Ministry of Health and Population

MALAWI NATIONAL SUPPLY CHAIN TRANSFORMATION PLAN

(MNSCTP 2023-2030)

Version 2

Health Products Management Strategy

Table of Contents

LIST OF ACRONYMS AND ABBREVIATIONS

3PL	Third Party Logistics Provider
ABC	Activity Based Cost
ACCPAC	A Complete and Comprehensive Program for Accounting Control
AIDS	Acquired Immune Deficiency Syndrome
BOQ	Bills of Quantities
CHAM	Christian Health Association of Malawi
CMED	Central Monitoring and Evaluation Division
CML	Cargo Management Logistics
CMST	Central Medical Stores Trust
CWMM	Care Waste Management Manual
DEHO	District Environmental Officer
DHA-MIS	Department of HIV and AIDS Management Information System
DHIS	District Health Information System
DHO	District Health Office
DTC	District Technical Committee
DTC	District Therapeutic Committee
EMR	Electronic Medical Record
ERP	Enterprise Resource Planning
FCSIS	Facilities Supply Chain Information System
FDA	Food and Drug Administration
FEFO	First-Expired First Out
FSCIS	Facilities' Supply Chain Information System
GAVI	Global Alliance for Vaccines and Immunization
GF	Global Fund
GFFA	Global Fund to Fight AIDS
GHSC-PSM	Global Health Supply Chain Program-Procurement and Supply Management
GL	General Ledger

GoM	Government of Malawi
GPI	Generic Product Identification
GPP	Good Procurement Practice
GPS	Global Positioning System
GSI (codes)	Generic System Image
GTIN	Global Trade Identification number
GWP	Good Storage and Warehousing Practices
HAS	Health Surveillance Assistant / Agent
HIMS	Health Information Management System
HIV	Human Immune Virus
HR	Human Resources
HR4SCM	Human Resources for Supply Chain Management
HSSP	Health Sector Strategic Plan
HTSS	Health Technical Support Services
IFSCIS	Integrated National Supply Chain Information System
INSCIS	Integrated National Supply Chain Information System
IPC	Internal Procurement Committee
ISO	International Organization for Standards
IT	Information Technology
Kg	Kilograms
KPIs	Key Performance Indicators
LMIS	Logistics Management Information System
MEML	Malawi Essential Medicines List
MHL	Must Have List
MHPR	Master Health Product Registry
MNDP	Malawi National Drugs Program
MNSCTP	Malawi National Supply Chain Transformation Plan
MOFEPD	Ministry of Finance, Economic Planning and Development
MoH	Ministry of Health
MoU	Memorandum of Understanding

MPSR	Malawi Public Service Regulatory Regulations
MSH	Management Sciences for Health
MWK	Malawi Kwacha
NMP	National Medicines Policy
NSCA	National Supply Chain Assessment
NSCIS	National Supply Chain Information System
ODPP	Office of the Director of Public Procurement
PMRA	Pharmacy and Medicines Regulatory Authority
POS	Point of Service
PPDA	Public Procurement and Disposal of Assets Act
PPDA	Public Procurement and Disposal of Assets Authority
PPM	Pooled Procurement Mechanism
PtD	People that Deliver
PU	Procurement Unit
QA	Quality Assurance
QC	Quality Control
RFID	Radio Frequency Identification
RFQs	Request for Quotations
RMS	Regional Medical Stores
SCI	Supply Chain Integration
SCSA	Supply Chain System Architecture
SKU	Stock Keeping Unit
SMEs	Subject Matter Experts
SMS	Stock Management System
SOPs	Standard Operating Procedures
SOW	Scope of Work
STG	Standard Treatment Guidelines
TB	Tuberculosis
TORs	Terms of Reference
UNFPA	United Nations Population Fund

UNICEF	United Nations International Children' and Education Fund
US$	American Dollar
USAID	United States Agency for International Development
WHO	World Health Organization
WMS	Warehouse Management System

ACKNOWLEDGEMENTS

The Ministry of Health (MOH) sincerely thanks all those who participated in the revision of the Malawi National Supply Chain Transformation Plan (MNSCTP) 2023-2030 lead by the Directorate of Health Technical Support Services (HTSS) in the Ministry.

Recognition is made of various stakeholders from Ministry of Health departments, disease programs and parastatals including program managers, medical officers, logistics professionals, pharmacists, laboratory personnel, representatives of the national public health community, Central Medical Stores Trust (CMST) and Pharmacy and Medicines Regulatory Authority (PMRA) who provided the required insights, data, and technical inputs to develop a plan that is technically sound and contextually feasible.

In addition, the Ministry would like to extend its gratitude to development partners that provide technical and financial assistance to strengthen the national supply chain management system in a sustainable manner. Of particular mention are USAID through the Global Health Supply Chain Procurement and Supply Management (GHSC-PSM) Program, the Global Fund to Fight AIDS, Tuberculosis and Malaria (GF), United Nations Development Program (UNDP), United Nations Children's Fund (UNICEF), World Food Program (WFP), Medicines San Frontiers (MSF), and United Nations Population Fund (UNFPA) who have been instrumental in the revision of this plan.

Continued and increased level of support is anticipated for the full implementation of the MNSCTP to contribute to the attainment of Universal Health Coverage (UHC), Agenda 2063 and all health-related SDGs.

ZIKOMO KWAMBIRI

Note: Soft Copy of This Document Can Be Downloaded on the Malawi Ministry of Health Website:

https://www.health.gov.mw

1. INTRODUCTION

This document is the revised Malawi National Supply Chain Transformation Plan (MNSCTP 2023-2030) for the Ministry of Health (MoH), a comprehensive eight-year supply chain roadmap and management plan that will engage all relevant national supply chain stakeholders and inform all national health strategies to yield a country-led, patient-centered, integrated health commodity supply chain.

2. BACKGROUND

Malawi has achieved notable improvements in health services delivery in recent years, most notably for women and children. For instance, there has been a significant increase in life expectancy from 55.6 years to 64.7 years between 2010 and 2020 which can be attributed to declines in Maternity Mortality Rate (MMR), under-five mortality rate (U5MR) and neonatal mortality rate (NMR). In addition, the HSSP II HIV incidence target of 2 cases per 1,000 adult population aged 15-49 years was surpassed and was at 1.21 in 2020. Progress towards global and national goals is the result of the collective efforts of health actors to expand access to health care services including quality pharmaceutical services.

As of December 2022, Malawi had surpassed the 2030 UNAIDS fast track 95-95-95 targets, with 98% of people living with HIV knowing their status, of which 99% who know their status had access to antiretroviral therapy treatment, and 95% on treatment were virally suppressed. TB treatment success rate was at 86% (above the WHO target of 85%) by 2020 and mortality due to malaria had decreased to 8.4 deaths per 100,000 population surpassing the target of 12 deaths per 100,000 by 2022.

Despite these gains, the country still faces challenges that require addressing such as new HIV infections and AIDS-related deaths, unmet family planning requirements; and malaria which remains highly endemic. Furthermore, unexpected epidemics and endemics such as Covid-19 and the recent cholera outbreak in 2022 - 2023 have had significant impact on the health care system, particularly the supply chain, where the country has been ill-prepared and has relied on ad-hock parallel supply chains created in response to the emergency because the routine system was unable to meet demand in health facilities in Malawi. It has been demonstrated that a robust supply chain system is at the heart of effective emergency response.

Supply chain management performance in the donor funded supply chains of the disease programs of HIV/AIDS, Malaria and Tuberculosis has been good with tracer medicine facility availability rate of 97%, 99% and 95% respectively. However, the country continues to experience chronic stock outs for health products procured through the central procurement agency.

As Malawi's population continues to grow rapidly, these issues will intensify if not addressed. The national health and supply chain system is constrained by workforce

capacity gaps, limited governance capability, fragmented information systems, and inadequate financing.

There are many inefficiencies in the management of public health sector resources and the Malawi Government has undertaken various health sector reforms which aim to improve the efficiency of the public health sector by focusing on addressing the key drivers of inefficiencies at all levels of the health system. The Malawi Government developed its long-term development vision in 2020 called "Malawi 2063" with three development pillars, each with several enablers. Enabler number 5 is Human Development Capital which includes Health and Nutrition.

The "Malawi 2063" envisions a healthy population with improved life expectancy working towards the socio-economic transformation of Malawi. The goal is to attain universal health coverage with quality, equitable and affordable health care for all Malawians. In pursuit of this, the Ministry of Health has developed the Health Sector Strategic Plan III to guide implementation of a comprehensive health care system. Supply Chain is a pillar in the HSSP III under Medical Products and Technology to encourage reforms that aim to identify and address inefficiencies at the procurement, warehousing, distribution, and utilization stages of the supply chain system of medicines and other medical products.

Policies, Reports and Strategies Consulted

- The Constitution of Malawi (1994)
- Malawi 2063 Vision (2020)
- Health Sector Strategic Plan III 2023-2030
- Health Sector Strategic Plan II 2017-2022
- Sustainable Development Goals 2015 - 2030
- National Medicines Policy 2015
- Pharmacy and Medicines Regulations Act 2019
- National Health Policy 2018
- Public Finance Management Act 2022
- Public Audit Act 2003
- Public Procurement and Disposal of Assets Act and Associated Regulations 2017
- CMST Business Plan 2015-2020
- National Quantification Report 2022
- Malawi Health Supply Chain Integration Review

The MNSCTP is owned and implemented by the Ministry of Health, Health Technical Support Services (HTSS) along with its partners and relevant stakeholders namely, the

Central Medical Stores Trust (CMST), the Central Monitoring and Evaluation Division (CMED), the Pharmacy and Medicines Regulatory Authority (PMRA), Department of Planning and Program Units, development partners (donors) and implementing organizations. The MNSCTP is aligned with key national policies, reports, and strategies including most critically, the Malawi Vision 2063, National Medicines Policy 2015, HSSP III 2023-2030 and the Pharmacy and Medicines Regulations Act 2019.

In implementing the MNSCTP, all activities shall be subjected to quality assurance (QA) systems to ensure that they meet local regulatory and international quality standards and that all pharmaceutical products are safe, effective, and assured quality and maintained up to the end user level. The QA processes will permit appropriate monitoring and evaluation of all the activities of the strategy as part of the ongoing continuous improvements process.

3. MISSION, VISION, AND OVERALL OBJECTIVES

The MNSCTP 2023-2030 will serve to align all stakeholders around the goals, objectives and activities necessary to achieve supply chain integration and to secure the necessary financial support from the Government of Malawi (GOM) and development partners to provide high quality medical products to Malawians in an efficient and effective manner and to strengthen the operations and sustainability of the sector. Implementation of the plan will contribute to the realization of the Ministry of Health mission and vision for the pharmaceutical sector as also reflected in the accompanying sections of the Health Product Management Strategy.

3.1 Vision

A constant and uninterrupted supply of high quality vital and essential health commodities for the end users of all public health facilities in Malawi.

3.2 Mission

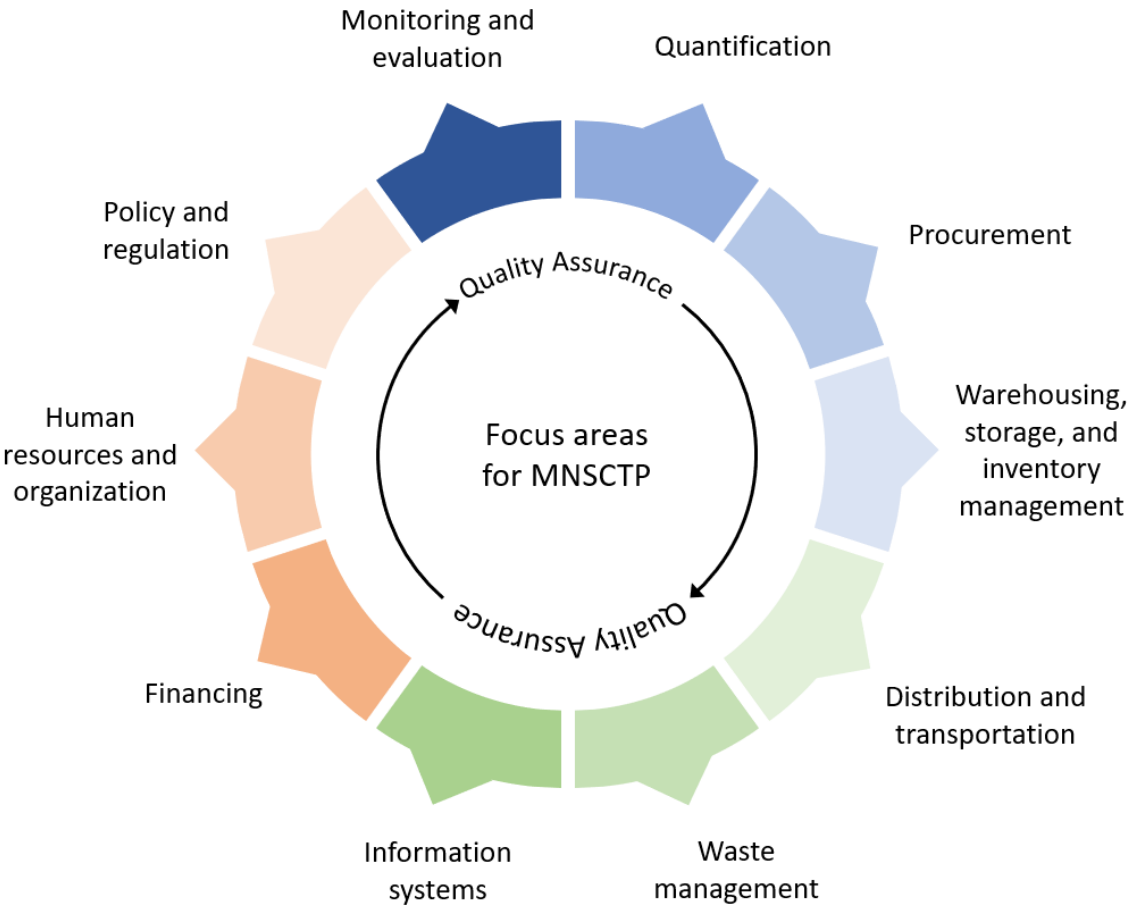
To contribute to improved health of Malawians through equitable access and rational use of good quality, safe, efficacious medicines, and supplies at affordable cost.

3.3 Overall Objective

The purpose of this document is to align all stakeholders around the key goals, objectives, and activities necessary to achieve supply chain integration and to secure the necessary financial support from the GOM and donors to achieve a full country-led, patient centered integrated supply chain. Nine focus areas were decided for the MNSCTP (see Exhibit A) to provide a focused and in-depth strategy for the critical functioning of a national public health supply chain. In addition to the established focus areas, the revised MNSCTP includes a tenth focus area; that of Monitoring and Evaluation.

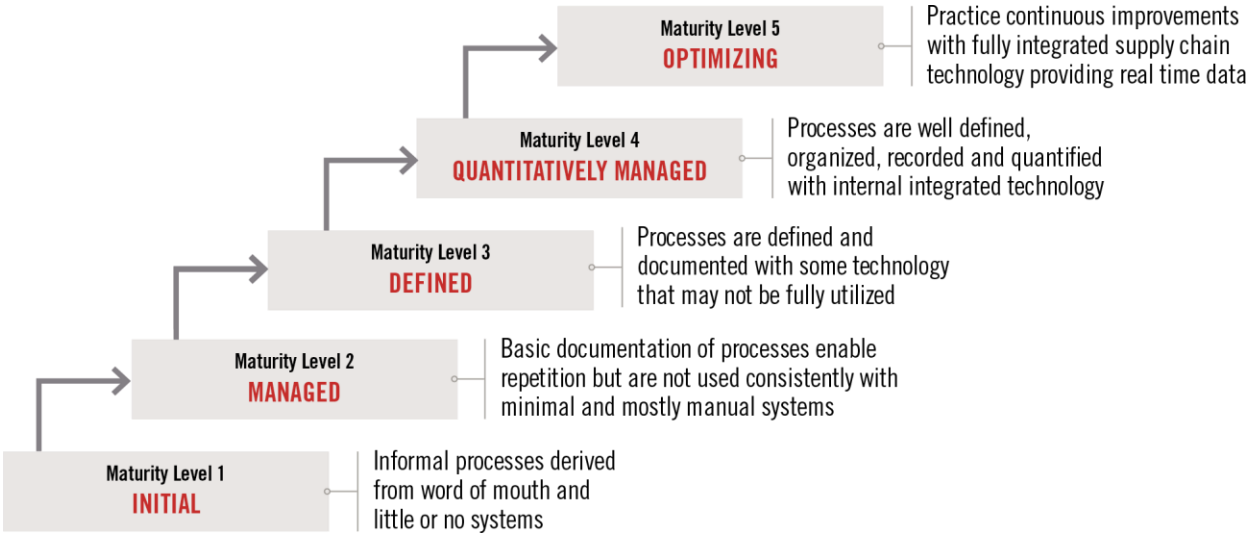
4. MATURITY MODELING

Exhibit A. MNSCTP Focus on ten components that are earmarked for improvement and include Monitoring and Evaluation (M&E) shown in the chart below:



To establish appropriate baselines by which to understand the status quo of the supply chain and to subsequently develop goals, objectives and activities that are well-informed and contextually relevant, a maturity model assessment was conducted within the public sector at both the central level and the sub-national level (districts and health facilities) by a representative group of stakeholders at the Health Product Management Strategy Workshop in Blantyre, Malawi in January 2020. The schema of maturity levels (see Exhibit B) captures the status of processes for each supply chain function and provides a trajectory to higher levels of maturity.

Exhibit B. Maturity Model Levels



The maturity model assessment set the basis for the upstream and downstream supply chain strategies captured through the goals outlined within this MNSCTP 2023-2030). The proceeding volume includes a detailed discussion of the challenges and root causes driving the maturity level of the processes within each of the focus areas and offer objectives and activities aimed to elevate processes from their current level of maturity up to a maturity level 4 or above.

To assess maturity of the Central Medical Stores Trust (CMST), seventy-seven supply chain elements covering processes within each of the nine focus areas were analyzed (see Annex II for detailed inputs). The modeling exercise revealed areas that CMST needs to improve to reach an organizational maturity of at least level 4. Per the assessment (see Exhibit C), half of CMST processes is either undefined (level 1) or documented but manual and not consistently implemented across the organization (level 2). The other half have reached level 3 with structured processes supported by some level of automation. One field (policy and regulatory) is reaching level 4.

Exhibit C. 2020 Maturity Assessment Results: CMST

	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4	Maturity Level 5
Quantification	0	0	1	0	0
Procurement and Planning	0	0	1	0	0
Warehousing	0	13	16	0	0
Distribution and Transportation	0	2	1	0	0
Waste Management	1	0	0	0	0
Information Systems	1	1	2	0	0

	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4	Maturity Level 5
Financing	0	0	1	0	0
Policy and Regulatory	1	6	6	1	0
Human Resources	0	3	1	0	0
% Of Total Fields (55) at Level	5%	45%	49%	2%	0%

Exhibit D. 2020 Maturity Assessment Results: District Health Offices and Health Facilities

	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4	Maturity Level 5
Quantification	2	1	0	0	0
Procurement and Planning	1	0	1	0	0
Warehousing and Inventory Management	13	16	2	0	0
Distribution and Transportation	1	4	0	0	0
Waste Management	2	0	0	0	0
Information Systems	2	1	2	0	0
Financing	N/A	N/A	N/A	N/A	N/A
Human Resources	2	0	3	0	0
Policy and Regulatory	6	11	1	0	0
% Of Total Fields (70) at Level	41%	47%	13%	0%	0%

5. STRATEGIC COMPONENTS SUMMARY

Throughout the MNSCTP 2023-2030 development process, government and partner representatives worked along nine strategic focus areas to establish supply chain improvement priorities. The process included establishing an understanding of the status quo, reaching agreement on current problems and challenges, setting goals and objectives for improvement, reviewing possible interventions, and selecting and refining a series of strategic activities through which to build and operate a supply chain that fully supports the Ministry of Health's objectives for a government-managed, patient-centered national integrated supply chain.

Throughout, reference is made to the "upstream" and "downstream" supply chains. Upstream is in reference to national level entities and operations, with a primary focus on strengthening the CMST operations and establishment of a Logistics Management Unit within the Ministry of Health for improved coordination and integration; while downstream captures supply chain actors and functions at the sub-national level, namely districts, health facilities and wards/communities.

As part of the MNSCTP review process, it was acknowledged that the critical component of monitoring and evaluation was overlooked during the inception of this plan. Therefore, this revised MNSCTP 2023-2030 includes M & E as its 10th component.

The following section provides a detailed strategy in the form of goals, objectives, and proposed activities for each of the ten strategic focus areas and offers key performance indicators (KPIs) to measure progress and achievement of stated objectives. The strategy is accompanied by an actionable cost implementation plan detailing the responsible parties, timeline and costs for each activity presented in the strategy and a volume of annexes which include additional research and reference information.

5.1 Quantification

Effective quantification is critical to achieving uninterrupted supply of health products for the population. Incomplete and inaccurate supply chain data and suboptimal quantification tools results in inaccurate and inefficient national quantification outputs which leads to inaccurate budgeting and supply planning and subsequently stock outs and expiries. To improve accuracy of forecasts and effectiveness of supply plans, the MNSCTP proposes to standardize tools, establish quarterly data review meetings, and introduce regular forecast accuracy tests to assess variance between projections and actuals. Quantification and its subsequent data and reviews include essential medical equipment or devices.

The quantification process of medical devices and equipment will equally be standardized, checked for forecast accuracies, variances between projection, actuals needed, and quantities supplied.

The Ministry of Health, through the Logistics Management Unit (LMU) will conduct periodic data spot checks to strengthen data quality and allow for informed decision making. Central to the transformation is the decentralization of the quantification

responsibilities from central level to district level, which will involve capacity building to allow the districts and central hospitals to take on the role over time.

5.2 Procurement and Planning

Government-led procurement has the capacity to sustainably supply Malawians with essential medicines, medical supplies, and devices; yet processes that govern resources which are allocated to procurement inhibit proper supply of pharmaceuticals and essential medical devices to meet country demand. To establish CMST as a reliable and effective client to their suppliers and provider to health facilities, the MNSCTP proposes to advocate to the Government of Malawi (GOM) to close the funding gap and to update procurement policies and contract management systems.

5.3 Warehousing, Storage, and Inventory Management

The volume of products from all parallel supply chains will be coordinated and monitored through integrated automated software at the Ministry of Health (MoH) through the logistics management unit (LMU). The LMU will be responsible for managing Public Private Partnership interactions with CMST and other parallel supply chain systems and will assign distribution schedules of commodities located at the different warehouses for efficient distribution and availability of commodities.

To accommodate the additional volume, reduce existing high costs of warehousing and boost efficiency of operations both within warehouses and to the last mile, the MNSCTP proposes to introduce a fully functioning Inventory Management System (IMS), harnessing existing CMST property to build a central receiving warehouse and introduce a centralized ordering system that transitions through a cross-docking model at RMS to reach health facilities. The ordering system will reach health facilities enabling direct engagement between suppliers and customers and be supported by an automated inventory management system to effectively manage stocks, with continuous monitoring taking place by the LMU. Consideration should be given to critical issues such as the location of system hosting and how it will be deployed to enforce SCI and Integrated Supply Chain Information System.

5.4 Distribution and Transportation

To adopt a more flexible and customer-oriented distribution model, the MNSCTP proposes to consolidate distribution, introduce more effective third-party logistics provider (3PL) contract management processes, and optimize routes from a centralized warehouse to the last mile. The goal being to reduce the number of drops to each health facility each month, decrease overall costs and increase efficiency of the distribution process both in transit and upon arrival to health facilities.

The “on demand” model and transparent lead time will reduce the need for commodity transfers amongst facilities and improve the system which is currently under-resourced and unstructured through the introduction of standard operating procedures (SOPs). Vehicle tracking through Global Positioning System (GPS) will form a critical part of

tracking and tracing health commodity distribution, which will be monitored centrally at the LMU.

5.5 Waste Management

The MNSCTP 2023-2030 will propel existing national efforts to establish an effective waste management system. This will include the safe storage of unused, expired, or damaged health commodities including devices and equipment. The system will promote accountability and the establishment and implementation of initiate reverse logistics Standard Operating Procedures (SOPs) for an effective waste management system. Activities include dissemination of SOPs, provision of recommendations based on internationally recognized best practices in design of a comprehensive reverse logistics system, procurement of adequate equipment, and empowerment of all actors along the supply chain to adequately manage waste in an environmentally safe manner.

Consideration should be given to the impacts of Electronic Waste and the purchase of generic digital equipment should be discussed. One example to consider is buying health and environmentally friendly equipment that provides flexibility of staff to manage time and deliver results.

5.6 Information Systems

Improvements have been made to electronic management information systems across the supply chain, however, there is a need to strengthen use of information systems at the last mile to enable automated data exchange for true end-to-end data visibility and real-time data for decision making. To provide a network of information systems which support an integrated supply chain, the MNSCTP has proposed introduction of an Integrated National Supply Chain Information System (INSCIS) envisioned to comprise two core components:

a. the National Supply Chain Information System (NSCIS) to conduct supply chain operations in a regulated and controlled manner from warehouse management/ to the delivery of commodities to health facilities;
b. the Facilities' Supply Chain Information System (FSCIS) to monitor stock and record dispensing of drugs at the health facility level and below. The Digital Supply Chain Strategy and Systems Architecture, developed in 2022, will be taken as a guiding document for implementation of the integration processes.

5.7 Financing

The national supply chain must be well-resourced to serve the population adequately and efficiently. CMST's budgetary shortfalls, due to inadequate capital, have a direct impact at the sub-national level as health facility budgets cannot cover their clientele's demand.

Further capitalization of CMST will halt the vicious cycle that drives up costs and compromises the ability to provide affordable, efficient service to central hospitals, district hospitals and health facilities. Ten percent (10%) of the district drug budget and 40% of the national central hospital drug budget is currently decentralized with an intent to increase this allocation, driven by persistent stock stock-outs at CMST. Further

decentralization of budget management will also enable health facilities to be more effective stewards of funds in their respective drug budgets.

5.8 Human Resources

A national supply chain is only as functional as the people by which it is managed. To achieve true supply chain integration and transformation, it is vital that Malawi retain an adequate, skilled, and motivated workforce for health commodity management at all levels, from CMST to communities. Determination of vacancy profiles and action plans to fill positions, scale up of training and establishment of mentorship programs and consolidation of a national supply chain team within the Ministry of Health will support realization of the workforce needed to implement this MNSCTP. Furthermore, the MNSCTP recommend revision of functional review at central and facility level

5.9 Policy and Regulatory

Several objectives put forth throughout this MNSCTP have policy implications and will require engagement with policy-making institutions to be realized. Due to the intersection with policy setting, securing political will for capitalization of the CMST, procurement reform, further decentralization of responsibility to health facilities and changes in human resource hiring and dismissal policies will require significant policy support. The MNSCTP will leverage the Pharmacy and Medicines Regulatory Authority (PMRA) Act 2019 which compliments the Malawi Public Service Regulations (MPSR) for health care workers.

5.10 Monitoring and Evaluation

To assess whether the MNSCTP activities have been successfully completed and reach the intended objectives, KPIs have been defined within the strategy for each of the nine strategic focus areas and for each objective presented and embedded in the implementation plan. The defined KPIs are a combination of qualitative and quantitative indicators according to the most appropriate metric and availability of data and include both custom indicators and indicators put forth by the National Supply Chain Assessment 2.0 Toolkit.

Completion of defined activities and achievement of objective-level KPIs set forth will be measured by the metrics listed and assessed according to the relevant surveillance method as outlined in Exhibit E. Monitoring and evaluation of the MNSCTP will be carried out at all levels of implementation: central, district and health facility and clear roles and responsibilities on the collection, collation, analyses, and dissemination of reports will be defined upon implementation of the plan.

Exhibit E. Monitoring and Evaluation Surveillance Methods

Random sampling	Designed to evaluate outputs by randomly selecting and inspecting a statistically significant sample.
Periodic inspection	Scheduled or unscheduled inspection of predetermined selected outputs.

100% inspection	Scheduled or unscheduled inspection of all outputs (most applicable to small, but important services; written deliverables or tasks).
Customer feedback	Survey conducted to solicit staff/client/user satisfaction. May combine elements of validated user complaints and random sampling.
Third-party audits	Evaluation by a third-party organization.
Progress or status meetings	Regular internal and external meetings to review the status of outputs.
Analysis of reports	Review reports for completion, technical merit, and timeliness, among other factors.

5.11 Implementation Plan

The strategy for each focus area is accompanied by an implementation plan which outlines each objective, respective activities, and the recommended timeline across the six-year period of performance on the MNSCTP by quarter. A more detailed implementation plan which includes all focus areas with projected costs for each objective and/or activity is in Annex I. The approximate cost of implementation of the proposed activities is **$68,669,613** from 2023 to the end of 2030 (see Exhibit F).

Exhibit F. MNSCTP Implementation Cost Summary

YEAR	COST
2023	$3,876,240
2024	$20,013,258
2025	$22,345,590
2026	$10,380,950
2027	$4,574,700
2028	$2,961,625
2029	$3,004,625
2030	$1,512,625
TOTAL	**$68,669,613**

6. STRATEGY: GOALS, OBJECTIVES AND PROPOSED ACTIVITIES

6.1 QUANTIFICATION

The Ministry of Health, in collaboration with other stakeholders, conducts forecasting to establish the national pharmaceutical requirements for all products provided through the public sector. The requirements are then costed out to inform supply planning. An annual quantification exercise, led by Health Technical Support Services (HTSS) and supported by partners, informs the Government of Malawi's (GOM) budgetary allocation for procurement of essential medicines and medical supplies and the quantities of pharmaceuticals (HIV, malaria, family planning, tuberculosis) for donor-supported programs needed to meet the needs of the population for the following three years.

Quantification is conducted annually through a National Quantification workshop, with biannual quantification reviews. Forecasts generated in the workshop are presented in a national quantification report used to secure GOM and donor funding commitments that ensure health commodity supply. Throughout the course of this plan's implementation, the health commodities need to be expanded to include durable and non-durable ones.

Quantification for the public sector is largely done using the consumption-based method. For commodities with limited and inconsistent quality of consumption data, there is validation with demographic statistics, health management information system (HMIS) data and morbidity data and (see Exhibit G). The quantification factors in population growth and national program targets and changes in treatment guidelines. However, disease programs e.g., HIV/TB mainly utilize morbidity-based forecasting methodology.

Exhibit G: Forecasting Methodologies and Data Sources

	Demographic	Morbidity	Service	Logistics	Tools Used
Data Source		Malawi Demographic Health Survey (MDHS)	District Health Information System 2 (DHIS 2)	OpenLMIS	Excel and Access-based
	Population and Housing Census Report	Applied Malawi and International standard treatment	Family Planning Factsheet Booklet	Central Medical Stores Trust Sales Data, Historical	QuanTB,
		Standard Treatment Guidelines (STGs), e.g., MSTG 2023, and protocols	Historical service	Consumption	Quantification Analytics Tool (QAT)
		Expert Opinion	Expert Opinion	Expert Opinion	Quantification Analytics Tool (QA[1]T)

[1] Comprehensive quantification tool

Supply planning for essential medicines and supplies is based on the commodities in the Central Medical Stores Trust "must have list" (MHL) (see Exhibit H, next page) – defined as critical products on the Malawi Essential Medicines List (MEML) and national Standard Treatment Guidelines (STG). Following the quantification of need, supply plans are then produced by assessing the price of each commodity, standard treatment guidelines and national policies, current stock on hand, commodity shelf life, incidence of stock-outs and non-reporting and provider lead time. Tools are used to aggregate and analyze data and to generate the different forecasts, in keeping with the methodologies outlined previously.

Since 2020, the CMST conducts its own quantification for essential medicines, in addition to the Ministry of Health exercise and compares the results of the two quantifications. However, the MNSCTP through the LMU will consolidate these two activities. CMST uses their enterprise resource planning (ERP) sales data for each product over the past 12 to 24-month period, adjusted for stock-out days and considering current stocks on hand and expiry status.

Exhibit H. Stock Status Snapshot

TRUSTED PARTNER IN HEALTH CARE

DIRECTORATE OF PHARMACEUTICAL OPERATIONS

SUMMARY ON 226 LINE STOCK POSITION 7TH DECEMBER, 2022

PARAMETERS			CMST	
CODE	DESCRIPTION	Total in MHL	Available-CMST	% Available-CMST
AA	Tablets And Capsules	53	34	64%
BB	Injectable	41	28	68%
CC	Vaccines	1	1	100%
EE	Galenicals	33	20	61%
FF	Surgical Dressing	9	3	33%
GG	Sutures	9	5	56%
HH	Surgical Equipment	31	19	61%
KK	Dispensing Items	1	1	100%
LL	Hospital Equipment	1	1	100%
MM	Laboratory Items	29	10	34%
NN	X-Ray	12	7	58%
PP	Dental Items	6	2	33%
TOTAL ITEMS		**226**	**131**	**58%**
MEDICINES		**128**	**83**	**65%**
MEDICAL SUPPLIES		**98**	**48**	**49%**

6.2 Maturity Assessment, Challenges and Root Causes

Inaccurate forecasting and quantification followed by poor funding allocation are leading root causes of the low order-fill rate to health facilities. The maturity model assessment conducted in 2019, found that national level quantification was at a level 3 of maturity, yet the processes were not standardized for each commodity category and many manual tools continued to be used. Key challenges included:

6.2.1 *Poor data quality.* Quality of data is compromised due to a lack of standardized data collection processes, errors during data entry at facility level and in some cases exacerbated by supply planning tools that are not comprehensive and require a multi-step process to complete the forecast.

6.2.2 *Inadequate data availability.* Inadequate data availability stems from late data submission, incomplete data collection and data elements required for quantification that are not routinely collected and aggregated.

6.3 Goals, Strategic Objectives and Proposed Activities

The following goal, supported by actionable objectives and appropriate activities, has been defined to address existing challenges and standardize an effective and efficient forecasting process that ensures a supply chain with sufficient pharmaceuticals and health supplies to meet Malawians' demand.

Goal: Accurate determination of the quantities of health commodities required at all levels that anticipates future needs based on Ministry of Health targets and achievements.

Objective 1.1: To improve accuracy of forecasts to less than 20% variance between quantity forecasted and actual quantity consumed for all public sector commodities by 2030. Forecasting informs supply plans and relates to products procured and available to patients. Thus, accuracy is critical to providing sufficient pharmaceuticals and supplies to the population. Increased quality and availability of data and use of standardized, effective forecasting tools will improve both the accuracy and efficiency of forecasts.

KPI 1.1: Forecast Accuracy

Calculation of variance between forecast and actual.

Surveillance Method: Periodic inspection

Improved forecasts will eliminate the need for dual efforts of the Ministry of Health (MOH) and the Central Medical Stores Trust (CMST) and result in a unified quantification exercise, which will save time and money.

Proposed activities include:

a. Standardize forecasting tools: review of existing tools, introduction of the use of internationally recognized forecasting tools where they are not currently used (See Annex IV).

b. Establish quarterly meetings for Quantification Technical Working Groups to enable regular review of forecast assumptions and supply plans against actual consumption; to guide adjustments in forecasts, assess and address data anomalies and serve as data collection and validation exercise for future quantifications.
c. Enable Enterprise resource planning program (ERP) to record instances of short supply at the product level.
d. Introduce standard data cleaning processes for cleaning data from health management information systems (HMIS) and logistics management information systems (LMIS) to improve quality of data inputs for forecasts.
e. Improve the quantification process to include factors of seasonal demand, product hierarchies, slow moving items, causal variables, intermittent demand.
f. Clarify and document formal procedures about roles and responsibilities related to quantification of Ministry of Health-managed commodities.
g. Ensure availability of subject matter experts (SMEs) for each commodity category to participate in the quantification exercise.
h. Conduct forecast accuracy tests annually based on the annual forecast (and subsequent quarterly updates) against consumption data for all product categories.
i. Add all products in the current "Must Have List" to LMIS to enable tracking of commodity consumption and ensure availability of data for the annual quantification exercise. This could include introducing the data capturing of items and quantities discussed at District Technical Committee (DTC) meetings in each district to ensure accurate forecasting.

Objective 1.2: To build capacity of district actors in quantification to enable health offices to manage forecasting and supply planning for their respective district. Under decentralization each district controls its own budget and is intended to undertake quantification: forecasting and supply planning. To enable successful transition of this responsibility and to instill ownership of the process, capacity building will be needed.

KPI 1.2: Forecast Accuracy

Calculation of variance between forecast and actual.

Surveillance Method: Periodic inspection

Proposed activities include:

a. Develop quantification training program for district health offices (DHOs) incorporating skills in excel and data analysis which are useful in quantification.
b. Conduct training for all DHO staff tasked with forecasting and supply planning. Ensure the function of DTCs every month and the requirements are captured in the system that could articulate with the suggested automated inventory system and proposed NSCIS.
c. Quantify all medical equipment and devices and their operating status (functional or not).

6.4 Implementation Plan

To achieve the goals and objectives described above through implementation of activities proposed, a detailed implementation plan complete with estimated timelines and associated costs has been developed to guide stakeholders (see Exhibit I). To view a more detailed plan, complete with estimated costs required to implement the Quantification strategy see Annex I

Exhibit I: Implementation Plan: Quantification

Activities		Timeline																													
		2023				2024				2025				2026				2027				2028				2029				2030			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Objective 1.1: To improve accuracy of forecasts to less than or equal to 20% variance for all public sector commodities by 2030.																															
1	Standardize forecasting tools: review existing tools, introduce use of internationally recognized forecasting tools.																														
2	Establish quarterly meetings for Quantification Technical Working Groups to enable regular review of forecast against actual consumption.																														
3	Enable ERP to record instances of short supply at the product level.																														
4	Introduce standard data cleaning processes for HMIS and LMIS to guarantee quality of data inputs for forecasts.																														
5	Improve quantification process to include consideration of the factors of seasonal demand, product hierarchies, slow moving items, causal variables.																														
6	Clarify and document formal procedures about roles and responsibilities related to quantification of MOH-managed commodities.																														
7	Ensure availability of																														

	SMEs of each commodity category to participate in the quantification exercise.								
8	Conduct forecast accuracy test annually based on the annual forecast against consumption data.								
9	Add all MHL products to OpenLMIS to enable tracking of consumption and ensure availability of data for the annual quantification exercise.								
	BUDGET VALUES TOTAL $ 167,000	$131,000	$36,000						
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY							
	KEY PERFORMANCE INDICATORS	REDUCTION IN THE VARIANCE BETWEEN FORECASTED VOLUMES AND ACTUAL VOLUMES							
Objective 1.2: To build capacity of district actors in quantification to enable health offices to manage forecasting and supply planning for their respective district.									
1	Develop quantification training program for district health offices (DHOs)								
2	Conduct training for all DHO staff tasked with forecasting and supply planning.								
3	Quantify all medical equipment and devices and their operating status								
	BUDGET VALUES TOTAL $ 729,000	$36,000	$99,000	$99,000	$99,000	$99,000	$99,000	$99,000	$99,000
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; CENTRAL MEDICAL STORES TRUST; DONOR COMMUNITY							
	KEY PERFORMANCE INDICATORS	IMPROVEMENT IN DHO SKILLS SETS. CONTINUOUS REVIEW OF PERFORMANCES COMPARING ACTUAL TO FORECASTED VOLUMES							

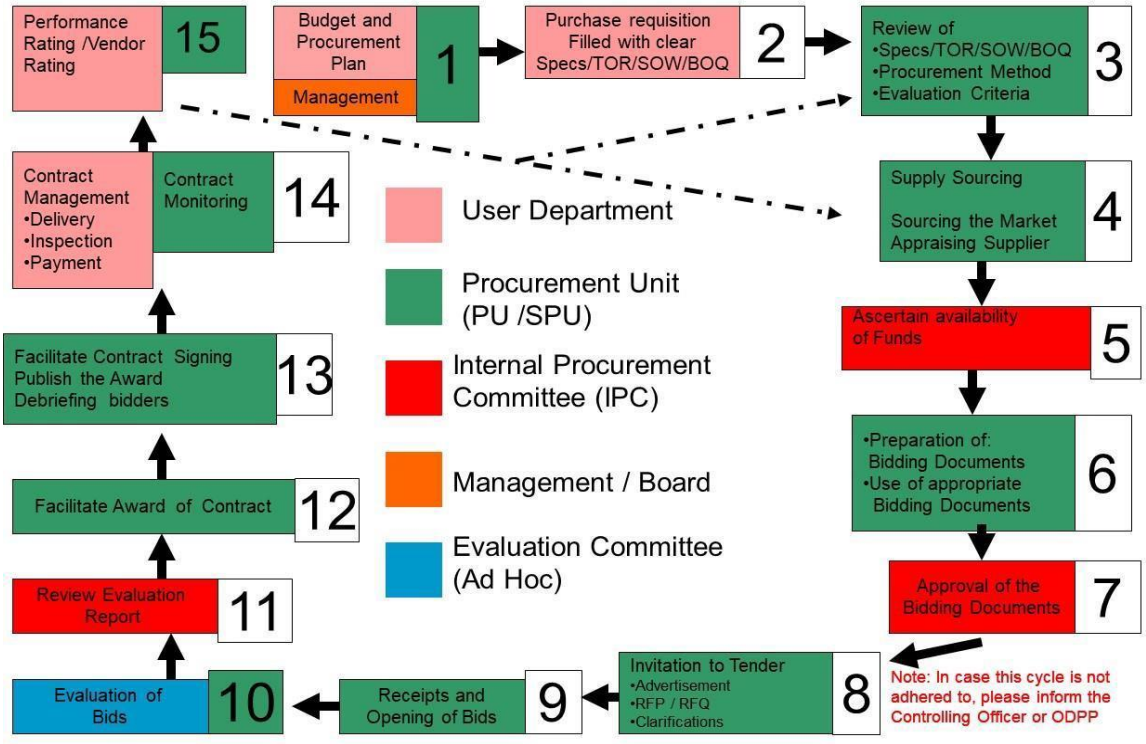
7. PROCUREMENT AND PLANNING

7.1 Overview

Procurement activities are governed by the Malawi 2017 Public Procurement and Disposal of Assets Act. As outlined in the NMP 2015, procurement of essential medicines and all the essential medical devices / machinery as well as their spare parts fall within a particular budget allocation to ensure up and running medical facilities for effective results for the public health sector is managed by the Central Medical Stores Trust (CMST) and is restricted to pharmaceuticals included on the Malawi essential medicines list (MEML) which are registered by the Pharmacy Medicines and Regulatory Authority (PMRA). The primary focus of public sector procurement is on pharmaceuticals and other products included on the "Must Have List" (MHL). A 12-month procurement plan is developed annually based on the forecast received, as described above.

CMST acquires products and supplies through open tendering and requests for quotation (RFQs). Tenders are split into products within categories and are awarded to suppliers on that basis with the required volumes outlined. The process, from start to order execution, typically takes two to six months (see Exhibit J).

Exhibit J. CMST Tender Management Process



All suppliers, international and local, are pre-qualified by the Central Medical Stores Trust (CMST) Procurement department. Suppliers' production capacity, International Organization for Standardization (ISO) status and World Health Organization (WHO) and/or Food and Drug Administration (FDA) certification is reviewed. Per a Memorandum

of Understanding (MOU) with the Government of Malawi (GOM), CMST is committed to the Buy Malawi Strategy for a period of five years (2019 to 2024).

Framework contracts are in place with both local and international suppliers using drawdown plans for delivery. For larger suppliers, indefinite contracts for one to three years are being piloted to assess performance before scale-up. All contracts are fixed in US dollars. Program procurement is executed by the respective contractors for the United States Agency for International Development (USAID) and the Global Fund, and this role is not anticipated to shift to GOM within the duration of this strategy.

7.2 Maturity Assessment, Challenges and Root Causes

Product procurement is not currently meeting the needs of the Malawi health supply chain with all health facilities experiencing stock outs in 2022. The procurement processes of Central Medical Stores Trust (CMST) were ranked level 3 in the maturity assessment. Key challenges creating stock shortfalls and general lack of availability include:

a. *Limited availability of funds for procurement of products and supplies.* Malawi's budget for medicines and medical supplies has been traditionally underfunded. The estimated funding gap between the full requirements for essential medicines and the funding available for procurement in 2019 was MWK 18.3 billion, or 48%.

b. *High costs associated with CMST procurement.* The latest management accounts of CMST show a creditor payment statistic of 265 days, while the preferred industry standard is 60 days. This causes reciprocating issues as local wholesalers increase their product and supply prices to account for the interest they will bear until paid (see Exhibit K). This drives districts to request lower cost products elsewhere and reduces CMST sales which were 21% lower than projected in 2019.

Exhibit K. Product Pricing Comparison

Item Code	Unit of Issue	Product Description	Purchase price by CMST (US$)	MSH Database (US$)	KEMSA Kenya (US$)
AA004800	1000	Amoxicillin 250mg, Capsules	20.35	-	13.64
AA049500	1000	Paracetamol 500mg, Tab	5.07	3.83	-
BB069300	Each pouch	Sodium chloride 0.9%, 1000ml	1.16	1.10	0.78

a. *Lack of supplier compliance to contract terms and conditions.* The manual supplier contract management lifecycle fully relies on the knowledge of the contract manager which widens the margin for human error and results in reliance on one individual and a lack of institutional knowledge. Contract compliance monitoring in terms of contract date; anticipated delivery date; actual delivery date and completion date are manually monitored and reported on. Supplier key performance indicators (KPIs) are available, but they are neither enforced nor measured and monitored.

b. *Procurement policy limits efficiency.* The 2017 Public Procurement and Disposal of Assets (PPDA) Act does not allow single sourcing of product unless dispensation is received for special circumstances. International suppliers must use local agents in accordance with the Buy Malawi initiative. Further, central hospitals and districts have been permitted to buy from other sources contributing to CMST's downward trend in sales.
c. *Suboptimal product selection processes.* The Malawi essential medicines list (MEML) is not updated with the revised version due to be released in the first quarter of 2023 together with the Standard treatment guidelines (STG). MSTG and MEML copies of outdated version have not been readily available and/or not widely circulated. The "must-have list" was too long with 425 products and has recently been reduced for both central hospitals and district hospitals. There is need to further refine the list to only includes many items that are in the MEML and those that best conform to public health needs.

7.3 Goals, Strategic Objectives and Proposed Activities

To address the stated issues and to develop an effective and efficient procurement process capable of ensuring sufficient supply to Malawians, the following goals supported by actionable objectives and appropriate activities have been defined.

Goal: Quality health commodities are identified, ordered, and made available at the right time, in adequate quantities, and at the lowest possible cost to the system.

Objective 2.1: To reduce the funding gap for essential medicines by 20% annually from 2023 to 2030.

An increase in funding, both to the procurement operations of Central Medical Stores Trust (CMST) and health facility drug budgets is paramount for the supply of medical products to meet demand and to sustain and improve health outcomes. As funding of procurement has a resounding impact, this objective is also reflected in the Section 9. Policy and Regulatory and Section 7. Financing. Proposed activities include:

KPI 2.1: Funding Gap

Calculation of variance between value of national forecast to value of funds available for commodity procurement.

Surveillance Method: Periodic inspection.

a. Conduct a funding gap exercise for Ministry of Health-funded commodities.
b. Reduce the "must-have list" (MHL) to a more manageable number of products considering public health priorities to serve most prevalent conditions.
c. Advocate with the Government of Malawi (GOM) to increase funding for the procurement of nutrition and essential medicines commodities to meet needs per existing quantification procurement plans.

Objective 2.2: Advocate to re-engineer the procurement process to increase efficiency, minimize number of steps, duration, and ensure Good Procurement Practices (GPP) by the end of 2025.

Adoption of procurement processes, policies and contracts that align with international best practices will increase efficiency and reduce costs of the procurement. Procurement is currently governed by the 2017 Public Procurement and Disposal of Assets (PPDA) Act and alterations to the process will require a government policy change. Thus, the focus of this objective and supporting activities will be to advocate for a review of the PPDA to identify existing government policies which inhibit GPP and to identify where, if at all, changes can be made. Proposed activities include:

a. Conduct an analysis of the PPDA Act to identify which policy, if any, inhibits GPP.
b. Plan and execute lobbying activities to encourage changes, if any, of PPDA act to meet GPP.
c. Prepare three-year procurement plans, manual and standard operating procedures (SOPs) for all Malawi Supply Chain Transformation Plan levels.
d. Establish central tendering and contract strategies for standard commodities.
e. Define a list of low-demand and special health commodities and respective procurement services.
f. Optimize registration process for more rapid uptake of new technologies.
g. Provide ongoing procurement technical assistance to the Central Medical Stores Trust.
h. Assess the need and inclusion of the procurement of medical equipment and devices consumables within the budget of CMST.

KPIs 2.2: Stock Availability; Percentage of International Reference Price Paid

Measurement: Compare actual stock availability against performance of previous year

Measurement: Compare latest "Must Have List" prices to International Reference Prices

Surveillance Method: Periodic inspection.

Objective 2.3: To improve supplier contract management processes through adoption of automated systems by 2025.

Executing the upfront effort to adopt best practices will reduce the time and costs associated with auditing supplier compliance, monitoring value metrics, and continuing strong supplier relationships. The acquisition of document management software will enhance the ability of the CMST Procurement department to manage and control contracts. Proposed activities include:

a. Strengthen procurement contract management processes including enhancement of contract management module in Navision that meets international standards.
b. Acquire and implement a Document Management System.
c. Review developed SOPs to establish interfaces to the Navision system.
d. Advocate for a shift in policy to enable longer-term framework agreements with suppliers.
e. Strengthen and automate tracking of procurement processes from start to end.

KPI 2.3: Vendor on time and In Full Delivery Rate

Calculate percentage of orders that vendors delivered within the agreed-upon delivery window, and in full.

Surveillance Method: Periodic inspection

7.4 Implementation Plan

Per the implementation plan below, activities are anticipated to begin in quarter 3 of 2023 and continue through the end of 2024 (see Exhibit L). To view a more detailed plan, complete with estimated costs required to implement the Planning and Procurement strategy see Annex I

Exhibit L: Implementation Plan: Procurement and Planning

	Activities	Timeline																													
		2023				2024				2025				2026				2027				2028				2029				2030			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Objective 2.1: To reduce the funding gap for essential medicines by 20% annually from 2023 to 2030.																															
1	Conduct a funding gap exercise for MOH-funded commodities.																														
2	Review and revise MHL with goal of reducing to a more manageable number of products.																														
3	Advocate with GOM to increase funding for procurement of nutrition and essential medicines to meet needs																														

	quantified.																																	
	BUDGET VALUES TOTAL $ 120,000	$80,000				$40,000																											
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH																															
	KEY PERFORMANCE INDICATORS	GAP ANALYSIS BETWEEN ACTUAL & FORECAST COMPARED TO 20% TARGET																															
Objective 2.2: Advocate to re-engineer procurement processes to increase efficiency and ensure Good Procurement Practices (GPP) by 2025.																																	
1	Conduct an analysis of PPDA Act to identify which policy, if any, inhibits GPP.																																	
2	Plan and execute lobbying activities to encourage changes, if any, of PPDA act to meet GPP.																																	
3	Prepare three-year procurement plan, manual and SOPs for each level of the supply chain.																																	
4	Establish central tendering and contract strategies for standard commodities.																																	
5	Define list of low-demand and special health commodities and respective procurement services.																																	
6	Optimize registration process for more rapid uptake of new technologies.																																	
	Provide																																	

7	ongoing procurement technical assistance to CMST.																																
8	Assess the need and inclusion of procurement of medical equipment within the CMST budget																																
	BUDGET VALUES TOTAL $ 60,000	$60,000																															
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY																															
	KEY PERFORMANCE INDICATORS	MEASUREMENT OF ACTUAL STOCK AVAILABILITY AGAINST CURRENT PERFORMANCE MEASUREMENT OF LATEST MUST HAVE LIST PRICES AGAINST CURRENT AS THE BASE																															
Objective 2.3: To improve supplier contract management processes through adoption of automated systems by 2025.																																	
1	Strengthen procurement contract management processes including enhancement of contract management module in Navision that meets international standards.																																
2	Acquire a Document Management System.																																
3	Review developed SOPs to establish interfaces to the Navision system																																
4	Advocate for shift in policy to enable longer-term framework agreements																																
5	Strengthen and automate tracking of procurement processes from start to end.																																

	BUDGET VALUES TOTAL $ 90,000	$90,000							
	RESPONSIBLE PARTIES	CENTRAL MEDICAL STORES TRUST; TECHNICAL ASSISTANCE; DONOR COMMUNITY							
	KEY PERFORMANCE INDICATORS	DETERMINING THE LEVEL OF SUPPLIER SUPPLY PERFORMANCE AGAINST CURRENT AS THE BASE							

8. WAREHOUSING, STORAGE, AND INVENTORY MANAGEMENT

8.1 Overview

Upstream: Currently, the Central Medical Stores Trust (CMST) manages warehousing for Government of Malawi (GOM), Global Fund-funded tuberculosis and United Nations Population Fund (UNFPA)-procured health commodities. Warehousing of the remainder program commodities; USAID-procured malaria and family planning commodities; Global Fund-funded malaria and HIV/AIDS products are managed by the respective donors and currently contracted to private sector third-party logistics providers (3PLs), Cargo Management Logistics (CML) and Bollore Logistics.

CMST operates a network of seven warehouses – three regional (North, Central and South) branch warehouses, and three rented receipt warehouses (Manobec, CML and Bakali) based in Lilongwe. The operation of CMST multiple warehouses within Lilongwe creates logistical challenges and duplicative overhead costs and the constant need for internal stock transfers between its warehouses.

Inventory management is currently manual and requires CMST to close operations on a quarterly basis to provide program managers with stock information. Stock is received at the central warehouse and then routed to regional warehouses. Health facility orders for CMST-managed products, via their respective districts, are received and actioned at regional medical store (RMS) level monthly. Per the study completed in 2019, due to the parallel supply chains, stock is transported to health facilities from multiple locations, with each facility receiving an average of 4.32 drops per month. Recent consolidation activities may have improved this average; an updated study is recommended.

Downstream: Health facility resupply for CMST-managed products, ordered via their respective district, are received, and actioned at the RMS level monthly. CMST receives and processes orders from districts and central hospitals for essential medicines and tuberculosis program commodities via OpenLMIS. Each facility submits a paper logistics management information system (LMIS) form monthly to its respective district. OpenLMIS has scaled up over the past two years from 260 to 400 facilities, therefore facilities reporting directly through the system have increased. The district receives the

paper form, creates an electronic LMIS form, enters and submits the data. Submitted forms are then reviewed, updated, and authorized.

Once authorized by the district therapeutic committee (DTC) and reviewed and approved by the district health officer (DHO), a requisition is routed to CMST where it is reviewed, converted into an order, and exported from OpenLMIS. As of 2021, due to the parallel supply chains, stock is transported to health facilities from multiple locations, with each facility receiving an average of 4.32 drops per month. However, efforts have since been made to integrate distribution of commodities procured through Global Fund and USAID.

Upon receipt, monthly stock is stored on premise at the respective facilities. To provide additional storage space when needed, 447 prefabricated "stores in a box" units have been installed, though approximately five are no longer operational. Stock keeping at the facility level is largely paper-based and with manual tools which results in sub-optimal record keeping. eHIN platform has been introduced as an inventory management and dispensing tool for SDP level, providing the opportunity to provide real-time data. "C-Stock," is used beyond the facility at the community levels.

Upstream: Though the maturity model assessment, warehousing and inventory control processes at the national level are each at a maturity level 2 or 3, the majority of which can be upgraded to a maturity level 4 through implementation of a fully functioning Inventory Management System (IMS). The challenges outlined below do not consider the impact of the 5S Kaizen project, which is working with CMST to directly improve many of the limitations below. Key challenges include:

a. *Limited storage capacity.* An analysis of existing warehouse space in 2019 (before opening of the Bakali warehouse) showed a pallet occupancy percentage across the Central Medical Stores Trust (CMST) warehouses of 92.5%, well beyond the best practice threshold of 85%. Significant issues can occur when occupancy exceeds this percentage in terms of service level and efficiency with uplifts in volumes. The existing warehouse capacity strains will be exacerbated with supply chain integration (SCI) and an anticipated 129% increase in volume of commodities to be stored by CMST.

   Further analysis conducted in 2021/2022 was focused on calculating the consolidated warehousing requirement for CMST in Lilongwe. The study considered the five warehouses being occupied (in 2022) and calculated cost and service efficiencies, as well as the return on investment for constructing a consolidated central warehouse which would have the capacity to hold all CMST commodities and included a 10-year horizon (to 2032).
b. *Suboptimal structures and equipment.* Structural elements of the existing CMST central warehouse prevent optimal utilization of the space. The racking (pallet) densities are inadequate, the height at the eaves is too low, and flows within the interior areas are obstructed by multiple walls and chambers. Loading and off-

loading facilities are inhibited by a lack of dock levelers and the high frequency of loading and unloading products from delivery vehicles.

c. *Poor inventory management and "dead stock."* With the lack of visibility into stock levels, the already limited space in central and regional warehouses and in facilities is often strained by storing expired products, slow-moving or "dead stock. A manual activity-based cost (ABC) analysis (product ordering frequency) highlighted levels of slow-moving and dead stock and revealed that in the period from August 2020 to September 2021, 1 546 products were ordered from a catalogue of 3,314 products. Out of the 1547 products ordered, 32.2% were ordered only once in the six-month period and 330 products delivered 95% of the total ordering activity, displaying a significant quantity of "dead stock" and need to differentiate management of fast and slow-moving stock to optimize warehouse space.

d. *Lack of visibility of order flow.* The order flow from the regional medical stores (RMS) to health facilities, wards and communities is not transparent which prevents CMST from providing a high level of customer service. Many of the smaller health facilities do not submit an order every month and therefore run out of stock; however, it is not yet clear at the central level if this issue is due to sufficient stock levels or overstocking at the time of delivery, or to a failure of the district health officers (DHO) to create the facility's order.

e. *Costly warehousing.* Due to the issues cited above: lack of space requiring CMST to rent additional warehouses, suboptimal processes and supporting equipment, poor inventory, and the existence of "dead stock," the cost of warehousing is extensive (see Exhibit M).

Exhibit M: Current Warehousing Costs

	Max Pallets	Average Pallets	Rental Costs	Running Costs
CMST	$14,945	$10,124	$544,140	$3,013,892
Global Fund	$9,228	$9,228		$2,166,588
USAID (GHSC-PSM)	$943	$646		$652,038
Total	$25,116	$19,998	$544,140	$5,832,518

Downstream: Though the maturity model assessment, storage, and inventory management processes at the health facility level were each at maturity level 1 or 2. Due to their manually reliant design, the storage and management processes at the health facility level are not capable of rising above this maturity level without introduction of an electronic system with direct data input. Key challenges include:

a. *Multiple drops per month.* With an average of 4.32 drops per month in 2021 to each facility, too much time is spent by facility staff in the intake of inventory.

b. *Lack of ability to track orders at the facility level.* Facilities have limited insight into the status of their products and thus are unable to plan accordingly. In addition, there is little to no autonomy at the facility level for ordering and health facilities have no ability to track their orders. There is inadequate information on drug donations which are sometimes dropped at the facility level and the multitude of deliveries per month from different sources creates confusion.
c. *Compromised security of products.* The security of products is compromised within many facilities' storage, both in terms of unstable temperatures and theft.
d. *Overburdened and unskilled personnel.* There is an inadequate number of qualified and skilled personnel to manage storage and inventory control at the facility level. Standard operating procedures (SOPs) exist but are not followed which sometimes results in expired and usable stock being stored together, which compromises the integrity of usable stock and complicates the full view of usable stock within inventory reporting.
e. *Erratic power supply at health facilities*. There is erratic supply of electricity at health facilities, with very few having access to backup power (solar), which compromises storage conditions of medicines related to temperature monitoring and cold chain.

8.2 Goals, Strategic Objectives and Proposed Activities

To address the stated issues and to provide adequate warehousing space managed by effective and efficient processes, the following goals supported by actionable objectives and appropriate activities have been defined.

Goal: Warehousing infrastructure, systems and operations are equipped to manage the volume of commodities associated with supply chain integration at each level of the supply chain.

Objective 3.1: To revise and implement Good Storage and Warehousing Practices (GWP) guidelines at all levels which includes the warehouse of Central Medical Stores Trust (CMST), rented warehouses, USAID commodities warehouse, the Global Fund warehouse, and the warehouses at the health facility level to have a harmonized GWP guidelines across the supply chain by the end of 2024, and at the health facility level by 2026.

Standard operating procedures (SOPs) based on the practical aspects of running a GWP Warehousing, and Distribution operation have been developed and submitted to all the senior managers of CMST and parallel warehouses. The SOPs must have harmonized indicators and processes across CMST and parallel warehouses. It is a requirement to build capacity at National and sub-national level by establishing training course. Proposed activities include:

a. Review and analyze existing CMST and Parallel warehousing SOPs, develop and institutionalize updated harmonized SOPs, and train staff on SOP implementation (in progress currently).
b. Review and analyze existing storage and inventory management SOPs for health facilities, wards, and communities.
c. Develop harmonized SOPs with common indicators and processes for GWP across the supply chain with the goal of creating an integrated supply chain system.

KPI 3.1: Performance Level

Compare performance level of warehouse operations against performance of previous year.

Surveillance Method: Periodic inspection; customer feedback

Objective 3.2: To implement a fully functioning inventory management system (IMS) in the Central Warehouse by 2024. A stand-alone system with functionality to "Best Practice" to enhance Supply Chain Integration by 2024.

Given the required sophistication and complexity associated with operating a centralized warehousing system, it is essential that a standalone fully functioning IMS that will interface with Open LMIS and systems that processes at point of dispensing, such as eHIN be acquired. The system to be acquired should have the capacity to also support central ordering, central inventory management and journey planning. Proposed activities include:

a. Conduct a functional specification (see Annex V).
b. Issue RFP to capable suppliers (see profile of suitable supplier in Annex VI).
c. Install a fully functioning IMS in the new bulk warehouse at the CMST Head Office site. Install the same IMS in the new central supply chain integration (SCI) warehouse once built.

KPI 3.2: Performance Level

Measurement: Compare performance level of warehouse operations against performance of previous year.

Surveillance Method: Periodic inspection; customer feedback

Objective 3.3: To increase warehouse storage capacity from 7, 460 to 15, 000 pallets by 2030 and warehouse space utilization to 80%.

For supply chain integration to succeed, the provision of suitable warehousing capable of expanding to meet future needs is imperative. The anticipated 3% annual population growth rate and increased volume of products due to eventual integration of products from several CMST rented warehouses within Lilongwe to single location will burden the existing warehouse space. Efforts can be made to expand the size of the warehouse using existing CMST property, as well as the adoption of more advanced racking and equipment to optimize existing space (See Annex VII). Proposed activities include:

a. Plan and initiate site upgrading and provide project management support to develop a central receiving warehouse.
b. Design structure (steel frame with external cladding) for proposed central receiving warehouse in Lilongwe.
c. Issue a request for proposals (RFP) for the building of a warehouse and kitting and award contracts.
d. Re-engineer bulk warehouse racking; build new warehouse and kit out on CMST site.
e. Provide project management services for the warehouse built.
f. Assess implications of increases in volume and greater efficiency to determine continued warehousing needs, on an annual basis.
g. Develop an inbound schedule that evaluates available storage space and handling capacity vis-à-vis inbound deliveries to set phased deliveries based on volumes.
h. Build and institutionalize distinct processes for management of fast and slow-moving products to reduce "dead stock" and better use pallet space.
i. Procure and implement use of roll-cages for use in conjunction with dock levelers and vehicles with tail-gate lifts, to significantly reduce loading and off-loading times.

KPIs 3.3: Pallet Space Available.

Space Utilization

Measurement: Number of pallets; pallets available versus pallets used

Surveillance Methods: Periodic inspection; Third- party Audits; 100% inspection

Objective 3.4: To consolidate the existing warehousing systems to enable all stock to be centrally managed at the Logistics Management Unit (LMU) by 2025.

Shifting the current warehousing system in which the central level feeds RMSs to a centrally managed warehousing system in which all stock is managed through the LMU will yield significant benefits across the supply chain. Centralization will enable increased visibility across the supply chain leading to efficient and affordable warehousing, offering customers a better service at a better price.

Consolidating CMST's Lilongwe warehousing will reduce operational costs of owning, renting, and maintaining additional warehouses, lower inbound costs by taking in larger shipments to one location and by consolidating deliveries across all three primary warehouse operations, will reduce the number of deliveries to health facilities.

KPI 3.4: Full Transition of Stock

Measurement: Termination of rental agreements for warehouses; management of all stock via central inventory database

Surveillance Methods: Periodic inspection; Third- party Audits; 100%

This system will offer lower costs to customers and/or yield higher profit margins. Further, concentrated inventory management will enable quick order fulfillment due to access to real-time knowledge regarding issues with supply, oversight and transparency of what

stock is where. The mentality will shift to a service ethic that concentrates on meeting the needs of the health facilities as opposed to coordinating shipment of inventory.

Proposed activities include:

a. Design the flow of orders to facilitate better service to the health facilities.
b. Remove all slow-moving and dead stock to Lilongwe.
c. Repurpose existing regional medical stores (RMS) to serve as cross-docking facilities: develop new SOPs, train staff, implement control procedures.
d. Transition stock from warehouses containing stock (Manobec; Mantino, CML, Bollore Logistics warehouse) to the new SCI warehouse.
e. Shift current inbound and outbound activity of Global Fund commodities from every two- months to monthly to be consistent with CMST and USAID processes and consequently reduce the number of pallet positions required.
f. Commence cross-docking operations.
g. Cover ongoing costs of running central ordering (IMS, office operations, salaries)

Goal: Adequate inventory management operations and systems at the facility level that align with international standards.

Objective 3.5: To strengthen inventory management practices to reduce waste and damages at health facilities by 2025.

Significant increase in maturity can be made through implementation of best practices such as first-expired first-out (FEFO) and introduction of automated inventory management tools that provide visibility into stock levels and optimize space to maximize use of existing resources. Design and/or procurement of an automated system complete with consumption and inventory data management is also reflected in Section 6. “Information Systems,” Objective 6.4.

The supply chain management transformation will include the inventory management of devices and other consumables for durable pieces of equipment for control of stocks at the central level and incorporation in elaborate waste management processes to promote green environment.

Proposed activities include:

a. Conduct a root cause analysis to determine the factors creating waste at the facility level and develop strategies for reduction accordingly.
b. Design and implement automated tools to report and track consumption and manage inventory at the health facility level that facilitates easy and accurate capture of consumption data through direct data input (see Section 6. Information Systems, Objective 6.4).
c. Review and update supportive supervision modules and protocols of district oversight of health facilities.
d. Train heath facility staff on FEFO principles.
e. Increase the stock turn rate of all inventories in the public health supply system. This can be achieved by increasing the cadence of in- and outbound shipments, consistently removing expired and damaged stock, and reviewing and disposing of slow-moving products.
f. Design and implement automated tools to track and maintain inventory for durables and non-durable devices and equipment including the consumables for the medical devices.

KPI 3.5: Wastage from Damage, Theft or Expiry

Measurement: Compare the damaged, lost, and expired stock to the total stock during the reporting period (by quantity or value of the stock).

Surveillance Methods: Random Sampling; Third-party Audits

KPI 3.6: Automated Ordering

Measurement: Binary (Y/N) - ability to reorder stock without manual intervention.

Surveillance Methods: 100% inspection

Objective 3.6: To improve order processing through implementation of an ordering replenishment system that is appropriate, flexible, and functional by 2025.

Proposed activities include:

Conduct a functional analysis to determine the structure, output, input, method of update, and security of the system.

a. Procure/design and implement an effective inventory management system and sales order processing software.
b. Identify and implement innovative methods of powering the system (i.e., solar panels).
c. Evaluate quality of communications and develop communications protocol.
d. Develop min/max stock levels for “must have list” (MHL).

Objective 3.7: To maintain and improve storage space for all commodities in health facilities by 2027.

Despite the introduction of 572 prefabricated units, limited storage capacity and insufficient use of space continues to be cited by those at the district and facility level as a key issue.

Proposed activities include:

KPI 3.7: Space Utilization

Measurement: shelves available versus shelves used.

Surveillance Methods: Periodic inspection

a. Identify and evaluate existing storage space and conditions (i.e., general structure conditions, temperature control and solar systems considering population growth and improved order fill.
b. Develop a maintenance plan for existing storage facilities.
c. Evaluate the impact of new prefabricated units and determine feasibility of scale up to additional health facilities.
d. Increase storage space through expansion or introduction of prefabricated or conventional building storage units at health facilities.
e. Provide alternative sources of power, preferably solar power to health facilities.

Objective 3.8: To provide all health facilities with electrification either through connection to the national grid or renewable energy by 2026.

To ensure health facilities have access to adequate provision of power and electrification, the MNSCTP will undertake an evaluation of the power requirements for all health facilities with suspect or no power.

Proposed activities include:

KPI 3.8: Electrification

Provide electrical power to facilities.

Surveillance Method: Periodic inspection

a. Undertake an evaluation of the power requirements for all health facilities with suspect or no power.
b. Determine the nature of the solution for every health facility.
c. Undertake an Open tender for the supply of the power solutions.
d. Issue contracts to the selected suppliers based on budgets.
e. Establish a project team and commence the implementation of the electrification upgrades.

8.3 Implementation Plan

The implementation plan below provides the projected timeline by which activities will be completed to reach the stated objectives. To view a more detailed plan, complete with estimated costs required to implement the Warehousing, Storage and Inventory Management strategy see Annex I.

Exhibit N. Implementation Plan: Warehousing, Storage, and Inventory Management

	Activities	Timeline																													
		2023				2024				2025				2026				2027				2028				2029				2030			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Objective 3.1: To revise and implement Good Storage and Warehousing Practices guidelines at CMST by 2024 and at the health facility level by 2026.																															
1	Review and analyze existing CMST warehousing SOPs, develop and institutionalize updated SOPs, and train staff on SOP implementation.																														
2	Review and analyze existing storage and inventory management SOPs for health facilities, wards and communities.																														
	BUDGET VALUES TOTAL $ 80,000	$40,000												$40,000																	
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; CENTRAL MEDICAL STORES TRUST; TECHNICAL ASSISTANCE; DONOR COMMUNITY																													
	KEY PERFORMANCE INDICATORS	COMPARING PERFORMANCE LEVELS AGAINST STANDARDS OF OPERATION																													
Objective 3.2: To implement a fully-functioning Inventory Management System (IMS) in the Central Warehouse by 2024. A robust system with functionality to "Best Practice" to enhance Supply Chain Integration																															
1	Conduct a functional specification.																														
2	Issue RFP to capable suppliers and procure system.																														
3	Install IMS in the new bulk warehouse at the CMST Head Office site.																														
4	Install IMS in the new SCI warehouse once built.																														
	BUDGET VALUES TOTAL $ 350,000	$250,000				$100,000																									
	RESPONSIBLE PARTIES	CENTRAL MEDICAL STORES TRUST; TECHNICAL ASSISTANCE; DONOR COMMUNITY																													
	KEY PERFORMANCE INDICATORS	THE COMPARATIVE OF STANDARDS OF OPERATION ACHIEVED VERSUS BEST PRACTICE BENCHMARKS																													
Objective 3.3: To increase warehouse storage capacity from 15,000 to 30,000 pallet locations by 2025 and warehouse space utilization to 80%.																															
1	Plan and initiate site upgrading and provide project management support to develop central receiving warehouse.																														
2	Design structure (steel frame with external cladding) for proposed central receiving warehouse in Lilongwe.																														
3	Issue an RFP for build out of the warehouse and kitting and award contracts.																														
4	Re-engineer bulk warehouse racking, build new warehouse and kit out on CMST site.																														

5	Provide project management services for warehouse build.																																
6	Assess implications of increases in volume and greater efficiency to determine continued warehousing needs, on an annual basis.																																
7	Develop an inbound schedule that evaluates available storage space and handling capacity vis-à-vis inbound deliveries to set phased deliveries based on volumes.																																
8	Build and institutionalize distinct processes for management of fast and slow-moving product to reduce "dead stock" and better use pallet space.																																
9	Procure and implement use of roll-cages (1500) – use in conjunction with dock levelers and vehicles with tail-gate lifts, to significantly reduce loading and off-loading times.																																
	BUDGET VALUES TOTAL $ 10,063,140	$510,000				$2,518,000			$7,035,140																								
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; CENTRAL MEDICAL STORES TRUST; TECHNICAL ASSISTANCE; DONOR COMMUNITY																															
	KEY PERFORMANCE INDICATORS	THE ACHIEVEMENT OF THE PALLET SPACE AVAILABLE AGAINST THE TARGET BY 2022, THE CLOSURE OF THE RENTED WAREHOUSES OF CENTRAL MEDICAL STORES TRUST																															
Objective 3.4: To consolidate the existing warehousing system to enable all stock to be centrally managed at the CMS in Lilongwe by mid-2025.																																	
1	Design the flow of orders to facilitate better service to the health facilities.																																
2	Establish central ordering equipment and office set-up																																
3	Repurpose existing RMS to serve as cross-docking facilities: develop new SOPs, train staff, implement control procedures.																																
4	Transition stock from warehouses containing stock (Manobec; Mantino, CML/HIS warehouse) to the new SCI warehouse.																																
5	Shift current inbound and outbound activity of Global Fund commodities to monthly to be consistent with CMST and USAID processes and reduce the number of pallet positions required.																																
6	Commence cross-docking operations.																																
	BUDGET VALUES	$109,000				$120,000																											

	TOTAL $ 229,000								
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY							
	KEY PERFORMANCE INDICATORS	THE TOTAL MANAGEMENT OF STOCK CENTRALLY VIA A CENTRAL INVENTORY DATABASE THAT FACILITATES THE CLOSURE OF RENTED WAREHOUSES – Bakali; Manobec; Mantino, CML/Bollore warehouse							
Objective 3.5: To strengthen inventory management practices to reduce waste and damages by 2025									
1	Conduct a root cause analysis to determine the factors creating waste at the facility level and develop strategies for reduction accordingly								
2	Design automated tool to report and track consumption and manage inventory at the health facility level that facilitates easy and accurate capture of consumption data through direct data input								
3	Review and update supportive supervision module and protocols of district oversight of health facilities.								
4	Train heath facility staff on FEFO principles.								
	BUDGET VALUES TOTAL $ 6,523,000	$120,000	$1,229,000	$1,779,000	$679,000	$679,000	$679,000	$679,000	
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY							
	KEY PERFORMANCE INDICATORS	REDUCING THE WASTE PERCENTAGE FROM THE CURRENT LEVELS. COMPARING CURRENT VERSUS ACHIEVED							
Objective 3.6: To improve order processing through implementation of an ordering replenishment system that is appropriate, flexible, and functional by 2025.									
1	Conduct a functional analysis to determine the structure, output, input, method of update, and security of the system.								
2	Procure/design and implement effective inventory management system and sales order processing software.								
3	Identify and implement innovative methods of powering the system (i.e., solar panels).								
4	Evaluate quality of communications and develop communications protocol.								
5	Develop min/max stock levels for "must have list."								
	BUDGET VALUES TOTAL $ 380,000	$90,000	$290,000						
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY							
	KEY PERFORMANCE INDICATORS	THE ABILITY TO REORDER STOCK WITHOUT MANUAL INTERVENTION							

Objective 3.7: To improve storage space for all commodities in health facilities by 2027.																															
1	Identify and evaluate existing storage space and conditions considering population growth and improved order fill.																														
2	Evaluate the impact of new prefabricated units and determine feasibility of scale up to additional health facilities.																														
3	Increase storage space through expansion or introduction of prefabricated storage units at health facilities.																														
4	Provide solar power to health facilities																														
	BUDGET VALUES TOTAL $ 15,298,315	$88,315				$4,680,000				$4,680,000				$4,680,000				$1,170,000													
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY																													
	KEY PERFORMANCE INDICATORS	1. THE IMPLEMENTATION OF EXTRA STORAGE FACILITIES AT THE HEALTH CENTERS THAT REQUIRE THEM THE INSTALLATION OF SOLAR POWER AT HEALTH FACILITIES																													
Objective 3.8 To provide all health facilities with electrification either through solar or wind assisted power generation by 2027																															
1	Undertake an evaluation of the power requirements for all health facilities with suspect or no power (approx. 251 sites)																														
2	Determine the nature of the solution for each health facility.																														
3	Undertake an Open tender for the supply of the power solutions																														
4	Determine the overall budget and compare to the Grant Application budget																														
5	Issue contracts to the selected suppliers																														
6	Establish a project team and mobilize the same																														
7	Complete the implementation of the electrification upgrades.																														
	INDICATIVE BUDGET VALUES TOTAL $ 6,152,499					2,050,833				2,050,833				2,050,833																	
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY																													
	KEY PERFORMANCE INDICATORS	Provide Electrical power facilities to all health facilities that require upgrade																													

9. DISTRIBUTION AND TRANSPORTATION

9.1 Overview

Distribution of all Government of Malawi, Global Fund-funded tuberculosis, and United Nations Population Fund (UNFPA) procured health commodities to health facilities is currently managed by the Central Medical Stores Trust (CMST) to fulfill monthly orders from health facilities and/or to follow national program distribution plans. These commodities are delivered to health facilities through a two-tier distribution system: first, internally from central warehouse to CMST regional warehouses and central hospitals; and second, through a third-party distribution contract with Cargo Management Logistics Malawi Limited (CML) from the regional warehouses to district hospitals, health centers, and Christian Health Association of Malawi (CHAM) health facilities.

The Ministry of Health operates a parallel supply chain for Global Fund-procured HIV/AIDS and malaria commodities in partnership with Bollore Logistics, a private international logistics company, acting as the third-party logistics (3PL) provider. Similarly, the U.S. Agency for International Development (USAID), through its Global Health Supply Chain–Procurement and Supply Management project (GHSC-PSM), operates a parallel supply chain for all USG-procured malaria, HIV and family planning commodities utilizing Bollore and CML as 3PLs.

Deliveries are monthly to health facilities. Yet, due to the parallel supply chains, while scheduled to receive one delivery per month on or about the 25th of each month, after submitting their orders by the 10th of every month, health facilities receive multiple deliveries, averaging 4.32 per month (see Exhibit O). This places an unnecessary burden on the health facilities in time spent receiving and checking the multiple deliveries. The current process of receipt involves end-user recipients verifying the contents of each carton thereby increasing the overall route times and adding cost into the supply chain.

Exhibit O: Commodity Orders "Drops" Received at Health Facilities

	Average Monthly			Annual		
	Cube	**Drops**	**Cost**	**Cube**	**Drops**	**Cost**
CMST	1,315	902	$113,104	15,779	10,829	$1,357,250
Global Fund	1,117	579	$88,445	13,405	6,953	$1,061,334
UNICEF	238	385	$24,229	2,850	4625	$290,748
USAID (GHSC-PSM)	343	1,068	$94,490	4,121	12,815	$1,133,875
Total	**3,013**	**2,935**	**$320,267**	**36,155**	**35,222**	**$3,843,207**

9.2 Maturity Assessment, Challenges and Root Causes

Upstream: Distribution processes at the national level are each at level 2 or 3 of maturity. The two- tiered distribution process is inefficient as through the current system, product is handled more than once before it gets to the end-user. Lead time is inconsistent, and facilities have no insight into the scheduling of their deliveries. Key challenges include:

a. *Inefficient order flows and routes.* An analysis of the total distribution activity for the Central Medical Stores Trust (CMST) revealed a high degree of variability in routes traveled, volumes delivered, and number of drops completed from month to month. The current methodology of fixed routes creates inefficiencies as there is no optimization or cross- fertilization of the routes to achieve greater utilization of the fleet capacities.
b. *Existing fleet mix.* The CMST fleet is not suitable for consolidation of loads to health facilities. For consolidation to be achieved, the carrying capacity and power units of vehicles need to be shifted.
c. *Ineffective 3PL management.* Third-party logistics provider, Cargo Management Logistics Malawi Limited (CML), has stated their capacity utilization is less than 68%. The current cost per drop is approximately $109.11 which is considered quite high. For comparison, the Uganda central medical stores (CMS), which serves a larger country and greater volume of health facilities, has an average cost per drop of $53.34.
d. The pricing mechanism utilized is based upon rates for kilometers traveled, weight (Kgs) carried, and vehicle cube applied to each contract, which results in a variable cost burden. For more effective and transparent cost control, third-party logistics (3PL) contracts need to be shifted to an open book contracting mechanism.

Downstream: Efficiencies in the "upstream" process of distribution flow down to health facilities as the delivery recipient. Once orders are received at the health facility level, authority for managing any necessary redistribution of commodities amongst facilities and resupply to wards and communities is held by districts. "Downstream" at the district and facility levels, transportation in the form of stock transfers was designated to be a maturity level and has been cited as an issue by stakeholders. Key challenges include:

a. *Inconsistent and unknown lead time.* Lead time is inconsistent, and facilities have no insight into the scheduling of their deliveries.
b. *No dedicated transport for redistribution.* When redistributions need to happen, often no vehicles are available. If a mistake is made at the central level, the district then must fund the recovery of the missing product.
c. *No system for tracking of commodities from health facilities to wards and communities.* At the facility level, requisitioning of drugs and commodities from wards and dispensaries and the reporting of stock is done manually. When a ward or community dispensary needs replenishment of its own internal stock, a

requisition form is filled out and submitted to the pharmacy department for the release of the requested drugs. Based on the quantity at hand within the pharmacy the pharmacist decides upon the actual quantity that would be given to the requesting entity.

9.3 Goals, Strategic Objectives and Proposed Activities

To address stated issues and transition existing parallel supply chains into one integrated supply chain managed by the Logistics Management Unit (LMU), using integrated management information systems, monitoring, and evaluation, the following goal supported by actionable objectives and appropriate activities has been defined.

Goal: Health commodities are transported to health facilities, wards, and communities efficiently and effectively in suitable quantities while maintaining the quality of the products.

The overarching strategy is to centralize all deliveries under one control mechanism that supports health facility orders to the last mile. Centralization has proved, internationally, to be the most efficient manner by which to respond to variability in demand. Achievement of this goal will require careful planning to transfer responsibilities, increase efficiency, and cost effectiveness. It will be necessary to change the ordering cycle, adjust the size and capacity of the delivery vehicles and introduce more dynamic routing and scheduling to optimize the fulfillment of orders received.

Objective 4.1: To define and implement updated standard operating procedures (SOPs) based upon Good Transport Practices and Standards by 2021.SOPs based on transportation best practices and international standards for medicines handling must be determined, established, and implemented across CMST.

KPIs 4.1: SOPs Updated; Training Established

Measurement: Binary (Y/N) - SOPs updated; binary- (Y/N) training program established.

Surveillance Methods: 100% inspection

Proposed activities include:

a. Review and analyze existing SOPs, develop, and institutionalize updated SOPs.
b. Establish training program on implementation of SOPs.

Objective 4.2: To consolidate the distribution network through centralized ordering and inventory management at one warehouse location to reduce the average number of drops to each facility to two by mid-2022.

Analysis of current operations has shown that the "order by the 10th of the month, delivery by the 25th of the month" protocol incurs higher costs, less flexibility and, alongside the push system used by donor-funded programs places a higher level of strain on the health facilities. Through use of an optimized distribution network and supply chain integration, deliveries can be consolidated and routed more efficiently to health facilities to reduce the number of drops per facility per month, both reducing the costs and the burden of receipt on health facilities (See Exhibit P).

Proposed activities include:

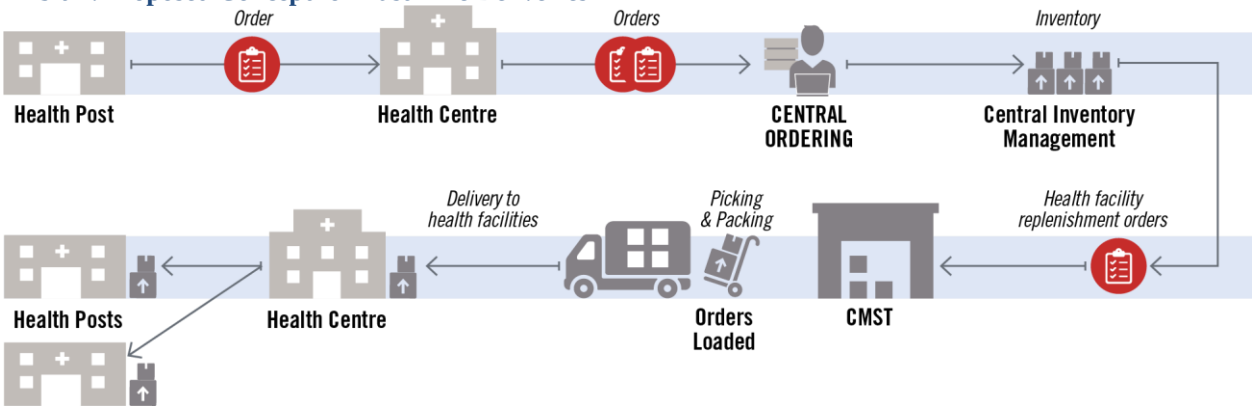
a. Conduct an analysis of total orders received over a three-month period to determine a more efficient cadence of ordering. Design ordering patterns to facilitate better delivery service levels to health facilities.
b. Evaluate and adjust the fleet mix to vehicles with the carrying capacity and power units to suit consolidation of loads to health facilities.
c. Set up a Central Ordering Office with all computers, telephone, and office equipment.

KPI 4.2: Frequency of Deliveries

Measurement: average number per month, per facility

Surveillance Methods: Random Sampling

Exhibit P. Proposed Concept for Last Mile Deliveries



Objective 4.3: To assess the current national distribution system and implement network optimization.

Introducing the ability strategically select routes fleets based on conditions, destinations, and commodity volumes to be distributed will optimize use of the vehicle fleet in terms of capacity utilization, route times and distances and enable CMST to deliver more efficiently, both in terms of cost and time spent.

Proposed activities include:

a. Determine availability of digitized road network, assess quality, and upgrade to required specification where required.
b. Review GPS location coordinates for all the health facilities and update as required.
c. Create digitized network for health facilities relative to the road network.
d. Establish the road conditions affecting route speed; establish health facility delivery time windows.

KPI 4.3: Routes Optimized

Measurement: Binary (Y/N) development of optimized routes and delivery patterns reducing from the current 77 routes covering each of the 28 districts.

Surveillance Methods: 100% Inspection.

e. Create a database of one year of historical data of detailed customer demand, orders, and deliveries; and of movement by stock keeping unit (SKU) by distribution location, cube and weight by SKU, and logistics-related financial spending by distribution location.
f. Populate a vehicle routing and scheduling model with all the data and interface to orders history files by customer location.
g. Create a fleet database including weight limits, cube limits, driving / traveling time limits and trip limits per vehicle type.
h. Define main scenarios to evaluate (e.g., single / multiple monthly deliveries to health facilities; multi-day routes; product specific journey plans, etc.); set up parameters of operation for vehicle scheduling model; and run the optimizations. Alter parameters for the various optimization exercises and determine best fit for the distribution network.

Objective 4.4: To implement dynamic scheduling and routing for distribution of health commodities from the central level to health facilities by 2023.It has been proven that aggregating orders each day and generating suitable routes to reach those facilities which have requested an order is the most efficient way of utilizing a total fleet of delivery vehicles. The introduction of dynamic vehicle routing and scheduling will enable CMST management to determine sequencing by which health facilities generate orders to optimize use vehicles and provide a better level of service. Transition to this model will take a phased approach that creates the infrastructure and processes first and then facilitates the required changes in supply chain ownership. Explore alternate transport models such as outsourcing deliveries to the private sector.

KPI 4.4: Cost of Distribution Operation

Measurement: compare cost of the operation of distribution from the warehouse to hospitals, facilities, and SDPs with the total value of the commodities distributed and express the costs as percentage of turnover.

Surveillance Methods: Periodic inspection

Proposed activities include:

a. Optimize the existing distribution network to improve distribution while centralization is underway.
b. Conduct an analysis of total orders received over a three-month period to determine a more efficient cadence of delivery.
c. Develop comprehensive distribution plans/guidelines.
d. Determine delivery route structures that match volumes per route to the type and capacity of vehicle required.
e. Implement dynamic scheduling that optimizes routes based upon the total orders for the day as opposed to current fixed route planning.
f. Introducing journey planning.

Objective 4.5: To institute a more open and effective method of contract management and pricing for third-party logistics providers (3PLs).

More strategic and transparent contracting of 3PLs coupled with robust performance management processes can enable CMST to secure a high level of service at a reasonable cost, taking advantage of the experience of private sector 3PLs as the volumes of distribution are scaled up through supply chain integration.

Proposed activities include:

a. Redesign and renegotiate 3PL contracts.
b. Develop 3PL key performance indicators (KPIs) and performance management systems.
c. Introduce continuous improvement processes for determining 3PL routes.
d. Implement dynamic routing and scheduling (as described in detail above).

KPI 4.5: Implementation of Open-Book 3PL Contracts

Measurement: Percentage of 3PL contracts which are open book.

Surveillance Methods: Analysis of progress report.

Objective 4.6: To strengthen districts' capacity to redistribute health commodities in 100% (28) of districts by 2024. Stronger and more transparent processes at each level of the supply chain should reduce the need for facilities to redistribute commodities. However, as redistribution among facilities can be an effective way to optimize the use of stock, reduce expiries and eliminate stock outs, efficient processes need to be in place.

KPI 4.6: Redistribution Process Improvement

Measurement: qualitative – feedback on efficiency of redistribution.

Surveillance Methods: Customer feedback (DHOs and facility staff).

Proposed activities include:

a. Assessing the status quo of stock transfers and the frequency of transfers.
b. Identify options for redistribution (3PLs, procure vehicles).
c. Update the current SOP and disseminate at the district and health facility levels.

9.4 Implementation Plan

The implementation plan (see Exhibit Q) provides the recommended timelines for completion of the activities and achievement of objectives stated above. To view a more detailed plan, complete with estimated costs required to implement the Distribution and Transportation strategy see Annex I.

Exhibit Q. Implementation Plan: Distribution and Transportation

	Activities	Timeline																													
		2023				2024				2025				2026				2027				2028				2029				2030			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Objective 4.1: To define and implement updated SOPs based upon Good Transport Practices and Standards by 2024.																															
1	Review and analyze existing SOPs, develop, and institutionalize updated SOPs.																														
2	Establish training program on implementation of SOPs.																														
	BUDGET VALUES TOTAL $ 660,000					$400,000				$260,000																					
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY																													
	KEY PERFORMANCE INDICATORS	THE UPDATE OF THE LOGISTICS PRACTICES AND THE TRAINING THEREOF WITH CONTINUOUS SKILLS ASSESSMENTS																													
Objective 4.2: To consolidate the distribution network through centralized ordering/inventory management to reduce the average number of drops to facilities to two by 2030.																															
1	Conduct an analysis of total orders received over a three-month period to determine a more efficient cadence of ordering.																														
2	Design the ordering patterns to facilitate better delivery service levels to all health facilities.																														
3	Evaluate and adjust the fleet mix to vehicles with the carrying capacity and power units to suit consolidation of loads to health facilities.																														
	BUDGET VALUES TOTAL $ 60,000					$60,000																									
	RESPONSIBLE PARTIES	CENTRAL MEDICAL STORES TRUST; TECHNICAL ASSISTANCE																													
	KEY PERFORMANCE INDICATORS	REDUCTION IN NUMBER OF DELIVERIES PER MONTH PER HEALTH FACILITY FROM 4.32 TO A TARGET OF TWICE PER MONTH																													
Objective 4.3: Assessment of current national distribution and implementation of network optimization.																															
1	Determine availability of digitized road network, assess quality, and upgrade to required																														

	specification as required.																														
2	Review GPS location coordinates for all the health facilities and updates as required.																														
3	Create digitized network for health facilities relative to the road network.																														
4	Establish the road conditions affecting route speed; establish health facility delivery time windows.																														
5	Create a database of one year of historical data of detailed customer demand, orders, and deliveries; and of movement by stock keeping unit (SKU) by distribution location, cube and weight by SKU, and logistics-related financial spending by distribution location.																														
6	Populate a vehicle routing and scheduling model with all the data and interface to orders history file by customer location.																														
7	Create fleet database including weight limits, cube limits, driving / traveling time limits and trip limits per vehicle type.																														
8	Define scenarios to evaluate; set up parameters for vehicle scheduling models; and run the optimizations. Alter parameters for the various optimization exercises and determine best fit for distribution network.																														
	BUDGET VALUES TOTAL $ 1,920,000					$1,280,000			$640,000																						
	RESPONSIBLE PARTIES	CENTRAL MEDICAL STORES TRUST; TECHNICAL ASSISTANCE																													
	KEY PERFORMANCE INDICATORS	OPTIMISATION OF ROUTES AND DELIVERY PATTERNS FROM THE CURRENT 77 ROUTES FOR 28 DISTRICTS TO REDUCE DISTRIBUTION COSTS																													
Objective 4.4: To implement dynamic scheduling and routing for distribution of health commodities from the central level to health facilities by 2026.																														

1	Revise the existing distribution network to improve distribution while centralization is underway.								
2	Conduct an analysis of total orders received over a three-month period to determine a more efficient cadence of delivery.								
3	Develop comprehensive distribution plans / guidelines.								
4	Determine delivery route structures that match volumes per route to the type and capacity of vehicle required.								
5	Implement dynamic scheduling that optimizes routes based upon the total orders for the day as opposed to current fixed route planning.								
6	Introducing journey planning.								
	BUDGET VALUES TOTAL $ 105,000	$70,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000
	RESPONSIBLE PARTIES	CENTRAL MEDICAL STORES TRUST; TECHNICAL ASSISTANCE							
	KEY PERFORMANCE INDICATORS	REDUCTION IN COST OF DISTRIBUTION BY 20% BY 2025							
Objective 4.5: To institute a more open and effective method of contract management and pricing for 3PLs.									
1	Redesign and renegotiate 3PL contracts.								
2	Develop 3PL KPIs and performance management system.								
3	Introduce continuous improvement processes for determining 3PL routes.								
	BUDGET VALUES TOTAL $ 20,000		$20,000						
	RESPONSIBLE PARTIES	CENTRAL MEDICAL STORES TRUST; TECHNICAL ASSISTANCE							
	KEY PERFORMANC	IMPLEMENTATION OF "OPEN-BOOK" CONTRACTS WITH THE 3PLs							

	E INDICATORS																																
Objective 4.6: To strengthen districts' capacity to redistribute health commodities in 100% (28) of districts by 2025.																																	
1	Assess the status quo and incidence of stock transfers.																																
2	Identify feasible options for redistribution.																																
3	Update the current SOP and disseminate at the district and health facility levels.																																
	BUDGET VALUES TOTAL $ 22,000	$4,400				$17,600																											
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY																															
	KEY PERFORMANCE INDICATORS	PERCENTAGE IMPROVEMENT YEAR ON YEAR FROM EXISTING LEVEL UP TO 100% OF ALL DISTRICTS																															

10. WASTE MANAGEMENT

10.1 Overview

There is not currently a formal national hazardous waste process in Malawi although a policy is being established that will be put forward for approval at the end of fourth quarter 2023. A reverse logistics supply chain does not currently exist. Standard operating procedures (SOPs) and processes for the management of waste at the facility level have been developed but are not widely practiced. The Ministry of Health has identified waste management as a national priority and has implemented a strategic initiative with the aim of establishing a network of four eco-friendly waste disposal facilities at strategically located sites.

Four incinerators have been procured, funded by the Global Fund, and are in process of installation at selected sites; and an addition of two more incinerators through GAVI are in the planning stages. For the incineration sites to be used to dispose of clinical and anatomical waste, a reverse logistics supply chain must be developed to transport waste safely and efficiently from hospitals, health centers and posts to the incinerators.

Through close coordination between the Environmental Department of the Ministry of Health and the CMST, the MNSCTP will aim to design and implement a structured process of waste management in Malawi over the term of the strategy. The World Health Organization Health-Care Waste Management Manual provides detailed information on the care and attention needed for the various categories of clinical and anatomical waste and will serve as the primary document of reference for international best practices.

Through resource mobilization, there is a need for effective utilization of modern technology, functional and effective disposal systems for malfunctioning or condemned medical devices.

10.2 Maturity Assessment, Challenges and Root Causes

Currently, the maturity of waste management processes is ranked level 1 as there are no formal processes or structures to manage waste at a national level (See Annex II for a detailed maturity assessment model). Through support of the World Health Organization, development of a national policy is underway by the Department of Environment of the Ministry of Health and an external consultant is to be employed to finalize the total supply chain. Completion of these imminent activities will elevate the maturity to level 3.

Handling and transportation of diverse types of waste has implications on human health and safety and on the environment. Health facilities have guidelines of the management of hazardous waste, but these are not widely practiced. The proper equipment needed to support a comprehensive reverse logistics system such as tailgate lifts and mobile waste bins are currently not available or utilized.

10.3 Goals, Strategic Objectives and Proposed Activities

To address the stated issues and to develop an effective national waste management system for Malawi, the following goal supported by actionable objectives and appropriate activities have been defined.

Goal: Effective and efficient process of waste management that complies with international standards.

To achieve the goal of a proper waste management system that meets international standards, procedures must be established that are followed at each level of the supply chain; and a comprehensive reverse logistics supply chain must be designed and implemented. This will include supplying color-coded waste bins to all facilities to ensure compliant disposal of healthcare waste.

Objective 5.1: To establish and consistently practice certified SOPs for waste disposal by 2025.

Establishment of procedures for waste management based on international best practices is a critical first step in the implementation of a national waste management program. Proposed activities include:

a. Conduct a desk review of the World Health Organization Health- Care Waste Management Manual.
b. Develop and disseminate an SOP for waste management.
c. Establish a Ministry of Health unit responsible for waste disposal.

KPIs 5.1: SOPs Updated; Training Established

Measurement: binary (Y/N)- SOPs updated; binary (Y/N) - training program established.

Surveillance Methods: 100% inspection

d. Disseminate and train staff on SOP for waste management.

Objective 5.2: To design and implement a reverse logistics supply chain by 2024.

A reverse logistics supply chain must be designed and implemented that will manage the process of transporting waste from hospitals, health centers and health posts to the four national incinerators.

KPI 5.2: Reverse Logistics Supply Chain Established

Measurement: Reverse logistics scheme, rollout plan and SOPs established and implemented.

Surveillance Methods: Analysis of reports.

Options exist that must be analyzed by stakeholders to determine the most optimal system. Shifts in the roles of regional medical stores (RMS) as proposed in the section above provide opportunity for repurposed use for waste management. Proposed activities include:

a. Assess annual waste accumulation across the supply chain to determine the volume of waste that must be carried through the system.
b. Assess incinerators for compliance with pharmaceutical waste.
c. Hold sensitization and cost implication meetings with stakeholders.
d. Consolidate waste at RMS and enable RMS to act as locations for the consolidation of the waste prior to the onward transmission to the incineration sites.
e. Utilize existing third-party logistics providers to pick up waste upon delivery of orders and to transport waste to incineration sites.
f. Expansion and modernization of waste sites in accordance with environmental and health standards to accommodate the large volume of waste production generated at the health facilities.
g. Provision of modern equipment e.g., crushers and incinerators with less smoke and chemical emission.
h. Improve the functionality of the disposal practices through electronic and mechanical equipment waste generated by the health facilities.

Objective 5.3: To provide the appropriate equipment for safe and effective waste management to 100% of health facilities.

To ensure a safe and compliant waste management system, appropriate equipment based on international standards and policies must be made available to those facilities and individuals handling waste.

Proposed activities include:

a. Procure and fasten tailgate lifts for various mobile waste bins to be effectively loaded and unloaded.
b. Procure and distribute waste bags/bins for health facilities for transporting the waste to each health center for onward collection by the specialist vehicles.
c. Procure and distribute personal protection equipment (PPE) for staff handling waste.

KPI 5.3: Availability of Equipment for Waste Management

Measurement: Health facility survey.

Surveillance Methods: Random sampling.

Objective 5.4: To advocate for a decentralized waste management process by 2022.

Sub-national stakeholders expressed bottlenecks occurring due to the requirement to receive central level approval for the management of waste. Decentralization of this authority would result in more efficient processes. Activities under this objective will coordinate closely with the Ministry of Health (MOH) Environmental Department and align with efforts underway of GAVI and the Global Fund.

KPI 5.4: Establishment of Waste Management Operational Plan

Measurement: binary (Y/N)- Plan submitted and approved by MOH.

Surveillance Methods: Analysis of report.

Proposed activities include:

a. Develop a business plan and process map to outline a case for decentralization.
b. Host meetings with decision-makers to share proposed plans.

Objective 5.5: To create waste storage facilities at every health center by 2024. Proposed activities include:

a. Acquire old containers, adapt for use as storage facilities for waste, and install one container into each health facility. Acquire strong locking mechanisms (burglar-proof lock boxes) for the containers.
b. Acquire Industrial 2' x 2' flatbed scales to be welded to the floor of the container to prevent theft.

KPI 5.5: Storage Facilities Installed

Measurement: Health facility survey.

Surveillance Methods: Random sampling.

10.4 Implementation Plan

As per the implementation plan below, activities are anticipated to begin in quarter 1 of 2025 and continue through the first quarter of 2025 (see Exhibit U). To view a more detailed plan, complete with estimated costs required to implement the Waste Management strategy see Annex I.

Exhibit U. Implementation Plan: Waste Management

Activities		Timeline																													
		2023				2024				2025				2026				2027				2028				2029				2030			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Objective 5.1: To establish procedures for waste disposal by 2024.																															
1	Conduct a desk review of the World Health Organization Health-Care Waste Management Manual.																														
2	Develop and disseminate an SOP for waste management.																														
3	Review the medical devices and equipment policy																														
4	Develop disposal policy																														
5	Assess the functional and the non-functional medical devices and equipment																														
	BUDGET VALUES TOTAL $ 20,000					**$5,000**				**$5,000**				**$5,000**				**$5,000**													
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH																													
	KEY PERFORMANCE INDICATORS	ESTABLISHED PROCEDURES FOR REVERSE DISTRIBUTION MODEL																													
Objective 5.2: To design and implement a reverse logistics supply chain by 2024.																															
1	Assess annual waste accumulation across the supply chain to determine the volume of waste that must be carried through the system.																														
2	Assess incinerators for compliance with pharmaceutical waste.																														
3	Analyze function of existing simple incinerators at health facilities to determine compliance with environmental regulations.																														

4	Hold sensitization and cost implication meetings with stakeholders.																																
5	Consolidate waste at RMS and enable RMS to act as locations for the consolidation of the waste prior to the onward transmission to the incineration sites.																																
6	Utilize existing third-party logistics providers to pick up waste upon delivery of orders and to transport waste to incineration sites.																																
7	Expansion and modernization of waste sites in accordance with environmental and health standards to accommodate the large volume of waste production generated at the health facilities.																																
8	Provision of modern equipment e.g., crushers and incinerators with less smoke and chemical emission																																
9	Improve the usage of incinerators both mechanical and electronic and dispose off the waste generated by medical supplies and durable and non-durable devices. generated by the health facilities																																
	BUDGET VALUES TOTAL $ 22,500					$22,500																												
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH' TECHNICAL ASSISTANCE; DONOR COMMUNITY																																
	KEY PERFORMANCE INDICATORS	THE ESTABLISHMENT OF A COST-EFFECTIVE REVERSE LOGISTICS SYSTEM																																
Objective 5.3: To provide the appropriate equipment for safe and effective waste management to 100% of health facilities.																																	
1	Procure and fasten tailgate lifts for various mobile waste bins to be effectively loaded and unloaded.																																
	Procure and distribute waste bags/bins for																																

2	health facilities for transporting the waste to each health center for onward collection by the specialist vehicles.								
3	Procure and distribute PPE for staff handling waste.								
	BUDGET VALUES TOTAL $ 300,000		$300,000						
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH' TECHNICAL ASSISTANCE; DONOR COMMUNITY							
	KEY PERFORMANCE INDICATORS	THE KITTING-OUT OF EACH HEALTH FACILITY WITH THE APPROPRIATE PPE. DELIVERY VEHICLES TO BE CORRECTLY ENGINEERED							
Objective 5.4: To advocate for a decentralized waste management process by 2024.									
1	Develop a business plan and process map to outline case for decentralization.								
2	Host meetings with decision-makers to share proposed plan.								
	BUDGET VALUES TOTAL $ 0								
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH' TECHNICAL ASSISTANCE; DONOR COMMUNITY							
	KEY PERFORMANCE INDICATORS	PRODUCTION OF AN AGREED AND EFFECTIVE WASTE MANAGEMENT OPERATIONAL PLAN							
Objective 5.5: To create waste storage facilities at every health center by 2024.									
1	Acquire old containers, adapt for use as storage facilities for waste, and install one container into each health facility.								
2	Acquire strong locking mechanisms (burglar- proof lock boxes) for the containers.								
3	Acquire Industrial 2' x 2' flatbed scales to be welded to the floor of the container to prevent theft.								
	BUDGET VALUES TOTAL $ 1,900,500	$95,025	$380,100	$380,100	$380,100	$380,100	$95,025	$95,025	$95,025
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH' TECHNICAL ASSISTANCE; DONOR COMMUNITY							
	KEY PERFORMANCE INDICATORS	COMPLETE SUPPLY AND INSTALLATION OF EXTRA STORAGE FACILITIES TO ALL HEALTH FACILITIES BY END OF 2024							

11. INFORMATION SYSTEMS

11.1 Overview

The health product supply chain in Malawi is managed by a collection of systems, each which currently operate independently and share data manually. On the "upstream" of the supply chain, the Central Medical Stores Trust (CMST) recently introduced the Microsoft Dynamics Navision enterprise resource planning (ERP) system which replaced ACCPAC. For program procurement, partners, the United States Agency for International Development (USAID) Global Health Supply Chain Program- Procurement and Supply Management project (GHSC-PSM) and the Global Fund Pooled Procurement Mechanism (PPM), utilize their own proprietary systems and those of their working partners, Bollore and CML.

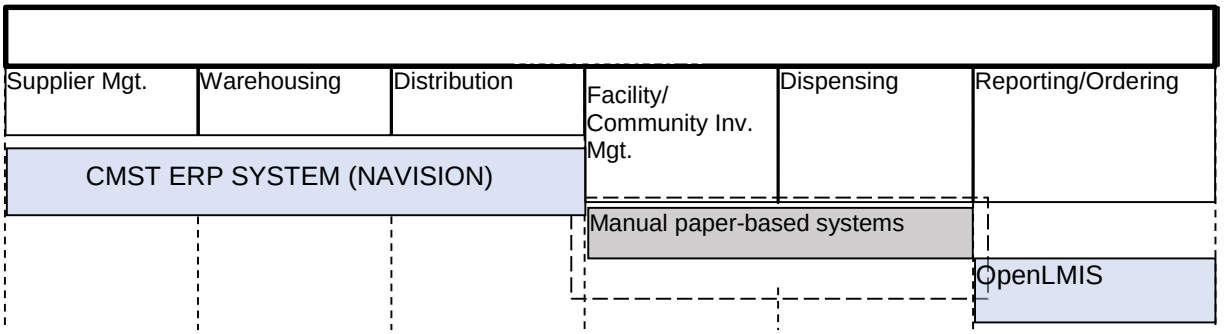
C-Stock

The objective of C-Stock is to strengthen visibility of health commodities at both the health facility and community levels.

The Ministry of Health is planning for continuation, sustainability and maintenance of C-Stock system tools that will help HSAs at community level.

The Ministry of Health's OpenLMIS, eHIN and C-Stock (see box) systems injects functionality towards the "downstream" lower, last-mile segments of the supply chain (district and ward levels respectively) and correlate health program service data with supply-chain data through an interoperability layer (see Exhibit V and Exhibit R below).

Exhibit V. Structure of Commodity Management Information Systems



Microsoft Dynamics NAV (Navision) ERP is a Microsoft-based Enterprise Resource Planning platform which has been in the process of implementation at CMST since mid-2019. The ERP is a holistic solution that manages procurement, financials, warehouse, and stock management and is complemented by advanced business intelligence modules. The system is slated to operate at all facilities of CMST.

At present the Warehouse and Stock Management and Financial modules have been implemented and are going through a period of parallel operation with the old ACCPAC system whilst under-going data transfer and clearance of back-logged transactions and further fine tuning. The Procurement and Advanced Business Intelligence modules are still

under development. Navision does not include functionality for journey planning or asset management in the iteration owned by CMST. Human Resources is and will continue to be managed through Sage 300 People.

OpenLMIS is an ordering and reporting platform. The system is owned by Health Technical Support Services (HTSS) and its operations are supported by USAID GHSC-PSM and VillageReach. It is recommended that the system be transitioned to be managed by HTSS Technical Team through the LMU. It operates as a hybrid system in which manual paper-based forms are utilized at lower levels with electronic components utilized at central level for data aggregation and analysis, ordering and reporting.

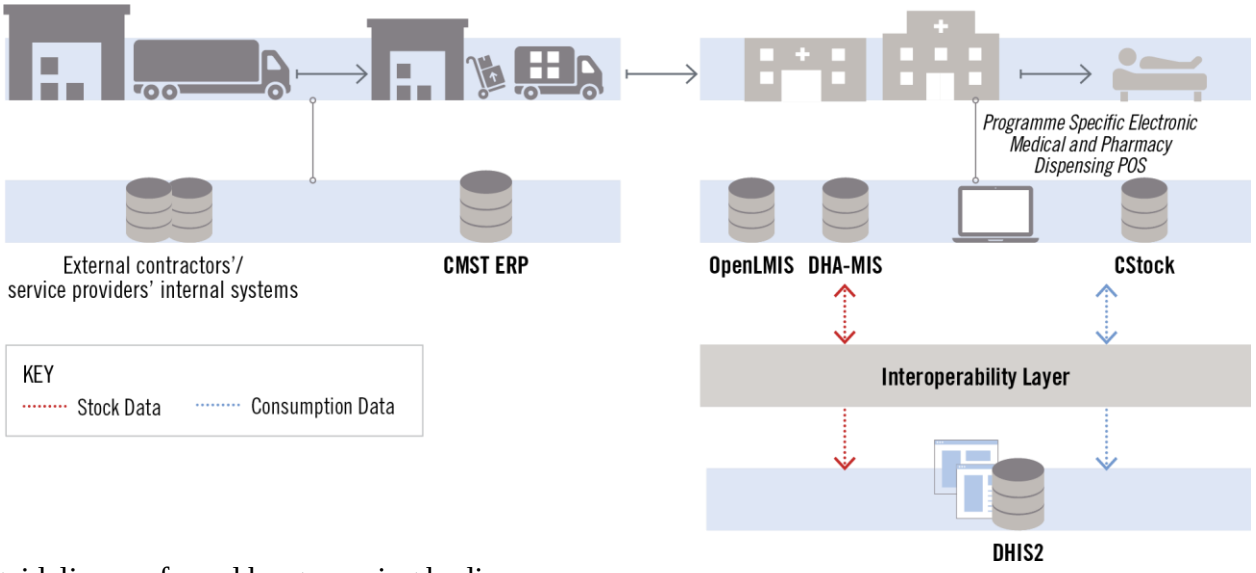
At the facility level, requisitioning of drugs and commodities and reporting of stock are done manually. Monthly, to replenish stock, health facilities report consumption to the district health office or a data collection hub who inputs the data into the online system. This data is utilized to generate a multitude of reports (i.e., consumption, stock-outs, adjustments, reporting rate, regular vs. emergency orders, and district summaries) and to generate orders. Once the order is generated, it is forwarded in spreadsheet/pdf format to the relevant procuring partner.

c-Stock is used by health surveillance agents (HSAs), who conduct health work at the community, to monitor and order their individual stock and to report stock on hand to health facilities which they operate under using SMS technology. Health facilities aggregate the stock information and manage the resupply of stocks to the HSA from the facility as needed using reports from C-Stock. Commodity consumption of HSA is included in the statistics reported by OpenLMIS and subsequently transferred to District Health Information Systems (DHIS2).

Exhibit W. Current Supply Chain/HIS IT System Structure

DHIS2 is the core health information system which tracks health services data from all health facilities in Malawi. It is expected that all other national health-related systems will feed into DHIS2. An interoperability gateway has been built to facilitate communication with DHIS and other systems, as applicable. The gateway seeks to improve data accuracy and to normalize various data elements collected by multiple systems through use of platform service tools such as a master facility list (MFR), master health product registry (MHPR) (under development) and a Terminology Service (which includes a data dictionary) that enables all systems to utilize the same nomenclature. Lastly, a multitude of program related thematic systems also exist, such as the Department of HIV and AIDS,

Management Information System (DHA-MIS) to monitor and correlate program data with commodity data, to maintain service quality and to adhere to global best practice



guidelines enforced by governing bodies.

11.2 Maturity Assessment, Challenges and Root Causes

Upstream: Overall, the existing systems throughout the supply chain, some with overlapping coverage, are inefficient and produce significant inconsistencies in data due to having different management frameworks, standards, and thresholds. Maturity of information systems at the central level, with proper implementation of the new Navision ERP is a level 3, representing an improvement from maturity of level 2 with the former ACCPAC system. However, due to an improper implementation of the ERP (non-extensive process analysis and requirement analysis), CMST struggles to retain operations at level 3. Key challenges include:

a. *Structural issues of Navision platform.* Significant shortcomings in the platform's capabilities make it difficult to properly control or organize processes and there is weak alignment between the platform processes and the business processes. The system is not ideally situated to manage SCI and will require significant operational support to be capable of operating the level of supply chain management required to sustain the future SCI.
b. *Missing functionalities of Navision.* Notably, the General Ledger (GL) system has a set of GL codes which precludes the effective analysis of operational costs and furthermore, prevents the implementation of Activity Based Costing and the setting of financial standards of operation. Operational capacity in warehouse management is limited, having only 43.2% of good warehousing practices (GWP) required functionality.
c. *Poor data quality.* Functionality of the systems is not helped by the low quality of data inputted. Most issues in data quality within the supply chain stem from unstructured data baskets, multiple and inconsistent tools and systems, and an insufficient cadre of skilled staff to operate and manage the systems.

d. *Manual data exchange.* While strides have been made in interoperability among systems with the development of the interoperability layer and automatic data sharing amongst OpenLMIS, DHIS2 and DHA-MIS; automated data sharing has not yet been extended to between the primary supply chain systems, OpenLMIS and the CMST ERP, Navision. Inconsistencies in data standards, formats and differences in system/business processes currently impede interoperability.
e. *Limited IT infrastructure.* IT infrastructure is quite limited throughout the supply chain; that which exists is primarily program owned and common infrastructure is dedicated to running the interoperability layer and services, meaning an additional system will require additional infrastructure. CMST has recently deployed servers for Navision, yet they lack scalability and have limited resources for disaster recovery. Warehouses are not equipped with technologies such as bar code readers or RFID infrastructure.

Downstream: Many of the challenges experienced with existing information systems throughout the supply chain can be traced back to the low quality of data inputted. Systems are inefficient, in some cases overlapping, and produce significant inconsistencies in data due to having different management frameworks, standards and thresholds.

At the sub-national level, aside from DHA-MIS which stands at a level 4, maturity of information systems is at level 3 at the district level due to the current use of the electronic modules of OpenLMIS; yet at the health facility level, maturity is at level 2 as data input (see Exhibit X) into OpenLMIS is manual resulting in data quality issues that are only exacerbated upstream. Key challenges include:

a. *Low data quality.* Most issues in data quality within the supply chain stem from unstructured data baskets, multiple and inconsistent tools and systems, and an insufficient cadre of skilled staff to operate and manage the systems. To increase data availability and quality, there is a significant need to digitize stock management and to enable health facilities to input data directly so that there is only one point of accountability.
b. *Lack of data sharing across supply chain systems.* While strides have been made in interoperability among systems with the development of the interoperability layer and automatic data sharing amongst OpenLMIS, DHIS2 and DHA-MIS; automated data sharing has not yet been extended to between the primary supply chain systems, OpenLMIS and the CMST ERP, Navision. Inconsistencies in data standards, formats and differences in system/business processes currently impede interoperability.
c. *Manual inventory management and tracking of consumption data at facilities.* The OpenLMIS stock management component is under development with plans to be piloted at sites. In its absence, the system monitors consumption levels at the facilities based on data collected via paper stock/bin cards. Data entry from the paper logistics management information systems (LMIS) forms into

OpenLMIS is tedious and inhibits the ability for the system to yield real-time data or provide end-to-end visibility as desired by stakeholders.

d. *Process not structured to provide "real-time" data.* Due to the burden of translating paper- based data into digital, the time lag between when the paper form is submitted, and reports are available is greater than one month. This renders the system ineffective for the proactive management of stock.
e. *Limited IT infrastructure.* The physical enabling environment for electronic systems is limited throughout the supply chain; that which exists is primarily program owned. Most facilities have cabling and wireless infrastructure for its local area network, but internet connectivity is sporadic, and hardware needed to operate information systems at the district and facility levels is often unavailable. Warehouses are not equipped with technologies such as bar code readers or RFID infrastructure.

11.3 Goals, Strategic Objectives and Proposed Activities

To address the stated issues and to provide a network of information systems which support an integrated supply chain, the following goals supported by actionable objectives and appropriate activities have been defined.

Goal: Integrated supply chain information system that provides end-to-end data visibility and effectively provides management level data for performance monitoring and decision-making.

High quality data and confidence in the data processing and management frameworks and processes are imperative for sound and effective decision-making. To monitor the supply chain and its commodities, to optimize distribution, and to increase commodity safety and security; and to provide high quality data for traceability and decision-making, supply chain information systems must be integrated and made interoperable.

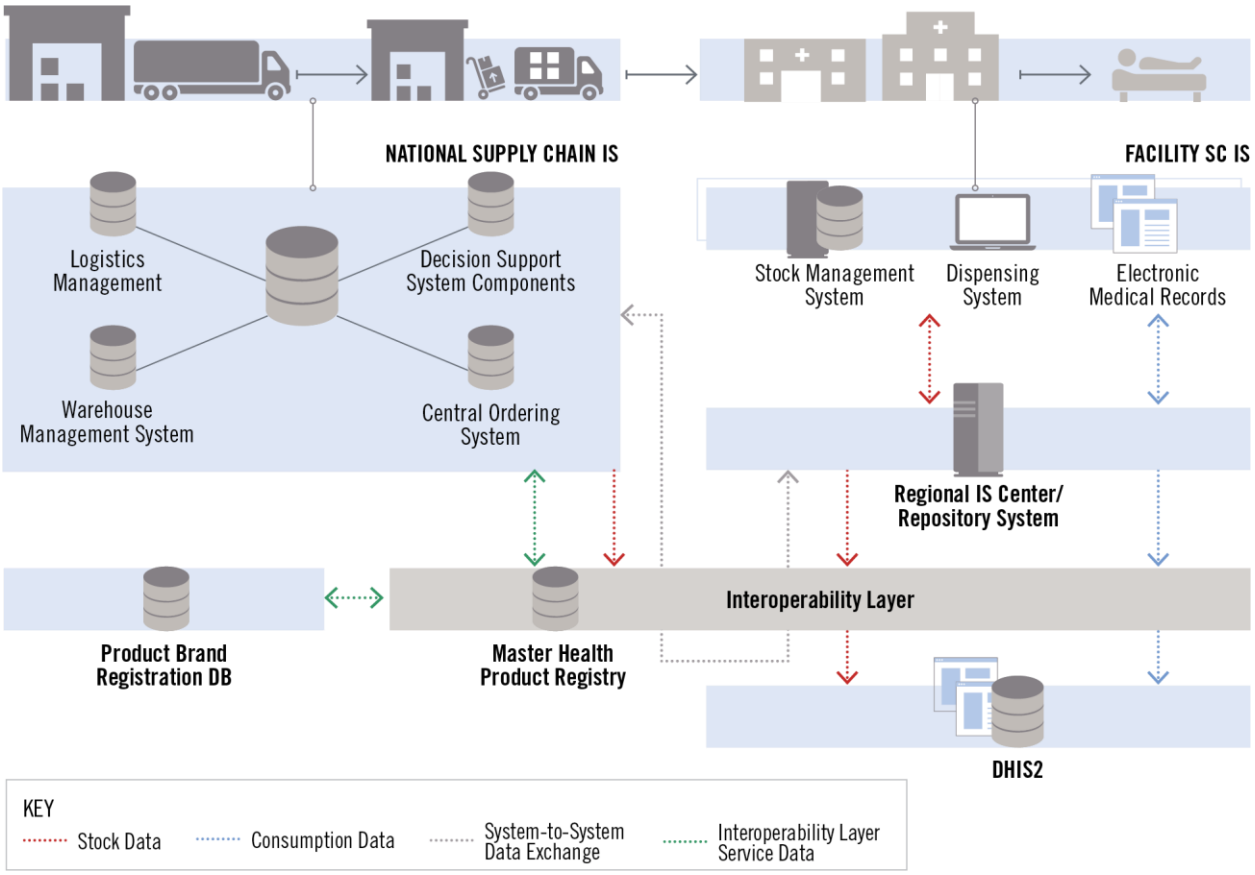
To provide this level of management information, an Integrated National Supply Chain Information System (INSCIS) is envisioned (see Exhibit X) to be composed of two core components: The National Supply Chain Information System (NSCIS) and the Facilities' Supply Chain Information System (FSCIS). The NSCIS will track commodities and provide services to conduct supply chain operations in a regulated and controlled manner in the upper segment of the supply chain (from warehouse to delivery to health facilities); while the FSCIS focuses on the last mile of the supply chain.

The FSCIS will be present at each facility for stock monitoring and recording the dispensing of drugs in collaboration with a common Electronic Medical Record (EMR) system. The FSCIS will also be accessible to mobile health clinics and service personnel such as health surveillance agents (HSAs) via its mobile components.

The NSCIS and FSCIS are complemented by two critical auxiliary systems: the interoperability layer, as described above which provides the tools and the framework for systems to interoperate; and the Product Item Registration Database, a registration

database for all pharmaceutical and medical devices registered to be traded in Malawi. Use of barcoding and QR scanning should be a requirement by the proposed systems

Exhibit X. Future State Supply Chain/ HIS IT System Structure



Objective 6.1: To facilitate interoperability including common services and connectivity tools by 2023.

As stated, the core interoperability layer has been developed. To interoperate supply chain systems, the interoperability layer, and its underlying system, DHIS2, need to be expanded to accommodate and report on supply chain data. This will provide a platform to validate and triage service data stored in DHIS2 against logistics data, increasing confidence in data quality and resulting in better- informed healthcare decision-making.

Proposed activities include:

a. Configure DHIS2 database and other dashboards to accommodate and report on supply chain data. Consideration of where the integration will take place, national or district.
b. Develop connectivity modules between NSCIS and FSCIS (see Section 6. Information Systems)

KPI 6.1: Completion of configuration and connectivity modules.

Measurement: Assessment of system functionality.

Surveillance Methods: 100% inspection.

c. Develop an equipment inventory management system for devices and spare parts that would be interoperable with the other systems that coordinate with NSCIS

Objective 6.2: To develop a Master Health Product Registry (MHPR) platform by 2023.

A Generic Product Catalogue is currently being developed and will be published as a manual spreadsheet and a Pharmacy and Medicines Regulatory Authority (PMRA) database is internal, requiring fielding of queries on an ad hoc basis to obtain information. An MHPR platform will harmonize the generic product catalogue developed by CMST and the product registration database which falls under the purview of the PMRA to enable stakeholders to view generic products and the registered brand items for each generic product. This will support proactive management and quality assurance of the products entering the supply chain. Proposed activities include:

a. Define structural and operational guidelines.
b. Develop an MHPR digital platform.
c. Rollout MHPR and compel other systems to use MHPR nomenclature for drugs and commodities.
d. Correlate generic product registrations with corresponding PMRA registration and Global Trade Identification Number (GTIN) codes for each brand item of the generic product and develop a system that logs the flow of products using their Generic Product IDs, GS1 codes and other relevant meta-data.

KPI 6.2: Master Health Product Registry (MHPR) Accessibility

Measurement: Percentage of users (central, district and facility level) able to access the MHPR.

Surveillance Methods: Random sampling.

Objective 6.3: To develop and deploy the National Supply Chain Information System (NSCIS) for central level supply chain operations (Inventory Management System/Ordering/Logistics Management System) by 2023.The benefits of a fully functioning Inventory Management System (IMS) and a central ordering system have been stated in Section 3 “Warehousing, Storage and Inventory Management,” Objective 3.2 and 3.4.

KPI 6.3: System Deployed and Operational

Measurement: Percentage of users (central) able to use the system.

Surveillance Methods: 100% inspection.

The IMS and the ordering system together will provide the functionality to assign stock for dispatching to facilities as orders are received. A logistics system will provide features on scheduling shipments and optimal routes and tracking the shipments in transit.

Proposed activities include:

a. Acquire a fully functioning IMS (See also Objective 3.2)
b. Deploy the IMS in the central warehouse.
c. Deploy the IMS in regional warehouses.
d. Procure and install supporting infrastructure (bar-code scanners, printers and other equipment required for optimal operation of the warehousing and logistics).
e. Develop and implement a comprehensive ordering that includes the necessary modules to accommodate the centralized direct ordering by facilities.
f. Transfer upper segment logistics systems' operations to NSCIS.
g. Develop data interchange components to other relevant systems including DHIS2.

Objective 6.4: To develop and deploy the Facilities' Supply Chain Information System (FSCIS) by 2025.

Development of a FSCIS, accessible and operational via desktop workstations and mobile devices, which will ensure that all facilities are equipped with a stock management application where stock updates are recorded and reported on-demand. The system will enable dispensing point of service (POS) to monitor all pharmaceutical (and medical device) dispensing to patients at pharmacies and other distribution outlets.

System services should be accessible and operational via desktop workstations and mobile devices. Stock levels, consumption and losses and adjustment data will be provided by all Malawi National Supply Chain Transformation Plan levels to the next level, adequate for decision making and performance monitoring. Proposed activities include:

a. Undertake a user-based functional specification.
b. Determine system requirements to include built-in ability to monitor supply chain components such as cold storage facilities; notification of impending stock-outs, expiries; scheduled deliveries and computational models for data validation.
c. Design a common application that monitors all commodities in the stockroom at the facilities and commodity dispensing needs to be deployed.
d. Computerize existing tools (transfer of data from sources rather than re-inputting it, use of mobile phones, direct data input).
e. Design a mobile application that will provide for community health inventory management.
f. Replace paper-based systems (move from paper-based reporting to automated).
g. Embed functionality to record batch/serial/GS1 codes, expiry dates, stock in dates, etc. and ensure that proper and prescribed stock rotation methods and other

KPI 6.4: System Deployed and Operational

Measurement: Percentage health facilities with access to the system.

Surveillance Methods: 100% inspection.

stock management protocols are followed (e.g., ensure items are rotated first expired first out "FEFO").

h. Deploy required computing infrastructure at all facilities that manage a stock room and/or dispense commodities.
i. Outline governance structure for authorities and approvals.
j. Develop a rollout and implementation plan.
k. Establish a training program for trainers.
l. Rollout system to health facilities.
m. Develop a medical device tracking system that can be used to monitor the location of medical devices, functionality (errors / failure) and lifecycle response and per manufacturer specifications.
n. Provision of digital data logs for device users.

Objective 6.5: To scale-up infrastructure to support the National Supply Chain Information System (NSCIS) by 2021 and Facilities' Supply Chain Information System (FSCIS) by 2024.

For the NSCIS and FSCIS to be effective from end-to-end; appropriate computing infrastructure must be deployed. Adhering to government policy, cloud-based solutions where hosting infrastructure is maintained outside of Malawi, are not acceptable. Proposed activities include:

a. Questionnaire (include with above) to identify reliable service providers
b. Establish the need for upgrade of the current hardware platforms.
c. Acquire and install hardware upgrades.
d. Determine standardized equipment package for health facilities.
e. Assess wired and wireless infrastructure of health facilities.

KPI 6.5: Availability of Infrastructure to Support System

Measurement: Health facility survey.

Surveillance Methods: Random sampling.

Objective 6.6: To standardize and implement data and quality improvement processes by 2021.

For data to interoperate and be of use for decision-making, it must be governed by master data and follow a common structure of indicators for reporting.

Proposed activities include:

a. Expand Master Facility Registry (MFR) to include data regarding supply chain attributes of facility types within the supply chain such as stock room attributes, availability of cold chain equipment, and road accessibility type.
b. Develop modules to electronically connect systems to the MFR.
c. Register warehouses and intermediary storage locations in the MFR and assign proper locator IDs.
d. Define core data elements to standardize reports and indicators.
e. Develop and formalize a data and key performance indicator (KPI) basket for each level of the supply chain.
f. Develop a common data quality assurance (QA)/ quality control (QC) and monitoring and evaluation (M&E) framework that encapsulates the best control and monitoring practices of existing systems, industry best practices and the national guidelines for periodic and consistent monitoring of supply chain data.

KPI 6.6:

Data Standardization.

Measurement: Report to outline completion of proposed activities.

Surveillance Methods: Report analysis.

Objective 6.7: To facilitate data exchange and service transfer.

To enable the Facilities' Supply Chain Information System (FSCIS) to report on consumption and stock (availability and flow) and the National Supply Chain Information System (NSCIS) to report on data pertaining to distribution and availability, the systems must be fastened to transfer aggregate data to DHIS2 to correlate consumption data against distribution data for analysis and reporting via dashboards that display KPIs.

KPI 6.7: Data Transfer.
Measurement: Binary (Y/N) – functionality of data transfer between systems.
Surveillance Methods: 100% inspection.

Proposed activities include:

a. Develop modules to FSCIS and the NSCIS along with other upper segment systems to transfer core data into DHIS2.
b. Define common, high level, national KPIs to be reported on.
c. Transition core data of parallel supply chain systems to the integrated system to facilitate structured data reporting and monitoring.

Objective 6.8: To create an enabling environment for supply chain IT system management and continuous support. For IT systems to consistently function, the right people and policies must be in place. Due to its cross-cutting nature, this objective is also reflected in Section 8 "Human Resources and Operations" and Section 9 "Policy and Regulatory."

KPIs 6.8: Training Program Established

Measurement: Binary (Y/N) training program established.

Surveillance Methods: 100% inspection

Proposed activities include:

a. Build capacity in data quality management, control, and assurance through establishment of IT training programs.
b. Reform the organizational structure to manage and support supply chain IT systems.
c. Restructure the organogram for CMST to manage the operations of the new NSCIS platform (See Annex VIII).
d. Adopt national digital legislature and policies.
e. Facilitate cultural change and shift in perspectives on data use and data rights.
f. Ensure an adequate IT policy and IT management team at Ministry of Health and regions.
g. Establish cadre of professionals capable of providing technical support to troubleshoot system problems or failures on behalf of system users.
h. Introduce continuous process improvement and engender relationships with relevant global technology communities to improve supply chain operations and digital technologies in accordance with changing needs and priorities.

Objective 6.9: To provide all community health facilities with an SMS based Inventory Management system by 2026.

To enable effective data reporting at community level, a SMS based Inventory Management system will be developed and implemented for all community health facilities. This will enable health workers to collate and report stock data including consumption more efficiently and reduce the reliance on paper- based systems thus supporting improved forecasting and procurement leading to a more sustainable supply of commodities to district levels and the reduction of stock outs and expiries. Proposed activities include:

a. Establish the status of the work already undertaken to provide the SMS solutions at community health facilities.
b. Identify the extent and nature of the number of health communities to be provided with the Inventory Management solution.
c. Develop a project plan for implementation and training.
d. Identify the quality of the SMS signal to those health communities that will be provided with the software tool.
e. Discuss the availability of SMS signal and mobile phones with a leading mobile phone supplier and obtain preferential prices for the supply of the shortfall.
f. Undertake a pilot study with a selected number of health communities.
g. Create and implement a roll-out plan on the successful conclusion of the pilot study.

KPIs 6.9: SMS Inventory Management System implemented in community health facilities.

Measurement: Assessment of system functionality.

Surveillance Methods: 100% inspection.

11.4 Implementation Plan

The implementation plan (see Exhibit Y) provides the recommended timelines for completion of the activities and achievement of objectives stated above. To view a more

detailed plan, complete with estimated costs required to implement the Information Systems strategy see Annex I.

Exhibit Y. Implementation Plan: Information Systems

Activities		Timeline																													
		2023				2024				2025				2026				2027				2028				2029				2030			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Objective 6.1: To develop an interoperability layer and deploy common services and connectivity tools by 2024.																															
1	Configure DHIS2 database and other dashboards to accommodate and report on supply chain data.																														
2	Develop connectivity modules between NSCIS and FSCIS.																														
	BUDGET VALUES TOTAL $ 45,000					$45,000																									
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY																													
	KEY PERFORMANCE INDICATORS	ACTUAL ACHIEVEMENT OF THE ACTIVITIES																													
Objective 6.2: To develop a Master Health Product Registry (MHPR) platform by 2024.																															
1	Define structural and operational guidelines.																														
2	Develop an MHPR digital platform.																														
3	Rollout MHPR and compel other systems to use MHPR nomenclature for drugs and commodities.																														
4	Correlate generic product registrations with corresponding PMRA registration and GTIN codes for each brand items of the generic product and develop a system that logs the flow of products using their Generic Product IDs, GS1 codes and other relevant metadata.																														
	BUDGET VALUES TOTAL $0																														
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY																													
	KEY PERFORMANCE INDICATORS	ROLL-OUT OF THE MASTER HEALTH PRODUCT REGISTRY TO ALL LEVELS BY 2023																													
Objective 6.3: To develop and deploy the NSCIS for central level supply chain operations (WMS/Ordering/Logistics Management System) by 2025.																															
1	Acquire a best of breed Warehouse Management Systems (IMS).																														

2	Deploy the IMS in the central warehouse.	
3	Deploy the IMS in regional warehouses.	
4	Procure and install supporting infrastructure (bar-code scanners, printers and other equipment that is required for the optimal operation of the warehouse and logistics operation).	
5	Develop and implement a comprehensive ordering system (See Inventory management section) that includes the necessary modules to accommodate the centralized direct ordering by facilities.	
6	Transfer upper segment logistics systems' operations to NSCIS.	
7	Develop data interchange components to other relevant Supply Chain and Logistics systems including DHIS2.	
	BUDGET VALUES TOTAL $ 30,000	$30,000
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY
	KEY PERFORMANCE INDICATORS	DEPLOYMENT OF THE SYSTEMS AS PLANNED AND THE PROOF OF THEIR OPERATIONAL EFFECTIVENESS THROUGH COMPARISON TO STANDARS OF OPERATION
Objective 6.4: To develop and deploy the FSCIS (health facility stock management system and dispensing POS) by 2027.		
1	Prepare a questionnaire to determine current system usage of health facilities.	
2	Undertake a user-based functional specification.	
3	Determine system requirements to include built-in ability to monitor supply chain components.	
4	Design a common application that monitors all commodities in the	

	stockroom at the facilities and commodity dispensing needs to be deployed.																																
4	Design a mobile application that will provide for community health inventory Management																																
5	Computerize existing tools (transfer of data from sources rather than re-inputting it, use of mobile phones, direct input).																																
6	Replace paper-based systems (move from paper-based reporting to automated).																																
7	Embed functionality to record batch/serial/GS1 codes, expiry dates, stock in dates, etc. and ensure that proper and prescribed stock rotation methods and other stock management protocols are followed.																																
8	Deploy required computing infrastructure at all facilities that manage a stock room and/or dispense commodities.																																
9	Outline governance structure for authorities and approvals.																																
10	Develop a rollout and implementation plan.																																
11	Establish a training of trainers' program.																																
12	Rollout system to health facilities.																																
13	Develop a medical device tracking system																																
14	Provision of digital data logs for device users																																
	BUDGET VALUES TOTAL $ 8,392,500	$80,000				$602,500			$1,542,000				$1,542,000				$1,542,000				$1,542,000				$1,542,000								
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY																															
	KEY PERFORMANCE INDICATORS	THE IMPLEMENTATION OF THE SYSTEM IN ALL HEALTH FACILITIES																															
Objective 6.5: To scale-up infrastructure (NSCIS –by 2027, FSCIS by 2029).																																	
1	Questionnaire to identify reliable																																

	service providers.																																
2	Procure hardware for IMS and central ordering system.																																
3	Determine standardized equipment package for health facilities.																																
4	Determine the cost of the development and hardware upgrades.																																
5	Assess wired and wireless infrastructure and procure/implemen t servers, routers, and firewalls as needed.																																
	BUDGET VALUES TOTAL $ 263,250	$140,000				$52,750			$70,500																								
	RESPONSIB LE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY																															
	KEY PERFORMANC E INDICATORS	TO COMPLETE THE SCALE-UP OF INFRASTRUCTURE AS DETERMINED BY THE ASSESSMENT																															
Objective 6.6: To standardize and implement data and quality improvement processes by 2024.																																	
1	Conduct a data quality assessment.																																
2	Expand Master Facility Registry (MFR) to include data regarding supply chain attributes of facility types within the supply chain such as stock room attributes, availability of cold chain equipment, and road accessibility type.																																
3	Develop modules to electronically connect supply chain information system to the MFR.																																
4	Register warehouses and other intermediary storage locations in the MFR and assign proper locator IDs.																																
5	Define core data elements to standardize reports and indicators.																																
6	Develop and formalize a data and KPI basket for each level of the supply chain.																																
	Develop a common data QA/QC and M&E framework																																

7	that encapsulates the best control and monitoring practices of existing systems, industry best practices and the national guidelines for periodic and consistent monitoring of supply chain data.								
	BUDGET VALUES TOTAL $ 45,000		$45,000						
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY							
	KEY PERFORMANCE INDICATORS	TO COMPLETE THE STANDARDIZATION OF DATA AS PLANNED BY 2023							
Objective 6.7: To facilitate data exchange and service transfer.									
1	Develop modules to FSCIS and the NSCIS along with other upper segment systems to transfer core data into DHIS2.								
2	Define common, high level, national KPIs to be reported on.								
3	Transition core data of parallel supply chain systems to the integrated system to facilitate structured data reporting and monitoring.								
	BUDGET VALUES TOTAL $0								
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY							
	KEY PERFORMANCE INDICATORS	THE COMPLETION OF THE ABILITY TO TRANSFER DATA FROM THE OTHER SYSTEMS TO THE DHIS2							
Objective 6.8: To create an enabling environment for supply chain IT system management and continuous support.									
1	Build capacity through establishment of IT training programs.								
2	Reform the organizational structure with manages and supports supply chain IT systems.								
3	Restructure the organogram for CMST to manage the operations of the new NSCIS platform.								
4	Adopt national digital legislature								

	and policies.								
5	Facilitate significant cultural change and change in perspectives on data use and data rights.								
6	Ensure adequate IT policy and management team at MOH and in regions.								
7	Establish cadre of professionals capable of providing technical support to troubleshoot system problems or failures on behalf of system users.								
8	Build local capacity to understand data quality management, control, and assurance; introduce continuous process improvement through technology and engender relationships with relevant global technology communities.								
	BUDGET VALUES TOTAL $ 693,000		$99,000	$99,000	$99,000	$99,000	$99,000	$99,000	$99,000
	RESPONSIBLE PARTIES MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY								
	KEY PERFORMANCE INDICATORS	THE DESIGN OF THE TRAINING PROGRAMME AND THE COMPLETION OF ALL TRAINING WITH A CONTINUOUS ASSESSMENT OF SKILLS GAINED							

Objective 6.9: To provide all community health facilities with an SMS based Inventory Management system by 2026

1	Establish the status of the work already undertaken to provide the SMS facility (approx. 550 facilities)
2	Review and undertake the software tool upgrade
3	Identify the extent and nature of the number of health communities to be provided with the Inventory Management Solution
4	Develop a project plan for implementation and training
5	Develop a training program for the implementation of the SMS software tool
6	Identify the quality of the SMS signal to those health communities that will be provided with the

	software tool																																
7	Determine the availability of the mobile phones at each health community and establish where there is a shortfall																																
8	Discuss the shortfall with a leading mobile phone supplier and obtain preferential prices for the supply of the shortfall																																
9	Create project team to undertake the implementation of the software tool																																
10	Undertake a pilot study with a selected number of health communities																																
11	Create a roll-out plan on the successful conclusion of the pilot Study																																
12	Implement the roll-out plan																																
	INDICATIVE BUDGET VALUES TOTAL $564,459					73,625			245,417				245,417																				
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY																															
	KEY PERFORMANCE INDICATORS	Implementation of the Inventory Management APP into all health communities by 2026																															

12. FINANCING

12.1 Overview

When CMST was established in 2012, there was a commitment by the Government of Malawi to provide capital for the organization to operate on a financially stable basis. In 2020, this infusion of capital has yet to occur resulting in reliance on donor funding and high service charges imposed on partners and health facilities. Currently, the 18% fee applied to product cost is too high to be considered fair value to clients and too low to cover the total operational costs of CMST.

CMST's budgetary shortfalls, due to inadequate capital, have a direct impact at the sub-national level as health facility budgets cannot cover their clientele's demand. Lack of adequate funding results in a system destined to fail as the annual quantification for the supply of pharmaceutical products and supplies has never been allocated the level of government commitment required to meet the requested funds for procurement. Over the previous three years, there is an evident trend towards budget increases each year, yet the gap between funds needed and funds available persists (see Exhibit Z).

Exhibit Z: Historical Budget Allocation Versus Quantified Need

Year	CMST Annual Quantification (MWK billions)	Approved Annual Budget (MWK billions)	Annual Shortfall (MWK billions)	Annual Shortfall (%)
2016/17	25	15.77	-9.2	-37%
2017/18	35	17.35	-17.7	-51%
2019/20	38	19.7	-18.3	-48%

Budgets for each health facility are allocated annually and managed by the districts. Facilities currently have no visibility into their budget or role in budgeting or financial reporting.

12.2 Maturity Assessment, Challenges and Root Causes

Upstream: In the maturity assessment, CMST financial systems were ranked level 3 and are not seen as adequate for proper financial planning and management. The current accounting system is unable to support the cost analysis needs of a more sophisticated supply chain necessitating the implementation of a more structured set of General Ledger codes to facilitate such analysis.

However, the root cause of financial challenges faced by CMST is insufficient capital, which drives a vicious cycle:

a. *Inadequate working capital drives up creditor days and product costs.* Creditors do not receive payments within the industry norm of 60-days and therefore, short their orders or fail to respond to them. Local suppliers, cognizant of the delays in payment, add interest to the original product prices to compensate for the non-timeous payment, further driving up costs.

b. *High prices drive down sales.* The high fee percentage charged on commodities due to the scenario described above coupled with experiences of out-of-stocks and inadequate order fill disincentives districts from ordering from CMST and results in requests for waivers or exclusions from the 2017 Public Procurement and Disposal of Assets (PPDA) Act to procure from other sources which have been granted by the Government of Malawi (GOM).

c. *Diverted business unbalances revenue and expenditures, further driving up prices.* High prices due to the product cost plus an 18% service charge on price

of commodities results in CMST being uncompetitive against wholesalers in Malawi for the same products. The diverted business results in a reduction of sales and further imbalance between sales and the cost of sales (operational costs), further driving the fee percentage required for cost recovery, and worsening the stock-turn and creditor payment scenarios.

In the current state, to break even on operational costs, CMST would need to charge 32% on commodity orders. To offer acceptable creditor days and competitive service prices, CMST must be capitalized to support the payment of the orders in the pipeline and allow a degree of working capital.

Downstream: Symptoms of the lack of capital then reverberate through the downstream supply chain in the form of stock outs and insufficient order fill. Key challenges include:

a. *Blind ordering.* Facilities have no visibility into their budget; meaning that they are managing and requesting inventory with no understanding of the budget available to accommodate the orders. Facilities that procure medicines from CMST ordering are done based on quantities without cost and no feedback is received so consumption in terms of cost is not known by the facility.
b. *Centralized budget management.* Facilities may not receive a complete order or a certain product due to either a lack of availability of the product, or a lack of funds available; neither of which is known at the facility level, stewing frustration.
c. *Limited drug budgets and high costs of drugs.* Many District Health Offices have huge debts with CMST because of inadequate drug budgets.

12.3 Goals, Strategic Objectives and Proposed Activities

To address the stated issues and to provide appropriate health facility financing mechanisms that are adequate, coordinated, and accountable, the following goals supported by actionable objectives and appropriate activities have been defined.

Goal: Ensure financial sustainability of CMST.

Objective 7.1: To increase current capital of CMST by 100% in 2025 and establish a secure flow of incoming capital to sustain operations thereafter.

In its 2020 to 2023 Business Plan, CMST has requested a capital input equal to double its current capital. This funding is to be realized over a period of three-years to reduce creditor days, fund the existing procurement pipeline, and provide working capital to upgrade CMST to meet the requirements of supply chain integration.

Proposed activities include:

a. Develop and submit a recapitalization proposal to the Ministry of Health (MOH) and Ministry of Finance, Economic Planning and Development (MOFEPD).
b. Lobby government and development partners for recapitalization of CMST.
c. Explore options for long-term funding from a funding source or of a joint funding consortium composed of GOM, donors and a funding bank (e.g., Development Banks).
d. Strengthen financial planning processes.

KPIs 7.1: Capitalization Resolution; Funding Level of CMST

Measurement: Binary (Y/N) resolution of the requirement for capitalizing CMST to the full extent required; Value of funds available to CMST.

Surveillance Methods: 100% inspection

Objective 7.2: To increase CMST revenue by 10% annually, to reach an increase of 50% by June 2025.

Proposed activities include:

- Design pricing model for products and services.
- Develop a revolving drug fund and/or identify alternative and innovative sources of funding.
- Conduct a benchmarking exercise to identify funding models for alternative sources of funding used by other countries.
- Develop a marketing strategy for CMST products and services to include client engagement, development of customer profiles and tailored sales pitches.
- Conduct a price differentiation exercise between different customers.

KPIs 7.2: CMST Revenue

Measurement: Increase in CMST income per annum.

Surveillance Methods: Periodic inspection.

Goal: Adequate funding for pharmaceuticals and health supplies to meet population needs.

Objective 7.3: To increase financial resources allocated to the national budget for pharmaceuticals to reduce the gap between quantification and allocation by 10% annually. Proposed activities include conducting a financial gap analysis/survey to quantify the gap in need versus availability of funds.

a. Advocate to GOM for increased funds for drug budgets.
b. Strengthen auditing, both internal and external, to accredit advocacy and reduce the incidence of waste and theft.

KPI 7.3: Funding Gap

Measurement: Calculation of variance between value of national forecast to value of funds available for commodity procurement.

Surveillance Method: Periodic inspection.

Goal: Improve financial management and controls across each level of the supply chain.

Mobilize increased resources for essential health commodities at health facility level.

Objective 7.4: To improve system capability for financial tracking and oversight of CMST.

KPI 7.4: Tracking of Activity Costs

Measurement: Binary (Y/N)- ability to determine activity costs through general ledger enhancement.

Surveillance Method: Report analysis.

Proposed activities include:

a. Revise the financial management system to enable analysis of operational costs, extraction of cost data and implementation of Activity Based Costing. Introduce General Ledger system, create new GL codes and test standards of operation.

Objective 7.5: To improve oversight and management of health facility budgets.

Proposed activities include:

a. Introduce financial tracking of commodities expenditures of health facilities.

b. Develop a system to evaluate commodity donations. Extend visibility of drug budget to health facilities to empower health facilities to act as customers and ensure ordering is done with a basis of

c. understanding of the funds available.

d. Advocate to GOM for decentralized structure of budget management to health facility level to enable them to act as empowered participants in managing the budget.

KPI 7.5: System to Track Facility Budgets Deployed and Operational

Measurement: Percentage health facilities with access to the system.

Surveillance Methods: Random Sampling.

e. Involve facilities in the budgeting process to establish the drug budget.

12.4 Implementation Plan

To achieve the goals and objectives described above through implementation of activities proposed, a detailed implementation plan complete with estimated timelines and associated costs has been developed to guide stakeholders (see Exhibit AA). To view a more detailed plan, complete with estimated costs required to implement the Financing strategy see Annex I.

Exhibit AA. Implementation Plan: Financing

	Activities	Timeline																													
		2023				2024				2025				2026				2027				2028				2029				2030			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Objective 7.1: To increase current capital of CMST by 100% by 2027 and to establish a secure flow of incoming capital to sustain operations thereafter.																															
1	Develop and submit a recapitalization proposal to the GOM (MOHP and MOFEPD).																														
2	Lobby government and development partners for recapitalization of CMST.																														
3	Explore options for long-term funding from a funding source or of a joint funding consortium comprised of GOM, donors and a funding bank (e.g., Development Banks).																														
4	Strengthen financial planning processes.																														
	BUDGET VALUES TOTAL $ 60,000	$60,000																													
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH, TECHNICAL ASSISTANCE; DONOR COMMUNITY																													
	KEY PERFORMANCE INDICATORS	RESOLUTION OF THE REQUIREMENT FOR CAPITALIZING CMST TO THE FULL EXTENT REQUIRED																													
Objective 7.2: To increase CMST revenue by 10% annually, to reach an increase of 50% by June 2030.																															
1	Design pricing model for products and services.																														
2	Develop a revolving drug fund and/or identify alternative and innovative sources of funding.																														
3	Conduct a benchmarking exercise to identify funding models for alternative sources of funding used by other countries.																														
	Develop a marketing strategy for CMST products																														

4	and services to include client engagement, development of customer profiles and tailored sales pitches.								
5	Conduct a price differentiation exercise between different suppliers & sources of supply.								
	BUDGET VALUES TOTAL $ 204,000	$45,000	$70,000	$89,000					
	RESPONSIBLE PARTIES	CENTRAL MEDICAL STORES TRUST; TECHNICAL ASSISTANCE							
	KEY PERFORMANCE INDICATORS	ONGOING COMPARATIVE BETWEEN CURRENT INCOME AND ANNUAL FUTURE INCOME							
Objective 7.3: To increase financial resources allocated to the national budget for pharmaceuticals to reduce the gap between quantification and allocation by 10% annually.									
1	Conduct a financial gap analysis/survey to quantify the gap in need versus availability of funds.								
2	Advocate to GOM at both the ministry and district levels for increased funds for drug budgets.								
3	Strengthen auditing, both internal and external, to accredit advocacy and reduce the incidence of waste and theft.								
4	Mobilize increased resources for essential health commodities at health facility level.								
	BUDGET VALUES TOTAL $ 8,800	$8,800							
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; DONOR COMMUNITY							
	KEY PERFORMANCE INDICATORS	THE REDUCTION IN THE VARIANCE BETWEEN QUANTIFICATION AND ACTUAL FUNDING BY 10% ANNUALLY							
Objective 7.4: To improve system capability for financial tracking and oversight of CMST.									
1	Revise the financial management system to enable analysis of operational costs, extraction of cost								

	data and implementation of Activity Based Costing.							
2	Introduce General Ledger system, create new GL codes and test standards of operation.							
	BUDGET VALUES TOTAL $ 60,000	$15,000	$45,000					
	RESPONSIBLE PARTIES	CENTRAL MEDICAL STORES TRUST; TECHNICAL ASSISTANCE						
	KEY PERFORMANCE INDICATORS	THE ACTUAL DETERMINATION OF ACTIVITY COSTS THROUGH GENERAL LEDGER ENHANCEMENT						
Objective 7.5: To improve oversight and management of health facility budgets.								
1	Introduce financial tracking of commodities expenditures of health facilities.							
2	Develop a system to evaluate commodity donations.							
3	Extend visibility of drug budget to health facilities to empower health facilities to act as customers and ensure ordering is done with a basis of understanding of the funds available.							
4	Advocate to GOM for decentralized structure of budget management to health facility level to enable them to act as empowered participants in managing the budget.							
5	Involve facilities in the budgeting process to establish the drug budget.							
	BUDGET VALUES TOTAL $ 17,600	$17,600						
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH						
	KEY PERFORMANCE INDICATORS	IMPLEMENTATION OF A SYSTEM TO EFFECTIVELY MANAGE AND MONITOR THE HEALTH FACILITY BUDGETS						

13. HUMAN RESOURCES AND OPERATIONS

13.1 Overview

The health care sector in Malawi is chronically understaffed and the overall vacancy rate is 51%. While the decrease in vacancy rate is notable, and despite all of the progress reported the population to health worker ratio which, in 2020, was at 1.5 health workers per 1,000 people against the WHO target of 4.45 per 1,000. Continued shortage of trained health workforce remains the most significant constraint in improving the health status of Malawians. The Government of Malawi (GOM) through the Ministry of Health (MOH) recognizes that a well-performing, motivated, and professionalized supply chain workforce is paramount to ensure Malawian's access to medicines, lifesaving treatments, and commodities. Human Resources for Health (HRH) is the largest consumer of health budget, manages other resources, runs the health services system and is the major player in supporting other health service development goals.

Building knowledge and skills is necessary for effective supply chain management and needs to be intensified. Sustainable human resources development that contributes to positive health outcomes requires a holistic approach to improve the systems, processes, and performance factors affecting an organization and its workforce, with a focus on professionalization.

Upstream: CMST is composed of approximately 180 professionals. A skills assessment and training needs assessment of CMST was conducted in September 2019 utilizing the People that Deliver (PtD) diagnostic tool Human Resources for Supply Chain Management (HR4SCM) that is designed to identify skills strengths and gaps in these areas and to highlight areas for future human capital mapping, training, capacity building, and organizational strengthening. Staff from all Directorates of CMST (Procurement, Pharmaceutical Operations, Finance and Administration- Human Resources (HR), Audit, Information Technology and Security) and CMST warehouses and regional branches were represented during the skills assessment and training needs analysis exercises. A discussion of the results is included in the following section.

Downstream: The "downstream" supply chain is staffed primarily by health workers who do not have formal training in supply chain management. There are approximately three doctors, nurses and/or midwives per 10,000 people whereas a ratio of a minimum of forty-one is recommended. Districts are responsible for health service delivery and oversee health facilities and health surveillance agents (HSAs) in their respective districts yet have little or no control over the providers working there.

HR planning, payment, promotion, and performance evaluation are centralized functions overseen by the Ministry of Health. The central Ministry of Health is also responsible for selection and placement of staff; local managers have input into staffing decisions in their facilities.

13.2 Maturity Assessment, Challenges and Root Causes

A national supply chain is only as functional as the people by which it is managed. CMST, across the four assessment areas: staffing, skills, working conditions and motivation; skills consistently received the lowest marks exposing the need for scaled up training of CMST staff.

Key challenges across each of the areas include the following:

a. *Significant competence gaps among staff.* Per the 2019 skills assessment, training is needed in both technical and managerial competencies (see box, next page) especially for new and junior staff. Competency gaps stem from a lack of strong collaboration with local educational institutions related to supply chain management and non-existent formal coaching and mentoring programs and development plans for staff.

b. *Vacant positions (and unqualified staff in existing positions).* Vacancies exist across functions, particularly for warehouse staff, although the budget is in place to recruit. The current recruitment process is lengthy, up to nine months in some cases.

c. *Weak performance management.* Performance is not managed regularly or in a structured manner, supervisory visits and discussions are spontaneous, not systematic and there is no documented plan in place linked to progressive career paths to reward strong performance or performance improvement plans to address weak performance. While CMST utilizes a

d. computerized Performance Management System biannually, it is not given significance in the organization.

e. *Lack of autonomy in HR decision-making.* CMST leadership do not have the authority to make decisions on termination of advance of employment results in an unmotivated and inefficient workforce.

f. *Wide breach in sense of ownership between leadership and mid- and junior-level staff.* Leadership demonstrates a high sense of motivation and ownership while junior and mid-level staff and leadership express to feel they are not a part of a system. Staff meetings are not held regularly limiting opportunities to raise and discuss issues. Hierarchical decision-making leaves middle level managers feeling disempowered as all decisions must go through senior leadership, even minor approvals.

Identified Training Needs

Technical:

Forecasting and supply planning
Supplier and tender management
Storage, warehousing, and inventory management
Commodity management

Managerial:

Strategic and operational planning
Performance management
Data use for management problem-solving and decision-making
Teamwork, leadership training, mentorship
Finance for non-financial staff
Communication skills
Change Management
HR management
Records management and IT

Downstream: Vacant positions and unqualified staff in existing positions across districts and health facilities inhibit significant progress in supply chain management. At the district and health facility level, the maturity of human resources and operations was ranked level 2 for leadership and champions, workforce development and performance management and level 3 for policies and plans.

Key challenges include:

a. *Overburdened staff, vacant positions.* Vacancies are rampant and health facility staff and HSAs at the community level are overburdened; often managing a large patient load and all facility operations with little to no support.
b. *Significant competency gaps among staff.* Training takes place but is not systematic or needs-based. Most staff lack skills in supply chain management. Competency gaps stem from a lack of strong collaboration with local educational institutions related to supply chain management and non-existent formal coaching and mentoring programs and development plans for staff.
c. *Weak performance management.* Performance support systems are haphazard and supervisors at health facilities and District Environmental Health Officers (DEHOs) are overburdened with supervision responsibilities — covering an average of 350 HSAs each. A performance appraisal system has been designed by the central Ministry of Health, but not consistently rolled out to districts.
d. *Lack of autonomy in HR decision-making.* Local managers have no authority in discipline, promotions, or associated raises. A piloted performance-based incentive scheme has not provided the hoped-for boost in motivation and results.
e. *Lack of potable water at health facilities.* Most facilities do not have piped water for the facility as well as for the staff residencies making them prone to high staff turnover.

13.3 Goals, Strategic Objectives and Proposed Activities

Goal: Adequate, skilled, and motivated workforce for health commodity management available and retained at all levels.

To address the stated issues and to provide a high-performing, motivated, and accountable supply chain workforce, the following goals supported by actionable objectives and appropriate activities have been defined.

Objective 8.1: To reduce vacancy rates at CMST, districts and health facilities by 5% annually.

Proposed activities include:

a. Create a staffing plan that defines HR needs and ensure adequate staffing for implementation of Malawi National Supply Chain Transformation Plan activities.
b. Determine current vacancy profiles.
c. Understand current pipeline of those in training who will enter workforce. Determine rules and regulations applicable to recruitment/HR planning.
d. Understand/validate policy for recruitment.
e. Improve recruitment processes.
f. Determine retention rate, turnover rate, and vacancy rate.
g. Improve working conditions. This can be further enhanced by providing portable water for health facilities through boreholes or water tanks.

KPI 8.1: Percentage of Supply Chain Positions Vacant

Measurement: Calculate supply chain vacancies divided by total positions.

Surveillance Methods: Random Sampling; Report Analysis.

Objective 8.2: To improve performance of CMST staff through the introduction of a systematic performance management system by 2024.

Proposed activities include:

a. Put in place robust staff development plans to support desired staff development and ensure that all staff have access to a staff development plan.
b. Improve pay scales.
c. Improve the performance management appraisal system.
d. Develop a monitoring system to monitor performance of staff.
e. Enforce implementation of performance-based management.
f. Improve staff retention mechanisms.
g. Develop a continuous improvement plan for HR.
h. Establish supervision policies.

KPI 8.2: Percentage of Supply Chain Staff Monitored by Performance Management System

Measurement: Calculate percentage of staff being actively monitored by an established system.

Surveillance Methods: Random Sampling.

Objective 8.3: To develop structured orientation, training, and mentorship programs at CMST by 2024 to build the skills of the supply chain workforce in health product management.

Proposed activities include:

a. Develop a formal mentoring and coaching system to encourage transfer of knowledge, boost employee morale and improve achievement.
b. Strengthen the orientation program for CMST staff onboarding.

KPIs 8.3: Training Program Established; Training and Mentorship Accessibility

Measurement: Binary (Y/N) training program established; Percentage of staff that attended a training or met with a mentor within the last six months.

Surveillance Methods: 100% inspection; Random sampling.

c. Create a link of CMST to university programs and other educational and training outlets for continued education of staff.
d. Implement regular training needs assessments of CMST staff.
e. Create structured training programs for CMST staff.
f. Create an effective system to monitor and evaluate the effectiveness of training and development programs.

Goal: Implementation of the MNSCTP is well-managed and staffed by a cohort of dedicated professionals.

Objective 8.4: To establish a dedicated supply chain unit within the Ministry of Health within the first year of Malawi National Supply Chain Transformation Plan operations.

KPIs 8.4: Merger of Existing Units

Measurement: Binary (Y/N) Coordinated Unit established

Surveillance Methods: 100% inspection.

Proposed activities include:

a. Centralize the supply chain experts into one supply chain department that manages all commodities.

Objective 8.5: Review of Supply Chain skills in MOH and implementation of skills strengthening and organization development.

KPIs 8.5: Review Completed.

Measurement: Binary (Y/N) review completed.

Surveillance Methods: 100% inspection.

Proposed activities include:

a. Design and undertake a skills assessment relevant to supply chain and expertise.
b. Design a training program that seeks to eliminate the shortfalls in skill sets and strengthen supply chain knowledge of the health workers.
c. Undertake the training of 300 District pharmacy personnel. The training to last 3-days for each cohort of trainees. Each batch to be restricted to twenty personnel.
d. Undertake annual audits by repeating the skills assessment.

Objective 8.6: To provide good quality water supplies and plumbing to health facilities.

To further strengthen the enabling environment for the retention of staff and provision of health services, the MNSCTP will evaluate the water and plumbing requirements for all health facilities and determine the best way to ensure a sustainable and safe water supply for staff and patients at health facilities.

Proposed activities include:

a. Undertake an evaluation of the water requirements for all health facilities with limited or no access to potable water.
b. Evaluate the availability and long-term sustainability of water in the water table.
c. Determine the nature of the solution for each health facility i.e., well drilling, water tanks, water transportation.
d. Undertake an Open tender for the implementation of the identified solutions.
e. Determine budget, establish project team, and implement water supply upgrades.

KPIs 8.6: Provision of water supplies and plumbing assured.

Measurement: Binary (Y/N) review completed.

Surveillance Methods: 100% inspection.

13.4 Implementation Plan

Many of the activities proposed under the HR strategy will be ongoing from 2020 through 2025 and beyond as Malawi works to secure a sufficient supply chain workforce (see Exhibit AB). To view a more detailed plan, complete with estimated costs required to implement the Human Resources and Operations Strategy see Annex I.

Exhibit AB. Implementation Plan: Human Resources and Operations

Activities		Timeline																													
		2023				2024				2025				2026				2027				2028				2029				2030			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Objective 8.1: To reduce vacancy rates for the pharmaceutical sector by 5% annually.																															
1	Create a staffing plan that defines Human Resources needs and ensure adequate staffing for implementation of proposed MNSCTP activities (MOH, CMST, districts, health facilities).																														
2	Determine current vacancy profiles.																														
3	Understand current pipeline of those in training who will enter workforce.																														
4	Determine rules and regulations applicable to recruitment/HR planning.																														
5	Understand/validate policy for																														

	recruitment.				
6	Improve recruitment processes if required.				
7	Provide boreholes and water tanks for health facilities				
	BUDGET VALUES TOTAL $ 3,300,000	$550,000	$1,100,000	$1,650,000	
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH			
	KEY PERFORMANCE INDICATORS	EFFECTIVE IMPROVEMENT IN THE AVAILABILITY OF SUITABLY QUALIFIED HEALTH FACILITY STAFF			
	Objective 8.2: To improve performance of supply chain staff through the introduction of a systematic performance management system by 2024.				
1	Put in place staff development plans to support desired staff development and ensure that all staff have access to a staff development plan.				
2	Undertake an assessment to compare pay scales with private sector and neighboring countries to determine the gap.				
3	Enforce implementation of performance-based management.				
4	Improve staff retention mechanisms.				
5	Develop a continuous improvement plan for HR.				
6	Assess, review and where necessary improve supervision policies.				
	BUDGET VALUES TOTAL $ 960,000	$160,000	$640,000	$160,000	
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH			
	KEY PERFORMANCE INDICATORS	ALL SUPPLY CHAIN STAFF BEING MONITORED BY A SYSTEMATIC PERFORMANCE MANAGEMENT SYSTEM			
	Objective 8.3: To develop orientation, training, and mentorship programs at CMST, districts and health facilities to build skills of the supply chain workforce.				
1	Develop a mentoring and coaching system to encourage transfer of knowledge, boost employee morale and improve achievement.				
2	Develop a formal orientation program for CMST and all other Health Facility staff onboarding.				
3	Create a link for CMST to university programs and other educational and training outlets for continued education of staff. As contained in the CMST staff development plan				
	Implement regular				

4	training needs assessments across each level of the supply chain.								
5	Create structured training programs for CMST staff.								
6	Create training program for primary healthcare workers in drugs supply management.								
	BUDGET VALUES TOTAL $ 1,650,000	$550,000	$1,100,000						
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH							
	KEY PERFORMANCE INDICATORS	ALL HEALTH WORK FORCE TO HAVING BEEN TRAINED IN GOOD PRACTICE SUPPLY CHAIN MANAGEMENT TECHNIQUES							
	Objective 8.4: To establish a dedicated supply chain unit within the Ministry of Health within the first three months of MNSCTP								
1	Centralize the supply chain experts into one supply chain department that manages all commodities.								
	BUDGET VALUES TOTAL $ 0								
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH							
	KEY PERFORMANCE INDICATORS	THE MERGING OF ALL MOH SUPPLY CHAIN ACTIVITIES INTO A SINGLE DEPARTMENT							
	Objective 8.5: Review of Supply Chain skills in MOH and implementation of skills strengthening and organization development.								
1	Design and undertake a skills assessment relevant to supply chain and expertise								
2	Design a training programme that seeks to eliminate the shortfalls in skill sets and strengthen supply chain knowledge of the Health Workers								
3	Undertake the training of 300 DHO staff. The training lasts 3-days for each batch of trainees. Each batch to be restricted to twenty personnel								
4	Undertake annual audits by repeating the skills assessment.								
	BUDGET VALUES TOTAL $ 1,650,000	$550,000		$1,100,000					
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY							
	KEY PERFORMANCE INDICATORS	ALL HEALTH WORK FORCE TO HAVING BEEN TRAINED IN GOOD PRACTICE SUPPLY CHAIN MANAGEMENT TECHNIQUES							
	Objective 8.6: To provide good quality water to those health facilities that do not have any, including plumbing at the health facility by 2026								
1	Undertake an evaluation of the water requirements								

	for all health facilities with no availability of water (approx. sixty-one sites)							
2	Determine the nature of the solution for each health facility. Well drilling or water tanks							
3	Evaluate the availability of water in the water table.							
4	Determine the long-term sustainability of the underground water Reserve							
5	If no water reserve plan for n the implementation of water tanks and the refill potential via water Tankers							
6	Undertake an Open tender for the implementation of the identified solutions							
7	Determine the overall budget and compare to the Grant Application budget							
8	Issue contracts to the selected suppliers							
9	Establish a project team and mobilize the same							
10	Complete the implementation of the water solution upgrades.							
	INDICATIVE BUDGET VALUE. TOTAL $ 747,250		159,250	196,000	196,000	196,000		
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY						
	KEY PERFORMANCE INDICATORS	Provision of water supplies and plumbing to those health facilities affected						

14. POLICY AND REGULATORY

14.1 Overview

The Ministry of Health is mandated with providing overall policy direction for the delivery of health services in Malawi. The National Medicines Policy 2015 is the guiding policy for the pharmaceutical sector. The guiding principles for the National Medicines Policy are inspired by the Malawi Health Policy which include human rights-based approach and equity, gender sensitivity, accountability, and decentralization, among others. Within the National Medicines Policy, the primary policies which impact the supply chain for pharmaceuticals are those for procurement, distribution, and storage of medicines, as well as stated policies in support of supply chain integration and improvement of the Central

Medical Stores Trust (CMST) infrastructure and capacity to improve supply chain efficiency.

One of the key reform areas that the Ministry of Health has prioritized is the strengthening of the supply chain management of drugs and medical supplies to address the serious persistent shortages of essential medicines in public facilities. In the Malawi Health Sector Strategic Plan for 2023 – 2030, ensuring availability, equitable access and rational use of safe, good quality and affordable medicines is one of the key strategic objectives of the Ministry of Health. Further, the health workforce and the availability of drugs in public facilities were defined as the two most important inputs in health service delivery and health systems strengthening.

In response to issues of significant leakage identified in 2011, the Drug Theft Investigation Unit (DTIU) was established to reduce the prevalence of theft of drugs in the public health sector through enhanced auditing and monitoring of the drug chain supply chain management system; and fast- tracked investigation and discipline of those suspected and found to be stealing drugs from the public sector.

While audit, monitoring and investigations are important, it is even more critical to ensure that there are robust preventative measures to reduce the incidence of theft. The preventive efforts will include coordination of capacity to implement measures aimed at fixing current gaps in the national supply chain management of pharmaceuticals that contribute to the theft of drugs. For efforts of prevention, audit, monitoring and investigation to produce tangible and consistent results over time, deliberate and comprehensive awareness and sensitization efforts will be implemented with the support of the DTIU.

A combination of these efforts and the support of the DTIU will increase the chances of the country witnessing a reduction in theft cases. It is worthwhile to note that more resources for operations (beyond what is budgeted for this unit) will be required for the success of this effort.

Several objectives put forth throughout this MNSCTP 2023-2030, in addition to efforts to reduce leakage, have policy implications and will require engagement with policymaking institutions to be realized. Due to the intersection with policy setting, securing political will for these initiatives and for proposed policy changes will be critical to successfully implement the Malawi Supply Chain Transformation Plan and achieve supply chain integration (SCI).

Notably, capitalization of CMST, procurement reform and changes in human resource hiring and firing policies will require significant policy support. In addition, it is suggested that the Ministry of Health considers developing suitable policies for the governance of medical devices, both durable and non-durable devices.

Relevant to downstream supply chain operations, NMP includes policies on the management of pharmaceutical donations and on centralized financing of medicines. Yet it states that decentralization of drug budgets for efficiency and avoidance of stock-outs

should be explored. Further, to facilitate HR reforms, hiring and dismissal policies must be revised to allow for more effective performance management at each level of the supply chain.

14.2 Maturity Assessment, Challenges and Root Causes

Upstream: At CMST, policy and regulatory processes were ranked at levels 2 and 3 with one designation each at levels 1 and 4. Many key national policies are outdated and those existing are not widely distributed or accessible to stakeholders along the supply chain. While some policies are critical to effective supply chain operations, others inhibit efficiency. Key policy-related challenges include:

a. *Lack of autonomy of CMST.* Many challenges faced by CMST are related to the policy issue of autonomy. The organization has little autonomy in respect of their ability to manage at a more efficient level which inhibits their ability to become more efficient. Good corporate governance, a linchpin of effective operations of a central medical store, is best practiced under an autonomous governance structure.

b. *Restrictive procurement policy.* Policies such as the "Buy Malawi" memorandum of understanding (MOU) and restrictions in contracting with suppliers prevent CMST from procuring pharmaceuticals at competitive prices. Procurement guidelines based on 2017 Public Procurement and Disposal of Assets Act (PPDA) Legislation need to be amended to optimize the opportunity for CMST to procure pharmaceuticals and supplies at the lowest possible cost.

Downstream: At the district and health facility levels, the maturity of policy and regulatory processes was primarily ranked at a level 2, with a selection of ones and one rating of three. Many key national policies are outdated and those existing are not widely distributed or accessible to stakeholders along the supply chain. Key challenges include:

a. *Lack of policy-informed processes.* At the district, and especially facility levels, policies may exist yet are not widely disseminated, understood, or practiced.

b. *Limited autonomy.* Like CMST, district health offices and health facilities face obstacles with a lack of autonomy and inability to make informed, independent decisions. The devolution of health services envisioned in the Decentralization Act of 1998 has been only partially realized. Although district councils and the district health management teams (DHMTs) are responsible for management of health services, they lack the authority to allocate budgets between sectors or directly manage their human resources.

14.3 Goals, Strategic Objectives and Proposed Activities

Goal: Pharmaceutical services grounded in updated, comprehensive national policies are regularly practiced across all levels.

Objective 9.1: To ensure 100% of health facilities have access to and comply with national policies and regulations. Proposed activities include:

a. Identify applicable policies and regulations (to which facilities need to comply) and disseminate copies to health facilities.
b. Develop training programs for health facility staff on policies.
c. Involve health facilities in updating and drafting policies.

KPIs 9.1: Access to Policies and Regulations

Measurement: Calculate percentage of health facilities with access to national policies and regulations.

Surveillance Methods: Random sampling.

Objective 9.2: To update key supply chain-related policies.

Proposed activities include:

- Conduct a desk review of supply chain-related national policies and undergo a prioritization exercise for those which need to be updated.
- Convene technical working groups and key political figures to update selected policies.
- Create a new Malawi National Drugs Program unit at regional levels.
- Develop a new National Policy to govern the import, procurement, and quality standards of medical devices, both durable and non-durable ones.

KPIs 9.2: Supply Chain-Related Policies Updated.

Measurement: Binary (Y/N) - policies updated.

Surveillance Methods: 100% inspection

Objective 9.3: To introduce a governance structure to manage performance and support structures.

Proposed activities include:

a. Map out the current governance process, or lack thereof, and update / create a process to elevate issues and request at the facility level and structure of accountability.
b. Issue SOP and train staff in its implementation.

KPIs 9.3: Governance Structured Implemented.

Measurement: Binary (Y/N) – governance structure and SOPs implemented.

Surveillance Methods: 100% inspection.

Goal: Clear policies and supportive legislation are in place, and known and adhered to by the users, supporting an effective MNSCTP.

Objective 9.4: To increase autonomy of CMST and of downstream actors to enable the organization to make critical decisions about its operations, independently.

It has been proven in similar contexts (See Annex IX) that medical store operations gain significant improvement in performance if given the autonomy to act as a true business with limited interference from external sources. Increasing the level of autonomy of CMST as well as of districts and health facilities will benefit decision-making process and the efficiency required for good supply chain management. Proposed activities include:

a. Implementation of policies that create more decisive, strategic, and effective delegation of authority.

b. Delegation of authority to manage organizational change and to make decisions on employment (i.e., terminate employment or promote if exceling).

KPIs 9.4: Autonomy of CMST.

Measurement: Assessment compared to international recommendations.

Surveillance Methods: Report analysis.

Objective 9.5: To strengthen supply chain management of drugs and medical supplies to address persistent shortages of essential medicines in public facilities through enhanced auditing and monitoring of the pharmaceutical supply chain.

a. Advocate for sufficient resources and establish procedures to ensure implementation of robust preventative measures to reduce the incidents of theft.

b. Implement fast-tracked investigation and disciplining of those suspected of and found to be stealing drugs from the public sector.

c. Strengthen supply chain audits at service delivery points and/or health facilities.

d. Coordinate capacity to implement measures to fix current gaps in the national supply chain management of pharmaceuticals which contribute to theft of drugs.

KPI 9.5: Wastage from Damage, Theft or Expiry

Measurement: Compare the damaged, lost, and expired stock to the total stock during the reporting period (by quantity or value of the stock).

Surveillance Methods: Random Sampling; Third-party Audits

14.3.1 Implementation Plan

As described above, many of the policy and regulatory activities are crosscutting due to the intersection of policy and key supply chain functions. Exhibit AC below presents the proposed activities with recommended timelines for implementation. To view a more detailed plan, complete with estimated costs required to implement the Planning and Procurement strategy see Annex I.

Exhibit AC. Implementation Plan: Policy and Regulatory

Activities		Timeline																													
		2023				2024				2025				2026				2027				2028				2029				2030			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Objective 9.1: To have 100% of health facilities comply with national policies and regulations.																															
1	Identify applicable policies and regulations (to which facilities need to comply) and disseminate copies to																														

	health facilities.								
2	Develop training program to train health facility staff on the implementation of policies and regulations.								
3	Involve health facilities in updating and drafting policies and guidelines (i.e., EML).								
	BUDGET VALUES TOTAL $1,650,000		$1,100,000	$550,000					
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY							
	KEY PERFORMANCE INDICATORS	ALL HEALTH WORK FORCE TO HAVING BEEN TRAINED IN HEALTH FACILITY OPERATIONAL PRACTICES & PROCEDURES							
Objective 9.2: To update key supply chain-related policies.									
1	Conduct a desk review of supply chain-related national policies and undergo a prioritization exercise for those which need to be updated.								
2	Convene technical working groups and key political figures to update selected policies.								
3	Create a new Malawi National Drugs Program (MNDP) unit at National and regional levels.								
	BUDGET VALUES TOTAL $0								
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY							
	KEY PERFORMANCE INDICATORS	COMPLETION OF THE TASK TO REVIEW AND UPDATE MOH SUPPLY CHAIN POLICIES							
Objective 9.3: To introduce a governance structure to manage performance and support.									
1	Map out the current governance process, or lack thereof, and update/create process to elevate issues and request at the facility level and structure of accountability.								
2	Issue SOP and train staff in its implementation.								
	BUDGET VALUES								

	TOTAL $0								
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY							
	KEY PERFORMANCE INDICATORS	COMPLETION OF THE TASK TO REVIEW AND UPDATE MOH GOVERNANCE POLICIES & TRAINING OF ALL HEALTH FACILITY WORKERS							
Objective 9.4: To increase autonomy of CMST to enable the organization to make critical decisions about its operations independently.									
1	Review, development, and implementation of policies that create more decisive, strategic, and effective delegation of authority.								
2	Delegation of authority of CMST to manage organizational change and to make decisions on employment.								
	BUDGET VALUES TOTAL $0								
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY							
	KEY PERFORMANCE INDICATORS	CREATION OF A MORE FUNCTIONAL LEVEL OF AUTONOMY FOR CMST							
Objective 9.5: To strengthen supply chain management of drugs to address persistent shortages of essential medicines in public facilities through enhanced auditing and monitoring of the pharmaceutical supply chain. management system.									
1	Advocate for sufficient resources and establish procedures to implement preventative measures to reduce the incidents of theft.								
2	Implement fast-tracked investigation and disciplining of those suspected of and found to be stealing drugs from the public sector.								
3	Strengthen supply chain audits at SDPs and/or health facilities.								
4	Implement measures to fix gaps in management of pharmaceuticals which contribute to theft of drugs.								
	BUDGET VALUES TOTAL $ 1,512,000		$216,000	$216,000	$216,000	$216,000	$216,000	$216,000	$216,000
	RESPONSIBLE	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY							

	PARTIES	
	KEY PERFORMANCE INDICATORS	REDUCTION IN LOSSES DUE TO THEFT. INCREASE IN APPREHENSION OF LARCENOUS PERSONNEL

15. MONITORING AND EVALUATION

15.1 Overview

The Ministry of Health is mandated with providing results-based monitoring and evaluation reports through the Central Monitoring and Evaluation Department, CMED. The CMED technical team shall provide technical support and guidance to HTSS Technical support team on Monitoring and Evaluation critical activities. The HTSS Technical team on Monitoring and Evaluation shall be obliged to produce Monitoring and Evaluation Framework, indicator tracking table and Standard Operating Procedures with guidelines for the Pharmaceuticals Supply Chain Management.

In the Malawi Health Sector Strategic Plan III (2023 to 2030), ensuring availability, equitable access and rational use of safe, good quality and affordable medicines is one of the key strategic objectives of the Ministry of Health. Further, the health workforce and the availability of drugs in public facilities were defined as the two most important inputs in health service delivery and health systems strengthening. The M&E component will work to provide gap analysis, document best practices and lessons learnt and make sure that the strategic plan implementation is efficient and effective.

Further, the M&E will work with CMED and Digital Health in strengthening health digital systems by conducting data indicator mapping and informing data sources and collection for the existing systems. This shall see the emergence of interoperable digital platforms that will inform the Ministry of Health on status of health commodities and supply through integrated dashboards and data analytical tools. The M&E will also work towards establishing a structures M&E Framework and Systems in the Pharmaceuticals Supply Chain Management.

15.2 Maturity Assessment, Challenges and Root Causes

Upstream: Overall, the existing progress and performance management systems throughout the supply chain, some with overlapping coverage, are inefficient and produce significant inconsistencies in how data is collected and reported due to having different management frameworks, standards and focusing on multiple levels of information aggregation or layers of functionality (warehousing, Stock Management, Inventory, and dispensing) without harmonized key indicators and tools. Key challenges include:

a. *Poor data quality.* Lack of M&E Tools (Data Collection and Reporting Tools) developed from data indicators from the M&E Framework affects data collected and reported. Most data issues emerge from use of outdated or unstructured tools, multiple and inconsistent tools, and an insufficient cadre of skilled staff managing the monitoring and evaluation tools.

b. *Data Flow Maps.* There are no defined data flows detailing roles and responsibilities of staff in managing data collection and reporting.
c. *Limited or no research and studies:* There are no planned and commissioned studies aimed at improving internal processes and practices for the Supply Chain.
d. *Poor quality and timeliness of reports:* There is consistently poor quality and timeliness of reports for decision making at all levels.

Downstream: Many of the challenges experienced throughout the supply chain can exist because of lack of an M&E System. There is no theory behind improving efficiency and effectiveness of Supply Chain services. The Supply chain do not have M&E Framework and key challenges include:

a. *Low data quality:* Due to lack of M7E Tools, there is currently no confidence in the data collected and reported. There is a need for utilization by increasing data availability and quality, through end-to-end visibility where all the processes are digitized.
b. *Lack of data sharing across supply chain systems: A*utomated data sharing has not yet been extended to between the primary supply chain systems, OpenLMIS and the CMST ERP, Navision. Inconsistencies in data standards, formats and differences in system/business processes currently impede interoperability. This is because the tools are not harmonized and standardized.
c. *No roll-out strategy for Digital or Information System tools:* There is no roll-out strategy defining digital or information systems data collection and reporting tools where steps on orientation, piloting and roll-out before implementation are explained and supported with SoPs.

Goals, Strategic Objectives and Proposed Activities

Goal: To have a more informative and consolidated Results-Based M&E System for the Health Supply Chain with Integrated Management Information Systems.

Objective 10.1: To review, design and develop Health Supply Chain Management Logical Framework (M&E Framework) based on all the KPIs and objectives. Proposed activities:

a. Consultation meeting with Key components to identify KPIs and Objectives.
b. To consolidate the Key Components KPIs and Objectives into Log Frame with respective Indicators identified as Intermediate Outcomes, Outcomes and Output indicators.
c. Align and map activities falling through each KPIs.

Objective 10.2: To develop and implement a Monitoring and Evaluation Plan for the period of Strategic implementation.

Proposed activities:

a. Design and develop M&E key activity roll-out strategies and manuals.
b. Identify strategic key activities and produce project management plan.

c. Identify routine and occasional activities and categorize them as evaluation and monitoring activities. Indicate when data quality assessment and annual surveys will be conducted.
d. Define Standard Operating Procedures and guidelines (develop tools).
e. Develop capacity building plan for staff on M&E and Digital Systems.

Objective 10.3: To conduct Mapping and alignment of M&E Framework data indicators, digital systems and produce harmonized indicator reporting systems, data management and reporting.

Proposed activities:

a. Map and align each existing system with data indicators in the M&E Framework.
b. Harmonize data collection, reporting tools and enforce electronic data collection for easy tracking.
c. Deploy integrated planning and reporting system integrated with all existing digital systems in the Health Supply Chain Management.

Objective 10.4: To design and develop Standard Operating Procedures and Guidelines for the Key Components. Data Collection, analysis and reporting tools will have to be developed to enforce standardized and harmonized implementation of activities.

Proposed activities:

a. Review all the Key Components procedures to know if there are existing Standard Operating Procedures and Guidelines
b. Develop Standard Operating Procedures for each Component
c. Plan for pilot and roll-out for each Standard Operating Procedure
d. Implement the Standard Operating Procedures.

Objective 10.5: To develop Supply Chain Learning agenda for the first two years of implementation to allow for refining of targets and objectives and inform operationalization of the MNSCTP and institutionalization of LMU. The learning agenda will provide documented situational analysis, gaps and best practices, lessons learnt and base values for transformation of the Health Supply Chain.

Proposed activities:

a. Review and consolidate all studies, assessments, and research from the nine key components.
b. Review and develop ToRs and Dissemination schedules of all studies and research.
c. Review facilitation, training and standard operating procedures manuals based on findings and results of studies and research.
d. Produce Malawi Health Supply Chain manuals, SoPs, and guidelines as publications from the studies and research.

15.3 Implementation Plan

As described above, many of the monitoring and evaluation activities are crosscutting due to the intersection of supply chain functions. M&E will be providing overall consolidation of activities, progress and performance tracking and central reporting for the health supply chain.

Exhibit AD. Implementation Plan: Monitoring and Evaluation

	Activities	Timeline																													
		2023				2024				2025				2026				2027				2028				2029				2030			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Objective 10.1: To review, design and develop Health Supply Chain Management Logical Framework (M&E Framework) based on all the KPIs and objectives																															
1	Consultation meeting with Key components to identify KPIs and Objectives																														
2	To consolidate the Key Components KPIs and Objectives into Log frame with respective Indicators identified as Intermediate Outcomes, Outcomes and Output indicators																														
3	Align and map activities falling through each KPIs																														
	BUDGET VALUES TOTAL $170,000	**$34,000.00**				**$68,000**				**$68,000**																					
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY																													
	KEY PERFORMANCE INDICATORS																														
Objective 10.2: To develop and implement a Monitoring and Evaluation Plan for the period of Strategic implementation																															
1	Design and develop M&E key activity roll-out strategies and manuals																														
2	Identify strategic key activities and produce project management plan																														
3	Identify routine and occasional activities and categorize them as evaluation and monitoring activities. Indicate when data quality assessment and annual surveys will be conducted																														
4	Define Standard Operating Procedures and guidelines (Develop tools)																														
5	Develop capacity building plan for staff on M&E and Digital Systems																														
	BUDGET VALUES TOTAL	**$22,000.00**				**$22,000**				**$22,000**																					

	$66,000								
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY							
	KEY PERFORMANCE INDICATORS								
Objective 10.3: To conduct Mapping and alignment of M&E Framework data indicators, digital systems and produce harmonized indicator reporting systems, data management and reporting									
1	Map and align each existing system with data indicators in the M&E Framework								
2	Harmonize data collection, reporting tools and enforce electronic data collection for easy tracking								
3	Deploy integrated planning and reporting system integrated with all existing digital systems in the Health Supply Chain Management								
	BUDGET VALUES TOTAL $150,000	**$30,000.00**	**$60,000**	**$60,000**					
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY							
	KEY PERFORMANCE INDICATORS	COMPLETION OF THE TASK TO REVIEW AND UPDATE MOH GOVERNANCE POLICIES & TRAINING OF ALL HEALTH FACILITY WORKERS							
Objective 10.4: To design and develop Standard Operating Procedures and Guidelines for the Key Components. Data Collection, analysis and reporting tools will have to be developed to enforce standardized and harmonized implementation of activities									
1	Review all the Key Components procedures to know if there are existing Standard Operating Procedures and Guidelines								
2	Develop Standard Operating Procedures for each Component								
3	Plan for pilot and roll-out for each Standard Operating Procedure								
4	Implement the Standard Operating Procedures								
	BUDGET VALUES TOTAL $72,000	**$8,000**	**$15,000**	**$14,000**	**$14,000**	**$7,000**			
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY							
	KEY PERFORMANCE INDICATORS								
Objective 10.5: To develop Supply Chain Learning agenda for the first two years of implementation to allow for refining of targets and objectives and inform operationalization of the MNSCTP and institutionalization of LMU. The learning agenda will provide documented situational analysis, gaps and best practices, lessons learnt and base values for transformation of the Health Supply Chain									
1	Review and consolidate all studies, assessments, and research from the nine key components								
2	Review and develop ToRs and dissemination schedules of all studies and research								
	Review facilitation, training and standard								

3	operating procedures manuals based on findings and results of studies and research								
4	Produce Malawi Health Supply Chain manuals, SoPs, and guidelines as publications from the studies and research								
	BUDGET VALUES TOTAL $460,000	**$30,000**	**$30,000**	**$100,000**			**$50,000**	**$100,000**	**$150,000**
	RESPONSIBLE PARTIES	MINISTRY OF HEALTH; TECHNICAL ASSISTANCE; DONOR COMMUNITY							
	KEY PERFORMANCE INDICATORS								

ANNEX 1: List of Documents Consulted

A. Policies, Reports and Strategies Consulted

1. CMST Business Plan 2015-2020
2. Health Sector Strategic Plan II 2017-2022
3. Health Sector Strategic Plan III 2023-2030
4. Malawi 2063 Vision (2020)
5. Malawi Health Supply Chain Integration Review
6. National Health Policy 2018
7. National Medicines Policy 2015
8. National Quantification Report 2022
9. Pharmacy and Medicines Regulations Act 2019
10. Public Audit Act 2003
11. Public Finance Management Act 2022
12. Public Procurement and Disposal of Assets Act and Associated Regulations 2017
13. Sustainable Development Goals 2015 - 2030
14. The Constitution of Malawi (1994)

B. Other Documents Consulted

1. MNSCTP 2023-2030 Costed Implementation Plan
2. Detailed Maturity Assessment and Maturity Update Path: CMST, Districts, Health Facilities
3. Recommended Forecasting System Requirements
4. Warehouse Management System Functional Specifications
5. Inventory Management System Suppliers
6. CMST Warehouse Site Plans
7. Proposed Future CMST Organograms
8. Central Medical Stores Autonomy Cast Study and Commentary
9. Waste Management Maturity Model – Central Level
10. Central Warehouse Racking Reengineering