication of the number of treatments or MSL. Supply orders are placed using parent codes, eliminating the need-to-know specific pack sizes. This approach allows for first-expired, first-out (FEFO) to be applied to all child codes associated with a parent code.

Child codes (or SKU codes) are added to pack sizes (e.g., Parent Code A: Paracetamol, 500mg, Tablets, 100). These codes are in units of pack sizes and are used by the WMS. While it is recommended to create separate child codes for each manufacturer according to warehouse best practices, this is reserved for more mature warehouse management systems. The CMS can divide SKUs by manufacturer at a later stage, but it is not necessary at this time.

Policies are developed on how to manage different types of products:

- Cycle products (e.g., contraceptive pills, HIV treatments) are best managed based on the number of cycles or treatments available, rather than the number of pills. Both the parent and child codes represent SOH based on the number of cycles or treatments.
- Volume-based products (e.g., liquids) are managed based on units by volume. Both the parent and child codes represent SOH based on volume-based packs.
- Weight-based products (e.g., powders) are managed based on units of weight. Both parent and child codes represent SOH based on weight-based packs.

Management policies are agreed upon and uniformly implemented. When a product is owned by a program, it can either be incorporated into a pool and used in a FEFO order based on demand or entered as a separate child/SKU code to be managed with only one Program Unit in mind.

**KPIs**

- Percentage of authorized users who access MIS data monthly
- Percentage of time that the MISs are operational and available for use
- Percentage of total data sources that have been integrated into MISs
- Number of reports that are generated and distributed by MISs
**Key implementation plan activities**

**Phase 1 (2024)**
- Define and institutionalize the use of the parent-child code scheme.
- Define the product codes, their structures and corresponding SOPs.
- Establish a policy for managing cycle, volume and weight products.
- Define the management approach for products based on brand or generic names (and exceptions).
- Specify the policy for the use of master codes by all information systems.

**Phase 2 (2025-2026)**
- Produce and approve the Master Product List, consisting of parent code only.
- Develop and approve SOPs for adding, editing, and deleting codes within MISs.
- Roll out new product codes, including names, descriptions, dosages, and other relevant information, across all MISs.
- Merge the historical data associated with old codes into the new coding system.

### 3.3.2. Warehouse Management Systems (WMS)

**Strategic goal 14:** Reconfigure the warehouse management system (mSupply) to improve system performance, provide correct stock-on-hand quantities, and produce reports with accurate information.

**Current state**

The CMS has failed to achieve the required number of annual distribution cycles in recent years. This situation is the result of various factors, including IT system interoperability, frequent vehicle fleet downtime, and a complex mixture of large replenishment orders for county depots and individual orders for small health facilities.

mSupply is currently used as the WMS and has been operational for three years. During a site visit, an impromptu stock accuracy check was performed on the system, revealing a low rate of stock accuracy. The cause of this low accuracy was attributed to incorrect pick-confirm processes, erroneous data, or incorrect SOH data in mSupply. However, further analysis is required to determine the specific cause. The WMS operates within an environment that is affected by space limitations, and inefficiencies in put-away, pick-confirmation, and dispatch processes. These inefficiencies result in the management team receiving misleading information regarding the status of particular pallet spaces, available stock for picking, and the status of individual orders.

Several issues prevent optimal use of mSupply, some of which are internal to the CMS, while others are external.

External reasons include:
Lack of interoperability with eLMIS, necessitating manual processing of orders. The printout from the eLMIS system must be manually entered into mSupply, adding long lead times for order processing.

Lack of product code alignment, requiring manual translation of quantities from one code with a specific pack size to mSupply’s codes that contain stock. This also adds lead time and opportunities for manual errors that often go undetected until later stages.

Inadequate configuration of the system to align with the CMS’s operations, causing delays in warehouse operations such as picking, pick confirmation, and other related activities (e.g., the CMS is pick-confirming stocks many weeks after the stock has been picked).

Internal reasons include:

- Users’ lack of adherence to SOPs.
- User errors and mistakes with limited or no consequences to the user.
- Lack of error correction when discrepancies are identified.

Goal state

Re-engineered warehouse practices and processes suited to the various roles undertaken at Caldwell are established. They are supported by a WMS that enables the CMS management team to provide the levels of service required within the allocated budget. Trained staff perform their roles accurately and efficiently. The WMS provides information to the management team, allowing them to pinpoint areas of the operation requiring attention and produce regular performance reports promptly. The warehouse layout and equipment are configured to optimize the flow of incoming receipts and outgoing dispatches.

The mSupply uses the new master code list and parent-child coding scheme. This enables the generation of SOH reports by parent code (for programs, health facilities, etc.) and by child code/SKU (for internal management of warehouse operations). mSupply consistently produces accurate reports for SOH, goods in, goods out, MSL, AMC per product, stock at risk of expiry, and stock at risk of stock-out. The system supports the automatic importation of supply orders, eliminating the need for manual calculations and data entry. Supply orders come via an application programming interface (API) directly from the ordering system or through spreadsheet importation.

CMS uses barcode readers and hand-held devices with mSupply. The use of barcodes is highly recommended as it automates processes, reduces human error, eliminates paper usage, and enables real-time updates to the WMS. Level 1 barcodes are used to identify pallet labels, product codes (which can be added to the pallet label), and rack locations. Level 2 barcodes can be used to identify products and can be generated locally or obtained from manufacturers, including GS1 barcodes (GS1 codes are not an element that the CMS can introduce independently; the use of GS1 barcodes is an element of procurement and not warehouse management). Master level 1 barcoding must be mastered before level 2 is introduced.

KPIs

- Percentage of stock-on-hand quantities reported by mSupply that match actual stock levels (central stock record accuracy)
- Number of times inventory is replaced over a given period
- Percentage of orders fulfilled accurately and on time
- Time taken from order placement to delivery
- Number of hours it takes to unload, inspect, and store incoming inventory
The design and functionality of mSupply are reviewed and updated to align with CMS processes and SOPs. Processes configured in mSupply match the ones followed by the CMS. Mentorship and technical assistance support the CMS in key activities.

**Key implementation plan activities**

**Phase 1 (2024)**

- Review the current warehouse processes to identify efficiency and effectiveness improvements.
- Conduct a comprehensive process optimization and verification review of warehouse operations, aligning them with mSupply.
- Establish a supervision structure with clearly defined roles and responsibilities to ensure accountability.
- Develop and incorporate the supply order import module into mSupply.
- Incorporate the parent-child coding structure into the WMS and merge the product code history.

**Phase 2 (2025-2026)**

- Streamline and enhance reporting capabilities to produce high-quality data, including stock-on-hand, goods out and goods in.
- Identify knowledge gaps and provide capacity development as needed.
- Develop performance measures to monitor the results of the newly implemented warehouse processes, focusing on space utilization, put-away accuracy, and SOH accuracy.

**Phase 3 (2027-2028)**

- Design and implement new pallet and racking labels with level 1 barcodes.
- Design a solution for printing box packing labels for cross-docking.
- Design and implement a new solution for POD using new technology.
- Implement handheld devices with barcode readers.
- Implement box packing for cross-dock picking.
- Assess the long-term viability for mSupply.

### 3.3.3. Logistics Management Information System (LMIS)

**Strategic goal 15: Strengthen the logistics management information system (LMIS) for routine data collection and reporting to produce high-quality data to inform decision-making and support performance monitoring, traceability, visibility, and accountability.**

The MIS in Liberia is currently represented by three different systems that are not integrated, are not interoperable, and do not share a common set of product codes. These systems are:
The paper Logistics Management Information System (pLMIS) has been the main tool used for the requisitioning, collection and submission of medicines and health product consumption data from the service delivery point. Currently, the eLMIS system is the main driver that generates supply chain information and data from service delivery points. The eLMIS operation is minimal with a low rate of data quality and is unreliable for generating decision-making data and reports. Either the current eLMIS tool can be improved or a new LMIS tool can be implemented.

**eLMIS**

**Current state**

The electronic Logistics Management Information System (eLMIS) is currently operational and has achieved a reporting rate above 90% over the last 24 months. However, it faces many issues related to data quality, accuracy, and timeliness, which hinder its effectiveness in supporting decision-making. The system was designed and built in 2017 but was only implemented in 2019.

The eLMIS is being used across all 15 counties to collect and consolidate supply chain data from public sector facilities and some private sector institutions (faith-based and private not-for-profit) receiving health commodities from the public sector. This implementation was accomplished within nine months of rollout.

In 2021, a comprehensive assessment conducted by GHSC-PSM highlighted critical issues and recommended actions to improve the system functionality of the eLMIS. The system currently faces several detrimental challenges, including:

- Inadequate data quality in both accuracy and timeliness
- Limited leadership and coordination
- Limited human resource capacity for use
- Inadequate timeliness, accuracy, and quality of data management
- Lack of motivation and incentives
- System architecture limitations that prevent the use of flags and reminders
- Inadequate reliable decision-making reports and functionality

**Goal state: option 1 (fix the current LMIS/eLMIS tool)**

The goal state for a functioning eLMIS system involves a multi-phase approach, with specific short, medium, and long-term objectives. In the short term, the system aims to achieve the following:

- Establish clear leadership and accountability structures for LMIS/eLMIS at all levels.
- Streamline data collection protocols and develop a timely feedback mechanism for health facilities personnel.
- Conduct capacity building for district health officers to enhance their understanding and use of the system.
- Incentivize performance targets for data quality improvements.
- Review user accounts and product lists on the eLMIS platform to ensure system efficiency and data integrity.
In the medium term, the focus will be on the following:

- Provide infrastructure support at all levels to enable effective implementation of LMIS/eLMIS.
- Redesign the LMIS/eLMIS system to accommodate monthly reporting from health facilities.
- Conduct refresher capacity building for health facility staff to enhance their proficiency in using the system.
- Enhance the eLMIS platform with data quality analytics functionality to identify and address inaccuracies.
- Ensure system interoperability between eLMIS and other systems to facilitate data exchange and integration.
- Develop mobile-phone options for decentralized data entry, improving accessibility and timeliness of data collection.

In the long term, the focus will be on the following:

- Overhaul and enhance the LMIS/eLMIS system to align with global standards for traceability within the health supply chain.
- Establish linkages with track and trace functionality to enable accurate and reliable data management.
- Support effective decision-making, resource allocation, and supply chain management in the healthcare system through the use of eLMIS data.
- Contribute to improved health outcomes by ensuring reliable data for informed decision-making at all levels of the health system.

**Key implementation plan activities for option 1: fix the current eLMIS tool**

**Phase 1 (2024)**

- Establish and implement clear leadership and accountability structures for LMIS/eLMIS at all levels.
- Institute a formal communication strategy to establish the LMIS/eLMIS leadership team.
- Streamline data collection protocols with clear accountability measures.
- Establish data quality assessment and review systems during quarterly data collection.
- Develop and implement a timely feedback mechanism for health facility personnel, district health officers, and county health teams.
- Conduct capacity building for district health officers responsible for data collection, review, and entry.
- Establish and incentivize performance targets for improving data quality.
- Review user accounts and product lists on the eLMIS platform to ensure accuracy and efficiency.

**Phase 2 (2025-2026)**

- Provide infrastructure support at all levels to support effective implementation of the LMIS/eLMIS.
- Redesign the LMIS/eLMIS system to accommodate monthly reporting from health facilities.
- Conduct refresher capacity building for health facility staff on accurate record-keeping and reporting.
- Enhance the eLMIS platform with data quality analytics functionality and expedite the process of data reviews.
● Ensure interoperability between the eLMIS and other systems, such as warehouse management systems.
● Develop and implement mobile-phone or other hand-held device options to decentralize data entry.

**Phase 3 (2027-2028)**

● Overhaul the current LMIS/eLMIS system and consider adopting an enhanced platform if necessary.
● Establish links between the eLMIS and track and trace functionality to align with global standards for traceability within the health supply chain.

**Goal state: option 2 (implement a new LMIS tool)**

Rather than attempting to fix the current eLMIS, which would require a significant investment of effort, time, and resources, implementing a new eLMIS should be considered. It is important to define the difference between an LMIS and an HMIS. An LMIS collects and reports data on quantities dispensed, stock on hand, and losses and adjustments, while an HMIS collects and reports program data, such as disease incidence, patient information, and healthcare services rendered. The LMIS collects, organizes, and presents logistics data gathered from all levels of the healthcare system. The LMIS collects, organizes, and presents logistics data collected from all of the healthcare systems. It focuses on health product data, such as quantities dispensed, stock on hand, losses and adjustments, enabling logisticians to collect the data needed to make informed decisions that improve product availability, and customer service. One immediate decision based on logistics data is determining the quantities of products that need to be resupplied to health facilities. HMIS data, on the other hand, can be used to determine disease patterns, track health service use, and monitor and evaluate health service delivery.

**Key implementation plan activities for option 2: implementing a new LMIS tool**

**Phase 1 (2024)**

● Define the requirements and objectives of the new LMIS tool.
  o Identify the data that needs to be collected and analyzed.
  o Determine the functionality and features required for the new LMIS tool.
  o Define the objectives and goals of the new LMIS tool.
● Conduct a feasibility study.
  o Assess the current infrastructure and technology available.
  o Evaluate the resources required for the implementation of the new LMIS tool.
  o Determine the risks and challenges associated with the implementation.

**Phase 2 (2025-2026)**

● Develop a project plan.
  o Create a detailed project plan outlining the timeline, budget, and resources required.
  o Identify the key stakeholders and their roles and responsibilities.
  o Determine the communication plan and reporting structure.
● Design the new LMIS tool.
● Configure and customize the LMIS tool.
  o Customize the LMIS tool to meet the specific needs of the health system.
  o Configure the tool to collect and analyze the required data.
  o Provide training to users on how to use the new LMIS tool.

● Roll out the new LMIS tool.
  o Implement the new LMIS tool across the health system.
  o Monitor the implementation to ensure that the tool is being used correctly and effectively.
  o Address any issues that arise during the rollout process.

● Provide ongoing support and maintenance.
  o Provide ongoing support to the users of the new LMIS tool.
  o Ensure that the tool is maintained and updated as required.
  o Continuously evaluate the performance of the new LMIS tool and make improvements as needed.

**DHIS2**

**Current state**

The DHIS2 system in Liberia is used as a health system only and does not collect LMIS data from health facilities. Currently, the HMIS and LMIS, along with their respective data, are managed separately and housed in separate management hierarchies. Even though data from both systems is collected at the health facility level, service delivery program managers do not have access to aggregated logistics data, reports, and statistics, which is a frequently raised issue regarding the eLMIS. Similarly, logisticians do not have access to aggregated service delivery data, reports, and statistics. These issues highlight the need for data triangulation between DHIS2 and the LMIS. There are three primary ways to link an LMIS and an HMIS:

1. Ad hoc comparison of data: Collecting data independently from both the LMIS and HMIS at a single point in time and manually comparing or linking the data for analysis.
2. Capturing LMIS and HMIS data in one system: Creating a single system that acts as both an HMIS and an LMIS or capturing a subset of data from one system in the other.
3. Electronic integration of separate HMIS and LMIS: Integrating two separate and independent HMIS and LMIS systems externally so that relevant data from each system is available to users of both systems.

**Goal state**

Significantly improved logistics systems link the LMIS and HMIS data, allowing for easy correlation and analysis of the combined aggregated data. This linkage is essential to support various functions of the logistics system, including quantification, disease surveillance, and planning. The improved service delivery ensures that LMIS data are routinely available with HMIS data to managers responsible for service delivery at all levels of the hierarchy, which helps improve service delivery. An immediate and notable
The benefit of linking LMIS and HMIS data is data validation. The correlations between the two data sources allow for cross-validation and quality checks, improving data accuracy. By separating HMIS and LMIS, the burden of data collection and duplicate data collection is reduced, as they no longer exist in parallel capturing overlapping data. Regular monitoring and evaluation of health programs occur as indicators needed for monitoring and evaluation require data elements from both the HMIS and LMIS. Additionally, linking HMIS and LMIS data promotes enhanced communication between service delivery program managers and supply chain managers. Routinely linking the data and the analysis would not only enable managers on both sides to understand and improve their respective functions but also enhance communication across organizational boundaries.

**SSRR Forms**

**Current state**

The current state of the SSRR forms is problematic, as they are often submitted late, resulting in delayed data transmission up the chain, causing delays for the SCMU and CMS. Furthermore, the forms themselves are designed to collect low-quality data. They lack product essential information such as codes, and pack sizes and are not updated regularly when new products are introduced. Additionally, there is insufficient space provided to manually insert new products.

**Goal state**

Paper SSRR forms are easily accessible, up to date in all facilities, and have space available to manually add new products. Forms are checked regularly for accuracy and contain product codes from the Master Product List. There is a gradual transition to electronic documentation by capturing the data from these forms, using a web-based tool that enables data capture at the facility level using tablets or mobile devices.

**Key implementation plan activities**

**Phase 1 (2024)**

- Update paper forms and add product codes.

**Phase 2 (2025-2026)**

- Migrate SSRR forms to a web-based tool that captures data at the facility using tablets or mobile devices.

**KPIs**

- Average time taken for facilities to submit the paper-based SSRR forms after the reporting period
- Percentage of forms that correctly include the corresponding product codes from the Master Product List
- Percentage of facilities where the SSRR forms have been successfully transitioned to the web-based tool for data capture
3.3.4. Central Database

Strategic goal 16: Centralize data from all available information systems and ensure its accessibility for decision-making purposes.

Current state

Currently, LMIS data is distributed across multiple systems, making it challenging to produce integrated reports, such as national SOH reports. The data is reported across various systems like mSupply, DHIS2, eLMIS, and SSRR, with no consolidated sources. Extracting quantification data is time-consuming and difficult. Producing national-level statistical reports, including SOH, and consumption data, is a laborious and complex process. Data triangulation is not possible unless done manually for individual products. Additionally, none of these systems share product codes, which necessitates the creation of a Master Product List and its implementation in all MIS.

Goal state

A central database is created that serves as a repository for data from all available information systems in the MOH at the national level. This approach is preferred over fully integrating the information systems, as it requires less effort and offers scalability and flexibility. It is assumed that the creation of both product and facility master codes is completed before the creation of a central database.

The central database is responsible for generating and distributing product and facility codes to all other information systems. It receives LMIS data from all systems including mSupply, eLMIS, and DHIS2, providing the SCMU with a single source of LMIS data. The central repository enables the SCMU and other stakeholders to:

- Generate national levels of stock of a particular product
- Manage national shelf-life data
- Verify and ensure traceability of quantities, including quantities:
  - As requested by the county and by the facility
  - Corrected by the SCMU or program
  - Approved by the SCMU or program
  - Distributed by the CMS
  - Picked by the CMS
  - Shipped by the CMS
  - Received by the county

KPIs

- Percentage of LMIS and HMIS data centralized within the central database
- Response time and availability of the central database
- Number of security audit fails in each audit
- Accuracy of data stored in the central database
- Received by the health facility
- Utilized at health facilities and communities
- Remaining at the health facilities and communities

- Trace and track the progress of orders
- Provide accountability for products and stakeholders at each step
- Generate KPIs
- Facilitate the implementation of PBF initiatives

**Key implementation plan activities**

**Phase 1 (2024)**
- Determine the necessary functionalities and features of the central database.
- Establish data governance policies and protocols for data management within the central database.

**Phase 2 (2025-2026)**
- Utilize the central database to manage and share all codes related to products and facilities.
- Explore options for integrating the LMIS and HMIS within a single dataset, hosted and managed by the SCMU.
  - Option 1: Using the DHIS2 database as a central repository.
    - Convert the DHIS2 database into a repository of information, where mSupply and eLMIS would periodically send pre-defined reports to DHIS2 for data hosting.
    - Develop a reporting mechanism through the DHIS2 front end to extract national-level reports.
  - Option 2: Develop a separate tool designed to host all data from MIS within the MOH.
    - Create a new tool to receive periodic reports from all MIS to produce and extract national reports.

**Phase 3 (2027-2028)**
- Create new codes for the central database.
  - Implement strict control measures to prevent other MISs from creating new product codes or facility codes.
  - Push the new codes from the central database to all other systems, ensuring consistency and synchronization.
3.4. ADDITIONAL MANAGEMENT INFORMATION SYSTEMS

3.4.1. Track and trace

Current state
In Liberia, there is currently no track and trace system in place. Track and trace systems are software-based solutions that enable the tracking of vehicles, loading units, shipments, or products throughout the entire supply chain, from the supplier to the consumer. In the context of vehicles, a track and trace system is often referred to as a vehicle tracking system. Within the supply chain industry, track and trace refers to the ability to identify the historical and current locations of all product inventory, as well as the history of product custody.

Goal state
Software is implemented that allows for real-time tracking of order location, status, and custody. Following that, the implementation of parcel tracking and tracing is carried out.

Key implementation plan activities

Phase 2 (2025-2026)
- Implement software or technology that will allow for tracking of the location, status, and custody of an entire order.

Phase 3 (2027-2028)
- Implement parcel track and track.

3.4.2. GS1 Barcodes

The use of barcodes is highly desired and brings much-needed automation to the system. It reduces human error, eliminates the use of paper and enables real-time updates to the WMS without needing to wait for manual data entry into mSupply.

Please note that the implementation of GS1 barcodes is related to procurement and not warehouse management. It is not solely a decision of the CMS and the CMS alone cannot solve the GS1 barcode issue.

Key implementation plan activities

Phase 1 (2024)
- Implement barcodes for pallet labels and rack locations using non-GS1 barcodes to identify the pallet label (currently locally printed), product code (can be added to the pallet label), and rack location (can be easily added but is currently unavailable). This level of barcode implementation does not include barcodes for individual products.
Phase 2 (2025-2026)

- Implement barcodes for products using GS1 barcodes to identify individual products. These products can be locally generated and printed, but it requires handling all boxes and products as they enter the facility. Alternatively, products may come with pre-printed GS1 barcodes from the manufacturer. However, it is strongly advised not to proceed to this level of barcode use until the CMS has successfully implemented barcodes for pallet labels and rack locations.

3.4.3. Revolving Drug Fund (RDF)

The National Health Policy & Plan (NHPP 2011-2021 & NHPP 2022 – 2031) emphasized payment of affordable user fees for services. Once the systems and processes for RDF have been developed and implemented, a system that collects basic LMIS data is a necessity. An assessment is needed to identify the user and system requirements for the RDF system. This should be initiated after the basic issues are resolved under Master Product List, WMS, and LMIS and preferably have the central database up and running before implementing or merging the LMIS system of the RDF with the rest of the LMIS data.

Key implementation plan activities

Phase 1 (2024)

- Collect basic usage data from the LMIS that monitors RDF

3.4.4. Quantification information system

Currently, the quantification process is lengthy and challenging, as only unreliable and incomplete data are available. However, once the Central Database is operational, it will become possible to extract data to facilitate the quantification process.

The implementation plan for the Quantification Information System consists of two phases. In the first phase, there will be a focus on defining and producing reports that are needed for quantification. These reports will be generated by extracting data from the central database or collecting it from all available MIS systems within the MOH. Once the first phase is complete and there is a steady supply of reliable data, the second phase will involve the development of a tool to facilitate the quantification process. This tool will allow for the consideration of multiple parameters before recommending a quantity for a given product. It is crucial to emphasize that the implementation of this system should only proceed once phase one is complete and there is regular, reliable data being extracted from the central database.

Key implementation plan activities

- Define and produce reports necessary for the quantification process.
- Develop a tool to facilitate the quantification process once the reports are complete and reliable data is available from the central database.
3.4.5. Waste management systems

A waste management system refers to the strategy employed by an organization to dispose, reduce, reuse, and prevent waste. Possible waste disposal methods include recycling, composting, incineration, landfilling, bioremediation, waste-to-energy and waste minimization. In the context of the Liberian supply chain, a waste management system will be considered once the supply chain reaches a satisfactory level of maturity and has operated effectively for at least 12 months.

In the meantime, it is recommended that all disposed of products be recorded and issued out of the existing information system (eLMIS, DHIS2, or mSupply) using a designated client named according to disposal location of (e.g., incinerator, city dump). Additionally, it is essential to include the expiration dates of products in all transactions recorded in the WMS and eLMIS. Although this method is a basic approach to waste management, automated reports can be generated to provide insights into the written-off products, including information such as product details, quantities, batches, expiry dates, and their respective values.

Key implementation plan activities

- Establish clear policies and procedures for the removal and tagging of waste within the MIS.

3.4.6. National disaster stock management

In the event of a natural disaster, the ideal scenario would involve incoming stock being directed to one of the existing warehouses, where the facility’s system would handle and manage the newly arrived stock. However, when dealing with emergency donations, certain challenges often arise, including the following considerations:

- Lack of product codes for new products: This can pose a significant problem as most systems are unable to generate new product codes on their own.
- Storage in ad hoc locations: Products may be stored in temporary or improvised locations that do not have supply chain software in place.
- Storage of non-pharmaceutical items: Non-pharmaceutical items, such as mops and buckets, which are typically not coded in supply chain systems, may need to be stored.

Key implementation plan activities

Phase 1 (2024)

- Develop a national disaster stock management policy that addresses MIS concerns regarding critical factors like product coding, ad hoc storage, and non-pharmaceutical items (e.g., mops and buckets).
  - Define the policy of managing donated emergency stock.
  - Determine if the MOH will manage stock using the current WMS.
  - Identify if the MOH will manage stock housed in other emergency entities.

Phase 2 (2025-2026)

- Chose an emergency stock management system to be deployed within one day to start operations.
- Develop procedures to share daily SOH levels with all key stakeholders.
3.5. IN-COUNTRY WAREHOUSING AND DISTRIBUTION

3.5.1. Inventory management

Strategic goal 17: Strengthen storage and infrastructure at both county and health facility levels to support efficient handling and inventory control practices.

Inventory management is a supply chain management task to maintain stocks of products at various points within the supply chain while adhering to policy levels.

Products are typically classified into the following categories:

- Category A: High volume of use and/or high-value products.
- Category B: Products with a moderate level of regular usage.
- Category C: Products with low usage but still necessary to have them on hand when needed.

These classifications are determined through Pareto analysis, which indicates that Category A products account for only 20 per cent of the inventory managed by inventory managers, but account for 80 per cent of the volume supported by the supply chain. Category B items represent 15 per cent of the volume and 30 per cent of the items, while Category C items represent 5 per cent of the volume and 50 per cent of the items.

Category A items are typically managed using automated demand data, supplemented with human intervention for factors like promotional campaigns and changes in product usage. Category B items are often entirely managed by automated systems, which generate suggested procurement quantities regularly. However, Category C product inventory levels are often driven by minimum order quantities. This situation can lead to very high levels of stock cover and an increased risk of wastage due to product expiry.

Current state

The MOH currently uses AMC to manage inventory levels. The distribution network operates on a quarterly distribution cycle policy, with a cycle stock level of three months AMC and a safety stock level of two months AMC. However, the condition of storage facilities at the county level is generally inadequate, with poorly maintained facilities, leaking roofs, and limited power supplies. The Caldwell facility, on the other hand, meets the necessary standards for the storage of pharmaceuticals.
Goal state

While the team responsible for developing this document did not conduct an in-depth analysis of inventory management and policy in-country, there are potential benefits to be gained by shifting the focus by the SCMU and Program Units. Adopting an ABC analysis approach and implementing different inventory management techniques can support the quantification and procurement processes. Additionally, implementing various warehousing techniques can improve product availability and reduce the levels of expired stock for products, especially for products classified as Category C.

To achieve these goals, changes to the current quarterly replacement distribution cycles are necessary. Ceasing the storage of Category C products in all county depots and instead shipping them from a central point, when required, using small 4X4 vehicles or motorcycles, will create space at county depots and centralize the management of expired stock in one facility. It is crucial to adopt a more structured approach that allows inventory managers to focus on ensuring the availability of high-volume usage products. While comprehensive research is undertaken relating to the restructuring of the distribution network, county depots should be refurbished to meet at least the minimum standards required for the storage of pharmaceuticals and medical supplies.

Key implementation plan activities

Phase 1 (2024)

- Survey all county depots and major health facility storage facilities to assess the work required to meet acceptable infrastructure standards.

Phase 2 (2025-2026)

- Develop a plan for upgrading facilities in the short term to enhance operational effectiveness, considering the broader strategic network developments that will be defined and implemented.

3.5.2. Cold chain

Strategic goal 18: Enhance infrastructure to maintain the cold chain at all levels within the supply chain and strengthened policies, procedures, and protocols to reflect global best practices.

Traditionally, cold chain assets have been used for storing and distributing vaccines in both chilled (2-8°C) and frozen (-25°C) temperature ranges. However, with the introduction of new products like insulin, additional cold chain assets will be required alongside existing storage for oxytocin and ergometrine at the CMS.
Current state

The CMS has excellent temperature-controlled facilities with ample storage space capacity for both chilled and frozen products. However, there are concerns about frequent power outages at the Caldwell facility. As a result, vaccines are stored and distributed separately by Gavi or EPI through a parallel distribution network. Oxytocin, on the other hand, is stored at the CMS and transported in cool boxes by trucks. In certain circumstances, cool boxes have been air freighted to Maryland County due to poor road conditions in the southeast region of the country.

County depots and health facilities have refrigerators and cool boxes powered by the main electricity supply for storing small quantities of temperature-controlled products. County depots store oxytocin for the MNCH program, while health facilities store both vaccines and oxytocin.

Goal state

A three-hub distribution network, proposed by SCMP 2010-2020 and supported by SCMP 2023–2028, was established with sufficient temperature-controlled storage facilities for all products requiring temperature-controlled conditions, both for routine use and campaigns.

Cool boxes are deployed for smaller quantities of temperature-controlled products and monitoring devices are implemented for both storage and transit purposes. As volumes increase and full truckloads of temperature-sensitive products become more frequent, refrigerated vehicles equipped with temperature monitoring devices operate from the CMS.

Key implementation plan activities

*Phase 2 (2025-2026)*

- Establish a mechanism for continuous monitoring of cold chain facilities at the CMS and other subnational stock holding sites.
  - Conduct negotiations with the power utility company to ensure a reliable power supply at the CMS and refurbish the standby generator.
- Develop a comprehensive education program on best practices for cold chain facilities that include SOPs, policies, procedures, and maintenance. Specific areas to address include:
  - SOPs for temperature probing and data downloading from temperature recorders upon receipt of products
  - Procedures for maintaining cold-chain integrity during put-away and dispatch, including the pre-cooling of cool boxes, ice packs, and refrigerated vehicles
  - Maintenance procedures for cold-chain refrigeration units, MHE, cold room doors, temperature monitoring equipment, and stand-by generators

**KPIs**

- Percentage of total hours in a month operating outside the prescribed temperature operating range
- Number of times in a month the prescribed temperature operating range was exceeded
- Percentage of planned routine maintenance events undertaken in the month that are executed
- Develop contingency plans to safeguard product quality in the event of a major power outage or failure of the storage infrastructure.
- Define and implement reporting procedures for ongoing temperature monitoring of storage facilities and actions taken in the event of cold chain breaches.

3.5.3. Warehousing and transport operations

Strategic goal 19: Efficiently manage warehousing practices at the Central Medical Stores (CMS) to expand services to deliver health commodities reliably to the last mile without delays or service gaps.

Liberia has approximately 10,600 kilometres of roads, less than 10% are paved. During the eight-month wet season combined with a lack of maintenance and overloaded vehicles, many areas become inaccessible for months. Some roads are no more than tracks, which turn into quagmires during the wet season. It can take up to four weeks for vehicles to reach the far southeast of the country from Monrovia between March and November. While the wet season significantly affects the southeastern counties, poor road conditions are experienced widely, particularly during this period. Since 2010, the GOL has made efforts to improve roads, with a particular focus on projects such as the paving of the road from Monrovia to Ganta in 2015 and the ongoing upgrading of the road from Roberts International Airport to Monrovia. This infrastructure development is crucial for efficient healthcare supply chain operations, including temperature-controlled consignments to the CMS from the airport. However, it should be noted that the road from the port of Monrovia to the CMS still presents challenges and requires upgrading.

Significant further development of the road infrastructure is required before the SCMP 2023–2028 can establish a centralized distribution network operating from Monrovia. The road conditions will require some level of pre-positioning inventory to support areas heavily impacted by poor road conditions during the wet season. However, county depots have limited storage capacity and additional storage infrastructure will be needed to facilitate stock pre-positioning.

In 2019, USAID handed over four IVECO (all road) trucks to CMS Caldwell to support health commodities distribution across the country based on request. These trucks were intended to complement the existing five distribution trucks at the CMS to ensure the timely completion of national health commodities distribution. Unfortunately, most of these vehicles are currently non-functional due to the lack of funds for maintenance. Moreover, limited usage exclusively for national health commodities distribution had resulted in long periods of inactivity, leading to further deterioration. The combination of poor maintenance, high levels of downtime, and infrequent traffic patterns often prompts organizations to consider outsourcing such activities.
Current state

The existing storage infrastructure consists of the following components:

- The CMS at Caldwell in Montserrado County: To address the need for improved storage infrastructure, the SCMP 2010-2020 oversaw the construction of a purpose-built facility at CMS. The facility includes over 2000 pallet spaces organized within pallet racking. It features three temperature-controlled chambers: two chilled (2-8 degrees C) and one frozen (-25 degrees C), all with an air-conditioned environment. The warehouse adheres to good warehouse practices, including:
  - Designated areas for quarantine and high-security storage
  - Separate loading and unloading docks with roller-shuttered access for goods-in and goods-out.
  - One chilled chamber (2-8 degrees C) serves as a picking and packing area to maintain cold chain integrity
  - Implementation of a WMS, mSupply, to support facility operations
- Depots in 13 counties across Liberia: As identified in the SCMP 2010-2020, the entire supply chain storage infrastructure needs strengthening. CHTs report that county depots need maintenance and upgrades.
- Health facilities: Each facility is equipped with pharmacies or designated storage areas integrated into its floor plan.

The current MOH supply chain operation relies on a combination of primary and secondary transport operations, along with a hub and spoke distribution network. The movement of goods from international suppliers to Liberia by sea and air is primarily coordinated at the time of placing purchase orders by the entity responsible for procuring commodities for the MOH. Customs clearance at the port of entry and transportation to the CMS is outsourced to a local custom clearing agent, which is common practice internationally.

However, the in-country movements, both primary and LMD, are outsourced but managed in a fragmented manner. Two 3PLs, namely WFP and Chemonics International Inc., as well as individual CHTs, handle these operations. A diagnostic document from 2018 highlighted the lack of a fleet management system and limited fleet management experience at the CMS. Outsourcing these operations to either WFP, as currently done, or a private sector company would address this shortcoming and provide better value for money from the transport assets.

Although distribution cycles are supposed to occur four times per year, this has not been achieved in recent years. However, significant strides have been made in the last three years in expanding the distribution network, as envisioned in the SCMP 2015 Review. This expansion included extending the distribution from the CMS to all health facilities in Montserrado and Margibi counties. However, the combined activities of the CMS and WFP are considered unsatisfactory by the management teams in these two counties. Complaints include delayed deliveries, attempts at delivery outside of opening hours and poor communication regarding item and quantity discrepancies. This situation may be the result of the failure to implement key elements of the SCMP 2010-2020 and the SCMP 2015 Review, which include:
● Establishing a single organizational entity to manage the in-country supply chain from the port of entry to the service delivery point
● Creating a distribution network with regional hubs that replaces county depots with cross-docking depots
● Implementing an integrated logistics management information system that seamlessly encompasses all supply chain activities

As a result, the Montserrado management team is considering establishing a new county depot to meet their specific needs. Additionally, direct deliveries from the CMS to all national hospitals across the 15 counties commenced in the first quarter of 2020, aiming to improve the availability of health commodities at the service delivery points.

Considerable pre-work is undertaken by various components of the supply chain management team before the CMS receives instructions for picking, packing, and dispatching, typically towards the end of the first month of the quarter. This includes:

● Individual health facilities submitting stock requests
● CHTs aggregate these requests and submit authorized requests to the SCMU
● The SCMU analyses and adjusts the requests based on available inventory levels before sending authorized instructions to the CMS

The CMS is responsible for receiving and storing all incoming products, except vaccines requiring temperature-controlled conditions, LLINs, and nutrition products arriving in Liberia through any transport mode. The CMS also handles the picking, packing, and dispatching of orders for health facilities in Montserrado and Margibi counties. It should be noted that while there are 15 counties within Liberia, the CMS acts as the county depot for Montserrado and Margibi counties and the Margibi county depot is no longer operational as a distribution point, serving instead as additional bulk storage capacity for the CMS.

The transportation of these orders is managed by a WFP team using hired transport resources contracted by the Global Fund. The CMS has been responsible for picking, packing, and dispatching LMDs in the counties near Caldwell for several years. However, the WFP’s involvement in this process has increased in the past year, mainly due to the CMS vehicle fleet becoming unreliable and requiring significant refurbishment investment.

Additionally, the CMS handles the picking and dispatching of replenishment orders for the 13 counties that operate county depots. The WFP also manages the primary transport activity for these replenishment orders. Hospital replenishment orders in these 13 counties are also picked, packaged, and dispatched by the CMS. These orders are delivered on the same vehicles used for depot orders, but hospital orders are directly delivered to the hospitals, which are often located near the county depots. County depots are responsible for picking, packing, and dispatching individual orders for health facilities within the county, except for large hospitals that receive their deliveries directly. CHTs hire vehicles from the local freight transport market, with support from the Global Fund, for dispatching the orders. LLINs are dispatched from the General Service Agency (GSA) warehouse, which serves as an interim storage location due to limited space at the CMS. This model follows the distribution approach implemented for pharmaceutical products and is facilitated by GHSC-PSM. Outsourcing the entire activity aligns with best practices in supply chain management. The characteristics of LLINs, such as weight and volume, differ from pharmaceuticals, allowing for lower specification storage facilities and delivery vehicles.
Expired product management is a major concern for warehouse management at all levels of the supply chain. In many storage locations, particularly those with limited space, expired products accumulate while awaiting collection for disposal, contributing to warehouse congestion and inefficient operations. This often results in unnecessary expenses, such as renting additional space or procuring old freight containers for temporary storage.

Formal reverse logistics processes, specifically the return of expired products from health facilities and county depots to a central incineration facility, are not currently in place. The collection of such products requires an authorized collection instruction initially issued by the LMHRA. However, unless the outsourced transport contracts explicitly include and account for these activities, hired transport will not pick up goods for return to the CMS or an incineration plant. Currently, the contracts only include outbound deliveries to health facilities and county depots. Moreover, there appears to be hesitancy in authorizing the return of expired products to the CMS incineration due to limited storage space and funding availability for incineration. As a result, expired products remain at the lower levels of the supply chain indefinitely, occupying valuable storage space. While there were some efforts facilitated by GHSC-PSM in collaboration with the CMS and LMHRA in 2020 and 2021 to implement reverse logistics and incineration of expired health products, these initiatives were insufficient to address the majority of national health product expiries and the number of expiries continues to accumulate in the national system. Similarly, the transfer of stock between county depots to address inventory imbalances is not undertaken in a formalized and regular manner. As previously stated, the outsourced transport arrangements lack formal reverse logistics competency.

Comprehensive performance monitoring of the distribution operation is not regularly conducted. Some performance measures have been introduced at the CMS and the SCMU monitors operations at county depots quarterly. However, the primary sources of information relating to the distribution performance come from surveys undertaken by individual program teams, typically on an annual basis.

Goal state

A multi-layer distribution network incorporates the CMS, regional hubs, and cross-dock depots (with pre-packed products labelled for each health facility). This network is managed by CMS and overseen by the SCMU. Activities relating to both warehousing and transport, currently undertaken at the Caldwell facility, are outsourced. All activities are outsourced to a single 3PL, not just primary and secondary transport activities. If required, the 3PL acts as a lead LLP, providing transport activities in areas not covered by their assets. This distribution network, presented in the diagram below, aligns with the proposals of the SCMP 2010-2020 and the SCMP 2015 Review, which emphasized the need to minimize the reliance on multiple storage locations at county depots, thereby ensuring the timely availability of health products at service delivery points.

The diagram below reflects the outbound flow of pharmaceuticals and does not include data flows or return flows from health facilities. The establishment of regional hubs is crucial to improve the direct availability

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**KPIs**

- Percentage of total orders/requisitions delivered on time in a quarter
- Percentage of total orders/requisitions delivered in full in a quarter
- On-time and in-full (OTIF) percentage in a quarter
- Percentage of CHAs who receive their required health commodities in full and on time on a quarterly basis
- Total number of customer complaints received in a quarter analyzed by operational area (e.g., lateness, completeness, and product condition)
of health commodities from the central/regional storage locations. In terms of implementation, the county depots continue their current operations, with some refurbishment, until the new outsourcing arrangement is effectively introduced and further detailed distribution network research and piloting of cross-docking techniques have been undertaken.

Cross-dock depots serve as transit points for picked and packed orders destined for the health facilities they support. It is important to note that the cross-dock depots can cater to multiple counties if direct delivery from the warehouse to those facilities is feasible without compromising product integrity during transit. While refurbished county depots may play a role in the short term, they are not suitable for functioning as cross-dock depots. The location of cross-dock depots will be determined based on road infrastructure and population distribution across the country, rather than being county-based. According to a network optimization study from 2010, a cost-effective solution would require two satellite warehouses (renamed regional hubs in 2015), in addition to the CMS, along with eight cross-dock depots. Although the SCMP 2023–2028 does not specifically address the storage infrastructure at health facilities, other sections consider information system issues related to reporting usage and stock levels at these locations, which can provide valuable insights into their storage capabilities. While the construction of the excellent facility in Caldwell has addressed some storage infrastructure challenges, the SCMP 2010-2020 proposals regarding storage infrastructure remain relevant today. The inclusion of satellite depots/regional hubs helps address the issues associated with:

- The space needed for picking and packing orders before dispatching those orders to cross-dock depots where they are needed
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- The need for warehousing expertise across 13 locations (excluding Margibi and Montserrado counties)
- The issues associated with implementing best practice techniques in 13 locations (excluding Margibi and Montserrado counties)
- The poor road conditions, particularly in the southeast region of the country
- The need to allocate an additional budget for inventory to fill multiple supply chain layers increases the risk of product expiration due to additional stockholding.

CMS Caldwell strategically stores stocks at the regional hubs based on historical demands and inventory levels. These hubs serve as secondary holding points until final distribution instructions are given to health facilities. In some cases, the regional hubs directly receive stock from suppliers for fast-moving high-volume items. If necessary, stocks at the regional hubs are returned to CMS Caldwell and transferred between the hubs to balance inventories according to demands on health facilities in their respective geographic areas. A formal reverse logistics strategy is implemented to minimize the risk of product obsolescence and expired stock, especially phased-out products.

The primary and secondary transport movements are undertaken by multiple 3PLs contracted by the CMS. These 3PLs report to CMS and can also serve as an LLP if required. It is worth exploring alternative modes of transport, such as ships and planes, particularly for temperature-controlled shipments to the southeastern region during the wet season. Although road improvements are underway, it will take several years to establish a high-quality road infrastructure. Further research is required to assess the feasibility and effectiveness of these alternative transportation methods.

The kitting of supplies for CHAs is carried out at both the CMS and the regional hubs. These kits are then delivered to clinics via cross-dock depots, ensuring efficient onward dispatch to CHAs.

The CMS and the regional hubs maintain stocks of routinely used pharmaceuticals and medical emergency supplies. In the event of a medical emergency, predefined plans are in place to access additional transport resources (See Emergencies section). These plans include agreed-upon processes for requesting and obtaining the necessary transport resources from the appropriate owners.

To ensure proper management of expired products, delivery vehicles regularly collect expired items for incineration. This collection process occurs quarterly, helping to prevent the accumulation of a large volume of expired stock. As inventory control processes improve through the interoperability of information systems, the amounts of expired products requiring collection and incineration should decrease significantly.

The endorsement of an outsourcing arrangement for CMS, as proposed in SCMP 2010-2020, is crucial for achieving an effective in-country supply chain with end-to-end visibility. The current lack of end-to-end control hampers coordination and accountability, making it difficult and inefficient to implement the cross-dock concept proposed in the SCMP 2010-2020. Furthermore, carrying out regular value-adding reverse logistics activities would be difficult without proper end-to-end control and accountability.

Regardless of the future legal status of the CMS, an outsourced transport system is put in place for all in-country distribution movements, using best practice techniques in 3PL outsourcing. These techniques include:
● Designated contacts at both tactical and strategic management levels to facilitate effective communication and coordination between the CMS management team and the outsourced 3PLs
● Regular communication between the CMS management team and the 3PLs at appropriate frequencies to ensure smooth operations and address any issues or concerns
● SLAs outline the responsibilities and obligations of both parties, establishing clear expectations for performance and service quality
● Implementation of performance measures to assess and monitor the performance of the 3PLs, ensuring that they meet the agreed-upon service standards
● Encouraging input and feedback from the 3PLs regarding operational improvements and optimization strategies, fostering a collaborative and continuous improvement approach
● Sharing relevant information with the 3PLs, including future initiatives, the direction of the MOH, and corporate objectives, to align their operations and goals with the overall healthcare supply chain

The management of those outsourced arrangements by the CMS management team provides a central point of accountability for the transport operations within the broader MOH healthcare supply chain.

To ensure efficient coordination between different types of vehicles used for primary movements and LMD of cross-docked goods, a single management unit within the CMS oversees and synchronizes the schedules of large vehicles with local delivery vehicles such as pick-up trucks, small 4x4s, or motorcycles.

To maintain a consistent standard of vehicle quality and type for the transportation of pharmaceutical products, minimum requirements are established. These requirements are included in the contracts and/or SLAs with the 3PLs, specifically outlining vehicle specifications for larger vehicles, including:

● Vehicle sizes indicate weight and volume capacities for each specific activity, such as primary distribution and last-mile delivery.
● The percentage of the fleet requiring all-terrain capability and 4x4 transmissions.
● Maintenance intervals and documentation of servicing records.
● Vehicle body construction and security features, such as:
  o Insulated load compartments, even for non-refrigerated vehicles, preferably constructed with polyurethane panels
  o Aluminium channel or checker plate floors to enable air movement and drainage of cleaning water
  o Rear door locking rods designed to accept load compartment seals

Moreover, the standards are expanded to include minimum requirements for the transportation of cold-chain-dependent health products. This includes the need for frequent temperature monitoring of thermolabile products during transit to guarantee their potency upon arrival at the destination.

**Key implementation plan activities**

*Phase 1 (2024)*

● Outsource the management of the CMS facility while retaining ownership to ensure a coordinated approach to warehousing and transportation activities.
Phase 2 (2025-2026)

- Implement the county depot infrastructure refurbishment plan to establish safe storage for health commodities.
- Undertake a detailed analysis of product flows, current service levels, and operating costs of the in-country distribution network to inform the implementation of a regional hub and cross-docking strategy.
- Conduct a cross-docking pilot at one county depot to identify operational issues and assess the effectiveness of interventions.
- Incorporate the findings of the cross-docking pilot into the research on the regional hub and cross-docking strategy, making necessary revisions to the future in-country distribution network.
- Establish end-to-end visibility of the supply chain through a single entity, an outsourced CMS with oversight and enhanced SCMU reporting to a senior MOH official. This will increase network-wide proficiency, accountability, and performance.
- Identify and provide leadership and management capacity training and coaching for supply chain supervisors at key areas of the network, including the CMS and county depots.

Phase 3 (2027-2028)

- Based upon the detailed research on the current and projected product flows and the experience gained from the cross-docking pilot, design and construct a maximum of two regional hubs. These hubs will house emergency stockpiles and ensure a consistent supply of health commodities during the rainy season, allowing for more frequent replenishment.
- Develop policies changing receiving processes at health facilities for goods received via the cross-dock depots, drawing from the experience gained during the cross-docking pilot.
- Develop policies for receiving commodities at the community level and establish associated reverse logistics processes.

3.5.4. Reverse logistics

Strategic goal 20: Establish a process for reverse logistics to increase the efficiency of storage capacity at county depots and health facilities.

Current state

Reverse logistics is used to describe activities that make effective use of the available capacity of a transport fleet that otherwise would have returned to base empty. The use of the available resources has the aim of adding value to transport operations. The activities are typically not of an ad hoc nature and are planned and scheduled in the same way as the outbound delivery journeys. Activities often include the collection of inbound supplies to the distribution centre from local suppliers (the supplies having been procured on collected rather than delivered terms).
Currently, in Liberia, there is very little movement in a planned manner, which limits the ability to make the best use of available resources and add value to the transport operation. Ad hoc movements are more likely to be the result of an out-of-stock scenario or a limited space issue rather than regular planned movements. It is recommended that reverse logistics be deployed for the return of expired products to an incineration facility and the movement of products between stockholding locations to support inventory imbalances. This may require the return of products to the distribution centre for onward dispatch, rather than a direct movement between the two stock holding facilities.

**Goal state**

The current situation needs to be addressed by the policies being developed related to expired products and excess inventories based on data from eLMIS. Once experience has been gained with the planned movements of these categories of products, management attention can be focused on the more hazardous activities associated with clinical waste. A policy decision may well be taken that separates the disposal of clinical waste from supply chain activities and the rebalancing of the stockholding within the supply chain to minimize the risk of product expiration and avert stockouts.

Ideally, each stock holding facility, quarterly, will request authorization from LMHRA via SCMU to dispose of expired products from the appropriate authority at approved healthcare waste management location(s). Inventory management, quarterly, will identify any inventory that needs to be moved to balance the overall inventories across the multiple stockholding facilities with the aim of both improving product availability and reducing the overall level of product expiry. Authorization to collect and/or relocate inventory will be provided to CMS quarterly by LMHRA. Delivery vehicle routes and schedules are revised by the outsourced fleet management organization based on the quarterly distribution cycle plan. Stock holding locations will be advised of the planned collection dates and times seven days before collection. Collection documentation will be prepared to authorize the collections at each location involved and products will be returned to a central holding facility before further scheduled movements to LMHRA incineration plants or other stock-holding locations as soon as possible. Appropriate performance measures will be developed to monitor the effectiveness of the activity in terms of vehicle utilization, expiry rates, and stock-out rates.

**Key implementation plan activities**

The initial activity would be one of establishing a policy regarding the extent of the activities to be undertaken by the outbound delivery vehicles on their return to base. The priority of the delivery fleet is the outbound movement of medicines and healthcare products to health facilities. Thus, the initial steps in generating a value-adding operation can be summarized in the following manner:

**Phase 2 (2025-2026)**

- Define the scope of reverse logistics activities (e.g., expired stock returns, inventory balancing between locations and drug recalls)
- Amend SLAs and SOPs to incorporate reverse logistics and establish proper procedures for documentation and reporting
  - Agreeing on the amendments to SLA clauses to incorporate the reverse logistics activities
  - Negotiating any rate tariff adjustments
  - Develop the reporting and requesting processes between the stockholding locations, inventory management, CMS, and the authorizing entity, LMHRA

3.5.5. Contract management

**Strategic goal 21:** Improve contract management skills to effectively manage outsourced contracts and obtain the desired levels of service performance and cost-effectiveness.

**Current state**

Except for the experience gained in the procurement of pharmaceuticals and medical supplies by members of the supply chain management team, there is very little contract management experience MOH related to outsourced supply chain operations. Primarily, this is the result of the situation in which donors and other partners contract directly with the organizations providing the range of services required on behalf of MOH.

**Goal state**

SCMU has developed the required level of expertise to manage their outsourced relationships directly using best practices. The skills required to manage outsourced supply chain activities such as primary transport movements, warehousing activities, and last-mile distribution are different from those needed to manage those activities in-house. Contract management requires an understanding of the processes, objectives, and contract terms. However, contract managers need to work within SLAs to ensure the service provider delivers the required level of service within the specified budget levels. The temptation to intervene and take over management of the activity must be avoided.

Best practice procedures involve:

- In-depth planning and understanding of the procedures and service levels by both parties; of particular importance are the development of operational contingency plans so that the staff of both organizations are aware of the actions needed in the case of various types of operational failures
- Regular reporting by the service provider of progress and any issues (often a one-page daily report in a standard format)
- Immediate communication between the contract manager and the service provider’s lead manager in the event of operational issues requiring resolution based on the terms of a two-way SLA (a two-way SLA outlines the obligations of both parties to each other)
● Clear performance measures reflect only those activities that the service level provider can influence. For example, a transport service provider is unlikely to be able to influence order completeness, except for in-transit damage or loss

● Production and circulation of performance monitoring data promptly before scheduled review meetings

● Input from the service provider regarding operational improvements based on their professional experience

● Escalation processes with short initiation led times to quickly resolve matters that cannot be dealt with by operational managers

● Formal information exchange regarding the two businesses, in general, and specific plans impacting the contracted operations directly.

The client needs to understand that they remain responsible for delivering the supply chain service to their customers. The outsourced service provider is responsible for providing the contracted service to their client. Over a lengthy time, relationships can develop which integrate the two organizations operationally. However, the distinction will still exist legally and contractually. A considerable amount of training, coaching, and mentoring will be required to develop the skills needed and assume the contract management role within MOH.

**Key implementation plan activities**

**Phase 1 (2024)**

● Identify a contract manager and a small support team within SCMU to manage the outsourced relationship

**Phase 2 (2025-2026)**

● Develop and deliver a training and coaching plan for the SCMU Contract Manager and the support team

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**KPIs**

- Percentage of MOH management team that have completed both formal contract management courses and received coaching with regard to the management of outsourced supply chain contracts
3.6. WASTE MANAGEMENT

Strategic goal 22: Develop a healthcare waste management system with corresponding policies, procedures, practices, and guidelines.

Current state
SCMP 2010-2020 refers to pharmaceutical and healthcare waste, an area of supply chain management that encompasses more than just the disposal of expired pharmaceuticals. SCMP 2010-2020 highlighted the need for the creation of:

- A national joint pharmaceutical and health care waste management committee consisting of appropriate stakeholders
- The legally constituted agency responsible for the disposal of pharmaceutical waste (LMHRA was established in 2010 shortly after the publication of SCMP 2010-2020)
- National Health Care Waste Management Policy

At many supply chain nodes where storage space is at a premium, stocks of expired products await collection for disposal and contribute to warehouse congestion and inefficient operations. In many instances, unnecessary expenses are incurred by either renting additional space or procuring old freight containers to act as temporary storage.

While the proposed National Healthcare Waste Management Policy, referenced again in the SCMP 2015 Review, has not been developed, the issue of dealing with expired products remains a major concern for warehouse management at all levels within the supply chain.

Goal state
A pharmaceutical waste management policy developed by LMHRA and deployed by MOH supply chain teams aimed at reducing the amount of storage space within the distribution network occupied by expired stock to zero. In addition, a formalized reverse logistics strategy will effectively remove all expired stock from health facilities, regularly, to appropriately located incineration plants. The need to incorporate a waste management policy within a reverse logistics activity remains a crucial objective for the supply chain management team. Current stock levels of expired products at all levels in the supply chain would suggest that incineration capacity is required at the county level. However, once the supply chain has been cleansed of expired stock, a single national incineration facility may be enough to deal with the low volume of expired stock created in the future. Timely incineration of expired products and other counterfeit products remains a paramount concern to the supply chain system and must contain a policy that will be achievable.

KPIs
- Percentage of storage space occupied by expired stock

Key implementation plan activities

Phase 1 (2024)
3.7. EMERGENCIES

Strategic goal 23: Create emergency stock holdings and enhance emergency planning processes to maintain adequate supplies of emergency health commodities.

In the context of the healthcare supply chain, the term emergency is used in the following ways when referring to:

- Emergency requisitions which are raised by health facilities or county depots in the event of a zero-stock balance, for whatever reason, of a high-volume usage pharmaceutical
- Medical emergencies such as an Ebola or COVID outbreak

Current state

There is a process in place for the raising and fulfilling of emergency requisitions, but this process is not implemented due to lack of funding for the physical transportation of the products and limited visibility relating to the accuracy and validity of the data informing the emergency request from county depots and/or health facilities. As the key elements of SCMP 2023–2028 are implemented, the need for health facilities to raise emergency requisitions should decrease significantly. The current process involving various levels of authorization appears to work well, if a little protracted though there is limited process of authenticating the cause and validity of the emergency requisitions. However, the quarterly number of emergency requisitions should be noted as an element of any future performance monitoring process.

Medical emergencies occur less frequently than emergency requisitions, but their impacts are much more severe and require a resilient supply chain to support the healthcare professionals responding to the outbreak. It is understood that MOH is responsible for responding to medical emergencies and deploying stocks of supplies stockpiled for the purpose. In the event of a medical emergency, the National Disaster Management Agency, established in 2016, has the role of coordinating support provided by other government agencies including the GSA, NGOs, and donors. Additional support is necessary as MOH does not have enough resources (supplies or distribution assets) to deliver the supplies obtained from other sources. In practice, the single entity coordinating role has not worked as well as anticipated and coordination is currently not funneled through NMDA as intended.

KPIs

- Percentage of recommended stockpiled items held in the emergency store
- Percentage of storage space utilized in the emergency store
Goal state

In November 2019, the Liberia Emergency Supply Chain (ESC) Playbook\(^{30}\) was developed. The document detailed:

- Types of emergency supplies that should be stockpiled for medical emergencies
- Storage space required for the estimated volume of the supplies
- Potential locations of the stockpiling locations

The ESC Playbook development team researched all MOH storage facilities and concluded that except for the CMS, all other locations were not in a fit enough condition for the storage of stockpiles for medical emergencies for long periods. Consideration was also given to the facility operated by GSA at their forward logistics bases, which had been used successfully during the recent COVID-19 pandemic.

A top-level modelling exercise had also been undertaken by the ESC Playbook development team that calculated that a three-location storage network would provide a suitable network to enable MOH to respond quickly in the event of a medical emergency. The underlying assumption was that transport assets had been contracted to be available, at short notice, as required.

It should be noted that SCMP 2010-2020 proposed a three-regional hub distribution network. Although the document did not propose locations, the population spread and issues associated with Liberia’s road network would suggest the following locations would be appropriate for the combined regional distribution hubs and storage of medical emergency supplies:

- Greater Monrovia area (CMS at Caldwell in Montserrado County) to serve the central and western parts of the country
- Regional hub to serve the north of the country
- Regional hub to serve the southeast of the county

Key implementation plan activities

**Phase 1 (2024)**

- Distribute copies of ESC Playbook

**Phase 2 (2025-2026)**

- Draft emergency SOPs;
- Revisit the previous modelling assumptions from ESC Playbook and incorporate the results of the detailed product flow research activity to identify potential locations of three stockpiles and three distribution hubs as well as the possibility of communal storage for both;
- Review the results of the emergency stock holding study to determine the viability of constructing stockpile locations and distribution hubs;
- Liaise with GSA to utilize forward logistics bases as an interim situation while the new storage infrastructure is established;
- Develop detailed processes for the inventory management of the stockpiles with particular reference to those supplies with expiration dates.

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4. FINANCIAL IMPLICATIONS

As Liberia embarks on a mission to enhance its health supply chain, navigating through the myriad of financial challenges is a key aspect of SCMP 2023–2028. The health supply chain, a fundamental pillar in the healthcare system, has been subjected to chronic underfunding, leading to inequitable service delivery, frequent stock-outs, and compromised patient care. Furthermore, inconsistencies in baseline costs and expenditures for commodities across various counties and health facilities have added layers of complexity. The SCMP 2023–2028 Costing document details proposed expenditures for the first three years of the plan.
SCMP 2023–2028 acknowledges the significant underfunding of the health supply chain and inadequate budget allocations as key obstacles. The importance of increased and strategic financial commitment to health supply chain elements such as procurement, infrastructure maintenance, workforce development, and information management systems cannot be stressed and enough. Increasing effectively allocating the budget for the health supply chain is expected to lead to improved service delivery and overall health outcomes, especially in remote and underserved communities.

One of the critical issues confronting the health supply chain is the over-reliance on external funding. Such dependence creates uncertainty and disrupts the planning and execution of health programs. The SCMP underlines the need for the health sector to develop sustainable, domestically driven financing mechanisms to reduce dependence on external aid. In addition, the lack of financial autonomy of CMS compromises its efficiency and responsiveness. The plan recommends measures to ensure CMS gains financial autonomy, enabling it to make swift decisions and manage resources more effectively.

The inefficient use of allocated funds is another financial challenge recognized in the SCMP. To address this, the plan proposes the implementation of rigorous financial management practices, including regular audits, to enhance transparency and accountability. It also seeks to establish mechanisms for performance-based funding, which will align fund allocation with performance indicators to ensure maximum return on investments.

SCMP 2023–2028 Costing outlines four major areas that require the most substantial investment in the next five years, which include:

- **LMIS:** Upgrading the existing LMIS is identified as a strategic investment area to improve data accuracy, timeliness, and accessibility for better planning, forecasting, and decision-making.
- **Capacity development:** Investments in comprehensive training programs are earmarked to enhance the skills and competencies of supply chain staff at all levels.
- **Incorporation of digital technology:** Lack of investment in technology has been a bottleneck for data management and supply chain efficiency. Thus, the SCMP underscores the need for digital technology to modernize data collection and management processes, leading to improved decision-making and resource allocation. This is a cross-cutting theme, but there are certain areas, like procurement, which could benefit substantially from the incorporation of digital technologies.
- **Expanding CMS’ ability to deliver commodities:** Expansion of the supply chain’s reach to counties that are difficult to access during the rainy season by constructing two new regional hubs aims to ensure that health commodities reach the last mile without delays or gaps in service. This will also allow for the storage of emergency commodities, which will minimize the time necessary to mobilize emergency services when needed.

In addition, understanding both direct and indirect costs associated with the public sector supply chain is vital for achieving financial stability and sustainability, particularly in a supply chain largely funded by donors. Direct costs, such as procurement, storage, and distribution of health commodities, are often easier to account for. However, indirect costs like administrative overheads, capacity building, and systems maintenance, are just as important, even though they are often overlooked or underestimated.

It is essential to adopt rigorous accounting methods that attribute dollar amounts to both direct and indirect costs and provide a complete, realistic picture of the supply chain's overall expenditure. Similarly, recognizing and valuing donor contributions in both direct and indirect forms is crucial. This might involve
quantifying the cost of donated goods, services, expertise, and even time. Tracking these costs accurately and consistently can help identify opportunities for efficiency gains and cost reductions. It can also support more informed decision-making about funding allocation and lay the groundwork for realistic discussions about the financial sustainability of the supply chain.

The financial strategy laid out in Liberia's SCMP aims to overcome the multifaceted financial challenges and transform the country's health supply chain into an efficient, responsive, and financially robust system. This will ensure improved health outcomes and equitable access to quality health services for all Liberians.
5. PERFORMANCE MONITORING

Access to affordable, safe, effective, and quality-assured medicines and health products is an essential component for achieving universal health coverage and a key determinant of good health outcomes\(^{31}\). The role of access to medicines in supporting global health goals has risen steadily over the past decade, leading to greater emphasis on performance monitoring at both country and global levels. However, limited and fragmented systems for collecting, analyzing, and reporting data often hinder effective monitoring. In the SCMP 2023–2028, performance monitoring is given a central role, with a selection of measurable indicators to monitor and track progress.

While there are various tools available for measuring individual elements of the supply chain for access to medicines and health products, there has been relatively little focus on viewing the entire system as a whole. As a result, the SCMP 2023–2028 recommends the establishment of a monitoring framework and dashboard within the SCMU to measure, monitor, and report on the supply chain system’s contribution to the access and use of medicines in Liberia.

The concept behind the access dashboard is simple: to provide national policymakers and stakeholders with a high-level overview of the core functions of the supply chain system, enabling them to assess its performance and indicate areas that need strengthening. The dashboard should include indicators that enable policymakers to:

- Understand the current status of the supply system
- Track progress towards set targets and national goals
- A better understanding of local contexts and prioritizing actions
- Monitor the impact of interventions
- Ensure accountability, sustainability, and value for money in supply chain investments

Designing a fit-for-purpose supply chain monitoring dashboard is crucial for effective investment monitoring and success. Guiding principles that should be incorporated when creating a dashboard\(^{32}\) include:

- Ensuring the inclusion of equity and unmet needs measurements to identify disparities and gaps that require attention.
- Streamlining the data collection process to reduce reporting burden and avoid duplication, promoting a culture of data sharing and harmonization efforts.
- Building on existing datasets and data collection systems, even if they are initially incomplete, to kick-start the process.
- Leveraging innovative technology, such as tablets and cell phones, to optimize data collection efforts.
- Facilitating regular information sharing and developing a compelling narrative around the dashboard's findings.
- Involving key ministries beyond the health ministry, making the dashboard easily accessible and user-friendly.
- Using the dashboard to identify problem areas, triggering further investigations and focusing on areas for improvement.
- Encouraging country ownership at all levels and promoting knowledge exchange to foster a sustainable and effective monitoring system.
- Triangulating data to validate and interpret results, taking advantage of opportunities to gain political support.
- Engaging diverse stakeholders and building partnerships to strengthen the impact of the supply chain monitoring dashboard and drive long-term success in improving healthcare access and outcomes.

5.1. PHARMACEUTICAL AND HEALTH PRODUCT SUPPLY CHAIN MANAGEMENT

**Strategic goal 1:** Strengthen and harmonize the national and sub-national forecasting and supply planning of health products by ensuring decisions are informed by high-quality data to support the cost-effective procurement of health commodities across the public sector.

**KPI 1.1: Annual forecast accuracy percentage (forecasted versus actual consumption)**

Forecasting plays a critical role in supply chain management as it serves as the foundation for the entire supply chain cycle. It enables various stakeholders to plan their operations, including procurement, raw materials, and logistics, based on accurate demand projections. Measuring and improving forecast accuracy is essential for enhancing visibility and effectiveness across the supply chain.

The forecast accuracy percentage measures the level of accuracy between actual usage and forecasted usage. Choosing the right forecasting method or model is crucial for achieving accurate forecasts, as it directly impacts the reliability of the results.

- Information is collected by: National Forecast Committee
- Performance measurement information is reported to Program Units and the Deputy Minister for Health Services / Chief Medical Officer, R.L.
- Frequency of reporting: Annually
- Reporting mechanism: Annual forecast

**KPI 1.2: Percentage of health facilities reporting complete consumption data to central level by functional program area**

The use of appropriate data relies heavily on the ability of health facilities to routinely report key supply chain data elements. These elements include stock status data, consumption data, wastage, and expiries, which are crucial for conducting accurate forecasts. The eLMIS system is routinely analyzed by the quantification team at the national level. This performance indicator is measured on a quarterly or bi-annual basis.

- Information is collected by: CHTs
- Performance measurement information is reported to: National Quantification Team
- Frequency of reporting: Monthly
- Reporting mechanism: eLMIS reports

**KPI 1.3: Percentage of forecast review meetings held according to schedule**

Regular and routine forecast review meetings involving various stakeholders are essential for the effective operation of the public sector healthcare supply chain. To achieve this, an annual forecast meeting calendar is shared at the beginning of each year to facilitate the review of program forecasts. The output of these activities includes meetings, reports, and workshops. Monitoring the execution of the planned meetings and reporting the number of meetings held as a percentage of the planned meetings provides into the level of meeting activity.
Strategic goal 2: Align the selection of health products, commodities, and supplies with the priorities and needs of the population.

**KPI 2.1: Percentage of health products that are based on approved EML**

Given the complexity of drug use, WHO has developed several standardized indicators for evaluation. These indicators are categorized into prescribing indicators, patient care indicators, and facility indicators. For the public health sector program, the inclusion of products via national procurement in the supply chain should comply with the national treatment guidelines. This KPI assesses the alignment between the list of products in the supply chain and the approved essential medicines list. The evaluation is conducted by comparing the inventory listing at the central level with the list on the approved EML.

- Information is collected by: Director of SCMU / Chief Pharmacist, R.L.
- Performance measurement information is reported to the Deputy Minister of Health Services / Chief Medical Officer, R.L. and procurement team
- Frequency of reporting: Annually
- Reporting mechanism: Technical report

**KPI 2.2: Percentage of health facilities with updated SOPs and EML**

Measures of the availability of SOPs and guidelines at the service delivery points are necessary to ensure that key materials and documents developed at the national level are disseminated to reach the end-user level. This activity will be part of the routine supervision checklists conducted periodically and reported to the national level for tabulation.

- Information is collected by: CHTs
- Performance measurement information is reported to the Deputy Minister of Health Services
- Frequency of reporting: Annually
- Reporting mechanism: technical report

Strategic goal 3: Strengthen and streamline in-country procurement mechanisms for health commodities with the use of digital technologies.

**KPI 3.1: Annual percentage of the GOL contribution to the procurement of essential medicines in the forecasted budget**

The procurement of key essential medicines is heavily reliant on donor funding and the contribution of government resources has been minimal and not properly tracked as a percentage of the national forecasted needs. This KPI seeks to measure the proportion of the government’s contribution over time against the national forecast plan.

- Information is collected by: SCMU
Performance measurement information is reported to senior MOH management and procurement teams.

**KPI 3.2: Percentage of procurement completed (ordered quantities) by the procurement plan**

Delays in procurements result in treatment interruptions, stock out of commodities, and interruptions in transport and last-mile deliveries due to emergency orders created at the end-user level when commodities are delivered late to the CMS. This KPI is a measure of the timeliness of the procurement process at the national level to meet the allocated procurement quota or allocation of the national forecast. The calculation is a percentage of on-time delivery by expressing the number of procurements delivered on schedule as per the procurement plan and the total number of procurements processed in the same period.

- Information is collected by: SCMU from the procurement department.
- Performance measurement information is reported to senior MOH management and procurement teams.
- Frequency of reporting: quarterly
- Reporting mechanism: electronic summaries in presentation format

**Strategic goal 4: Establish importation and customs clearance guidelines for health commodities and enforce regulatory oversight of health commodities’ entry into the country.**

**KPI 4.1: Time spent in customs per consignment**

Delays at ports of entry not only result in additional costs but can also reduce the efficacy of those drugs requiring to be transported and stored in temperature-controlled conditions. While new procedures will facilitate the importation of consignments more rapidly, clearer instructions and enhanced relationships with clearing agents will also be beneficial. Even after importation, the need for laboratory testing can also delay the drugs being available for distribution to health facilities. The KPI is a measure of the quality of the documentation being presented to the authorities and the ability of the clearing agents to manage the process effectively. The calculation is a percentage which is derived by expressing the number of consignments processed in the standard lead time as a percentage of the total number of consignments processed. A profile can be presented reflecting a range of days over the standard lead time, for example, 1-2 days, 2-5 days, and >5 days.

- Information is collected by: SCMU from the clearing agents.
- Performance measurement information is reported to senior MOH management and procurement teams.
- Frequency of reporting: monthly
- Reporting mechanism: electronic summaries in presentation format.
**Strategic goal 5:** Enhance quality assurance practices to monitor health commodities entering the public sector supply chain and ensure health commodities within the supply chain are stored, handled, and managed appropriately to maintain their physical integrity.

*KPI 5.1:* See KPI 2.1.

*KPI 5.2:* See KPI 2.2.

**Strategic goal 6:** Improve pharmacovigilance practices to adequately capture adverse events and other health commodity-related issues.

*KPI 6.1:* See KPI 2.1.

*KPI 6.2:* See KPI 2.2.

### 5.2. SUPPLY CHAIN POLICY AND EXECUTION

**Strategic goal 7:** Introduce proactive communication and coordination of public sector healthcare supply chain stakeholders.

*KPI 7.1: Percentage of planned meetings held as scheduled*

It is accepted that regular and structured communication, of various types, by all of the various stakeholders, is essential for an effective public sector healthcare supply chain operation. To achieve that aim, circulating an annual plan of all the various communication interventions, meetings, reports, and workshops to all required attendees is a best practice procedure. Monitoring the execution of the planned meetings and expressing the number held as a percentage of the planned meetings will provide a view of the communication levels being achieved.

- Information is collected by the SCMU representative responsible for coordinating communication events and actions
- Performance measurement information is reported to MOH staff and all requested attendees
- Frequency of reporting: quarterly
- Reporting mechanism: electronic summaries in presentation format

*KPI 7.2: Percentage of required attendees attending meetings*

Not only is it important that the meetings should be held as planned, but it is also critical that the required attendees attend the planned meetings. Thus, in a similar manner to the monitoring of the timing of the meetings, the level of attendance by all of the various supply chain actors is crucial. Again, a top-level calculation expresses the number of attendees that attended the meeting as a percentage of the requested attendees. Again, further analyses can be undertaken regarding the attendance of various groups within the total attendee community.
- Information is collected by the SCMU representative responsible for coordinating communication events and actions
- Performance measurement information is reported to senior MOH staff and all requested attendees
- Frequency of reporting: quarterly
- Reporting mechanism: electronic summaries in presentation format

**KPI 7.3: Number of supply chain actors that have a copy of the supply chain governance document (online or paper-based) readily available**

Monitoring this KPI can provide insights into how effectively the supply chain governance document is disseminated and accessed among key actors. A high number suggests that the majority of the supply chain participants are informed and can reference the governance guidelines as needed, contributing to smoother operations and fewer misunderstandings or conflicts. Conversely, a low number may indicate a need for better communication strategies or tools to ensure all actors have the necessary information to operate within the defined governance framework.

- Information is collected by: SCMU
- Performance measurement information is reported to senior MOH staff
- Frequency of reporting: Annually
- Reporting mechanism: electronic report

**Strategic goal 8: Develop Central Medical Stores (CMS) as an autonomous primary distribution centre within the country, optimizing the flow of commodities from the port of entry to the point of use to improve operational and cost efficiencies.**

**KPI 8.1: Percentage of health facilities with all products in stock (on-shelf product availability percentage)**

The ultimate supply chain objective and thus, the primary aim of the CMS, is to have the products required by the various types of health facilities in stock at all times. Achieving this aim in full, or at least to an almost perfect standard, will enable clinical staff to focus on providing the required level of patient care rather than having to deal with supply chain inadequacies.

- Information is collected by: an independent sampling company that can deploy the required resources promptly
- Performance measurement information is reported to senior MOH personnel, CMS, county depot managers, SCMU staff, clinical managers, and Program Unit staff
- Frequency of reporting: quarterly
- Reporting mechanism: electronic summaries in presentation format

**KPI 8.2: Conformance to CMS operating budget**

Supply Chain Management requires a balance to be struck between the level of service delivered and the operating costs associated with delivering that level of service. Therefore, monitoring cost levels at the same time as monitoring service levels is necessary to gain a view of the value for money being delivered by the costs being incurred. The performance measure requires that total costs be monitored and compared
to the planned budget for the period under review. Variances resulting from both volume and cost differences can also be calculated to support management’s decision-making relating to corrective actions.

- Information is collected by: the finance department from internal sources and external organizations supporting MOH’s activities
- Performance measurement information is reported to senior MOH staff, SCMU, and various stakeholders
- Frequency of reporting: quarterly after each distribution cycle
- Reporting mechanism: electronic summaries in both detailed and presentation format

**Strategic goal 9:** Ensure the availability of sufficient, reliable, and easily accessible data to inform decision-making in forecasting, supply planning, distribution, and replenishment of health commodities through established communication mechanisms with the SCMU.

**KPI 9.1: Percentage of Program Units that submit inventory reports within the specified timeframe**

Knowledge of quantities stock on hand at health facilities provides visibility into the overall compliance and adherence to reporting requirements within Programs and allows for timely monitoring of stock levels and inventory accuracy, enabling better planning and decision-making. Lastly, a high percentage of on-time submissions indicates a well-functioning reporting system and a culture of accountability, fostering transparency and trust within the supply chain.

- Information is collected by: Program Unit Lead
- Performance measurement information is reported to senior MOH staff, SCMU, and various stakeholders
- Frequency of reporting: quarterly
- Reporting mechanism: technical memo

**KPI 9.2: The average time is taken from requisition submission to authorization and subsequent procurement lead times**

The average time taken from requisition submission to authorization reflects the efficiency of the process and the responsiveness of SCMU. A shorter average time indicates a streamlined workflow, enabling Program Units to receive timely authorization for their requisitions. Conversely, a longer average time may signify bottlenecks or delays in the authorization process, potentially impacting operations.

- Information is collected by: SCMU
- Performance measurement information is reported to senior MOH staff, Program Units, and various stakeholders
- Frequency of reporting: quarterly after each distribution cycle
- Reporting mechanism: electronic summaries in both detailed and presentation format

**KPI 9.3: Percentage of Program Units that have access to accurate and up-to-date LMIS data**

Accurate and up-to-date LMIS data ensures that program units have a clear understanding of stock levels, demand patterns, and lead times, leading to better resource allocation and reduced risk of stockouts or excess inventory.
Strategic goal 10: Reduce the administrative and supply chain management burden of County Health Teams (CHTs) caused by delayed or incomplete delivery of health commodities.

KPI 10.1: Percentage of total orders/requisitions delivered on time in a quarter

Distribution cycles are planned to occur quarterly. The health facilities, of all types, therefore, expect to receive a delivery, based on the agreed distribution plan every 13 weeks. Replenishment quantities have been calculated based on this expectation. While the health facilities will have first-hand knowledge of the timeliness of the distribution operation, supply chain managers and senior clinical staff will be interested in understanding the quality of the delivery service being provided. Regular deliveries will reduce the level of zero stock balances and minimize the time clinical staff spend on supply chain activities. The information should be calculated at an overall level and a more granular level such as a geographical area or a health facility type. The calculation is the number of on-time deliveries, in a quarter, expressed as a percentage of the total deliveries made, at the level of granularity required.

- Information is collected by: transport planning teams at CMS and county depot levels. Ideally, the data should be available from the IT system dealing with order capture, dispatch document production, and proof of delivery (POD) processing. However, a clerical resource may be needed to analyze the delivery document to produce the top-level calculations.
- Performance measurement information is reported to CMS and county depot managers, SCMU staff, clinical managers, and Program Unit staff.
- Frequency of reporting: quarterly within two weeks of the completion of a distribution cycle.
- Reporting mechanism: electronic summaries in presentation format.

KPI 10.2: Percentage of total orders/requisitions delivered in full in a quarter

In addition to regular deliveries promptly, complete orders are equally important. It is understood that rationing is sometimes needed if demand exceeds supply. This measure monitors the difference between the replenishment amounts agreed between SCMU and Program Units, and the amounts shipped from the CMS and county depots. Again, it is a top-level calculation expressing the incomplete orders as a percentage of the total number of orders at various levels of granularity.

- Information is collected by: warehouse/depot teams at CMS and the county depot levels. Ideally, the data should be available from the IT system dealing with order capture, dispatch document production, and proof of delivery (POD) processing. However, a clerical resource may be needed to analyze the delivery documents and pick notes to produce the top-level calculations.
- Performance measurement information is reported to CMS and county depot managers, SCMU staff, clinical managers, and Program Unit staff.
- Frequency of reporting: quarterly within two weeks of the completion of a distribution cycle.
- Reporting mechanism: electronic summaries in presentation format.
**Strategic goal 11:** Strengthen the supervision of health facilities to improve the availability of high-quality data for decision-making, quantification, and capacity development.

**KPI 11.1: Number of mentoring and supervisory visits conducted by CHTs**

Data from health facilities are instrumental in informing decision-making at all levels of the supply chain. A myriad of issues makes it difficult for health facilities to accurately report data including outdated forms, extensive staff turnover, high patient volumes, and limited technology and tools.

- Information is collected by: CHTs
- Performance measurement information is reported to SCMU
- Frequency of reporting: quarterly
- Reporting mechanism: technical memo

**Strategic goal 12:** Strengthen community health commodity availability and accountability at all levels in line with supply chain standard operating procedures (SOPs).

To ensure routine primary health care service provision at the community level, CHA distribution should be conducted quarterly in line with the distribution cycles for the counties. The resupply quantities and buffer stock will be determined based on logistics data. This informed pull system is important to avoid overstocks and understocks at the community level which can hamper service provision.

**KPI 12.1: Percentage of CHAs who receive their required health commodities in full and on time quarterly**

To ensure CHAP commodities are available, they need to be included in the routine forecasting and supply planning exercises to guarantee accessibility during the requisitioning process. The following list of CHA commodities should be included in the quantification and pipeline review exercises accordingly to ensure the commodity needs are known and tracked using the national system.

<table>
<thead>
<tr>
<th>Commodity name</th>
<th>Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artemether and Lumefantrine (2-11 months) 20/120mg</td>
<td>National Malaria Control Program</td>
</tr>
<tr>
<td>Artemether and Lumefantrine (1-5 years) 20/120mg</td>
<td>National Malaria Control Program</td>
</tr>
<tr>
<td>Malaria Rapid Diagnostic Test</td>
<td>National Malaria Control Program</td>
</tr>
<tr>
<td>Paracetamol 100mg Tablet</td>
<td>Essential Medicines Diseases Program</td>
</tr>
<tr>
<td>Amoxycillin 250mg Dispersible Tablet</td>
<td>Essential Medicines Diseases Program</td>
</tr>
<tr>
<td>Zinc 10 mg Dispersible Tablet</td>
<td>Essential Medicines Diseases Program</td>
</tr>
<tr>
<td>Oral Rehydration Sachets</td>
<td>Essential Medicines Diseases Program</td>
</tr>
<tr>
<td>Microlut</td>
<td>Reproductive Health Program</td>
</tr>
<tr>
<td>Microgynon</td>
<td>Reproductive Health Program</td>
</tr>
</tbody>
</table>

*Table 1. List of tracer commodities for the CHA Program.*
Since SCMP 2023–2028 proposes the integration of quantification exercises for all programs, the community health needs should be forecasted using the national quantification SOPs for quantifying community health products. This indicator will be calculated as the number of CHA tracer commodities included in the quantification divided by the total number of CHA tracer commodities. The SCMU and CHSD will be required to ensure the CHAP logistics data is included in both the forecasting and quarterly pipeline review meetings.

- Information is collected by: CHAP Lead
- Performance measurement information is reported to Chief Medical Officer and SCMU
- Frequency of reporting: Annually
- Reporting mechanism: technical report

**KPI 12.2: Percentage of kit distributions completed per county per year**

Kits, just like routine county supplies, will be distributed quarterly to all CHAs in the county. The quantities to be packed in the kits will be determined using the logistics data entered through the eCBIS and accessed through the eLMIS. Kits must be packaged and delivered quarterly to ensure commodity availability at the community level as the minimum and maximum inventory levels will be determined using this data.

This indicator is meant to determine the percentage of distributions completed as it has a direct impact on stock availability at the community level.

This indicator will be calculated as the number of kit distributions conducted per county per year divided by four as CMS is required to complete four distributions in a year.

- Information is collected by: SCMU
- Performance measurement information is reported to CHAP Lead
- Frequency of reporting: Annually
- Reporting mechanism: technical memo

**KPI 12.3: Percentage of CHAs accurately reporting logistics data through the eCBIS**

To supply CHAs in full based on the logistic data there is a need for all facility CHA SSRR data points to be reported. The key data points to be completed and reported quarterly are monthly consumption, stock-out days, quantity received, losses and/or adjustments, and closing balance.

- Information is collected by: SCMU
- Performance measurement information is reported to CHAP Lead
- Frequency of reporting: quarterly
- Reporting mechanism: LMIS report
5.3. INFORMATION SYSTEMS

Strategic goal 13: Create interoperable management information systems (MISs) to facilitate access to data.

**KPI 13.1: Percentage of authorized users who access MIS data monthly**

Having a master product list is fundamental for the interoperability of information systems. Once the master list is ready, one should monitor its use in each of the information systems. This measures the percentage of codes within the master list that are being used in the system. A high utilization rate indicates that the master list is being fully utilized and has been adopted by users. This indicator should be run on all information systems.

- Information is collected by: the IT team
- Performance measurement information is reported to CMS Operations Manager (WMS) and CHT (LMIS)
- Frequency of reporting: monthly
- Reporting mechanism: proprietary system report

**KPI 13.2: Percentage of time that the MISs are operational and available for use**

Once the master list is up and running, it is important that new product codes are created, coded, and passed to all information systems promptly. This measures the time it takes for new codes to be operational and available for use in the system. A higher percentage indicates that the MIS is functioning as it should.

- Information is collected by: the IT team
- Performance measurement information is reported to CMS Operations Manager
- Frequency of reporting: quarterly
- Reporting mechanism: project management report

**KPI 13.3: Percentage of total data sources that have been integrated into MISs**

This indicator is important because it measures the effectiveness of the master list implementation in this information system. This measures the percentage of codes that are accurate and up to date. A high accuracy rate indicates that the master list is being maintained and updated regularly.

- Information is collected by: the IT team
- Performance measurement information is reported to Operations Manager (WMS is CMS and LMIS is county depot)
- Frequency of reporting: monthly
- Reporting mechanism: proprietary system report

**KPI 13.4: Number of reports that are generated and distributed by MISs**

The effectiveness of the supply chain is dependent on reliable and usable data. Reports generated and distributed by MISs relay this information to key stakeholders and decision-makers. This KPI should ensure that all those that need access to MIS data receive it regularly.

- Information is collected by: the IT team
● Performance measurement information is reported to Operations Manager (WMS is CMS and LMIS is county depot)
● Frequency of reporting: monthly
● Reporting mechanism: proprietary system report

Strategic goal 14: Reconfigure the warehouse management system (mSupply) to improve system performance, provide correct stock-on-hand quantities, and produce reports with accurate information.

KPI 14.1: Percentage of stock-on-hand quantities reported by mSupply that match actual stock levels (central stock record accuracy)
Assessing how accurate the WMS stock is imparted to physical stock is the main indicator of the WMS system. This indicator should be analyzed every time there’s a physical stock count. It measures the accuracy of inventory levels in the WMS compared to actual physical inventory.
  ● Information is collected by: CMS Operations Manager
  ● Performance measurement information is reported to the warehouse manager, inventory management team, and operations team
  ● Frequency of reporting: weekly, monthly, quarterly
  ● Reporting mechanism: WMS-generated reports

KPI 14.2: Number of times inventory is replaced over a given period (time required to complete a cycle of receiving, storing, and shipping inventory)
This indicator is important because it measures how efficient the procurement and quantification teams are at doing their job. Having a long cycle of stock sitting in the warehouse for many months is undesirable. Whereas having a short cycle shows a more efficiently run operation. It measures the time it takes to complete a cycle of receiving, storing, and shipping inventory.
  ● Information is collected by: CMS Operations Manager
  ● Performance measurement information is reported to the warehouse manager, operations team
  ● Frequency of reporting: weekly, monthly, quarterly
  ● Reporting mechanism: WMS-generated reports

KPI 14.3: Percentage of orders fulfilled accurately and on time
The number of orders processed is a good indicator of the level of effort being outputted by the warehouse, but assessing how many of those orders were processed accurately, without error, and in full is also a very important indicator to assess the quality of outputted effort. It measures the percentage of orders that are processed accurately, without errors, and in full.
  ● Information is collected by: CMS Operations Manager
  ● Performance measurement information is reported to the warehouse manager, logistics manager, and operations team
  ● Frequency of reporting: daily, weekly, monthly
  ● Reporting mechanism: WMS-generated reports
**KPI 14.4: Time taken from order placement to delivery**

This indicator is important because it measures how responsive the warehouse is to a customer’s needs and orders. Having a short time means that SOPs are being used and working. Having a long lead time is a sign that warehouse operations are not tightly run. It measures the time it takes to fulfil an order from the time it is placed by the customer.

- Information is collected by: CMS Operations Manager
- Performance measurement information is reported to the warehouse manager, customer service manager, operations team
- Frequency of reporting: weekly, monthly, quarterly
- Reporting mechanism: WMS-generated reports

**KPI 14.5: Number of hours it takes to unload, inspect, and store incoming inventory**

When the product is received, it often needs to be picked up and shipped as soon as possible. Having a warehouse that can receive, inspect, store, and make the product available for picking is highly desirable. This indicator will show how healthy the receiving team and operations are running. It measures the time it takes to unload, inspect, and store incoming inventory.

- Information is collected by: CMS Operations Manager
- Performance measurement information is reported to the warehouse manager, operations team
- Frequency of reporting: daily
- Reporting mechanism: WMS-generated reports

**Strategic goal 15:** Strengthen the logistics management information system (LMIS) for routine data collection and reporting to produce high-quality data to inform decision-making and support performance monitoring, traceability, visibility, and accountability.

**KPI 15.1: Number of products with stock data in the LMIS system that matches the physical stock levels**

Assessing how accurate the depot stock is about the physical stock is the main indicator of the LMIS system at that depot. This indicator should be analyzed every time there’s a physical stock count. This indicator is a good way to assess all warehouse operations and management. This measures the accuracy of stock data in the LMIS system, compared to physical stock levels.

- Information is collected by: CMS Operations Manager
- Performance measurement information is reported to supply chain managers
- Frequency of reporting: quarterly
- Reporting mechanism: LMIS system reports

**KPI 15.2: Percentage of data that is accurate and up to date in the LMIS system**

This indicator reveals how well the LMIS system is being managed and how well the operations are being run in that depot. Higher data accuracy means the system is being used correctly and operations are following SOPs. This measures the percentage of data that is accurate and up to date in the LMIS system.

- Information is collected by: CMS Operations Manager
- Performance measurement information is reported to supply chain managers
● Frequency of reporting: monthly
● Reporting mechanism: LMIS system reports

**KPI 15.3: The average time taken for facilities to submit the paper-based SSRR forms after the reporting period**

This KPI is essentially a time-based metric that helps to track the efficiency and timeliness of the administrative processes within facilities. By tracking this KPI, organizations can identify delays in form submission, evaluate the efficiency of their data gathering and reporting processes, and work to improve internal workflows.

● Information is collected by: CHTs
● Performance measurement information is reported to SCMU
● Frequency of reporting: quarterly
● Reporting mechanism: electronic report

**KPI 15.4: Percentage of forms that correctly include the corresponding product codes from the Master Product List**

Accuracy in reporting product codes is crucial for several reasons, including inventory management, inventory tracking, and financial reporting. If the product codes on the forms don't match the Master Product List, there could be discrepancies in these processes, leading to issues such as mismanaged inventory, inaccurate data, or financial inconsistencies. A high percentage indicates a high level of accuracy in form submissions, which can lead to more effective business operations and decision-making.

● Information is collected by: CHTs
● Performance measurement information is reported to SCMU
● Frequency of reporting: quarterly
● Reporting mechanism: electronic report

**KPI 15.5: Percentage of facilities where the SSRR forms have been successfully transitioned to the web-based tool for data capture**

The successful transition means that a facility can fully utilize the web-based tool for SSRR form data capture, thus eliminating or significantly reducing the use of paper-based forms. This KPI indicates the progress of digital transformation within the organization, specifically in terms of data capture and management. The transition to a web-based tool can offer several benefits such as improved data accuracy, faster data submission and processing, reduced paper waste, and increased operational efficiency. This can aid in gauging how effective transition strategies are and identify any areas or facilities that may need additional support to complete the shift.

● Information is collected by: CHTs
● Performance measurement information is reported to SCMU
● Frequency of reporting: quarterly
● Reporting mechanism: electronic report
**Strategic goal 16:** Centralize data from all available information systems and ensure its accessibility for decision-making purposes.

**KPI 16.1: Percentage of LMIS and HMIS data centralized within the central database**

This measures the completeness of the data being entered into the database. A higher completeness rate indicates that the database is being used effectively to store all relevant data.

- Information is collected by: database administrators or IT staff responsible for monitoring and maintaining the database
- Performance measurement information is reported to management or stakeholders who rely on the completeness of the data for decision-making
- Frequency of reporting: regularly scheduled intervals such as daily, weekly or monthly
- Reporting mechanism: reports generated from the database management system

**KPI 16.2: Response time and availability of the central database**

This measures the time it takes to retrieve data from the database. A shorter retrieval time indicates that the database is being used efficiently and effectively.

- Information is collected by: database administrators or IT staff responsible for monitoring and maintaining the database
- Performance measurement information is reported to management or stakeholders who rely on timely access to data for decision-making
- Frequency of reporting: regularly scheduled intervals such as daily, weekly or monthly
- Reporting mechanism: reports generated from the database management system or performance monitoring tools

**KPI 16.3: Number of security audit fails in each audit**

This measures the level of security of the database to protect data from unauthorized access or loss. A higher security level indicates that the database is being used effectively to protect sensitive data.

- Information is collected by: database administrators or IT staff responsible for monitoring and maintaining the database
- Performance measurement information is reported to management or stakeholders concerned with data security and privacy
- Frequency of reporting: regularly scheduled intervals such as daily, weekly or monthly
- Reporting mechanism: reports generated from the database management system or security monitoring tools

**KPI 16.4: Accuracy of data stored in the Central Database**

This accuracy is evaluated by cross-verifying the data entries with their respective authentic sources. Any inconsistencies between the source and the entry in the database are considered errors, and the total number of such errors found in a given period can be used to calculate the accuracy rate. The accuracy rate can be represented as a percentage with the formula: \[
\frac{\text{total number of entries} - \text{number of incorrect entries}}{\text{total number of entries}} \times 100\%.
\] Higher percentages indicate higher data accuracy.
5.4. IN-COUNTRY WAREHOUSING AND DISTRIBUTION

Strategic goal 17: Strengthen storage and infrastructure at both county and health facility levels to support efficient handling and inventory control practices.

**KPI 17.1: Subnational stock record accuracy**

Although perhaps not as critical as stock accuracy at the central stockholding level of the supply chain, stock record accuracy, at the county and health facility level is nevertheless, an indicator of the effectiveness of local supply chain management teams. Upgrading the infrastructure in terms of power supplies, adequate lighting, rodent control, and secure establishments will enhance working conditions and as a result, improve staff performance. Thus, measuring stock accuracy will indicate the value derived from improving the infrastructure at the county and health facility levels. Again, cycle counts, or a monthly stock-take, and an expression of the variances, in terms of the total records, as a percentage analyzed will provide that indication.

- Information is collected by: members of CHT responsible for supply chain performance and subsequently collated by the SCMU
- Performance measurement information is reported to senior MOH staff, CHT Managers, and the appropriate SCMU team members
- Frequency of reporting: monthly
- Reporting mechanism: electronic summaries in presentation format

Strategic goal 18: Enhance infrastructure to maintain the cold chain at all levels within the supply chain and strengthen policies, procedures, and protocols to reflect global best practices.

**KPI 18.1: Percentage of total hours in a month operating outside the prescribed temperature operating range**

Knowing the time, if any, that vaccines and other products, requiring temperature-controlled storage conditions have spent outside of their optimum temperature range is critical to those supply chain managers taking the ‘ship’ or ‘not to ship’ decision. Continuous monitoring of the temperatures is therefore essential with appropriate automated alerts to managers to enable corrective action, if needed, to be executed. From the records available, the hours of non-compliance, in a month, can be expressed as a percentage of the total operating hours. The measure will provide an overall view of the quality of the facility but does not replace
the need for appropriate contingency plans to deal with cold chain breaches as and when they occur. It will highlight either the level of repair and maintenance required or the need to replace critical components.

- Information is collected by: a cold chain technician or warehouse supervisor at CMS and any other warehouse with temperature-controlled facilities
- Performance data is provided to: managers operating temperature-controlled storage facilities and the product quality manager of those Program Units or other stakeholders storing products requiring temperature-controlled conditions
- Reporting frequency: monthly
- Reporting mechanism: electronic circulation of reporting templates or recording equipment downloads

**KPI 18.2: The number of times in a month the prescribed temperature operating range was exceeded**

The above KPI provides an overall view of the quality of the operation, it is important to understand the frequency with which problems occur, to facilitate pinpointing the causes of the problem. Infrequent temperature breaches could be the result of poor discipline on the part of the warehouse staff. However, frequent problems could highlight power supply and/or cooling equipment inadequacies.

- Information is collected by: a cold chain technician or warehouse supervisor at CMS and any other warehouse with temperature-controlled facilities
- Performance data is provided to: managers operating temperature-controlled storage facilities and the product quality manager of those Program Units or other stakeholders storing products requiring temperature-controlled conditions
- Reporting frequency: monthly
- Reporting mechanism: electronic circulation of reporting templates or recording equipment downloads

**KPI 18.3: Percentage of planned routine maintenance events undertaken in the month that are executed**

Maintaining temperature-controlled facilities in optimum operating conditions is essential for their effectiveness. Thus, planned preventative maintenance is an essential element of the management activities associated with the operation of temperature-controlled facilities. To avoid unforeseen breakdowns, management must ensure that the equipment is maintained by the manufacturer’s recommendations. This KPI provides management with the information required to ensure that the required maintenance policy is being pursued. The measure is the number of completed activities expressed as a percentage of the planned activities, in a month.

- Information is collected by: a cold chain technician or warehouse supervisor at the CMS and any other warehouse with temperature-controlled facilities
- Performance data is provided to: managers operating temperature-controlled storage facilities
- Reporting frequency: monthly
- Reporting mechanism: circulation of maintenance checklists and details of any remedial work required, both carried out and awaiting completion
**Strategic goal 19:** Efficiently manage warehousing practices at the Central Medical Stores (CMS) to expand services to deliver health commodities reliably to the last mile without delays or service gaps.

*Two of the following KPIs have already been indicated as relevant to strategic objective 8 (Reduce the administrative and supply chain management burden of CHTs by ensuring that health commodities are delivered on-time and in full).

**KPI 19.1: Percentage of total orders/requisitions delivered on time in a quarter**

Distribution cycles are planned to occur quarterly. The health facilities, of all types, therefore, expect to receive a delivery, based on the agreed distribution plan every 13 weeks. Replenishment quantities have been calculated based on this expectation. While the health facilities will have first-hand knowledge of the timeliness of the distribution operation, supply chain managers and senior clinical staff will be interested in understanding the quality of the delivery service being provided. Regular deliveries will reduce the level of zero stock balances and minimize the time clinical staff spend on supply chain activities. The information should be calculated at an overall level and a more granular level such as a geographical area or a health facility type. The calculation is the number of on-time deliveries, in a quarter, expressed as a percentage of the total deliveries made, at the level of granularity required.

- Information is collected by: transport planning teams at the CMS and county depot levels. Ideally, the data should be available from the IT system dealing with order capture, dispatch document production, and proof of delivery (POD) processing. However, a clerical resource may be needed to analyze the delivery document to produce the top-level calculations.
- Performance measurement information is reported to CMS and County Depot Managers, SCMU staff, clinical managers, and Program Unit staff.
- Frequency of reporting: quarterly within two weeks of the completion of a distribution cycle.
- Reporting mechanism: electronic summaries in presentation format.

**KPI 19.2: Percentage of total orders/requisitions delivered in full in a quarter**

In addition to regular deliveries promptly, complete orders are equally important. It is understood that rationing is sometimes needed if demand exceeds supply.

This measure monitors the difference between the replenishment amounts agreed between the SCMU and Program Units and the amounts shipped from the CMS and County Depots. Again, it is a top-level calculation expressing the incomplete orders as a percentage of the total number of orders at various levels of granularity.

- Information is collected by: warehouse/depot teams at CMS and the county depot levels. Ideally, the data should be available from the IT system dealing with order capture, dispatch document production, and proof of delivery (POD) processing. However, a clerical resource may be needed to analyze the delivery documents and pick notes to produce the top-level calculations.
- Performance measurement information is reported to CMS, County Depot Managers, SCMU staff, clinical managers, and Program Unit staff.
- Frequency of reporting: quarterly within two weeks of the completion of a distribution cycle.
- Reporting mechanism: electronic summaries in presentation format.
**KPI 19.3: On-time and in-full (OTIF) percentage in a quarter**

The overall performance of a supply chain operation can be measured by combining the results of the timeliness and completeness performance measures, on-time and in-full, OTIF. Again, this can be done at the various levels of granularity calculated for the individual performance measures. Ideally, the operation should achieve high percentage scores in each area of service, timeliness and completeness. The measure is simply the multiplication of the two figures expressed as a single percentage.

- Information is collected by: members of the warehouse administrative team at CMS and the county depot levels. Little effort is required to obtain the percentage required as the two figures required have been calculated previously
- Performance measurement information is reported to CMS, County Depot Managers, SCMU staff, clinical managers, and Program Unit staff
- Frequency of reporting: quarterly within two weeks of the completion of a distribution cycle
- Reporting mechanism: electronic summaries in a presentation format as the final slide

**KPI 19.4: See KPI 12.1**

**KPI 19.5: Total number of customer complaints received in a quarter analyzed by operational area (e.g., lateness, completeness, and product condition)**

Top-level figures may mask individual aspects of poor performance, in particular geographic areas or operational elements, such as documentation accuracy. Thus, setting up a complaints procedure to obtain a further measure of customer service and operational quality will provide supply chain management with additional information to guide remedial actions. Complaints are captured via a survey or an email-based reporting mechanism under several different operational areas such as delivery timeliness, order completeness, documentation accuracy, documentation clarity, product condition, delivery driver attitude, vehicle suitability, and communications.

The different types of complaints can be collated to produce a complaint count, for each type and a summary presentation, again nationally or at various levels of granularity

- Information is collected by: a member of SCMU with the responsibility for performance monitoring
- Performance measurement information is reported to senior MOH staff, CMS and County Depot Managers, SCMU staff, clinical managers, and Program Unit staff
- Frequency of reporting: every six months with the annual presentations providing trend insights
- Reporting mechanism: electronic summaries in presentation format

**Strategic goal 20:** Establish a process for reverse logistics to increase the efficiency of storage capacity at county depots and health facilities.

**KPI 20.1: Percentage of outbound vehicles involved in reverse logistics activities**

Reverse logistics is the supply chain management technique that makes effective use of the logistics capacity of distribution vehicles, returning to base, that would otherwise go unused. The current system for collecting expired stock and equipment, no longer required at the county level, is unstructured and can only be regarded as irregular. This situation results in valuable storage space, at the lower levels of the supply chain, being unavailable for the storage of current products. To judge the effectiveness of a more formal
and structured reverse logistics activity focusing on expired products, the performance measure calculates, the number of vehicles returning goods as a percentage of the total vehicles involved

- Information is collected by: transport planning teams at the CMS and county depot levels. Ideally, the data should be available from the IT system dealing with order capture, dispatch document production and proof of delivery (POD) processing. However, a clerical resource may be needed to analyze the delivery document to produce the top-level calculations
- Performance measurement information is reported to CMS and County Depot Managers and SCMU staff
- Frequency of reporting: monthly (possibly, quarterly once the current levels of expired stock have been dealt with by the policy)
- Reporting mechanism: electronic summaries in presentation format

**KPI 20.2: Percentage of planned collections executed on schedule**

Operational issues may from time to time result in vehicles not being able to collect as planned or on schedule. Rarely, the planned collection may need to be abandoned due to inclement weather conditions or vehicle breakdown. The extent to which this occurs will determine how plans and schedules are made and executed. Again, another simple percentage is collections executed on a schedule expressed as a percentage of the total planned collections.

- Information is collected by: transport planning teams at the CMS and county depot levels. Ideally, the data should be available from the IT system dealing with order capture, dispatch document production, and proof of delivery (POD) processing. However, a clerical resource may be needed to analyze the delivery document to produce the top-level calculations
- Performance measurement information is reported to CMS and County Depot Managers, and SCMU staff
- Frequency of reporting: monthly (possibly, quarterly once the current levels of expired stock have been dealt with by the policy)
- Reporting mechanism: electronic summaries in presentation format

**Strategic goal 21:** Improve contract management skills to effectively manage outsourced contracts and obtain the desired levels of service performance and cost-effectiveness.

**KPI 21.1: Percentage of the MOH management team that has completed both formal contract management courses and received coaching about the management of outsourced supply chain contracts**

It is recognized that the introduction of significant levels of outsourcing, be they 3PL, LLP or 4PL, requires radically different skills from those previously needed by operational supply chain managers. Making available formal training courses from, for example, Africa Resource Centre and on-the-job coaching from experienced contract managers will close the skills gap that has arisen as a result of the change in strategy. The KPI is the result of expressing the number of managers that have obtained both types of training as a percentage of the total number of managers involved in managing outsourced supply chain contracts.

- Information is collected by: the HR function by analyzing the training records of the managers involved in managing outsourced contracts
• Performance measurement information is reported to senior MOH managers responsible for the personal development of the supply chain managers
• Frequency of reporting: every six months (possibly, annually once the initial strategy changes have been introduced and reached a mature state of operation)
• Reporting mechanism: electronic summaries in presentation format

5.5. WASTE MANAGEMENT

**Strategic goal 22:** Develop a healthcare waste management system with corresponding policies, procedures, practices, and guidelines.

**KPI 22.1: Percentage of storage space occupied by expired stock**

Until several protocols have been developed relating to the wider aspects of clinical and bio-hazardous waste, waste management activities will be focused on the collection and disposal of expired products. While plans are being developed for the redistribution of items nearing expiry and inventory management enhancements aimed at reducing the levels are introduced, reducing the level of expired stock in the distribution network will ease the pressure currently being experienced at all storage facilities. The calculation is a simple figure expressing the number of pallet/storage bin locations occupied by expired products as a percentage of the total number of locations.

• Information is collected by: CMS Manager and CHTs before being collated by a nominated SCMU representative. At larger locations, the figures will be available from the WMS. Smaller locations may need to rely on an analysis of the bin cards.
• Performance measurement information is reported to senior MOH staff, the transport planning team coordinating the reverse logistics activities, procurement staff, and Program Unit personnel
• Frequency of reporting: quarterly
• Reporting mechanism: electronic distribution of the collated information; a range of analyses could be undertaken based on the type of storage facility or the type of product, Program Unit or MOH procured

5.6. EMERGENCIES

**Strategic goal 23:** Create emergency stock holdings and enhance emergency planning processes to maintain adequate supplies of emergency health commodities.

**KPI 23.1: Percentage of recommended stockpiled items held in the emergency store**

The specialists in emergency medicine and disaster response have specified both the products and the amount of each of those products, that should be stockpiled for use in the event of a medical emergency or disaster. The performance measure produced quarterly aims to provide planners with an indication of the extent to which the stockpile plans have been executed. This is particularly important in the case of those items that have an expiry date and need to be replaced, regularly, with fresh supplies while the stock
approaching expiry is consumed via the healthcare distribution network. The calculation is a simple percentage expressing the number of items in stock at the specific emergency store as a percentage of the planned number of stockpiled items. The figure could be enhanced by incorporating the planned and actual stock on hand for each item.

- Information is collected by: the emergency store manager/supervisor from WMS deployed at the emergency location
- Performance measurement information is reported to the overall percentage and a list of those items either not stocked or understocked is circulated to the Emergency Planning Committee
- Frequency of reporting: monthly
- Reporting mechanism: electronic extracts from the Emergency Store WMS

**KPI 23.2: Percentage of storage space utilized in the emergency store**

In addition to understanding the performance issues around the procurement of emergency stockpiles, it is essential to have a view regarding the available space for stockpiling further supplies at the various emergency stores. The information will determine any courses of action needed to store any additional supplies shortly. Essentially, the empty pallet spaces expressed as a percentage of the total pallet spaces, in the store, will provide the information required by supply chain management

- Information is collected by: the emergency store manager/supervisor from WMS deployed at the emergency location
- Performance measurement information is reported to: the Emergency Planning Committee as an overall percentage with the list of those items either not stocked or understocked
- Frequency of reporting: monthly
- Reporting mechanism: electronic excerpts from Emergency Store WMS
### ANNEX 1. IMPLEMENTATION COSTS (USD)

<table>
<thead>
<tr>
<th>Summary By Objectives</th>
<th>Strategic Objectives</th>
<th>2023</th>
<th>2024</th>
<th>2025</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic Objective 1</td>
<td>Strengthen and harmonize the national and sub-national forecasting and quantification of health products by ensuring decisions are informed by high-quality data to support the procurement of health commodities in a cost-effective manner across the public sector.</td>
<td>156,000.00</td>
<td>-</td>
<td>-</td>
<td>156,000.00</td>
</tr>
<tr>
<td>Strategic Objective 2</td>
<td>Ensure that the health products, commodities and supplies selected are in line with the priorities and needs of the population and security.</td>
<td>13,500.00</td>
<td>-</td>
<td>-</td>
<td>13,500.00</td>
</tr>
<tr>
<td>Strategic Objective 3</td>
<td>Strengthen and streamline in-country procurement mechanisms for health commodities with the use of digital technologies.</td>
<td>604,650.00</td>
<td>-</td>
<td>-</td>
<td>604,650.00</td>
</tr>
<tr>
<td>Strategic Objective 4</td>
<td>Seek to establish importation and customs clearance laws and guidelines and enforce regulatory oversight of health commodities entry into the country.</td>
<td>12,500.00</td>
<td>-</td>
<td>-</td>
<td>12,500.00</td>
</tr>
<tr>
<td>Strategic Objective 5</td>
<td>Introduce proactive communication and coordination of public sector healthcare supply chain stakeholders.</td>
<td>123,750.00</td>
<td>-</td>
<td>-</td>
<td>123,750.00</td>
</tr>
<tr>
<td>Strategic Objective 6</td>
<td>Develop CMS as an in-country distribution centre of excellence embracing the flow of commodities from port of entry to point of use to improve operational and cost efficiency.</td>
<td>116,450.00</td>
<td>-</td>
<td>-</td>
<td>116,450.00</td>
</tr>
<tr>
<td>Strategic Objective 7</td>
<td>Ensure program units have sufficient, reliable and easily accessible data to inform decision-making and there are established mechanisms of communication with DPS-SCM.</td>
<td>201,130.00</td>
<td>-</td>
<td>-</td>
<td>201,130.00</td>
</tr>
<tr>
<td>Strategic Objective 8</td>
<td>Reduce the administrative and supply chain management burden of CHTs by ensuring that health commodities are delivered on-time and in-fullDPS-SCM.</td>
<td>170,000.00</td>
<td>-</td>
<td>-</td>
<td>170,000.00</td>
</tr>
<tr>
<td>Strategic Objective 9</td>
<td>Strengthen the supervision of health facilities to improve the availability of high-quality data for decision-making, quantification and capacity development.</td>
<td>11,670.00</td>
<td>194,250.00</td>
<td>-</td>
<td>205,920.00</td>
</tr>
<tr>
<td>Strategic Objective 10</td>
<td>Create MIS that are interoperable with one another to facilitate access to reliable data.</td>
<td>111,000.00</td>
<td>-</td>
<td>-</td>
<td>111,000.00</td>
</tr>
<tr>
<td>Strategic Objective 11</td>
<td>Reconfigure mSupply to improve system performance, provide more accurate stock-on-hand quantities and produce reports with accurate information.</td>
<td>210,000.00</td>
<td>-</td>
<td>-</td>
<td>210,000.00</td>
</tr>
<tr>
<td>Strategic Objective 12</td>
<td>Strengthen LIMS for routine data collection and reporting to produce high-quality data that can be used to inform decision making and support performance monitoring, traceability, visibility and accountability.</td>
<td>28,750.00</td>
<td>5,000,000.00</td>
<td>-</td>
<td>5,028,750.00</td>
</tr>
<tr>
<td>Strategic Objective 13</td>
<td>Centralized data from all available information systems and make it easily accessible for decision-making purposes.</td>
<td>300,000.00</td>
<td>-</td>
<td>-</td>
<td>300,000.00</td>
</tr>
<tr>
<td>Strategic Objective 14</td>
<td>Utilize global best practices and new technologies to aid in creating a central repository of data.</td>
<td>83,000.00</td>
<td>-</td>
<td>-</td>
<td>83,000.00</td>
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<tr>
<td>Strategic Objective 15</td>
<td>Effectively utilize CMS warehouse management system to enhance the warehouse efficiency and accuracy, particularly in the areas of inventory management and security.</td>
<td>100,077.50</td>
<td>-</td>
<td>-</td>
<td>100,077.50</td>
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<tr>
<td>Strategic Objective 16</td>
<td>Strengthen both county and health facility storage and infrastructure to support more efficient handling and inventory control practices.</td>
<td>31,770.00</td>
<td>-</td>
<td>-</td>
<td>31,770.00</td>
</tr>
<tr>
<td>Strategic Objective 17</td>
<td>Enhance infrastructure to maintain the cold chain at all levels within the supply chain and strengthen policies, procedures and protocols to reflect global best practices.</td>
<td>50,255.00</td>
<td>-</td>
<td>-</td>
<td>50,255.00</td>
</tr>
<tr>
<td>Strategic Objective 18</td>
<td>Efficiently manage warehouse practices at CMS to create a center of excellence and expand services to deliver commodities more reliably to the last mile without delays or gaps in service.</td>
<td>101,040.00</td>
<td>7,116,899.00</td>
<td>-</td>
<td>7,217,939.00</td>
</tr>
<tr>
<td>Strategic Objective 19</td>
<td>Bolster contract management skills to effectively manage outsourced contracts to obtain the desired levels of service performance and costs.</td>
<td>-</td>
<td>30,998.00</td>
<td>-</td>
<td>30,998.00</td>
</tr>
<tr>
<td>Strategic Objective 20</td>
<td>Develop a system for healthcare waste management with corresponding policies, procedures, practices and guidelines.</td>
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<td>Establish a process for reverse logistics to increase the efficiency of storage capacity at county depots and health facilities.</td>
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<td>Create emergency stock holdings and enhance emergency planning processes to maintain adequate supplies of emergency health commodities and supplies.</td>
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<td>Fortify quality assurance practices to monitor healthcare commodities entering the public sector supply chain.</td>
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## ANNEX 2. SCMP 2023-2028 DEVELOPMENT PARTICIPANTS

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<tr>
<td>1</td>
<td>Alice D.F. Cyrus</td>
<td>MoH National Diagnostic Unit (NDU)</td>
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<td>2</td>
<td>Dr Ezekiel F. Hallie</td>
<td>School of Pharmacy</td>
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<tr>
<td>3</td>
<td>Dr Abdul Salam</td>
<td>Project Lead / Chemonics-Akesis</td>
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<tr>
<td>4</td>
<td>Dr Alexander P. Tokpa</td>
<td>CHO-Sinoe</td>
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<tr>
<td>5</td>
<td>Dr Birhanu Getahun</td>
<td>jhpiego</td>
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<tr>
<td>6</td>
<td>Dr Cecelia C. Chenneyon</td>
<td>CHO-G. Cape Mt</td>
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<td>7</td>
<td>Dr Diwe Ekwere madu</td>
<td>CRS Country Director</td>
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<tr>
<td>8</td>
<td>Dr Garfee Williams</td>
<td>Arcelor Mittal, Nimba County</td>
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<td>9</td>
<td>Dr Innocent Ibeg Bunam</td>
<td>Country Director / Chemonics/GHSC-PSM</td>
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<td>Dr J. Woyee S. Wreh</td>
<td>CHO-G. Kru</td>
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<td>11</td>
<td>Dr John S. Doedeh</td>
<td>CHO-Lofa</td>
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<td>Dr Joseph N. Topor</td>
<td>CHO-Rivercess</td>
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<td>13</td>
<td>Dr Loraine Cooper</td>
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<td>Dr Samson Arzaquai</td>
<td>Supply Chain Advisor-CHAI</td>
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<td>18</td>
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<td>21</td>
<td>Dr Trokon Washington</td>
<td>Malaria Control Program Manager</td>
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<td>22</td>
<td>Dr Wilhelmina Jallah</td>
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<tr>
<td>23</td>
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<td>Dr Charles Ocan</td>
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<td>26</td>
<td>Dr Daniel Lohmann</td>
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<td>Dr Gorbie G. Logan</td>
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<td>Dr Lyndon Mabande</td>
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<td>MoH Assistant Minister for Vital Statistics</td>
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<td>MoH Deputy Minister for Administration</td>
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