

THE NATIONAL SUPPLY CHAIN STRATEGY FOR PHARMACEUTICALS AND HEALTH PRODUCTS

FEDERAL MINISTRY OF HEALTH

JUNE 2017

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United Nations Development Programme



Sponsored by:

The Global Fund for HIV/TB and Malaria



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List of Abbreviations

CNCD	Communicable and Non- Communicable Diseases
ERP	Electronic Resources Program
ELIMS	Electronic Logistics Management Information System
EPI	Expanded Programme on Immunization
FMOH	Federal Ministry of Health
FMOF	Federal Ministry of Finance
FP	Family Planning
GDOP	General Directorate of Pharmacy
GDP	Good Distribution Practice
GF	Global Fund to fight AIDS, TB and Malaria
HMIS	Health Management Information System
LMIS	Logistics Management Information System
NDQCL	National Drug Quality Control Laboratory
NHIF	National Health Insurance Fund
NHRHSP	National Human Resources for Health Strategic Plan
NMPB	National Medicines and Poisons Board
NMSF	National Medical Supplies Fund
NPHL	National Public Health Laboratory
NHSSP	National Health Sector Strategic Plan
SMSF	State Medical Supply Fund
SDP	Service Delivery Point
RH	Reproductive Health
SOPs	Standard Operating Procedures
TB	Tuberculosis
THE	Total expenditure on health
UNDP	United Nations Development Programme
UNFPA	United Nations Population Fund
UNICEF	United Nations Children’s Fund
WHO	World Health Organization

Foreword


The Federal Ministry of Health has been on a drive to improve access to essential medicines to the population of Sudan. In 2015, two significant decisions were made by the Federal Ministry of Health. The first was the setting up of the National Medicines Supplies Fund (NMSF) under an Act of Parliament, to be the lead procurement and supply chain service provider to the public health sector. This decision was followed by directive to the health sector players to integrating their procurement and supply services with the NMSF. The second decision was a commitment made by the FMOH to set up an integrated national supply chain strategy; this commitment was made as part of the agreement for Sudan to strengthen the Health system.

Sudan, like many developing countries has faced challenges in assuring sustained, uninterrupted procurement and supply of essential health commodities to its public health sector, in the face of competing national priorities. The challenge has thus been to create that assurance and to do so cost-effectively, given the demand for health services, in a country such as Sudan with its myriad of challenges on the health sector. The FMOH, with support from development partners, had over the years created many interventions for sustained availability health commodities at health facilities. Despite all these challenges, Sudan had made significant impact in ensuring that its population received their requisite healthcare services. However, the FMOH and its development partners understood that there was opportunity to improve on these interventions, particularly in the provision of procurement and supply chain services. Medicine access has remained as one of the leading causes of poor health outcomes in Sudan. While many factors have influenced medicine access at all levels, the capacity of the in-country supply chain to accurately forecast, procure and deliver essential medicines and health supplies on time to the health centres remains a major constraint.

The steps needed were aimed at controlling and managing decisions on procurement planning, remove duplication and control ever escalating costs in the health sector related to procurement and supply chain services. The decision to set up an integrated national supply chain service, therefore, is a significant step to a lean and cost-effective procurement and supply chain service that will enable Sudan achieves its goals as set up in its National Health Sector Strategic Plan.

This National Supply Chain Strategy 2017-2021 presents a significant change in the way the procurement and supply chain of health commodities is done and managed in Sudan. The NSCS, which has received the support of all stakeholders in the public health sector, places emphasis on having a single lead entity (NMSF) managing and coordinating all elements of the public health supply procurement and chain cycle which includes forecasting, quantification, procurement and distribution up to the last mile. It is the expectation of the public health sector that this new way of working will bring about positive change in availability of health commodities at all levels of health care in Sudan.

I therefore urge all public health sector institutions, health programmes and stakeholders involved in the implementation of this NSCS, to fully dedicate themselves to this important national programme. The Federal Ministry of Health will remain committed to ensuring the successful implementation of this Strategy.


13-11-17

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Acknowledgements

The development of this first National Supply Chain Strategy (NSCS) for Sudan, has been done as a joint effort of many stakeholders in the public health sector, with the able support, coordination and financing from the UNDP/ Global Fund (GF) Programme Management Unit for Sudan. This support arises from the commitment that the Federal Ministry of Health (FMOH) made in 2015, to the UNDP / GF to set up an integrated national supply chain strategy, as part of the Health Sector Strengthening (HSS) Grant agreement. Since that agreement, Sudan proceeded with reforms in the health sector, which included setting up of the National Medicines Supply Fund (NMSF) in 2015, as the lead entity for procurement and supply chain service to the public health sector. The FMOH directed that all stakeholders that are supporting access to essential health commodities begin to use the NMSF for procurement and supply chain services. This NSCS for Sudan thus cements the commitment Sudan made under the HSS Grant, set up an integrated supply chain strategy. To that end, I would like to extend my gratitude to all the individuals and institutions that contributed to the planning and development of the NSCS. Specifically, I would like to acknowledge the valuable input of the following:

We would like to thank Dr Gamal K. Mohammed Ali, Director General of NMSF, and the management team at NMSF for providing additional resources and guidance to the process of developing the NSCS. We thank Dr Abdalla Abdelkarim Osman, Director General of the National Public Health Laboratory, for his support to the process. We would like to thank Dr Mohamed Bashir Hassan, Director of General Administration of Medicines Control, National Medicines and Poisons Board (NMPB) for his support to this process. We also thank Mr Abdelhalim Elsyed Elahmin, General Director for Procurement & Contracting at the Federal Ministry of Finance for his contribution to this process and commitment to support the strengthening of procurement services in the health sector. We would like to thank Dr Hassan Abdel Rahman and Dr Hiba Yasin at the DGOP; Dr Thoweba Khougli and Dr Asrar at CNCDC; Dr Samira, Manager, EPI Programme. We would also like to thank UNICEF and UNFPA Sudan Country Offices for their contribution to the process of developing the NSCS. We also thank Dr Hassan Basheer, General Director of the Khartoum Revolving Drug Fund for his support and advice. Finally, We thank all the private sector players that were engaged and responsive to the enquiry leading to the developing of this NSCS.

In particular, we thank Dr Salah Osman, Director General for International Health at the FMOH, for his leadership and managing the commitment made by the FMOH to the UNDP / GF under the HSS Grant, resulting in this NSCS.

Consultancy Team

1. Executive Summary

The Government of the Republic of Sudan through the Federal Ministry of Health has been on a drive to improve access to essential medicines to the population of Sudan. In recent years, a number of studies and interventions have been conducted by the Government together with development partners in an effort to improve drug availability at health facility level. Among these interventions, has been the formation of the National Medical Supplies Fund (NMSF), through an Act Parliament, the National Medical Supplies Fund Act of 2015. The NMSF is mandated to be responsible for the procurement and supply chain services to the public health sector, through the Act of 2015. The NMSF is continuing its investment in strengthening its capacity for management, operations and warehouse and logistics infrastructure across the country. In this task, NMSF funding operations through self- financing and support from development partners, particularly those focusing on access to medicines in the public health sector. The NMSF is now in a position to the lead organisation to head the implementation of the integrated national supply chain strategy.

The NMSF and partners have achieved substantial accomplishments in the national supply chain services to the public health system in Sudan. The debate in recent months has been to move away from fragmented supply chain services, to more integrated services, that are working with one procurement plan and are applying one integrated supply chain strategy. This position has come about due to continued observations and reports of disjointed procurement and supply chain services that result in uncoordinated and costly duplications in the provision of essential medicines and medical supplies to health facilities. In this situation, the sector would see uncoordinated resource acquisition, particularly in the areas of human resource capacity building and material support for each strategic health programme, with the consequence that some programmes are poorly supported.

The development of an integrated national supply chain strategy (NSCS) therefore, is an appropriate response to these challenges, and aims to provide strategic direction to the sector as well as lay down a roadmap for addressing the end to end supply challenges currently prevailing in the sector.

The NSCS was developed through a series of consultative meetings with key players in the procurement and supply chain services to the public health sector. Desk analysis of several reports, assessments and reviews, were done to arrive at an analysis of the state of, challenges and demands on the public health sector in respect to procurement and supply chain services. To that end, individual programme objectives and strategic plans, were reviewed to establish specific health programme requirements, resulting in the creation of thematic areas or pillars, that shall support the NSCS, which are areas of activity or implementation by specific players. The thematic areas considered are:

1. Planning, Quantification and Forecasting
2. Quantification Forecasting
3. Commodity Security, Financing and Resource mobilization
4. Procurement
5. Logistics
6. Information Systems, e-LMIS and Communication
7. Quality assurance and rational use
8. Performance management, M&E for Supply Chain
9. Human Resources for Health in Supply Chain System
10. Cold chain Health Commodity Procurement and Supply Management
11. Medical device and technologies
12. Health Commodity Waste management
13. Public Private Partnerships
14. Provision of Retail Pharmacy services

The development of this National Supply Chain Strategy was firmly aligned to the broader national programmes, objectives, policies and priorities in the health sector, all of which are grounded on the National Health Sector Strategic Plan (NHSSP 2012- 2016) and the overall Sudan National Development Plan for the same period.

The process included setting the vision, mission and principles that would underpin the National Supply Chain Strategy; these were developed within the context of the overall public health sector agenda, and forms an integral part of the NHSSP 2012-2016 which is linked to multi-sector strategic frameworks, with relevance to the public health in Sudan. The vision was to have an effective, efficient and sustainable national supply chain which contributes to making a healthy and productive people of Sudan, provided by a public health sector whose mission is to provide equitable access to affordable quality essential health commodities to support the Sudan public health system. The overall goal is to improve the health status of people in Sudan, and in that way contribute to socio-economic development in the country, using the principles of integration, harmonisation, decentralization, coordination with clarity of roles, using systems that operate within the country's legal framework.

The strategic objectives for the NSCS were to set up a coordinated and efficient supply chain led by the NMSF, and included setting up a framework to develop one country Procurement Plan, one country health commodity Budget, one procurement and supply chain strategy, one performance monitoring, evaluation and reporting framework that results in one sector Report. This status would be achieved through improved decision- making processes supported by timely provision of information across the supply chain, that use appropriate supply chain information gathering systems and technologies. The process then identified the key operational pillars of the NSCS that contain the activities to be carried out by various players who are working in a coordinated, harmonised and integrated manner.

Overall sector goals and objectives were defined through the strategic planning process. Critical success factors were identified and listed as the key activities which needed to be performed to ensure that the FMOH, the SMOH and the wider public health sector would meet its obligations. Key performance indicators were formulated for each objective to help determine the extent to which these objectives would be met.

The NSCS will be adapted and linked to each succeeding NHSSP period. The FMOH will be responsible for coordinating and ensuring successful implementation of the NSCS across the public health sector, and for attaining of the objective. The NMSF, on the other hand, will take the strategic and implementation lead for the procurement and supply chain element of the NSCS, working as a service provider to the public health sector.

An implementation framework accompanies the NSCS, in which is described how the key sector partners will play their respective roles in the implementation of the NSCS. In order to ensure efficient and effective coordination of the partnerships with all these players, FMOH will strengthen inter-sector collaboration and coordination mechanisms at all levels. This would include setting up respective technical working groups that sub- sets of the NSCS.

2. Introduction

The procurement and supply of essential medicines and health products has been a key concern within the health sector in Sudan. Over the last few years, a number of interventions have been attempted to improve availability of, and access to, essential medicines, laboratory, medical supplies and related health products. These interventions have included reforms at the federal level related to the management of the procurement, storage and distribution functions, and development and adoption of new commodity management systems. Other notable reforms include automation at NMSF operational systems support to strategic disease areas such as those under the GFATM, Reproductive Health, and the Under 5 health programmes; the establishment of NMSF stores at the State level, and the development and adoption of NHSSP, the NDP to provide, among other things, policy direction to the provision and management of health programme and medicines and medical supplies.

These interventions have been led by the FMOH and supported by development partners (DP). Some of the initiatives have made significant contributions to systems strengthening and/or product availability, for example, the supply management systems for ARVs, HIV test kits, TB medicines, anti-malaria medicines, and laboratory commodities.

Over the years, partners have played significant roles in support of the health commodity supply chain in Sudan. These roles include funding different supply chain support activities, the procurement and distribution of commodities, and the provision of support to the development of inventory and information management systems for different levels of the supply chain. Development partners continue to work closely with the Federal Government in its efforts to improve supply chain performance.

Sudan continues to make advances in public health, but poor access to medicines remains one of the leading causes of poor health outcomes in the country, particularly in the vulnerable areas¹. The unsatisfactory access to medicines by the population has partly been attributed to the incapacity of several challenges, including in-country supply chains beyond the State Level, to accurately forecast, access and deliver essential medicines and health supplies on time to health facilities across the country. Until recently (2015), the public health supply chain consisted of many players who provided separate procurement and supply chain services, often in an uncoordinated manner. This fragmentation of the supply chain resulted in supply chain breakdowns and a lack of accountability leading to delays, shortages and expiries, as no single entity has full control of the end-to-end supply chain process. That situation did not provide visibility in the supply chain, and decision-makers had little knowledge of the state of the entire supply chain.

3. Call for Integration, Coordination, and Collaboration in the NSCS

In order to address the issue of weak supply chain performance the FMOH committed to a plan of action that required integration of the procurement and supply chain functions in the sector to improve coordination, focus strategic directions and investments, and enhance decision-making. In 2015, the NMSF was set up as the national entity that would take the lead and responsibility for providing procurement and supply chain services up to the last mile. By the end of 2016, 16 out of 18 States had integrated the majority of their procurement and supply chain services with NMSF. The FMOH had also issued a directive to all States and health programmes to put in place arrangements to integrate their procurement and supply chain services with NMSF. This directive also called upon all NGOs working in the health sector to set up integrative working arrangements with NMSF, and many have already responded, including the UN agencies.

¹ NMSF Report on availability of medicines 2016

As part of that commitment to institutionalize an integrated NSCS, the FMOH presented a Concept Note (2015-2017) to the GF in which it committed to prepare a national supply chain strategy and implementation, that would cement the decision to integrate the sector procurement and supply chain services. This national supply chain strategy therefore is a FMOH response first to these challenges presented by a fragmented procurement and supply chain services. It is also fulfilment of its decision within the context of the HSS framework, for formalizing the decision to integrate these services. With this integration formalized, the NSCS would be providing strategic direction to the sector and a roadmap for addressing the end-to-end supply challenges that would otherwise persist, resulting in wastage and unaffordable cost to the health sector.

The key outcome expected from operating an integrated NSCS, is that there is one central entity that is responsible for all procurement and supply chain services in the sector. This entity is provided the resources to take the leading role in implementation, coordination, collaboration and management of the procurement and supply chain services taking place in the sector. It is that entity that ensures that all parties that have a role to play in ensuring availability of health commodities, are doing so in coordination with the central entity, ensuring that all parties are working together for the common objective, reaching a common goal, using one Procurement Plan and one sector Report that applies to the procurement and supply chain strategy.

3.1 Strategic Planning Process

This National Supply Chain strategy was developed through a series of consultative meetings with all stakeholders. A desk analysis of the procurement and supply chain situation in the sector was conducted in order to ensure that the resulting strategies are relevant and responsive to the needs of the sector.

As integration of the procurement and supply chain was already underway, the development of the NSCS required direct consultation with the players to clarify the roles that they were expected to play, the investment that they would need to strengthen and secure their commitment to the NSCS. Detailed discussions were held with all stakeholders during the consultation process and the subsequent meetings to formulate the national supply chain strategic direction. The strategic direction developed was aligned to the broader aspirations of the Federal Government. During the consultation and planning process, key strategic pillars were identified which focused the strategic planning process. The National Supply Chain Strategy is anchored on the following Strategic Pillars namely:

1. Quantification Forecasting
2. Commodity Security, Financing and Resource mobilization
3. Procurement
4. Logistics
5. Information Systems, e-LMIS and Communication
6. Quality assurance and rational use
7. Performance management, M&E for Supply Chain
8. Human Resources for Health in Supply Chain System
9. Cold chain Health Commodity Procurement and Supply Management
10. Medical device and technologies
11. Health Commodity Waste management
12. Public Private Partnerships
13. Provision of Retail Pharmacy services

4. Country Context

4.1 Country Background

Sudan² is a vast country extending gradually from the desert in the north, with hot dry climate and almost no vegetative cover, to the African Sahel zone in the centre, with light and dense Savannah, and to the sub-tropical region in the south with heavier rains and dense tree cover. Sudan shares borders with Southern Sudan, Central African Republic, Chad, Libya, Egypt, Eritrea and Ethiopia and has access to the Red Sea with an 853 kilometres long coastline. Sudan has just emerged from a long civil war, which brought to the secession of South Sudan in 2011. Sudan is a federal country, divided into 18 states, which are further sub-divided into 181 localities (or districts). Agriculture remains for over 80 percent of Sudanese the main source of income³.

In Sudan, 88% of the total population are settled, including 32.7% in urban areas, while 8% are nomads. The social sector, is underfunded, adding to the fragility of the health sector⁴.

4.2 Sudan Health Sector Context

Sudan is a signatory to many international health commitments, including the Sustainable Development Goals. Through the Federal Ministry of Health, Sudan has development aid agreements with a number of development organisations, such the UN system, NGOs and civil society. The public health response is driven through the National Health Sector Strategic Plan (2012- 2016). The HIV epidemic in most of the geographic zones of the country is classified as a low level epidemic with the exception of the Eastern zone that includes Red Sea and Kassala states. Malaria is a priority health issue for Sudan with the vast majority of Sudanese population considered at risk of malaria. Endemic zones are found in most of the country below North latitude 15°. In 2012, malaria represented 8.7% of overall outpatient consultations and accounted for 11% of inpatient admission for all causes. Sudan has experienced significant reductions in TB related mortality, prevalence and incidence over the past 24 years. Since 1990, Sudan has seen a halving of TB related mortality from 44 deaths (17-84) per 100,000 population in 1990 to 22 deaths in 2012.

Universal access to essential medicines and medical supplies and related technologies, is a major goal of the national supply chain strategy. The total pharmaceutical expenditure (TPE) in Sudan in 2010 was SDG 2,833 million (US\$ 1,349 million). The total pharmaceutical expenditure per capita was SDG 72.3 (US\$ 34.45). The pharmaceutical expenditure accounts for 2.2% of the GDP and makes up 36 % of the total health expenditure⁵.

The Sudan health sector continues to face major challenges, which include high disease burden, inadequate medical staff, weak logistics management in the supply of health commodities particularly between the State and the Localities; weak medicines management and control systems at health facility level, inadequate distribution of health infrastructure, equipment and transport, and challenges related to health information systems, inadequate financing. Overall, access to essential medicines is compromised by international sanctions on Sudan, which prevents application of an effective procurement and supply chain service.

It is expected that the NHSSP 2017- 2021, and other contributing strategic plans in the sector, shall focus on overcoming these constraints and challenges, in order to ensure effective implementation of this plan, and attainment of the national health objectives.

² Country Background

³ Central Intelligence Agency's The World Fact book (<https://www.cia.gov/library/publications/the-world-factbook/geos/as.html>)

⁴ Sudan House Hold Survey 2010 (SHHS2)

⁵ FMOH Sudan Pharmaceutical Country Profile, 2010

4.2.1 Structure of Health Sector

Sudan has a federal system of governance with three levels of administration, namely national, state and locality levels⁶. According to the interim constitution, health is one of the joint responsibilities between these levels of Government. Health care system management structure and public sector health services follows the same government structure.

The FMOH has a leading role in policy and stewardship, while responsibility for delivery of public services is largely led by States and their localities under the leadership of the State Ministries of Health (SMOH). Some responsibilities remain shared between the different levels namely, early preparedness and response to disasters and epidemics, monitoring and supervision and tertiary level care. There are major differences in the quality and availability of health systems and facilities across States, as well as between urban and rural areas in Sudan. Less than 30% of Primary Health Care (PHC) facilities provide a full complement of essential services. The majority of PHC facilities are government institutions of which 90% are managed by the State Ministry of Health⁶.

The NHSSP (2012-16) places universal health coverage and primary health care high on its agenda within the framework of a decentralized local health system. The strategic objectives are to ensure social protection by increasing health insurance coverage and reducing reliance on Out Of Pocket payments, expand coverage amount the informal sector and improve access to equitable services. Funding for Government- run health services are made directly by the FMOF or State Ministry of Finance via the FMOH and SMOH, then through localities to health facilities. The NHIF is a governmental organization in Sudan, aiming at alleviating the risks of the high cost of health services on both the government and population and securing the quality and accessibility of health services. It was established in 1994 and implemented in 1995. The goal of the NHIF is to expand the coverage among the poor families and informal sector.

4.2.2 Sector Policy Changes

In early 2014, the National Medical Supply Fund (NMSF) announced the redesign of the national medical supply fund to include the Central Medical Supply Public Corporation and the States' revolving drug funds. These institutions were to be combined into one national supply system. The NMSF's key function is to provide guidance and policy formulation for all areas of the pharmaceutical supply chain logistics management system and to coordinate the strategic functions of the SC (which include, Forecasting, Quantification, Inventory Management, Communication and Logistic Management Information Systems, Supply chain Human Resource capacity building, etc). The health programmes, SMOH, and development partners collaboratively engage with NMSF to manage and operate the Sudan supply chain system with the aim to increase access to health commodities at health facilities across the Country. The NMSF manages two types of services, namely cost recovery medicines, and provision of free medicines to selected strategic health programmes.

The development of the National Supply Chain Strategy will require the FMOH and SMOH to imbed this sector decision in all the related health policies and strategies that address availability of health commodities.

⁶ Jan-Gerd Kühling: Rapid assessment: Health care Waste Management (HCW) component of Global Fund HIV/AIDS, TB and Malaria projects in the Republic of the Sudan

4.2.3 Support from Development Partners

Sudan works in partnership with various development partners such as the UN system⁷. Partners have assisted the Federal Government to develop national development strategies such as the National Development Plan 2012- 2016, the NHSSP, etc.

Development partners also provide financial assistance to Sudan, for example, in contribution to procurement of essential medicines under the GF, UNDP, UNICEF, UNFPA and others. The methods or forms of assistance rendered to the health sector in Sudan also includes technical assistance, capacity building and operational support. This National Supply Chain Strategy will seek to provide a framework for greater coordination among development partners providing support to the health sector in Sudan.

4.3 Health System Strengthening Component

UNDP is the GF and the principal recipient (PR) of GF grants in Sudan. The GF grants in Sudan are consolidated in the Sudan's Single Concept Note HIV/AIDS, TB, Malaria and Health System Strengthening. In terms of supporting access to health commodities, there is expressed within the HIV/AIDS, the Malaria and TB components⁸ and intention to support access to accurate strategic evidence- based information by stakeholders for decision- making, strengthening of governance, institutional and organisational capacity; to strengthen the capacity of integrated health systems to enable... coordinated delivery of.. interventions through the local health system. The NHSSP 2012-2016 provides the overarching framework and direction for different players in the sector to respond to identified health challenges. Within the HSS component it is planned to support objectives of the NHSSP for which an integrated national supply chain strategy will be vital for the success of the future NHSSP. These objectives from the NHSSP 2012- 2016 are:

1. Objective 1: To strengthen effective leadership, good governance and accountability of the health system in Sudan
2. Objective 2: To develop a sustainable and integrated Health Information System, that provides comprehensive, quality health related information in support of evidence-based policy and planning at different system level.
3. Objective 3: To improve equitable coverage and accessibility of quality integrated primary health care and
4. Objective 4: To assure quality secondary and tertiary care
5. Objective 5: To improve equitable access to quality essential pharmaceuticals and health technologies
6. Objective 6: To develop a well-performing, stable and equitably distributed workforce with an appropriate mix of skills to meet agreed health sector needs
7. Objective 7: To ensure that the health system financing is sustainable, efficient and equitable and provides social protection to the people

⁷ UNDP: Country Programme Action Plan Between the Government of the Republic of Sudan And the United Nations Development Programme, 2013-2016

⁸ National HIV/AIDS Strategic Plan 2013-2016; National Malaria Strategic Plan 2013-2016, and National TB Strategic Plan 2013-2016

4.4 Vision, Mission, Overall Goals, Principles

The NSCS has been developed within the context of the overall public health sector agenda articulated in the NHSSP 2012-2016, and forms an integral part of the Sudan National Development Plan.

Vision

An effective, efficient and sustainable national supply chain for health commodities, medical devices and medical equipment which secures the provision of quality healthcare services, managed by trained and expert human resources, resulting in positive health outcomes for Sudan.

Mission

To provide equitable and sustained access to affordable, quality health commodities, medical devices and medical equipment to support the Sudan public health system.

Main Goals/Objectives

1. Support the strengthening of the NMSF to enable it to remain an effective lead for the NSCS and implementation services
2. Establish a coordinated and efficient procurement and supply chain infrastructure for health commodities, using national and international procurement and logistics rules and regulations that apply to these commodities, led by the NSMF
3. Reduce shortages of health commodities within the within the public health supply chain with an health facility order fill rate that enables the health facility to provide uninterrupted treatment services (for example, not less than 80% fill rate)
4. Improve access to health commodities and supplies though decentralizing distribution of medical commodities and supplies.
5. Improve decision-making processes through timely provision of information across the supply chain, by implementing appropriate supply chain information systems and technologies.
6. Enhance accuracy in quantification and forecasting of health commodities within the sector through provision of accurate data.
7. Mobilize resources to support coordinated supply chain interventions in the sector
8. Ensure sustained and improved quality for all health commodities within the public health sector.
9. Attain dynamic supply chain alignment and agility within the public health sector.
10. Ensure private sector participation in the procurement and supply chain activities of the public health sector through, various initiatives including Public Private Partnerships (PPPs)

Principles

This national supply chain strategy will operate within the framework of principles set out below:

1. Efficiency, transparency, accountability and cost-effectiveness in the procurement, supply and distribution of health commodities
2. Decentralisation and equity of access of health commodities across Sudan
3. A coordinated approach to procurement and supply chain resource mobilisation, utilisation and implementation
4. Clarity of roles for all stakeholders implementing the national supply chain strategy

5. People centred
6. Environmentally aware
7. Operate within the country's applicable procurement and supply legal frameworks and be able to apply international rules and regulation recognized by Sudan
8. Private sector participation

4.5 Situation Analysis

A well-functioning and efficient supply chain is vital for an effective health care system. Overall, the public health care supply chain in Sudan includes the FMOH and its institutions (SMOH), the statutory bodies (NMSF, NMPB), the non-governmental organizations (NGOs), communities, the private sector (including clinics, manufacturing and distribution industry and retailers), and development partners. All have differing degrees of involvement or activities within the public health sector supply of health commodities.

The NMSF has been set up, by an Act of Parliament, to be the lead provider of procurement and supply chain services to the country's public health sector. Table 1 shows stakeholders in the procurement and supply chain system. At the end of 2016, sixteen (16) out of 18 States in the country were aligned with NMSF procurement and supply chain services. On 28 March 2016, the Under Secretary for Health signed a government order establishing a PR Coordination Committee. This committee provides a forum for formal coordination between FMOH and UNDP on Global Fund grant implementation issues. It also provides direction and support to the Capacity Development Operational Team at the Directorate General for International Health, the Communicable and Non-Communicable Diseases Control Directorate, and UNDP.

On 15 May 2016, a Cost Sharing Agreement totalling \$1,209,694 was signed between FMOH and UNDP to facilitate health systems strengthening and supply chain management support. Under this agreement, UNDP was to facilitate technical support to the HSS grant implementation.

To further strengthen and secure the investments being made in the procurement and supply chain area, the FMOH agreed to develop a National Integrated Supply Chain Strategy, as part of commitment under the HSS Grant. In addition, the parties agreed to update the procurement policy and align it with national requirements and international standards.

4.5.1 Other aspects of the current environment

Legal and regulatory controls are provided through the Sudan Medicines and Poisons, Act 2009, which is administered through the NMPB. The NMPB has responsibility for product licensing, setting standards for management of medicines and related medical supplies and Quality Assurance.

Table 1: Supply Chain Functions and associated key players

Supply Chain Function	Major Players
Quantification	FMOH health directorates; health facilities; NMSF; International development organisations;
Procurement	NMSF for 16 out of 18 States; International development organisations
Central Warehousing	NMSF; the GF; UNICEF (EPI Programme)
Primary Distribution	NMSF (3PL contracts), UNICEF, NGOs (3PLs)
State- based Distribution	NMSF; SMOH ; Health facilities ; NGOs (3PLs or own transport)
Last Mile Distribution	Localities; health facilities; NGOs
Community Distribution	Localities; health centres; community health workers
Logistics Management Information System (LMIS)	NMSF; FMOH health programmes (eg, EPI); UNFPA (RH)

For product selection, the FMOH, with technical input from the specific disease programmes and the GDoP, has responsibility for reviewing and producing standard treatment guidelines, and the Sudan Essential Medicines List. Health facilities are expected to submit reports on adverse drug reactions to the NMPB for review.

Some government institutions such as the Defence Forces and Sudan Police operate health facilities in different locations. The NHIS contributes medicines and medical supplies to its health facilities accessed by its members. The commodities for these facilities are procured through a pooled procurement service at NMSF. The NMSF also provides retail pharmacy services, offering a range of medicines and medical products at low cost to the general public. The NMSF has plans to expand this initiative to more States in the country. Khartoum State operates a Revolving Drug Fund under the auspices of the Khartoum State Ministry of Health.

The private sector is also a key player in the provision of health services in Sudan. Private sector services are provided through a network of private hospitals and clinics and privately owned pharmacies. Commodities for these facilities are largely managed outside the public sector's supply chain.

In the current public health sector environment, where there are various players with different roles, responsibilities and relationships within the public sector's supply chain, the coordination of supply chain activities through an integrative strategy with one lead entity responsible for the coordination and harmonisation of this service, becomes an important necessity for which FMOH has overall responsibility

4.6 Key Determinants of National Health Supply Chain

The efficiency and agility of a national public healthcare supply chain is, to a large extent, determined by both external and internal environments and circumstances in which it operates. Desk analysis and interviews of key players provided input summarized below.

4.6.1 Policy and regulatory framework

The public health supply chain is largely influenced by policy and regulatory frameworks surrounding public health. Policies are the basis for ensuring that the sector implements health sector strategic plans and decisions articulated in Strategic documents. The national treatment protocols, national guidelines on medicines, laboratory, medical supplies and related products; the applicable national regulations all directly influence the types of commodities that are procured and stored in the nation's supply chain. Changes in these guidelines impact the supply chain in as far as the product selection and pipeline management are concerned.

4.6.2 Socio-economic indicators

In 1960, Sudan had a population of 7.5 million. At the end of 2015, the World Bank estimated the population to be just over 40 million people in 2015⁹. Khartoum State which hosts the capital city Khartoum, had a population of approximately 5.2 million people in 2014¹⁰. This rapid national population growth has placed a great burden on the national economy, particularly the country's capacity to keep pace with the health needs of a rapidly increasing population and its dynamics. Consequently, this increase in population puts additional pressure on the supply chain, as the population demands more products.

4.6.3 National Infrastructure impacting supply chain

The level of infrastructure development in the country has a significant impact on the performance of the public health supply chain. The state and terrain of the national road network will determine access, reach and performance of the supply chain. The lack of appropriate storage infrastructure at all levels of the supply chain also presents challenges in stock replenishment processes and quality assurance of products. The lack of utilities such as electrical power and communications in rural settings also limit the use of more efficient means to record and transmit logistics data up and down the supply chain.

4.6.4 National Supply Chain Co-ordination

For some time, the lack of a clear supply chain lead in the public health sector in Sudan resulted in critical fragmentation of procurement and supply chain services, leading to the unsatisfactory performance of the sector. The decision, through an Act of Parliament, to make the NMSF the leading entity in provision of procurement and supply chain services, aims to create one platform that provides coordination and alignment of all vertical procurement and supply chain services. The fragmented approach procurement and supply chain would present significant operational challenges as supply chain optimization and performance is compromised, besides limiting transparency, accountability and responsibility. This makes it difficult to identify root causes of the challenges, leading to sector failures. Now, with NMSF as the lead entity for provision and management of integrated procurement and supply chain services, it is the centre through which investment in the national procurement and supply chain services can be addressed.

4.6.5 Human resources for health supply chain (HRHSC)

Sudan's public health sector has continued to endure a shortage of human resources across a wide spectrum of professions for healthcare delivery. In particular, skills in the field of logistics and supply chain management are severely limited thereby curtailing proficiency in the execution of tasks in this area. This lack of skilled human resource impacts the supply chain in areas of data accuracy, reporting and inventory management particularly at lower levels of the supply chain. A drive towards further development and investment in Human Resources for Health Supply Chain will bring to bear greater supply chain performance and contribute towards achievement of positive health outcomes. To that end, the NMSF has invested in a training centre and has entered into partnerships for provision of training in all aspects of the procurement and supply chain and related services.

⁹ <http://data.worldbank.org/country/sudan>

¹⁰ <https://en.wikipedia.org/wiki/Khartoum;>

4.6.6 Technology

The efficiency and agility of health care supply chain is greatly influenced by technological advancements. Lessons can be learnt from other sectors (for example, the private retail sector, the vehicle manufacturing sector) that have similar logistics demands that require efficient management tools. These industries are rapid in studying, developing or applying new technologies. These tools can be adapted to applying to procurement and supply chain services in the public health sector. These changes in technology are important in stock management, ordering and re-ordering. Further, the progression of new technologies in information and communication systems will continue to bring about opportunities for greater data visibility and transmission in the public health supply chain.

4.6.7 Finance

Some of the key challenges to commodity security include inadequate funding for health commodities. Financing is for procurement of health commodities, operations and capital expenditure. The financing of NMSF is rather complex, with income from Government, cost recovery. The NMSF is a self-financing entity and is supported by development partners through financing of certain activities, such as human resource training. However, given the economic status of the country, the NMSF would benefit from additional support from development partners, to enable the NMSF to meet its mandate. For example, with an infrastructure master plan, the NMSF can seek support from development partners in financing the construction of NMSF warehouses across the country. Infrastructure development across the supply chain will continue to be a critical need for the medium term, and could hamper the development of an effective NSCS, if not addressed directly. Inadequate funding to procure health commodities, and to support the operations, subsequently leads to stock outs, operational challenges and supply chain failures.

4.6.8 Sector SWOT Analysis

A rapid sector analysis was conducted to ascertain the sector readiness to support an integrated procurement and supply chain structure. The quadrant below provides details of strengths, weaknesses, opportunities and threats identified in the health sector that ultimately affects the performance of the supply chain.

Table 2: SWOT Analysis

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> • Strong and trusted NMSF • Clear mandate and policy direction • Well-structured hierarchy in the sector • Procurement and supply chain expertise invested in the NMSF 	<ul style="list-style-type: none"> • Fragmented supply chain still present • Inadequacy of HRHSC, compounded by staff turnover • Inadequate infrastructure, including storage • Sector not adequately funded • Weak information and communications systems • Weak financing platform for the NMSF • Unclear roles and responsibilities between players
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> • Strengthening NMSF entity • Increasing macroeconomic stability and sustainable • economic growth, leading to increased funding • to the sector; • Increased government prioritization and • funding to the health sector; • Increased donor support health sector; • All donors, NGOs, Civil society are true • believers in the government’s ability to • implement the reform process; • Successes in service delivery exists and can be • made more visible <p>Development partners can make resource savings by not creating their own procurement and supply chain services</p>	<ul style="list-style-type: none"> • Poor co-ordination of sector players due to reluctance to comply to policy directives • Continued mixed roles and responsibilities • Poor and unattractive conditions of service, resulting in staff turnover; • The above factors being used as justification by stakeholders to develop their own, parallel procurement and supply chain services • Continued growth in competitive local, regional and • international market for health staff; <p>Inability to meet operational cost demands from NMSF</p> <ul style="list-style-type: none"> • Current sanctions on Sudan

5. Strategic Objectives

As part of the strategic planning process, the key overall outcome was to set out clearly defined goals and objectives for the procurement and supply chain strategy functions. These objectives indicated what the public health sector players needed to do and achieve, in order to ensure that the NSCS guarantees a robust and sustainable health commodities supply chain for the country. The table below provides more detail on the objectives set out, strategies and interventions and proposed implementation arrangements.

Table 3: Strategic Objectives

Objective 1	<ul style="list-style-type: none"> Establish a coordinated and efficient supply chain in the sector led by NMSF
<i>Strategies & Interventions</i>	<ul style="list-style-type: none"> NMSF is the lead entity in supply chain management in the sector
<i>Implementation arrangements</i>	<ul style="list-style-type: none"> Clarification of roles for all players in the supply chain
Objective 2	<ul style="list-style-type: none"> Reduce shortages of medical commodities and supplies within the supply chain by increasing the fill rate to a level that can assure effective provision of health care services at health facilities
<i>Strategies & Interventions</i>	<ul style="list-style-type: none"> Procurement and supply chain optimisation by NMSF through end to end control of the medical supplies supply chain. Increase in drug budget Greater procurement coordination with other stakeholders
<i>Implementation arrangements</i>	<ul style="list-style-type: none"> Procurement lead by NMSF
Objective 3	<ul style="list-style-type: none"> Increase capacity at SNMSF for effective last mile services, monitoring, supervision and reporting.
<i>Strategies & Interventions</i>	<ul style="list-style-type: none"> Improve and expand storage facilities at State and facility level Increase the States last mile coverage through investment in distribution capacity (third party logistics)
<i>Implementation arrangements</i>	<ul style="list-style-type: none"> Supply and distribution led and coordinated by NMSF
Objective 4	<ul style="list-style-type: none"> Enhance accuracy in quantification and forecasting of medical commodities and supplies within the sector through provision of accurate data.
<i>Strategies & Interventions</i>	<ul style="list-style-type: none"> Quantification and forecasting to be led by single entity Automating inventory control at health facility level through implementation of appropriate ICT tools for real- time data collection, processing and transfer
<i>Implementation arrangements</i>	<ul style="list-style-type: none"> NMSF to lead the process
Objective 5	<ul style="list-style-type: none"> Mobilize resources to support supply chain interventions in the sector
<i>Strategies & Interventions</i>	<ul style="list-style-type: none"> Federal Government contribution to NMSF costs Develop a framework for regular cost of service reviews and implementation Private sector engagement for service provision Donor engagement to support NMSF costs
<i>Implementation arrangements</i>	<ul style="list-style-type: none"> FMOH and NMSF to lead
Objective 6	<ul style="list-style-type: none"> Ensure sustained and improved quality for all medical commodities and supplies within the public health sector.

<i>Strategies & Interventions</i>	<ul style="list-style-type: none"> • Develop a quality assurance policy with regards to prequalification and subsequent purchasing, storage and distribution activities. • Strong collaboration between NMSF and NMPB's NDQCL based at NMSF • Strategic Sourcing approach to procurement
<i>Implementation arrangements</i>	<ul style="list-style-type: none"> • NMSF lead entity
Objective 7	<ul style="list-style-type: none"> • Improve decision-making processes through timely provision of information across the supply chain, by implementing appropriate supply chain information systems and technologies.
<i>Strategies & Interventions</i>	<ul style="list-style-type: none"> • Automating inventory control and data transmission • Use of appropriate technologies to collect, process and transmit data across the supply chain
<i>Implementation arrangements</i>	<ul style="list-style-type: none"> • NMSF to lead
Objective 8	<ul style="list-style-type: none"> • Ensure private sector participation in the public health sector supply chain services
<i>Strategies & Interventions</i>	<ul style="list-style-type: none"> • Apply strategies that engage private sector, such as Public Private Partnerships • Outsourcing, for example, in transportation services
<i>Implementation arrangements</i>	<ul style="list-style-type: none"> • NMSF to lead
Objective 9	<ul style="list-style-type: none"> • Ensure effective Health Commodity Waste Management
<i>Strategies & Interventions</i>	<ul style="list-style-type: none"> • Supply chain strategies for management of health commodity waste products • State and central disposal strategies
<i>Implementation arrangements</i>	<ul style="list-style-type: none"> • NMSF to lead the process
Objective 10	<ul style="list-style-type: none"> • Cold chain procurement and supply chain
<i>Strategies & Interventions</i>	<ul style="list-style-type: none"> • Apply recommendations proposed from various studies on cold chain supply chain services in Sudan • Learning from cold chain systems / demands as articulated by health programmes such as the EPI Programme
<i>Implementation arrangements</i>	<ul style="list-style-type: none"> • NMSF to lead
Objective 11	<ul style="list-style-type: none"> • Performance / service agreements, monitoring, evaluation and reporting on procurement and supply chain
<i>Strategies & Interventions</i>	<ul style="list-style-type: none"> • Performance or service agreements between NMSF and the FMOH (and on behalf of SMOH) • Monitoring, evaluation and reporting
<i>Implementation arrangements</i>	<ul style="list-style-type: none"> • Internal performance audits at NMSF to be carried out • External auditors of NMSF to provide independent audit on NMSF performance • FMOH to audit performance of NMSF
Objective 12	<ul style="list-style-type: none"> • Secured medical devices, medical equipment selection, procurement, installation and maintenance services
<i>Strategies & Interventions</i>	<ul style="list-style-type: none"> • Product selection principles to be applied • Justification for specifically named products selected for procurement
<i>Implementation arrangements</i>	<ul style="list-style-type: none"> • FMOH health programmes • NMSF to implement procurement decisions

6. National Supply Chain Strategic Objectives

As part of the strategic planning process, key supply chain objectives were set out and clearly defined and grouped into strategic pillars. These objectives indicated what the sector needed to do and achieve in order to ensure that supply chain excellence in the public health sector was achieved. The following section provides more detail on the objectives set out for FMOH, NMSF and the wider health sector; it includes strategies, interventions and proposed implementation arrangements.

7. National Supply Chain Strategic Thematic Areas:

Strategic pillars refer to the framework around which the strategic objectives are formulated so as to achieve the desired strategic direction and goals that have been set. They are therefore critical areas of strategic focus for the whole public health sector. They are the primary means identified for achieving the sector mission and vision, and form the basis or foundation on which the strategic objectives are developed. These strategic pillars have been identified, as pointed above (section 1.1) as providing the basis of the National Supply Chain Strategy. The following is the description of each selected pillar in relation to its importance in the NSCS:

7.1 Quantification and ordering by health facilities:

A key and essential component of the supply chain is accurate quantification and forecasting for health commodities, medical devices and medical equipment. This process is the starting point of the supply chain process where national product requirements are determined and quantified. This activity has a direct impact on supply chain performance and resource utilisation. Quantification and ordering by health facilities impacts procurement, warehousing, distribution and ultimately the level and quality of service delivered to the patient. Concerns in this area have been identified, and include a lack of effective coordination, inaccurate or non-existent quantifications for health commodities. The overarching objective of this strategic pillar is to secure and strengthen the leadership NMSF, which would ensure an inclusive, harmonised and comprehensive quantification process.

7.2 Procurement:

The planning and execution of the procurement process for medicines and medical supplies for the public health sector is a key determinant to achieving public health goals in Sudan. The organisation and management of this core function to a large extent influences product availability at service delivery points, performance of the supply chain and has significant national budgetary implications. A number of challenges have been identified in the sector and include lack of coordination and information sharing among supply chain players and delays in procurement of medicines and medical supplies. This procurement strategic pillar therefore provides a platform to address these challenges and provide a long term vision and strategy for health procurement, which is based on NMSF being the lead office for all procurement services.

7.3 Logistics:

The movement of medical supplies from sources of manufacture to NMSF and finally to the service delivery point, involves a complex linkage of transporters, service providers and resources. Logistics management is therefore a critical strategic pillar, which involves the storage, transport and distribution of medical supplies to health facilities, including the management of related information flows. Expert implementation and professional management of this key function is a strategic imperative for the public health sector and primarily NMSF, and requires carefully thought out strategic investments and alignment. A number of logistics challenges have been identified in the sector and include insufficient storage and distribution capacity particularly at the health facility level.

7.4 Information systems, e-LMIS and Communication:

Information is the backbone of any logistics and supply chain system as it enables the sector to adequately plan, execute and deploy resources in an efficient and cost effective manner. In order to ensure the health supply chain is responsive, agile and meets the expectations of the sector, it is imperative to have robust electronic information systems which guarantee the efficient collection, storage and transmission of accurate data and information across the supply chain. Technology is changing how health supply chains are managed. Paper based LMIS are gradually being replaced by digital applications used on mobile phones, tablets and computers linked to central databases. The lack of a clear IT Strategy for the development of electronic information systems to support health commodity management at health facility level has been identified. This strategic pillar therefore provides a strategic direction to take in the development of ICT for health supply chain

7.5 Quality assurance of products:

It is important to set up rigorous quality assurance policies and strategies, to ensure that safe and efficacious drugs are procured and used in the health sector at all times. This includes routine quality control of all procured health commodities to which this step applies, such as medicines, laboratory reagents, and medical devices. Of key importance, is management of health commodities at point of use. This pillar explores and provides strategic interventions to quality assure products secure provision of quality services at service delivery points.

7.6 Commodity security, financing, resource mobilization and rational use of medicines:

The coordination and pooling of resources in the sector can, to a large extent, contribute towards commodity security and efficient use of resources. The sector has experienced fragmentation of procurement and supply chain, with little or no coordination in the procurement and supply chain processes and services, resulting in over procurement of certain health commodities. Assured financing of the sector will result in sustained availability of health commodities. The NMSF's operational and capital costs need to be continuously covered through its cost recovery activities. Financial support to the NMSF and the procurement and supply services will enable NMSF to carrying on improving its operations and developing infrastructure. Financial security of the NMSF is key for it to invest in the organisation and to ensure that it has the appropriate staff, operations and tools to guarantee provision of an efficient service to all health facilities. This strategic pillar aims to provide strategies for optimum utilisation of available resources, strengthening coordination and leveraging efforts by key stakeholders in the sector to improve commodity security and financing. Rational use of medicines, laboratory supplies, medical supplies has a direct impact on the health sector budget. Inappropriate and irrational use of these products will mean that the health sector has to refill the supply chain for these products, resulting in demand on health sector finances. Promotion of rational use and related monitoring activities, are poorly supported and funded in the sector. Rational use of health commodities will result in an effective health sector, without stock outs or avoidable expiry of medicines, and no irrational prescribing practices. This pillar explores and provides strategic interventions to ensure that health commodities are used rationally to ensure successful treatment, and to reduce the cost of care.

7.7 Performance management, Monitoring and Evaluation, and service quality:

In order to check and confirm that sector objectives are achieved, it is important to institute a performance management regime that monitors progress and attainment of key indicators. The NMSF has developed its performance criteria on which it conducts an internal performance assessment. This approach needs to extend up to the service delivery point. Having robust and functional performance management systems will enable the sector to steer supply chain performance towards set goals and targets. Shortfalls in this area include the lack of a national monitoring and evaluation (M&E) plan for assessing or enhancing supply chain performance. High performance aspirations that the Federal Government is calling for may require that there is a formal performance agreement between the FMOH and the NMSF, and between the SMOH and health facilities. There is also a lack of supervisory and performance management skills, particularly at State and locality level. The NMSF has invested in developing a Monitoring and Evaluation framework for the NSCS, supported by UNDP/GF.

7.8 Human Resources for Health in Supply Chain (HRHSC):

The human element is a key and strategic factor which can determine the success or failure of a supply chain. Sufficiently skilled adequate human resources are a requirement to ensure that supply chain roles are expertly executed subsequently translating to high levels of service at the service delivery point. The manpower supporting supply chain activities in the sector is insufficient in terms of numbers, skills, and professional status. Other significant challenges include staff retention, staff renewal, succession planning, and underfunded capacity building efforts related to supply chain activities. This pillar seeks to focus on the strategic development of the human resource that is performing supply chain tasks, from NMSF to the health facility.

7.9 Cold Chain Health Commodity Procurement and Supply Management:

SNMSFs receive, on average 40 items that need cold chain transportation and storage, with temperature ranging from 2° to 8° C. These include biological medicines, vaccines and testing kits. The NMSF provides cold rooms and refrigerators to some states and at all NMSF storage facilities. However, cold chain infrastructure at the SNMSF requires the use of appropriate cold storage equipment and temperature monitoring and reporting tools¹¹, to secure integrity (potency and safety) of the cold chain health. For example, an assessment conducted by the NMSF in 2015 showed that 44% of States were using domestic refrigerators procured from high street stores, which are not recommended for pharmaceutical and vaccines. Reliable power supply and power back up for cold chain equipment are adding to the cold chain challenges. There at health facility level, there is possibly of integrating storage facilities, as seen where the Expanded Programme on Immunization (EPI) lends the use of its cold chain freezers for storage of other cold chain health commodities. This is due to the fact that the EPI freezer will use alternative energy to secure the cold chain. New technology of cooling system like solar, passive cooling system, and temperature-controlled devices are the elements to be invested in the system in future. Immunization program has vertical supply chain and has adequate capacity at states level for cold chain including; storage capacity, equipment, and operation model, however, the Effective Vaccines Assessment conducted in 2013 showed that all 9 indicators measured were behind the WHO standards for good vaccines management. It is recommended to develop a master plan to support the cold chain system, upgrade the aging equipment, and ensure cold chain quality assurance.

¹¹ UNICEF Supply Division Online Catalogue, at <https://supply.unicef.org/> and go to Catalogue and search for Cold Chain Equipment

7.10 Medical device technologies:

The National Supply Chain Strategy is aligned with the NMSF Act (2015), which mandates the NMSF to be responsible for procurement, supply and maintenance of Medical Devices and related Furniture particularly for public sector. In this role, the NMSF works with health programmes on product selection, justification, and thereafter procurement and distribution. In addition to installation and maintenance services, the NMSF is required to ensure provision of adequate human capacity to support users and medical devices in use. The NMSF strategy is to establish Medical Devices units at all States with a clear mission to support the SMOH and health facilities in the selection, use and maintenance of medical devices at health facilities. Further, the strategy requires that the NMSF supports and leads the FMOH in carrying out Medical devices technology assessments, in creating guidelines and policies for health technologies. This includes supporting setting up product selection, preparing specifications and justifications for procurement of specific products. Above all, the NMSF is required to ensure that there is control on procurement of medical devices, using strategies that include cost- effectiveness, creation of local offices of suppliers of medical devices to enhance engagement for service provision and maintenance of medical devices. Moreover, NMSF requires to use its professional human capacity ability and support Medical Engineers skills and experiences to ensure acquiring of skillful and competent engineers and technicians. With the expanding private health care services in Sudan, there is a great opportunity for the NMSF to extend its services and expertise to the private sector, which faces challenges in procurement and maintenance of medical devices. Although the agreement between SMOH and NMSF, permits NMSF to perform provide these services, the lack of a coordination framework for medical device planning, selection and procurement weakens the ability to develop a robust medical devices services to the public health sector.

7.11 Health Commodity Waste Management:

The NMSF has a leading role to play, and has ability to support all other health care national entities, specifically in setting up a platform to ensure safe, quality, effective and efficient waste management service, using the internationally recognized waste management and disposal systems. The NMSF logistics capacity can be deployed to provide collection of such waste material (using a reverse logistics system) from health facilities at localities, or from appointed locations in each state. The NMSF can provide this service in collaboration with other responsible entities that are involved in either generation of waste, managing waste products in their possession, or in regulating waste.

7.12 Public Private Partnerships:

Private Public Partnerships can potentially bring benefits to the public health sector supply chain through private capital injection, skills and knowledge transfer, and new technologies. Private sector engagement and participation in the public health sector is often limited in as far as creating mutually beneficial partnerships are concerned. Private sector participation has been overly focused on product supply, but limited in skills transfer and investment into the public health sector's operations and programmes. This pillar will provide strategic options for engagement with the private sector.

7.13 Provision of Retail Pharmacy Services:

Provision of retail pharmacy services is a part of the general financial resource initiative at the NSMF. Retail pharmacies function in most cases as the first point of call for non-complicated illness that can be resolved through self-treatment. The NMSF has seen an opportunity to offer retail pharmacy services, not only as part of self-financing strategies, but also to make available to the general public, quality pharmaceutical and related services. Quality retail pharmacy services can contribute to improving public health outcomes, particularly when retail pharmacies carry all the over-the-counter, pharmacy only and prescription only medicines. Increasingly, modern pharmacy practice offers other complementary services such as rapid malaria tests, and other diagnostic services in a professional setting. The NMSF is rolling out retail pharmacies to all States, taking advantage of its logistics footprint in Sudan. The NMSF will need to ensure that it has standards for practice, service to the public, quality products are available at affordable prices that do not hinder access to essential medicines, but do not shut out private pharmacies. The NMSF can also set the standard to the private sector retail pharmacies, encouraging private enterprise to invest in meeting minimum standards for provision of retail pharmacies. In this process, the NSMF can set high standards of practice, service and goods that secure public health for those members of the general public that are seeking self-treatment,

8. Description of Interventions and Expected Benefits from each NSCS Pillars:

In the following sections, each thematic area is described in terms of challenges, proposed interventions and anticipated benefits to the sector. Thereafter, these pillars will form the basis of the Implementation Plan for the NSCS, with detailed descriptions of activities, stakeholders responsible for the activities, costs and times lines.

8.1 Health Facility Ordering and Quantification:

The quantification process within the sector is not clearly defined and structured as to inform the NMSF about the national requirements. The table below shows the challenges, the proposed strategies, interventions and the anticipated benefits in regards to quantification.

HEALTH FACILITY ORDERING AND QUANTIFICATION			
THEMATIC AREA	SUPPLY CHAIN CHALLENGES	PROPOSED STRATEGIC INTERVENTIONS	ANTICIPATED BENEFITS
Health facility ordering and Quantification	Quantification procedures not fully enforced or complied with and activities not well coordinated	FMOH to provide leadership and oversight to the annual quantification process through SMOH up to the health facilities NMSF to provide secretariat and coordination support to GDoP	Enhanced accuracy of quantification results. Accurate information for procurement planning and budgeting
	Quantification is not consistently based on consumption data	Improve technical and operational capacity at health facilities for data processing and automation of consumption data collection, processing and transmission from service delivery point to central level.	Enhanced accuracy of quantification results. Accurate information for procurement planning and budgeting
	Orders processing is a mix of push and pull strategies	Strategy to strengthen capability of health facilities to collect and process their consumption data to enable facilities to report and prepare their orders to NMSF	Health facilities comply with national treatment guidelines on what products to use at their health facilities Orders are based on accurate consumption data Issues data is compared with consumption data routinely
	Data capturing tools at health facilities is not generally present to health programmes, resulting in inaccurate data collection and dependence on issues data from NMSF	Introduce appropriate, cost- effective technologies to capture consumption data, process and transfer in real time to decision- makers along the supply chain up to NMSF and respective programme directorates at the FMOH and SMOH	Use of accurate, transparent consumption data Refined data for forecasting, quantification and budgeting Reduced workload with automation

8.2 Procurement

Challenges being experienced in the public health sector under this pillar include stock outs and over stocks, weak links between quantification and procurement planning. The following table outlines the strategic interventions that will address these challenges;

PROCUREMENT			
THEMATIC AREA	SUPPLY CHAIN CHALLENGES	PROPOSED STRATEGIC INTERVENTIONS	ANTICIPATED BENEFITS
Procurement	Absence of a quality assurance policy to support procurement of quality assured medicines and other health commodities	Develop a quality assurance policy with regards to prequalification and subsequent purchasing, storage and distribution activities	Consistent procurement and supply of quality assured medicines health commodities to the public health sector
	NMSF not yet procurement agent under the GF and other partners	Strategy for coordination of procurement services done by other partners Transfer of GF procurement services for the GF to the NMSF Application of all GF and Sudan rules and regulations Minimum CIPS certified procurement staff at NMSF	Completes integration of procurement services in the health sector Improved and sustained use of the NMSF pooled procurement service Coordination on procurement planning and services.
	Limited coordination on procurement services between NMSF, health programmes and development partners	NMSF to set up a joint national Procurement Plan for all medicines, medical supplies for public health NMSF to create a Procurement Implementation Plan linked to Budget execution	Annual Procurement implementation plan optimizes utilization of resources and prevents stock outs, delayed procurement or duplications.
	Disconnect between Quantification, procurement planning and inventory management.	FMOH to ensure that all health programmes at health facilities are using approved quantification tools to plan at specific times in the year FMOH to monitor and report that all health facilities have conducted their quantification activities NMSF to provide secretariat or support services at State level in quantification processes	Guided quantification activities at State health facilities will ensure compliance and timely output to this requirement Placing procurement and distribution under one roof ensures integrated planning, minimizing inventory imbalances and stock outs, overstocking and expiry.
	Under resourced procurement of medicinal commodities and supplies	Increase funding for essential medicines & medical supplies, in line with the Abuja Declaration target of 15% of the health budget.	Improved availability of essential medicines and medical supplies at service delivery points.
	No health sector procurement policy and guidelines for health commodities.	Develop health sector procurement policy and guidelines to support product selection, standardization, single-sourcing, procurement strategies Enforcement of rules and regulations Regular procurement audits	Standardization for strategic products is applied with documented justification Long- term framework contracts are applied Best value for money attained, reduction in product quality problems, shorter lead times for deliveries to the central warehouse, and improved product availability.

8.3 Logistics

This pillar includes all aspects of supply chain that relate to distribution, storage, inventory and waste management. It addresses issues to do with costs of the services, inadequacy of storage, distribution, inventory management, and infrastructure and commodity accountability within the chain. This section also addresses the need to put in place an affordable energy acquisition strategy that assures quality of health commodities, and ability to carry on services. The table below summarizes these challenges, strategic interventions and anticipated benefits under this pillar.

LOGISTICS			
THEMATIC AREA	SUPPLY CHAIN CHALLENGES	STRATEGIC INTERVENTIONS	ANTICIPATED BENEFITS:
LOGISTICS	Inadequate storage space at all levels of the supply chain.	FMOH and NMSF to enhance storage infrastructure at the all levels of health care delivery by way of setting up an Infrastructure Master Plan for Construction of NMSF Warehouses and Store Rooms at Health Facilities	Appropriate storage Reduced stock outs.
	Inadequate distribution capacity in the supply chain	NMSF to strengthen distribution capacity up to the SDP	Predictable distribution service along the supply chain, up to the health facilities
	Health facilities have inadequate storage infrastructure.	FMOH to ensure health facility design includes appropriate storage infrastructure to cater for diverse commodities (medicines, nutrition products, cold chain, etc.).	Reduced stock outs, inventory losses and expiries of medicines and medical supplies at health facilities. Reduced distribution costs along the supply chain
	High energy requirements across the supply chain to assure correct storage environment for health commodities	FMOH and NMSF to work with development partners in creating a strategy for affordable energy acquisition for the health sector. This will include application all energy sources: Hydro, Renewable, generated power	Reduced cost to the public health sector and for the supply chain, with ability to provide energy supply to all service areas, both for static infrastructure (warehouses, store rooms) and mobile units (vehicles)
	Inadequate facilities and systems for management of sharps / other pharmaceutical waste.	FMOH should provide policy for waste management in the supply chain, and set up guidelines for State- based waste management strategy	Safe management of medical waste at all levels of supply chain. Efficient destruction of waste material at State level

8.4 Information Systems, e-LMIS and Communication

Efficient supply chains rely heavily on robust information systems and appropriate technologies. In the absence of such systems, health care supply chains can be severely constrained and consequently fail to meet the demands of the sector. Some of the challenges facing the sector in regards to this pillar include: lack of real time data for decision making, lack of clear policy direction on tools, and inadequate information technology infrastructure for public health. These challenges and proposed strategic interventions are summarized in the table below;

INFORMATION SYSTEMS, e-LMIS and COMMUNICATION			
THEMATIC AREA	SUPPLY CHAIN CHALLENGES	PROPOSED STRATEGIC INTERVENTIONS	ANTICIPATED BENEFITS
Information Systems, e- LMIS and Communication	Mixing supply chain data collection with data about patients and health services	Invest in separate robust separate HIMS and ELMIS systems on platforms that facilitate interoperability and data sharing	Reduce the data collection burden on supply chain managers
	Lack of data visibility in throughout the supply chain	Implement a national end to end supply chain system	Supply chain managers have improved access to near real time data and improved decision making
	Lack of clear policy decisions for development of electronic information systems.	FMOH to formulate an e-Health strategy	Coordinated information systems deployment in the sector.
	Lack of real time data at all levels of health care delivery	Implement systems that provide real time data for decision-making at point of service.	Supply chain decision making is informed and faster.
	Insufficient HRHSC staff and skills up to SDP.	FMOH to secure training to staff in supply chain services and information processing at all levels of health care delivery Automation of supply chain tasks through implementation of appropriate ICT tool	Knowledgeable and skilled staff at SDP. Data accuracy is enhanced Reduced human intervention in inventory related tasks.
	Inadequate ICT infrastructure and funding for automation.	FMOH to increase funding for ICT infrastructure. Connect stock status reports to medicines prescribing to capture consumption	Improved data quality and ability to transfer commodity information quickly and accurately up and down the SC. Evidence- based, Information driven decision making.

8.5 Quality Assurance of Products

Quality assurance is a key component of supply chain excellence in the health sector. It ensures that the quality of services and health commodities is not compromised at any stage of the supply chain, therefore ensuring delivery of efficacious health commodities to patients. Some of the notable challenges under this pillar include; weak and fragmented pre- and post-marketing surveillance, poor adherence to standard operating procedures (SOPs) across the supply chain, among others. The table below helps to summarize these challenges, while providing strategic interventions and highlighting the anticipated benefits.

QUALITY ASSURANCE OF PRODUCTS			
THEMATIC AREA	SUPPLY CHAIN CHALLENGES	STRATEGIC INTERVENTIONS	ANTICIPATED BENEFITS:
Quality Assurance	Weak post-marketing surveillance.	Full implementation of the GDoP, NMPL and NMPB plans to ensure strengthening of post-marketing surveillance at all levels.	Assured quality of medicines, laboratory supplies, medical supplies up to the SDP.
	Weak monitoring of compliance to national regulations applying to health commodities at State and Locality level	Decentralization and strengthening of NMPB services at State and locality level to undertake early monitoring, supervision, surveillance, guidance, reporting on compliance to NMPB standards	Reduces risk of substandard medicines in the supply chain. Prevents counterfeit products entering the supply chain at any level
	Poor adherence to health commodity management standard operating procedures (SOPs) at service delivery points. Weak enforcement of standards of practice for dispensing and prescribing.	1) FMOH to coordinate all existing SOPs for QA, revise/update for all levels in the supply chain Clarify roles and responsibilities for all levels in relation to QA and promote usage of SOPs at all levels. 2) Regular training and supervision at different levels of the health care system is required	Improved quality of service.
	Implementation and enforcement of Quality Management Systems in NMSF operations	Commitment to establishing, implementing and maintaining an effective quality management system	Consistent provision of quality assured health commodities and services

8.6 Commodity security, Rational use of health commodities, financing and resource mobilization

As a major pillar, commodity security aims to ensure that health workers and patients have access to essential health commodities at all times. However, due to sanctions on Sudan, the competing national development priorities, this assurance is constrained. Notable challenges on commodity security, include: inadequate funding to meet operational and capital costs across the supply chain, up to the service delivery point; limited financing for procurement of health commodities, lack of effective and timely resource mobilization for health commodities, and limited financing for supply chain services at the health facility level. Irrational use of medicines has a direct negative impact on the budget for essential health commodities. Irrational use of medicines has a clear negative impact on the ability of the health sector to provide services, given that overuse of medicines results in increase in health sector budget, drug resistance, and poor health outcomes. In the era of sanctions, the NMSF and FMOH need to have a continuity plan that secures financing and enables procurement and importation of those health commodities that cannot be procured locally. Pharmacovigilance services are therefore critical in the control of irrational use of medicines. The table below helps to highlight these challenges and indicates the strategic interventions and the anticipated benefits;

COMMODITY SECURITY, FINANCING & RESOURCE MOBILIZATION			
THEMATIC AREA	SUPPLY CHAIN CHALLENGES	STRATEGIC INTERVENTIONS	ANTICIPATED BENEFITS
Commodity Security, Rational Use of Health commodities, Financing & Resource Mobilization	Inadequate funding for the procurement of medicines and supplies hence shortages within the supply chain.	Increase proportion of Federal Government funding to the health sector (target of 15% GDP per Abuja agreements), and institute improved mechanisms for sharing information on funds available, budgets, and procurement plans. FMOH to realign health sector funding	Improved availability of supplies, reduction in stock outs, hence improved health comes.
	Inadequate resources to support an efficient & effective supply chain.	<ol style="list-style-type: none"> 1. NMSF, Development partners, FMOH, to provide financial and material resources to secure procurement and supply chain operations 2. NMSF to explore additional cost- recovery schemes to expand the financing envelop to support operations to the public health sector 3. FMOH to secure funds from the NHIF to support procurement of health commodities and secure NMSF operations 	Enhanced ability of SC to meet performance expectations.
	Inadequate operational partnership between NMSF and development partners to support NMSF operations	Create specific levels for engagement between the NMSF and development partners to plan and mobilize resources for supporting NMSF requirements for operations, capital expenditure and expansion programme	Ability of NMSF to meet its operational and service expansion targets
	Irrational use of medicines and other health commodities at health facilities	Strengthen pharmacovigilance activities at health sector level Implement supervision of health practices to ensure rational use of medicines is applied by individual prescribers Set up a health education campaign to educate the public on dangers of irrational use of medicines	
	Lack of business continuity planning for health commodity procurement and financing of the logistics services	Develop business continuity plan that includes resource mobilization strategies and avenues to ensure that health commodities can be sustainably procured and operations in the supply chain can be financed	Uninterrupted supply of health commodities.

8.7 Performance Management, M&E, & Supply Chain Supervision

Performance management is very vital in supply chain as it helps to determine the degree to which the sector demands are being met. Monitoring and evaluation on the other hand compares performance against agreed deliverables, thereby identifying and highlighting performance gaps, as well as highlighting improvement areas within the supply chain. However, there are notable challenges experienced in this pillar namely: lack of a clear supply chain M & E framework, Localities' limited capacity to supervise health facilities, among others. The table below helps to highlight the challenges under this pillar, strategic interventions, and anticipated benefits:

PERFORMANCE MANAGEMENT, M & E & SUPPLY CHAIN SUPERVISION			
THEMATIC AREA	SUPPLY CHAIN CHALLENGES	STRATEGIC INTERVENTIONS	ANTICIPATED BENEFITS
Performance Management, M&E, & Supply Chain Supervision	Fragmented M & E services	<ol style="list-style-type: none"> 1) FMOH to establish a Supply Chain M and E Plan / framework with reporting framework that will provide one sector report 2) Resource mobilization to secure this activity annually 	Public health supply chain performance will be responsive to sector expectations since performance gaps are easily identified and filled.
	Unclear supply chain roles and responsibilities between State, Localities and at lower levels of service delivery.	<p>FMOH to incorporate SC responsibilities in the JDS for those performing SC tasks.</p> <p>Create stock visibility along the supply chain</p>	<p>Improved accountability for performance of supply chain responsibilities.</p> <p>Increased visibility of stock along the supply chain</p>
	No formal service agreement between NMSF and FMOH, SMOH and health facilities	<p>FMOH to set up service agreement framework to use to enter into performance agreement with NMSF</p> <p>Similar tool to apply to NMSF services to SMOH, Localities and health facilities</p>	<p>Improved compliance to service requirements</p> <p>Improved sector outcomes for health</p>

8.8 Human Resources for Health in Supply Chain (HRHSC)

The sector has continued to endure a shortage of qualified and experienced human resource across the supply chain. In particular, skills in the field of logistics and supply chain management are severely limited thereby curtailing proficiency in the execution of tasks in this area. The table below helps to put the challenges, strategic interventions and anticipated benefits into perspective.

HUMAN RESOURCES FOR HEALTH SUPPLY CHAIN			
THEMATIC AREA	SUPPLY CHAIN CHALLENGES	PROPOSED STRATEGIC INTERVENTIONS	ANTICIPATED BENEFITS
HRHSC	Strengthening the governance, management, fiducial control skills, procurement, warehousing, quality assurance, distribution, coordination, monitoring, supervision, and reporting at NMSF	FMOH and NMSF Board to invest in establishing these skills through MOUs with local and internationally accredited governance, leadership, management and PSM training services Long-term HRHSC Strategic Plan and Budget Continued collaboration with partners supporting NSCS services	An efficient NMSF that is able to provide the minimum requirements for GDP services
	Create dedicated supply chain roles at FMOH, the SMOH and Localities to provide professional oversight work on the NSCS	FMOH to prioritize and establish supply chain specific job roles with clear career path at Federal, State and Localities	<ul style="list-style-type: none"> Structured system of supply chain jobs in the sector Retention of skilled staff is enhanced because of established career path.
	Inadequate skilled human resources across the supply chain	FMOH shall define an acceptable HR structure for State and Localities and for health facilities in terms of supply chain needs, and shall recruit staff to fill the posts. Use the NMSF as a centre of excellence (COE) for in-service training	Availability of qualified and skilled supply chain staff for the sector.
	Inadequate funding for supply chain related capacity building.	Continued resource mobilization to support annual capacity building exercise	Improvement of skills for supply chain personnel.

8.9 Cold Chain Health Commodity Procurement, Storage and Management

The integrity of cold chain health commodities is directly related to the quality of their storage facilities across the supply chain. By definition, the cold chain means that from source to the service delivery point, temperature control of the storage system for cold- temperature controlled products is maintained.

COLD CHAIN HEALTH COMMODITY PROCUREMENT AND MANAGEMENT			
THEMATIC AREA	SUPPLY CHAIN CHALLENGES	PROPOSED STRATEGIC INTERVENTIONS	ANTICIPATED BENEFITS
Cold Chain Management	Limited cold chain operational guidelines across the supply chain	Support development of an integrated Cold Chain Procurement and Supply chain Management Strategy that supports integrated and coordinated cold chain services, up to the last mile; led by the NMSF, at central and State levels	Secure procurement, supply and management of cold chain health commodities up to the service delivery point
	Weak cold chain health commodity storage facilities	Create an integrated Cold Chain Infrastructure investment and costed implementation plan	Ensure appropriate management of cold chain health commodities across the supply chain, up to the service delivery point, and management of Waste products
	Limited technical knowledge on cold chain health commodity management, handling of related waste products and disposal	Invest in Human Resource training on procurement, supply and management of cold chain products	Health personnel and staff working in supply chain are knowledgeable and capable to handle all types of cold chain health commodity products, enabling provision of quality, safe and effective cold chain products to the patient
	Weak monitoring and record keeping for cold chain health commodity products, particularly at Locality levels	Develop a monitoring and record keeping system for cold chain health commodities and strengthen risk-based inspections. Institute capacity building service at health facility, locality and state levels on management of cold chain health commodities	Secured integrity of cold chain health commodities up to the service delivery point

8.10 Medical Devices Technologies, Policy, Capacity Development & Service Provision

The National Supply Chain Strategy is aligned with the NMSF Act (2015), which mandates the NMSF to be responsible for procurement, supply and maintenance of Medical Devices and related Furniture particularly for public sector. The NMSF works with health programmes on product selection, justification, and thereafter procurement and distribution. In addition to installation and maintenance services, the NMSF is required to ensure provision of adequate human capacity to support users and medical devices in use. Moreover, NMSF requires to use its professional human capacity ability and support Medical Engineers skills and experiences to ensure acquiring of skilful and competent engineers and technicians. The NMSF strategy is to establish Medical Devices units at all States with a clear mission to support the SMOH and health facilities in the selection, use and maintenance of medical devices at health facilities. Although the agreement between SMOH and NMSF, permits the NMSF to perform all processes for medical device for FMOH, the lack of a coordination framework for medical devices planning, selection and procurement weakens the ability to develop a robust medical devices services to the public health sector.

MEDICAL DEVICES POLICY, CAPACITY DEVELOPMENT & SERVICE PROVISION			
THEMATIC AREA	SUPPLY CHAIN CHALLENGES	PROPOSED STRATEGIC INTERVENTIONS	ANTICIPATED BENEFITS
Medical Devices Capacity development	Lack of a National Health Sector Technology assessment establish baseline on the status of medical devices, equipment in public health sector	Conduct a broad- based National Health Sector Technology assessment in public health sector	The assessment will support selection of Medical Devices that suit Sudan public health context; effective procurement from reliable source ; ensure rapid maintenance services are available locally
	Lack of a National Health Sector Technology policy to guide decisions on medical devices and medical equipment	Support development of the National Health Sector Technology policy that provides guidance on specifications, procurement strategies, maintenance requirements, local presence, standardization for specific products	The policy will guide decision making on medical devices; support coordination and Determine needs for each level of health care; ensure effective procurement of the right devices
	Absence of unified list for Medical Devices specification and features per device	In collaboration with stakeholders, develop a list of standard medical devices with full specification for use in the Sudan public health sector	The list of specification will result in procurement of appropriate biomedical devices that fit the health service requirements at health facilities
	Lack of well-equipped Biomedical Devices intervention units at SNMSF facilities	Establish SNMSF Biomedical Devices units at all SNMF offices to provide rapid intervention at health facilities, including providing technical guidance to users, and first response in maintenance of devices.	Establish Biomedical Devices unit at SNMSF to support Medical Devices selection, quantification, and maintenance
	Lack of trained and skilful Biomedical Engineers and technicians mainly State, Locality and health facility level	Develop human capacity building plan for Biomedical Engineers	Availability of trained Biomedical Engineers and Technicians capable to support the Medical Devices systems and their management at health facility level
	Lack of funds to develop the Biomedical Devices units at State, Locality and health facility levels including: equipment, infrastructure and management	<ul style="list-style-type: none"> - Develop the Strategic Plan for development of the Biomedical Engineering services - Present the Biomedical Strategic Plan to Government and development partners as part of resource mobilization - Generate direct resources through providing self-financing maintenance services to the private sector 	Provision of adequate fund will support all Medical Devices supply chain functions

8.11 Health Commodity Waste Management

The Sudan's supply chain strategy recognized the importance of having robust health commodity waste management system that protects health personnel, local communities, and the environment from hazardous and non-hazardous products. Detailed assessment work has been done in this area of management of health sector waste, with recommendation on actions to be taken¹², with reference to the National Waste Management Policy (2009), which attributes roles to be carried out by each institution generating waste. The NMSF would be responsible for implementation of the strategy and policy, in line with regulation of the Environmental and Food Department.

HEALTH COMMODITY WASTE MANAGEMENT			
THEMATIC AREA	SUPPLY CHAIN CHALLENGES	PROPOSED STRATEGIC INTERVENTIONS	ANTICIPATED BENEFITS
Waste Management	Lack of a harmonized and integrated national health care wastes management strategy.	Support development of the National Health Care waste Management Strategy that supports integrated and coordinated waste management effort, led by the: NMSF, at central and State levels	Improved management and control of health care waste management for health commodities, through a dedicated NMSF, carried out to avoid risks to public health
	Weak health commodity waste management infrastructure including availability of appropriate treatment and disposal equipment.	Using established recommendations, establish health commodity waste management infrastructure systems, and appropriate waste treatment and disposal treatment equipment, such as high-temperature incinerator	Ensure safe disposal of hazardous and non-hazardous waste and protect environmental
	Limited technical knowledge on health commodity waste management, treatment and disposal	Set up staff training programme on health commodity management and control and strategies to apply for treatment and disposal	Health personnel and staff working in supply chain are knowledgeable and capable to handle all types of health commodity waste products
	Weak management of health commodity waste products at lower levels, collection or return to NMSF	Strengthen management of health commodity waste products at lower levels, including reverse logistics and /or collection of wasted products up to the lower level health facilities.	Safe, quality and effective collection of the wasted material from lower level
	Weak monitoring and record keeping for health commodity waste products	Develop a monitoring and record keeping system for wasted health commodities and strengthen risk-based inspections. Institute capacity building service at health facility, locality and state levels on management of waste health commodities	Using applicable methodologies and standards monitor, record, report and management waste health commodities at facility, locality and state levels

¹² Kühling, J.: Rapid Assessment: Health Care Waste Management (HCW) Component of Global Fund HIV/AIDS, TB and Malaria Projects in the Republic of the Sudan, 2015

8.12 Partnerships for supply chain services

Governments face an ever-increasing need to find sufficient financing to develop and maintain infrastructure and provide services required to support growing populations. Additional challenges arise from demands on public services, due to increasing urbanisation, the need for rehabilitation of aging infrastructure, the need to expand networks to new populations, and the goal of reaching previously unserved or underserved areas. Furthermore, infrastructure services are often provided at an operating deficit, which is covered only through subsidies, thus constituting an additional drain on public resources. Combined with most governments' limited financial capacity, these pressures drive a desire to mobilise private sector capital for infrastructure investment and in the provision of services. In this regard, the Federal Government has experience in PPPs, and can actively seek private partners to invest and operate in the public health supply chain in Sudan. Currently, NMSF has outsourced its distribution services to Sudapost. The table below details the strategic interventions and anticipated benefits;

PARTNERSHIP FOR SUPPLY CHAIN MANAGEMENT IMPROVEMENT			
THEMATIC AREA	SUPPLY CHAIN CHALLENGES	PROPOSED STRATEGIC INTERVENTIONS	ANTICIPATED BENEFITS
Partnership For Supply Chain Management Improvement	Against competing priorities, there is limited investment in the health sector by the Government	Seek private capital and long-term investment through PPPs, to address existing opportunities in public health Institute performance agreements within the supply chain as a foundation for efficiency and securing private investments	New infrastructure, technologies and services Performance by public health sector along lines that will secure PPP arrangements
	High cost of new technology	Outsourcing and PPPs to secure new technologies	Shared costs and risks Access to new technologies
	Limited engagements of the Private sector through PPPs	Develop PPP models/options	
	Limited know how and lack of skills in supply chain management	Gain skills through outsourcing section of the supply chain to private sector	Acquisition of capacity and capability to provide services to health facilities
	Lack of clear mechanisms to approach the cooperative partners to support public health supply chain	NMSF to establish robust mechanisms to set clear platform to engage the international communities and cooperative partners to support supply chain activities	

8.13 PROVISION OF RETAIL PHARMACY SERVICE

The burden of providing public health services can be shared between the Government and the general public, when the latter, being well informed about self treatment, can seek advice, basic diagnosis and self-treatment at well-resourced retail pharmacies. This service from NMSF is part of the self-financing initiative that allows the organisation to be independent of Government grants. There is a great opportunity to create a retail pharmacy service that provides the general public with basic healthcare solutions, thereby reducing the care burden on the FMOH, but resulting in positive health outcomes. The interventions proposed here aim to secure this service from the NMSF.

PROVISION OF RETAIL PHARMACY SERVICES			
THEMATIC AREA	SUPPLY CHAIN CHALLENGES	PROPOSED STRATEGIC INTERVENTIONS	ANTICIPATED BENEFITS
Provision of Retail Pharmacy Services	Strategy for NMSF retail pharmacy service and practice not updated	Preparation of an NMSF Retail Pharmacy Strategy and costed Implementation Plan	Master plan will enable focused and controlled planning
		NMSF Retail Pharmacy Infrastructure Master Plan	Uniform brand of NMSF retail pharmacy outlets that promote quality, safety and effectiveness of health commodities on offer
		Annual review of medicine / supplies' retail costs	Maintain affordability of goods and services on offer from NMSF retail pharmacies
	Public demand for quality retail pharmacy service	Expand pharmacy-based services to increase health issues for diagnosing, advice and / or self-treatment as paid-for services	Basic health problems can be addressed by trained pharmacists thereby reducing
		Identify and contract sources of quality medicines (General Sell, OTC, PO, POM) and medical supplies	Quality sources of retail pharmacy health commodities will secure the credibility and integrity of the service
	Trained pharmacists and pharmacy technician	Assess the situation on available retail pharmacy training available in Sudan	Set the standard for retail pharmacy practice
		Prepare a retail pharmacy practice training programme	Set a standard for pharmacy practice that can apply to public and private pharmacy practice
		Establish training service providers	Secured long-term training service will secure provision of quality retail pharmacy services
	Integration of data with national health management information system requires strengthening	Referral system for health conditions that cannot be addressed at the pharmacy	Linkage allows the health sector to have better information on morbidity;
		e-system for data collection, processing and transfer linked to the NMSF ERP system for collating data for national assessment	Provide a national picture on health status and demand for self-treatment and products used for self-treatment, affordability measures, etc

9. Strategic Objectives, CSFs & KPIs

In order to develop sector targets and to keep in line with the supply chain strategy, there is a need to link the broader strategic objectives with critical success factors and key performance indicators to determine the extent to which the sector is achieving its objectives in as far as the supply chain is concerned. Critical Success Factors are those elements where if the health sector performs well, it would lead to the sector's success in delivering its objectives. Key performance indicators are the things that key participants in the sector will measure to find out if the intended objectives are being met. These indicators can be linked to specific players in the supply chain performing their respective supply chain tasks. Figure 1 below shows the relationship of the overall strategic objectives with critical success factors, key performance indicators and outcomes.

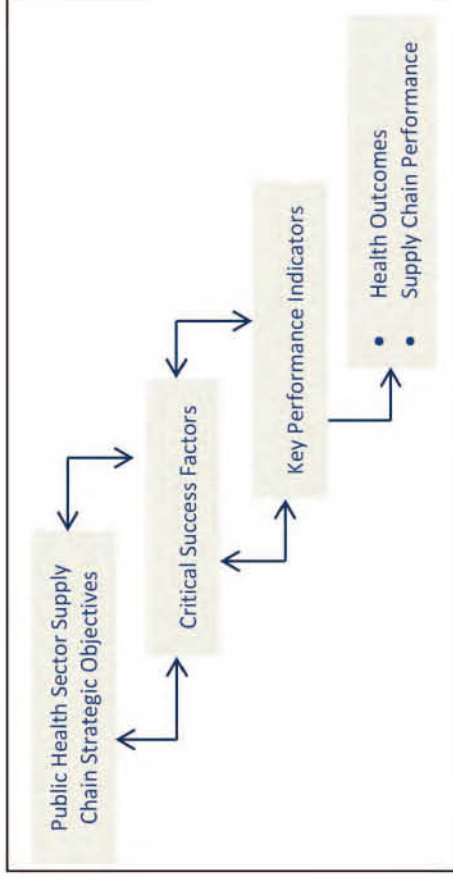


Figure 1: Objectives, Critical Success Factors, Key Performance Indicators

Following the definition of the overall sector goals and objectives through the strategic planning process, critical success factors were identified and listed as the key activities which needed to be performed in order for the FMOH, NMSF and the wider public health sector to meet its objectives. Key performance indicators were formulated for each objective in order to help determine the extent to which these objectives are being met. Table 4 below provides details of strategic objectives, critical success factors, key performance indicators and the lead entity responsible for driving these objectives.

Table 4: Strategic Objective, Critical Success Factors, KPIs and implementation responsibilities

	Objective	Critical Success Factors	Key Performance Indicators	Responsible
1	Set up a NSCS Support Committee to assist in the process of resourcing the implementation of the NSCS, and in setting up operational framework for its implementation and thereby reduce risk to successful implementation	<ol style="list-style-type: none"> The NSCS Support Committee is set up The members are high level FMOH, NMMPB, NPHL, SMOH representative, and UNDP (on behalf of the UN agencies) Plan for phased integration approach is set up for different health programmes or institutions A plan for mobilizing resources for development of new infrastructure that are high value 	<ol style="list-style-type: none"> The resources for the NSCS implementation are provided All development partners supporting access to essential medicines are supporting implementation of the NSCS Phased integration is being applied for selected health programmes or institutions NMSF is fully supported as the lead PSM entity Resource mobilization activity is developed and ongoing Risk management plan is in place 	FMOH, UNDP/GF (on behalf of all UN agencies)
2	Set up operational technical working groups (TWGs) based at NMSF, consisting of stakeholders	<ol style="list-style-type: none"> Technical Working Groups for key operational areas at NMSF, set up and functional Technical working group is set up to support implementation of a phased integration approach 	<ol style="list-style-type: none"> Technical Working Groups are set operational consisting of NMSF and stakeholders supporting those areas. For example, Procurement TWG, Logistics Working Group, Infrastructure Development TWG A TWG is functional to assist with the phased approach to integration 	NMSF with support from the UNDP/GF PMU
3	Establish a coordinated and efficient supply chain in the sector led by NMSF	<ol style="list-style-type: none"> Identification and appointment of lead entity Adoption of new policy on single lead entity Acceptance by all stakeholders of the role of the NMSF. Seamless transfer of procurement and supply chain services to NMSF 	<ol style="list-style-type: none"> Policy on single lead supply chain entity Transfer of roles to new lead entity Designated lead institution mandated and providing services to the sector 	FMOH, This is already done through the NMSF Act 2015.
4	Reduce shortages of medical commodities and supplies within the supply chain by increasing the fill rate over to 80%.	<ol style="list-style-type: none"> Increase in health commodity budget Ring fenced health commodity budget Supply chain optimisation Efficient collection, processing and transmission of accurate data across the supply chain 	<ol style="list-style-type: none"> Stock out rates/ fill rates Demand fulfilment 	FMOH, SMOH, NMSF
5	Improve access to health commodities and related products through decentralizing distribution	<ol style="list-style-type: none"> Adequate budget for distribution services Adequate available budget for State NMSF operations 	<ol style="list-style-type: none"> Distribution budget from State to health facilities Number of health facilities /population reached per month On time delivery Shorter lead times 	FMOH, SMOH, Localities, NMSF

	Objective	Critical Success Factors	Key Performance Indicators	Responsible
6	Enhance accuracy in quantification and forecasting of health commodities and related products through provision of accurate data.	<ol style="list-style-type: none"> Existence of quantification policy document to guide the sector Approved Framework for quantification 	<ol style="list-style-type: none"> Single Consolidated annual quantification report that guides procurement for all categories of drugs and medical supplies 	FMOH, CNCD, DGOP, NMSF
7	Existence of an Annual and multi- year Procurement Plan and Budget	<ol style="list-style-type: none"> One sector procurement plan framework for annual and multi- year Contributions from all partners supporting public health 	<ol style="list-style-type: none"> One Annual Procurement Plan with Budget One multi- year (rolling) costed procurement plan 	FMOH, CNCD, DGOP, NPHL, NMSF; Development partners
8	Existence of a Single, Pooled Procurement framework and service at NMSF	Use of the Pooled Procurement platform at NMSF	<ol style="list-style-type: none"> CDP for procurement staff Accreditation of procurement staff 	FMOH, NMSF, Development partners
9	Existence of a one Procurement and Supply Chain Monitoring, Supervision and Report framework	Existence of policy and operational framework	Production of one sector Report	FMOH, NMPB, NMILP, NMSF, Development Partners
10	Mobilize resources to support supply chain interventions in the sector	<ol style="list-style-type: none"> Clear strategy/framework for resource mobilisation Sector wide coordination and collaboration Commitment by Federal Government and partners to support common services to the public health sector 	<ol style="list-style-type: none"> Increased and sustained budgetary allocation to supply chain functions Increased use of self- financing strategy to increase resources for supply chain services 	FMOH; MOF; DGIH; Development Partners
11	Ensure sustained and improved quality for all medicines and medical supplies and related products within the public health sector.	<ol style="list-style-type: none"> Establishment of robust QA structures/processes for all products along the supply chain Available budget for QA services 	<ol style="list-style-type: none"> QA measures implemented 	NMPB, NPHL, GDoP, NMSF
12	Improve decision-making processes through timely provision of information across the supply chain, by implementing appropriate supply chain information systems and technologies.	<ol style="list-style-type: none"> Clear policy on ordering systems Consensus on a single consultative platform Training of users on new ordering systems Automating data collection and transmission 	<ol style="list-style-type: none"> Establishment of supply chain end to end electronic information systems 	CNCD; DGOP, NPHL; NMSF
13	Ensure private sector participation in the public health sector through various modalities, including PPPs	<ol style="list-style-type: none"> Knowledge of structuring PPPs Enabling legal and policy framework for PPPs in public health sector 	<ol style="list-style-type: none"> Number of PPP interventions implemented 	FMOF; FMOH; NMSF

10. Implementation Framework

10.1 Legal and Regulatory Framework

This plan is closely linked to the Sudan Constitution, which is the supreme Law of the land. The Constitution guarantees the right to life and right to health. It also guarantees other fundamental human, social and economic rights to the population, which have direct and/or indirect impact on the key determinants of health. Other Acts, rules and regulations are available and inform the provision of procurement and supply chain services applied at and complied with by the NSMF.

10.2 Overall National Health Policy and Legal Frameworks

The Federal Government through various policies and strategies underpinning the provision of goods and services in the Sudan public health sector, and in reference to other national legislation, provides a comprehensive policy and legal framework for implementation of the NSCS. Various health, procurement and finance related pieces of legislation for addressing specific aspects of the health supply chain exist, and the NSCS is closely linked with those. The Federal Government will continuously review the needs and gaps for specific health, procurement and finance related legislation and policies. The Federal Government will also develop appropriate legislation necessary for enforcement of particular aspects of the health supply chain, in support of the NSCS.

10.3 Institutional Framework

This plan will be implemented through the existing health sector institutional framework. FMOH will take the overall responsibility for coordinating and ensuring successful implementation and attainment of the objectives of this plan. However, the NMFS will take the lead in implementing this strategy together with several other key sector partners. This plan will be implemented and coordinated through the existing health sector organisational and management structures, which will include:

- 1. FMOH and sector coordinating framework:** At the centre, the FMOH will take full responsibility for the successful implementation of the plan, through the formulation and implementation of successive, annual action plans and budgets. It will also be responsible for policy leadership, standards setting and enforcement, and the overall coordination of implementation of this plan. The FMOH will table the NSCS at relevant sector coordinating sessions, such as the High Counsel for Pharmaceutical Services, which will be responsible for overall steering of the NSCS.
- 2. State Ministry of Health offices:** The SMOH will serve as intermediaries for implementation of the plan within their respective States. They represent the FMOH's functional link to the localities and the lower level structures and NGOs working at locality level. SMOHs, together with the State NMSF, will be responsible for coordinating and supervising the implementation of the NSCS at State level.
- 3. Localities and Health facilities:** The Localities will enforce rational use of health commodities at health facilities, monitor performance and ensure that health programmes are using the appropriate tools for, collecting and processing data on consumption of medicines and medical supplies, and for onward reporting to the SMOH, SNMSF and NMSF.
- 4. Human Resource Capacity Building for Supply Chain:** The NMSF will take the lead in training of health care staff responsible for the Supply Chain services. These include NMSF staff and also the SMOH, Locality and Health facility staff members managing the supply chain at their level. On the national level, however, it would be expected that the Federal Government invests in enabling various national institutions to be responsible for the production of appropriately trained health workers that can work on implementation of the NSCS and the Implemented Plan.
- 5. Health facilities:** Hospitals, Health Centres and community health workers will be responsible for the implementation of the supply chain services that apply at that level of operations.

10.4 Key Sector Partners

All the key sector partners will play their respective roles in the implementation of this Strategy. In order to ensure efficient and effective coordination of the partnerships with all these players, FMOH will strengthen inter-sector collaboration and coordination mechanisms at all levels. The following are the key partners:

1. Federal Government Ministries and Departments: Several other Government ministries and departments impact differently on the performance of the health sector supply chain, as all have an direct or indirect impact on public health. Strong inter-sector coordination mechanisms will need to be maintained.
2. Development Partners: The UN system and specialized agencies such the GF; Local and International NGOs and others supporting public health, are expected to play an important role in the implementation of the NSCS, through provision of financial and technical support to the health sector and specific supply chain related interventions. The FMOH will work towards strengthening partnerships with the Development Partners, and harmonisation of their support efforts, for high impact.
3. Private Sector: The pharmaceutical and medical manufacturing industry can play a great role to assure availability of quality essential health commodities in the public sector.

11. Prioritizing the integration process and areas for investment:

Not every aspect of this reform can be implemented at the same time. There is need to consider resource constraints (finance, HR, material). There is also a need to plan, convince, mobilize support and create the working infrastructure for successful implementation of the NSCS.

Implementation of the NSCS will need to be planned and managed carefully, to ensure that parties to the process have considered all relevant aspects and factors, in order to avoid being overwhelmed with decisions, activities, costs and responsibilities. While the sector has integrated to a large extent in terms of procurement and distribution services, given the investments needed for further developments of the procurement and supply chain will require a need to prioritize the way forward. Various investment areas will require unique master plans to focus the commitment of the Government. For example, in ensuring cold chain services, and in creating appropriate warehouses at state level, and in providing the energy requirements within the supply chain, the NMSF will need to come up with Infrastructure Master Plan for construction of warehouses, energy supply and cold chain services. There will be a need to have a master plan for communication, waste management, etc. Thus, some areas of the NSCS will demand financing from both Government and development partners. So areas of work will be phased over a period of years. This approach will enable the NMSF, development partners and Government to plan the investment and managed the transition into a fully functional NSCS over the next NHSSP (2017- 2021).

12. Conclusion

The requirement for a national supply chain strategy calls for reform of the existing procurement and supply chain services to the public health sector. The Federal Government has embarked on this reform, starting with the formation of the NSMF as the national entity in the provision of procurement and supply chain strategy, through an integrated NSCS. The NMSF, on its part, has progressively invested in transforming its infrastructure and services to be fit for this purpose, and can now be invested in, as the national lead entity for implementation and management of the NSCS.

The need to re- think strategically about the public health supply chain has never been more important. Spending money on medicines, medical supplies and the support systems that assure their availability is a huge part of the health care debate and Budget, as these essential health commodities compete with other sector and national priorities for new spending. This NSCS provides a roadmap for all players in the supply chain to reinvigorate and align their processes to respond to the growing need to have a strategic focus on addressing the challenges related to availability of medicines and medical supplies in the public sector. The NSCS will be implemented through its Implementation Plan, which is a costed activity plan for the sector.