

Supply Chain Management Training Road Map for Liberia: *A Sustainable Solution for Supply Chain Capacity Development*

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Acronyms

AIDS	Acquired Immune Deficiency Syndrome
EPI	Expanded Program on Immunization
EVD	Ebola virus disease
HIV	Human Immunodeficiency Virus
LMHRA	Liberia Medicines and Health Products Regulatory Authority
MDGs	Millennium Development Goals
MOHSW	Ministry of Health and Social Welfare [Liberia]
NDS	National Drug Service
OIC	Officer-in-charge
PBL	Pharmacy Board of Liberia
PSA	Pharmaceutical Systems Africa
PtD	People that Deliver
SC	Supply chain
SCM	Supply chain management
SCMU	Supply Chain Management Unit
SCMS	Supply Chain Management Systems project
SDP	Service delivery point
SPH	School of Public Health
TA	Technical assistance
TB	Tuberculosis
TNIMA	Tubman National Institute of Medical Arts
USAID	U.S. Agency for International Development
WHO	World Health Organization

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Introduction

Health logistics continues to be an obstacle to successful global health interventions. In the World Health Organization 2005 report 'Health and the Millennium Development Goals,' the problem of logistics for health is highlighted: "Much of the burden of disease can be prevented or cured with known and affordable technologies. The problem is in getting staff, medicines, vaccines, and information on time, reliably, and in sufficient, sustained and affordable quantities to those who need them.

In the area of reproductive health, limitations in supply chain systems have been shown to be problematic with regard to the introduction of new interventions, such as new treatments. Some of these products require professionally managed health supply chains with well-trained personnel to ensure proper handling and delivery to both fixed and mobile clinics. Improving the efficiency of health systems and their ability to handle new inputs, such as medicines and vaccines, requires the existence of functional supply chain systems. Whether publicly or privately managed, this needs to be coordinated, from central to peripheral levels.

To adequately perform their functions, health supply chain managers require proper training, qualifications, and capacity to design and manage publicly and privately owned supply chains that improve the performance of health systems. Currently, few training opportunities for health logistics exist, particularly in Sub-Saharan Africa where problems abound. As a result of inadequate training and the lack of standardization of practice, major problems exist in the introduction of new health interventions. Some of these challenges include storage and handling capacity. In Liberia, these challenges have been exacerbated by the Ebola outbreak. In addition to destroying weak supply chain systems, the Ebola outbreak saw a number of key organizations providing technical assistance in supply chain leaving the country at the time when the country was most in need. The Ebola outbreak also saw huge consignments of commodities being brought into the country as a response from the international community, leading to a major increase in logistical requirements for the country and supply chain management (SCM) staff. This placed a huge burden on a system which was already weak. The result was a near collapse of the system which only managed to stand due to external support, which although late, was overwhelmingly effective and efficient.

The Ebola epidemic accentuated the challenges of the inadequate capacity to manage the supply chains. An inadequate capacity to manage medicines and related health products can lead to increased costs to systems as well as wastage. While some medicines may cost a few cents, new interventions, such as those for family planning, are much more expensive. This makes it important for supply chain managers to be trained on appropriate management practices. Also, the absence of professional health supply chain managers means that pharmacists, nurses, and other healthcare professionals often perform logistics

functions. However, these individuals often have little specific training in logistics and are usually needed elsewhere in the health system.

In Liberia, weak systems have been tested to the core by the Ebola Virus Disease (EVD). As of May, 2015 when the country was declared Ebola free, 10,817 persons had been infected by the EVD, resulting in 4,785 deaths. At the time of preparing this document, a pocket of new cases had appeared not far from the capital city, Monrovia, indicating that the country may not be quite out of the woods. Before the Ebola outbreak the Liberia supply chain (SC) system already faced a number of challenges. These included poor coordination, leading to under/over stocking of commodities at various levels. For example, as of July 2014, just before the Ebola crisis, 64% of public healthcare facilities did not have Depo-Provera, 90% did not have ergometrine, 66% did not have Microgynon 30, 71% did not have male condoms, and 78% did not have oxytocin. Poor forecasting and quantification of commodities, poor record keeping and management of data and information, and erratic distribution and irrational use of commodities at service delivery points were among the weakest SC components.

Even though the health system weaknesses are multifold; inadequately trained staff is chief among the challenges in Liberia. Currently, most supply chain management (SCM) functions in the country are performed by untrained staff, some with as little as three years of formal education. To date, no exercise has attempted to present a road map for training SC managers in Liberia. Funded by the RHSC Innovation Grant, Pharmaceutical Systems Africa, working with the Supply Chain Management Unit (SCMU) of the Ministry of Health and Social Welfare (MOHSW) and the University of Liberia, and supported by the People that Deliver Initiative, developed a roadmap for SCM training in Liberia. This document is a presentation of the roadmap.

Objectives

The overall goal of this project is to improve pharmaceutical supply chain training in Liberia. The specific objectives of the project were the following:

- Map SCM training activities in Liberia (both pre- and in-service).
- Assess SCM training curricula in the country (by cadre and by level of training).
- Develop a SCM training road map for Liberia (based on competency framework, training capacity, and resources available).
- Adapt the SCM training road map into a policy document and market the document for possible funding.

Methodology

The development of the SCM training road map was comprised of three different components. The first component was to describe the existing training institutions for supply chain management. This was followed by assessing the curricula for supply chain content. The final component entailed the development of a road map for supply chain management capacity development in Liberia. The approach to gathering information included the following:

1. Desk reviews

Information was collected from documents that were accessible from the country.

2. Key informant interviews

Key informant interviews were conducted with selected personnel performing supply chain functions or those involved in the training of supply chain cadres. Persons interviewed included:

- National Drug Service (NDS). This entity serves as the central medical stores for the country.
- Ministry of Health and Social Welfare, Chief Pharmacist's Office
- Ministry of Health and Social Welfare, Supply Chain Management Unit (SCMU)
- Liberia Medicines and Health Products Regulatory Authority (LMHRA)
- The Pharmaceutical Association of Liberia
- The Pharmacy Board of Liberia (PBL)
- The Nursing and Midwifery Association of Liberia
- Academic institutions including pharmacy and nursing Schools
- Major tertiary hospitals in the country

Partners

- U.S. Agency for International Development (USAID)
- USAID|DELIVER PROJECT
- The Rebuilding Liberia Health Services Project (RBHS)
- The Clinton Health Initiative (CHAI)

- Pharmaceutical Systems Africa (PSA)
- United Nations Population FUND (UNFPA)
- UNICEF

3. Workshops

For the last phase of this project, a workshop with representatives of health institutions as well as universities and training colleges was held. During this workshop questions of interest were discussed in groups. The groups included key persons in SCM, HIV/AIDS, Malaria, TB, Reproductive Health, Medicines Procurement and Production Department and academic institutions providing courses on SCM related areas. Each group deliberated on SCM-specific questions before discussing the responses in plenary sessions. Discussing responses in a plenary allowed participants from other groups to contribute and to correct factual inaccuracies or inconsistencies. The group discussions included key partners from the international development community.

Mapping SCM Training in Liberia

Higher Education Institutions in Liberia

In total, there are 31 institutions of higher learning accredited to offer tertiary education training in Liberia. However, many of Liberia’s 15 counties do not have institutions that are accredited to provide higher education training. Out of the 31, 19 are based in the capital Monrovia. Of those 19, only nine provide courses in business studies and only two offer modules in supply chain management. These are the University of Liberia, School of Pharmacy and the Tubman National Institute of Medical Art (TNIMA). Table 1 shows the number of higher education institutions in Liberia by county.

Table 1: Number of accredited higher education institutions in Liberia by county

#	County	Population	Number of accredited higher education institutions	Number providing courses in business studies, supply chain or nursing	Number providing courses in SCM
1	Bomi	82,036	1	0	0
2	Bong	328,919	3	0	0
3	Gbarpolu	83,758	0	0	0
4	Grand Bassa	224,839	1	0	0
5	Grand Cape Mount	129,055	0	0	0
6	Grand Gedeh	126,146	0	0	0
7	Grand Kru	57,106	0	0	0
8	Lofa	270,114	2	0	0
9	Margibi	199,689	1	1	0
10	Maryland	136,404	1	0	0
11	Montserrado	1,144,806	19	9	3
12	Nimba	468,088	3	0	0
13	Rivercess	65,862	0	0	0
14	River Gee	67,318	0	0	0
15	Sinoe	104,932	0	0	0

Even though only 31 institutions of higher learning are accredited to provide higher education services in the country, there are many more providing these services without accreditation. Loose regulation by the education authorities has allowed unaccredited training facilities to flourish in the country. Among the unaccredited facilities is the Pharmaceutical Dispensing School of Liberia. The dispensing school trains from 40 to 100 dispensers annually. These end up in dispensing roles in private pharmacies and drug shops. However, cadres coming out of the Pharmaceutical Dispensing School are not recognized by the

government. With the proper accreditation and modeling of courses, the Pharmaceutical Dispensing School could become a major source of SCM cadres at the service delivery point in the country.

Existing SCM Courses in Liberia

Only three institutions offer courses in SCM training in Liberia. Of the few existing courses, none is comprehensive enough to cover the required breadth to fully professionalize SCM functions. The curriculum at the School of Pharmacy teaches SCM management in the fourth year of the program. It has only one member of the academic staff with a higher degree in supply chain management. Recently, the Pharmaceutical Dispensing School has reportedly included some supply chain modules in their training. However, the depth and quality of these courses could not be ascertained. Also, as with the pharmacy training program, only one member of staff at the dispensing school has done further studies on supply chain management.

With regard to in-service training, no academic institution in Liberia offers in-service courses in SCM. Also, no institution offers long distance learning or online courses on supply chain management. It is important for Liberia, and other countries with similar systems, to have institutions that offer long distance, online, and evening courses dedicated to operational areas such as supply chain management. This would cater to full-time working professionals who have limited time to attend daytime courses. As the premier training institution for pharmacists, the School of Pharmacy at the University of Liberia should lead the way in piloting online, evening, or long distance training courses on supply chain management and other pharmaceutical management areas which are necessary for the optimum delivery of services.

Even though there are no institutions that currently provide in-service training programs, a number of international organizations have provided these trainings to both SCM staff at the central level and those working at service delivery points. In 2008, Management Sciences for Health's SPS Program conducted a training of trainers (TOT) on pharmaceutical management in Monrovia. This was followed by a training of dispensers in Grand Geddeh and Nimba counties. In total, approximately sixty dispensing personnel were trained on different aspects of pharmaceutical management. However, since that period there are no programs in the country that provide comprehensive courses on supply chain or pharmaceutical management at the health facility level.

Between 2008 and 2015, The USAID | DELIVER PROJECT conducted a number of courses on quantification and forecasting. These courses mainly targeted pharmacists and supply chain managers working at the central level. With funding from the Global Fund, Pharmaceutical Systems Africa, piloted and scaled up a program to train service delivery point staff on how to use logistics management information tools. In total, over 700 staff were trained under this program. In August 2015, at the time of preparing this

document, there were no active in-service training programs on pharmaceutical supply management. There is thus need to institutionalize in-service training to ensure that such programs are established, sustained and are readily available even when there are no donor-supported programs providing them.

Table 2: Institutions offering SCM courses in Liberia

Name of Institution	Supply chain training course offered	Description of SCM courses offered	Number of students per year
School of Pharmacy of Pharmacy, University of Liberia	<ul style="list-style-type: none"> • SCM modules taught in the fourth year of the pharmacy program • Also one semester 4-credit hour program on administrative pharmacy and supply chain management 	SCM modules are taught in the fourth year of the 4-year B. Pharm program. This course is a one semester, 3 credit course. Only one member of staff has the qualifications to teach this course.	Approximately 30 students graduate with a B.Pharm degree each year.
Pharmaceutical Dispensing School of Liberia (not accredited by the education council of Liberia)	This program mainly offers courses on pharmacology and some aspects of dispensing. There is currently little content on supply chain in this program.	Some supply chain courses are taught but a restructuring of the current curriculum appears necessary. The current curriculum is lacking depth.	40–100 students graduate from the dispensing school annually.
Colleges of Nursing and Midwifery (10)	There are currently 10 colleges of nursing and midwifery in Liberia. The nursing curriculum does not include any components of SCM even though nurses and midwives contribute significantly to this area.	The pharmacology component of the nursing and midwifery programs will be evaluated during the second phase of the program.	Approximately 300 nurses and midwives are training in Liberia every year.

Supply Chain Management Training Curricula in Liberia

School of Pharmacy, University of Liberia

The School of Pharmacy at the University of Liberia runs a four year B.Pharm Program. Areas of relevance to supply chain management include the following topics.

Introduction to Health Care

In the first year, the school offers a course on Introduction to Health Care. This is a two-credit class in which the students learn about the structure of public and private health supply chain systems and are presented with a description of the Liberian health delivery system and the sources of its funding. With slight modification, this class could be the place to introduce students to some basic concepts of health supply chains. Because of the importance of supply chain to today's health systems, it is important to introduce students to this component early.

Experiential Learning Programs

In the third year of the pharmacy program, students participate in three externships. These include a clinical, administrative, and a community-based component. All the components have hands-on supply chain application. The rotations, which last for a semester, are aimed at exposing students to a broad set of issues. The rotations are also used to introduce students to the important roles played by the health supply chain at the national and the community levels and its importance in improving health outcomes.

The greatest weakness of this very important rotation is that the system does not have sufficient or adequately qualified staff to supervise students while they are on the rotations. In the community rotation, for example, the majority of the students find themselves working with dispensers who often have less than 12 years of education and with no training on medicines or pharmacy issues. In the public sector, the majority of the supervisors do not have prior exposure to supply chain training themselves, so it is unrealistic to expect them to provide sufficient training for the students during their rotation. Following on from this project, we strongly recommend strengthening this component of the pharmacy program, including sending a few of the instructors for further training where possible. This is the only way to sustainably build the capacity of the Liberian people is to address these challenges.

Pharmaceutical Supply Chain Management

In the second semester of the fourth year, the students participate in a new two-credit class on pharmaceutical supply management, which is dedicated to teaching and providing the student with the skills to manage the health supply chain. The course is intended to introduce students to the principles of managing medicines procurement, selection, distribution, and use. It emphasizes the fundamentals of drug procurement (including quality assurance), drug selection and drug distribution (including inventory management, storage and pharmaceutical management information systems), as well as drug use. The course is one semester long and is taught by supply chain managers from the Ministry of Health and Social Welfare.

Pharmaceutical Association of Liberia Dispensing School

The Pharmaceutical Association of Liberia Dispensing School runs a two-year program to train pharmaceutical dispensers. In relation to supply chain management, the school offers a course in drug management and one on introducing supply chain management. The drug management module is a three-credit hour course offered in the second semester of the first year and the first semester of the second year. Introduction to supply chain module is another three-credit hour course taken in the second semester of the second year.

The medicines management course looks at medicine usage and discusses good dispensing practices, rational drug use, and medicines use evaluation. Other components include drug and therapeutic information, promoting rational prescribing, as well as encouraging appropriate drug use by the public and patient are discussed. The course also discusses hospital drug services, responsibilities of hospital staff, organization of hospital pharmacy services and inpatient drug management. The final component looks at inventory management and inventory control records, an overview of drugs distribution and medical store management.

The introduction to supply chain course discusses the importance of supply chain in the pharmaceutical industry in Liberia. It then goes on to discuss the role and functions of different supply chain functionaries in the country. The second part of the module discusses logistics management; the definition and importance of logistics to the pharmaceutical industry in Liberia. The supply chain course at the dispensing school is taught by pharmacists.

Even though the dispensing school has the requisite supply chain courses in its curriculum, the materials are rather thin on content. In order to improve the teaching of supply chain management, more detailed materials would need to be included in the modules. In addition, this course is only theoretical in nature.

A more practical approach, including student attachments and placements, is required for students and the system to benefit from the courses. The school would also need to further train the instructors who are teaching the course. Even though one instructor has a diploma in supply chain management, the majority are learning on-the-job, as they carry on with the teaching duties and responsibilities.

Tubman National Institute of Medical Arts

The Tubman National Institute of Medical Arts (TNIMA) is the preeminent college for the training of nurses, midwives, clinical officers, and related professions. The school trains mid-level health professionals who work to assist the physicians and to assume the responsibilities as officer-in-charge (OIC) in clinics and health centers where physicians are not regularly stationed. There are five programs in the school—including the School of Physician Assistants, the School of Professional Nursing, the School of Midwifery, the School of Environmental Health, and the School of Medical Laboratory Technicians. Each of these schools is a three-year program and each includes a module on supply chain, referred to as Health Facility Management in their curricula, specific to their area of study.

The Health Facility Management module is taught in the final year of the three-year program. The course includes a general introduction to and definition of management; a discussion of the nine principles of management; the teaching of the three main functions of management and the organization of health teams. The second and final part of the course looks at the styles of supervision/leadership, resource management, as well as medical supplies (with emphasis on drug and medical supplies, general supplies/management system/storage and protection). Students are also taught financial, personnel, facilities, and equipment management as well as management information system and reporting.

Even though the course has little in terms of supply chain content, it helps students in the organization of clinics and healthcare posts where most of them work. The addition of a more supply chain focused module, in particular for nurses and midwives, will be critical for improving supply chain efficiency in the country.

Key SCM Cadres in Liberia's Health Care System

With regard to supply chain cadres most supply chain functions at the central level are performed by pharmacists. At service delivery points, the majority of staff performing SCM functions are nurses and dispensers. Most of the dispensers are primary school leavers with no secondary or tertiary education. While the Pharmaceutical Dispensing School of Liberia trains some dispensers, the majority of these work in the private sector (pharmacies and medicine stores). While nurses perform many supply chain management functions at the periphery, nurse training courses have little to no pharmaceutical management content. Table 3 presents a list of cadres who routinely perform supply chain and pharmaceutical management functions in Liberia's health-care system.

Most supply chain functions are carried out by pharmacists. The NDS has five pharmacists working at the central warehouse in Monrovia. These, including the Managing Director who is also a pharmacist, manage the day to day functions of the central medical stores, such as the quantification of needs, procurement, and distribution planning. All five pharmacists report that most of their supply chain skills were learned on the job. None has had prior training on supply chain management before assuming their roles and functions. However, most also stated that they have attended various courses and trainings in pharmaceutical supply chain management, notably those provided by Management Sciences for Health's Strengthening Pharmaceutical Systems program and those provided by Pharmaceutical Systems Africa.

The Ministry of Health Pharmacy Division is headed by a Chief Pharmacist and a Deputy. Both of these perform more administrative and policy-making functions. However, under this division is a Supply Chain Management Unit. The Supply Chain Management Unit is headed by a pharmacist with a Masters' degree in pharmaceutical management from Tanzania. Working with this manager are two other pharmacists who, however, have no previous training in pharmaceutical management. Also under the Pharmacy Division are 15 county pharmacists responsible for each of the counties. In addition to these, each of the parallel programs—HIV/AIDS, Malaria, TB and Maternal and Reproductive Health—has at least one pharmacist each. None of these have had previous training on supply chain training.

Table 3: Key supply chain management cadres in Liberia’s health-care system

Name of Cadre	Function	System level where activity is performed	SCM training received
Pharmacists	<ul style="list-style-type: none"> • Procurement of medicines and related products (including local procurement) • Selection of medicines and related products • Quantification and forecasting of medicines and related product • Distribution of medicines and related products • Monitoring of medicine use • Training and supervision of healthcare workers on medicines’ logistics and the rational use of medicines 	<ul style="list-style-type: none"> • Central level, including MOHSW, NDS, and programs such as HIV/AIDS, malaria, TB & leprosy, and maternal and reproductive health • County (Provincial Level) <ul style="list-style-type: none"> ○ There are 15 counties in Liberia and each has a pharmacist • Referral hospitals <ul style="list-style-type: none"> ○ There are 5 referral hospitals in Liberia only one is fully public 	<ul style="list-style-type: none"> • One semester module on SCM taught in the B. Pharm program <ul style="list-style-type: none"> ○ This is only a recent development. The first pharmacists to benefit from this program are only graduating this year. • A few in-service training courses provided by PSA and USAID/Deliver Project
Nurses & midwives	<ul style="list-style-type: none"> • Procurement, storage and distribution of medicines and related products at the service delivery point (SDP) • Training and supervision of other health-care staff on product management at the SDP 	<ul style="list-style-type: none"> • District hospitals • Service delivery points (health centers) 	<ul style="list-style-type: none"> • Very little to no training on logistics and supply chain management
Dispensers	<ul style="list-style-type: none"> • Procurement, storage and distribution of medicines and related products at the SDP 	<ul style="list-style-type: none"> • District hospitals • Service delivery points (health centers) 	<ul style="list-style-type: none"> • Very little to no pre-service training on logistics and supply chain management • A few have attended the dispenser training course in Monrovia but this course has no supply chain component • Most have benefited from the one week logistics management courses organized by PSA with funding from the Global Fund and from the USAID/DELIVER Project

Key Supply Chain Managers and Associated Numbers

At the county level, there is at least one pharmacist in each county to coordinate supply chain functions. It is the duty of the county pharmacist to receive data from the facilities in the county, quality-assure it, and transmit it upwards to the central level. At the service delivery point (SDP), nurses, midwives, and dispensers are responsible for receiving, storing, and dispensing medicines and related commodities. In the current system, there are no pharmacists at health facilities below the county level, except major hospitals. In some facilities, dispensers are helped by nurses/midwives to carry out their supply chain management functions. These, however, have no prior training on supply chain or in pharmaceutical management in general. Table 4 shows the number of supply chain cadres working at the central MOHSW level (including county level) in Liberia.

Table 4: Number of supply chain cadres working at the central or provincial level in Liberia

Depart/ Unit	Name	Number of Pharmacists	Other cadres performing supply functions	Number with pre-service training in supply chain management	Comments
Pharmacy Division	Central Administration	2			
	Counties	15			
	Supply Chain Management Unit	3	4	1	SCM Manager holds an MSC in SCM
	Major hospitals	18			
	HIV/AIDS	1			
	Malaria	2			
	TB and Leprosy	1			
	Expanded Program on Immunization (EPI)	1			
Reproductive Health	1				
NDS		5			
Partners	USAID/DELIVER	10			
	PSA	5			
	CHAI	2			
	UNICEF				
	UNFPA				
	UNDP				

Interventions to Improve HR-related Efficiency of Key Institutions in Liberia

Developing a Liberia SCM Training Road Map

The final component of the road map development process was a stakeholders' meeting. Once the assessment process was completed, the People that Deliver Initiative (PtD), which has been providing critical technical assistance to the program, convened and coordinated a partners meeting. Partners with an interest in supply chain activities in the country contributed to the development of the road map. This activity was achieved in a two-day workshop with key partners helping the MOHSW to develop a supply chain road map.

Based on the findings of the assessments and the consensus building workshop, interventions were recommended to improve SCM capacity at different levels of the health-care system and in different performance areas. The different areas and suggested capacity development interventions are given below.

The Pharmacy Division of the MOHSW

The MOHSW is ultimately accountable for ensuring that Liberians have access to quality health and social welfare services. An effective public health supply chain is essential for the MOHSW to meet its mandate. Key to building an effective and sustainable supply chain system is recognition of and investments in the human resources and the necessary management structures required to effectively and efficiently manage these systems. Within the MOHSW, there are a number of programs and departments that undertake specific roles within the supply chain, all under the guidance of a Supply Chain Management Unit (SCMU) and overall oversight of the Pharmacy Division.

The Pharmacy Division has two critical functions in an effective supply chain system: 1) it serves as the essential medicines program unit with responsibilities similar to the other MOHSW program units; and 2) it sets and oversees national pharmaceutical policy. Both these functions are required to support an effective supply system. Pharmaceutical policies such as essential medicines lists, national formularies, and standard treatment guidelines promote the rational use of medicines and the efficient use of limited resources. They serve as the foundation upon which an effective and efficient supply chain is built. The Pharmacy Division works closely with the SCMU and programs to support appropriate pharmaceutical management throughout the supply chain, and through its oversight of county pharmacists ensures that

policies are implemented at the county and facility level. It is thus important that the pharmacy has the adequate number of staff, who have the needed skills to perform their functions. Suggested interventions to improve the functions and efficiency of the Pharmacy Division are as follows:

1. Assess the human resource needs of the Pharmacy Division and appoint the requisite numbers for the Division to perform its functions.
2. Train the Pharmacy Division Staff in the requisite areas of how to set national pharmaceutical policies.
3. Train the Pharmacy Division on how to lead and train its core staff on essential medicines concepts, including trainings on rational use concepts.
4. Capacitate the Pharmacy Division to play its role of developing in-service curriculum on rational medicines use practices and understanding national policies.
5. Facilitate the Pharmacy Division to play a leading role in establishing a national Medicines Therapeutics Committee, including training staff on the use of national formularies and guidelines.
6. Develop and standardize the terms of reference for a dispenser.

Supply Chain Management Unit

The SCMU is the management structure responsible for overseeing all supply chain activities within the Liberian public health supply chain. The SCMU strives to maximize customer service based on the resources available by facilitating seamless linkages between organizations and functions within the supply chain. SCMU functions include increasing the visibility of data up and down the system; facilitating greater coordination between stakeholders; and ensuring alignment of demand with supply via data-based quantifications and the development of unified procurement plans. As a focal point for coordination, the SCMU is involved in virtually all supply chain activities and system strengthening interventions. It serves as the primary mechanism for institutionalizing good supply chain management practices and linking logistics activities throughout the supply chain. Suggested interventions to improve the functions and efficiency of the SCMU are as follows:

1. Assess the human resource needs of the SCMU and appoint the requisite numbers to enable to perform their functions.
2. Develop a well-coordinated operational platform between the NDS and the SCMU.

3. Train SCMU staff in key competence areas, such as forecasting and quantification, LMIS, warehouse management, distribution, and M&E.
4. Equip SCMU with the requisite skills to conduct supervisory visits in the counties and at SDPs.

Program Units (FHD, NACP, NTLCP, NMCP, EPI)

With the establishment of the SCMU, the logistics related roles of the individual programs shifted but the program still play a critical role in the supply chain. By defining the policies and selecting the products, program ensure that effective medicines are used appropriately. Programs are also in the best position to identify and investigate discrepancies between morbidity, service and logistics data, and identifying and highlighting the supply chain implications of program activities (i.e., BCC campaigns, introduction of new diagnostic tools). The programs work closely with the SCMU to ensure that products critical to their programs are available when and where needed. Suggested interventions to improve the functions and efficiency of the programs are as follows:

1. Develop a well-coordinated system at the central level with defined roles, responsibilities and terms of reference.
2. Train program staff in key competence areas, such as forecasting and quantification, LMIS, and M&E.
3. Equip each program with the requisite skills to conduct supervisory visits in the counties and at SDPs.

Liberia Medicines and Health Products Regulatory Authority (LMHRA)

The LMHR Act created the Liberia Medicines and Health Products Regulatory Authority (LMHRA) to be responsible for conducting the registration of all medicines and health-care products and to ensure the quality of medicines in Liberia. The LMHRA is responsible for ensuring that all medicines entering Liberia will be of the quality standard according to the Essential Medicines List. Suggested interventions to improve the functions and efficiency of the LMHRA are as follows:

1. Train staff in key areas of competence, such as inspection, medicines registration, and dossier evaluation.

National Drug Service (NDS)

The National Drugs Service (NDS) is fully responsible for the procurement, storing, and distributing of health-care commodities in country. At present, the entity is under-staffed, and its legal status has not been defined. For the past few years, the NDS has been plagued with operational and management issues that have had serious consequences on accountability and management of the stored health-care products within its warehouses. At the county level, the county depots, an extension of the NDS, also have inadequate storage capacities for storing medicines and medical supplies. The problem leads to the use of sub-optimal storage, such as small rooms, verandas, and corridors. Warehouse facilities are understaffed and lack necessary equipment to run daily activities. This situation is further exacerbated by the fact that there is no continuous and uninterrupted power supply in most facilities, and no county has adequate cold chain facilities; in most cases, hospital facilities, which are already overburdened, are used where possible. Finally, last mile distribution is severely challenged by poor road conditions; only about 10% of the roads to county headquarters are paved. Suggested interventions to improve the functions and efficiency of the NDS are as follows:

1. Develop a well-coordinated system at the central level with defined roles, responsibilities and terms of reference.
2. Train staff in key areas of competence, such as warehouse and storage, inventory management, and distribution.
3. Develop a well-coordinated operational platform between the NDS and the SCMU.
4. Train staff on how to accurately quantify and forecast medicines and related commodities needs.

County Health Teams (CHTs)

Liberia has just completed the process of decentralizing its health system and devolving greater responsibility and resources to the county health teams. Upon completion of this process, the MOHSW allocate an annual budget to CHTs, and the CHTs are now responsible for ensuring that their citizens have access to quality, affordable health services. Having an effective supply system that guarantees the availability of essential medicines is critical to fulfilling the CHT's mandate. By controlling health resources, the CHT is a primary customer of the NDS. Within the CHT, the County Health Officer (CHO) and the County Pharmacist both play critical roles in the supply system. Suggested interventions to improve the functions and efficiency of the County Pharmacists include the following:

1. Train SCMU staff in key competence areas such as forecasting and quantification, LMIS, Ex. Warehouse management, distribution & M&E
2. Equip SCMU with the requisite skills to conduct supervisory visits in the counties and at SDPs.

Health-care Facilities (Service Delivery Points)

The ultimate test of the performance of the Liberian public health supply chain occurs at the health facility level. It is here where health services are provided to the Liberian people. It is here where the need for health commodities is vital for the adequate rendering of health services. It is also here where public opinion concerning the performance of the Liberian health-care system is formed. In addition to the health facilities' important role in managing public demand for health commodities, health facilities also have a critical role in supply chain management. Every facility has a responsibility to exhibit good storage and inventory management practices of health commodities in their custody. This custody starts immediately upon NDS delivery of commodities and ends only upon the dispensing of commodities to patients.

Health facilities are also accountable for health commodities given over to the custody of community health workers. Typically, each health facility will house a storeroom under supervision of a storeroom keeper and a dispensing area under supervision of a lead dispenser. The Liberia Supply Chain Master Plan dictates that health commodities be received into the facility storeroom and that adequate records of receipt be maintained. Health commodities can, in turn, be supplied to the dispensing area or to a community health worker, again supported by adequate registration. Finally, records should be kept during dispensing commodities to the patients. Records and registries should be updated promptly and be sufficiently reliable such that they can form an essential element of the Liberian public health supply chain. As assessed in this document, the majority of the persons managing commodities at this level have no prior training in supply chain management. It is thus necessary and essential that nurses, midwives and dispensers be trained on basic supply chain competences required at this level. At the health-care facility level we recommend the following interventions:

1. Convince the MOHSW (with evidence) that the dispensers trained by the Pharmaceutical Dispensing School have added value to the public health supply chain system.

2. Identify partners to assist the MOHSW with supply chain training courses for SDPs staff—we recommend that the partner works with the School of Pharmacy and the Pharmaceutical Dispensing School to ensure that the program is sustainable and that the capacity of the two institutions is built to help with training.
3. Train community health workers on the basic elements of supply chain management.
4. SCMU coordinates the efforts and works with the various partners that are assisting with capacity development programs for SCM in the country.
5. Dispensers are to be properly trained and deployed under the supervision of pharmacists.
6. Clearly define the role of dispensers.
7. Re-examine the salary of dispensers to avoid attrition from their assigned facilities.
8. Include nurses and midwives when holding in-services training course on supply chain management.
9. Train community health workers on the basic supply chain and medicines use in the community.

The School of Pharmacy, University of Liberia

The University of Liberia School of Pharmacy was founded in 1986. Initially, the School of Pharmacy was established to develop human resources in the pharmaceutical sector in Sierra Leone, Liberia, and the Gambia, with the hope that the governments of those countries would share in the cost of providing the training. The school graduates approximately 30 pharmacists a year and most of the pharmacists currently practicing in Liberia are graduates of the School of Pharmacy. The aims of the four-year professional pharmacy degree-training program of the University of Liberia School of Pharmacy is to produce pharmacists with a broad and balanced knowledge in all areas of pharmacy, who should be able to:

- Manage all aspects of pharmacy operations within a pharmaceutical outfit (e.g., pharmacy stores/premises), including inventory, personnel and security with emphasis on patient/client/customer relations
- Work to assure the safe, appropriate and cost-effective use of medicines
- Work in collaboration with other health-care professionals to provide the most appropriate drug treatment for patients and to promote health
- Work in collaboration with the other professionals in the production and distribution of high quality drugs and other medicinal products and devices.

Suggested interventions to improve the functions and efficiency of the School of Pharmacy include the following:

1. Incorporate short courses and in-service training on supply chain management
2. Work with the MOHSW, Pharmacy Division to develop national training modules for all capacity development initiatives for all levels of the supply chain
3. Identify post-graduate courses for academic members of staff in the school of pharmacy
4. Further enrich the current modules on supply chain to include more 'hands-on' approaches to training
5. Train supply chain pharmacists and professionals to apply a business mindset to their area of work
6. Include emergency response in training modules
7. Include communication skills, computing, and report writing skills in the pharmacy curriculum

The Pharmaceutical Dispensing School

As described previously, the Pharmaceutical Dispensing School runs a two-year program to train dispensers. If managed appropriately the School has the potential to fill a significant gap in the system with regard to SCM human resources at the service delivery point. For the Pharmaceutical Dispensing School we recommend the following interventions:

1. Develop a business plan for the Pharmaceutical Dispensing School with assistance from technical partners.
2. Advocate for the acceptance of graduates from the Pharmaceutical Dispensing School into public sector roles
3. Review the curriculum for dispensers and make it relevant for the needs of the country
4. Strengthen components on supply chain for the training of dispensers
5. Harmonize the training of dispensers with that of the West African region (upgrade course to a Pharmacy Technician training program)

6. Consider running in-service courses for health-care workers who are already in the field.
7. Define entry points for trainees registering in the Pharmaceutical Dispensing School

Schools of Nursing

The curricula at the school of nursing and midwifery have little to no component on supply chain management. This is despite the fact that nurses and midwives run most rural health posts, including the management of medicines and related commodities. For schools of nursing we recommend the following:

1. Incorporate basic supply chain management components into the nursing program

Framework for a Coordinated Approach to Developing Human Resources for SC in Liberia

Based on a triangulation of project assessment and the outcome of the stakeholders' meeting, a five point framework was agreed as a way forward to systematically address human resources for SCM capacity development issues in the context of a wider systematic approach to HR development and a strategic review of the health supply chain of Liberia. This is described below and presented in Table 5.

1. Plan to have advocacy meetings with senior MOHSW and other political leaders to reiterate the importance of supply chain capacity development in the context of the country.
 - a. This process started with the stakeholder meeting led by the People that Deliver Initiative. The advocacy process is ongoing with regular meetings among a Supply Chain Steering Committee. These meetings are led by the SCMU and have become increasingly important after the Ebola epidemic. After review by implementing partners, the road map will be adopted as a key working document for the SCMU, the Pharmacy Division, and the Ministry of Health and Social Welfare.
2. Work with partners to review the Supply Chain Master Plan. In particular, components of the Master Plan that focus on HR and capacity development should be accorded due attention. The Supply Chain Master Plan is a 10-year health commodity supply chain strategy and implementation plan, or Master Plan, developed in 2010 with the assistance from international development partners. The document presents a program of activities that improves supply chain performance while meeting MOHSW decentralization objectives, via the placement of budgetary control with county health teams. The Master Plan also takes advantage of cost

savings and efficiencies available through shared procurement, warehousing and distribution services. Since the current document is over 20 years old, the MOHSW and its partners felt it would be of value to have it reviewed and revised.

3. Develop SCM human resources capacity development program strategic plans.

- a. Working with partners, the SCMU will lead the development of SCM capacity development strategic plans.

4. Workforce development (in-service, mentoring)

a. Pharmacists

- i. Central level (policy, supply chain) and National Drug Service (NDS) (National medical stores)
- ii. Hospital pharmacist
- iii. County pharmacists and
- iv. Health facility supply chain coordinators

b. Dispensers

c. Nurses

d. Community health care workers

5. Develop academic capacity (pre-service)

a. University

b. Dispensing school

c. Mentoring through partners

Table 5: Agreed framework for a coordinated approach to developing human resources in SCM in Liberia

Key activity	Tasks to achieve activity completion	Key organization (s)	Status
1. Plan to have advocacy meetings with senior MOHSW and other political leaders to reiterate the importance of supply chain capacity development in the context of the country	<ul style="list-style-type: none"> • List key political leaders in health, finance and planning that need to be aware of the importance and role of health supply chains. • Prepare key advocacy messages • Arrange advocacy meeting called by WHO with the support of all key stakeholders 	SCMU, Pharmacy Division, PtD, PSA, USAID/DELIVER, MSH, UNFPA, UNICEF, CHAI	Ongoing, process started with the stakeholders' meeting led by PtD
2. Work with the MOHSW and other partners to review the Supply Chain Master Plan. In particular, components of the Master Plan that focus on HR and capacity development should be strengthened.	<ul style="list-style-type: none"> • Convene a meeting of key pharmaceutical and health supply chain stakeholders from within the government to review the SC Master plan • Develop workplans to implement key components of the Master Plan 	SCMU, USAID/DELIVER, Pharmacy Division, PtD, PSA, MSH, UNFPA, UNICEF, CHAI	This activity will be completed by end of September
3. Develop SCM capacity development strategic plans	<ul style="list-style-type: none"> • Identify key implementing partners • Work with partners to develop strategic plans 	SCMU, USAID/DELIVER, Pharmacy Division, PtD, PSA, MSH, UNFPA, UNICEF, CHAI	Activity will begin as soon as the review of the Supply Chain Master Plan has been completed
4. Workforce development (preservice, in-service, mentoring) <ol style="list-style-type: none"> a. Pharmacists b. Dispensers c. Nurses d. Community health care workers 	<ul style="list-style-type: none"> • Identify resources for training • Identify key partners to support this activity • Adapt/develop training materials • Identifier staff to conduct the training • Conduct training of trainers courses for trainers • Conduct training for healthcare workers 	SCMU, Pharmacy Division, USAID/DELIVER, PtD, PSA, MSH, UNFPA, UNICEF, CHAI	Activity will begin after the completion of the strategic plans

Supply Chain Management Training Road Map for Liberia

Key activity	Tasks to achieve activity completion	Key organization (s)	Status
<p>5. Develop academic capacity</p> <ul style="list-style-type: none"> a. The School of Pharmacy b. The Pharmaceutical Dispensing School c. Schools of Nursing 	<ul style="list-style-type: none"> • Identify resources to strengthen SC academic capacity development • Identify local and international partners whose core/key TA areas are academic development • Work with the local partner to do the following <ul style="list-style-type: none"> a. Review the School of Pharmacy curriculum b. Identify key persons in the school of pharmacy to send for postgraduate training c. Develop a business plan for the Dispensing School d. Review the curriculum for the dispensing School e. Work with the School of Pharmacy to develop a SCM component for nursing schools f. Work with the nursing schools to include a SCM component in their curricula 	<p>School of Pharmacy, Dispensing School, School of Nursing, SCMU, Pharmacy Division, USAID/DELIVER, PtD, PSA, MSH, UNFPA, UNICEF, CHAI</p>	<p>Activity will begin after the completion of the strategic plans</p>

Discussion and Recommendations

By developing a training road map for SCM training, this product will provide a coordinated platform to engage donors and develop human resource capacity for supply chain. With regard to the process, the road map development process has shown that the training of supply chain cadres in Liberia has not been a priority to the country. The Ebola epidemic showed how misplaced the sentiments were that supply chain issues are not of primary consequence to countries such as Liberia. Because of the weak human resource capacity to manage supply chains, the country could not cope with improved commodity supply from the international community. To help the country manage a crisis that threatened the whole essence of the nation, Liberia had to rely on expatriates to help them manage the supply chain crisis caused by Ebola.

Only three tertiary institutions in the country are involved in the training supply chain courses. Worse still, the curriculum at nursing schools have nothing on supply chain management even though nurses and midwives run most rural health posts, including the management of medicines and related commodities. It is thus highly recommended that the MOHSW engages a partner to help them incorporate supply chain management content into the nursing curricula.

Although the School of Pharmacy at the University of Liberia has incorporated key supply chain courses into their training program, these courses are being taught by part-time instructors. For Liberia to fully benefit from these courses, dedicated instructors are required. So, investing in postgraduate training for faculty staff to manage such specialized courses is critical for Liberia to sustain the gains that partners are helping to attain. In addition, the Ebola virus disease epidemic has exposed the weakness in coordinating supply chain activities in the system. Program management, including coordination, must thus be included in the supply chain training curriculum.

The inclusion of supply chain courses at the Pharmaceutical Dispensing School of Liberia is a much welcomed intervention. However, the school needs to be assisted to develop a business plan and also to have the dispensers trained at the school recognized by the Ministry of Health and other relevant stakeholders. Deployment of dispensers in the public health system will go a long way in addressing the shortages of trained dispensers at service delivery points (SDP).

At the county level, there is at least one pharmacist to coordinate supply chain functions in the county. It is the duty of the county pharmacist to receive data from the facilities in the county, quality assure the data, and transmit it upwards to the central level. At the SDP, dispensers are responsible for receiving, storing, and dispensing medicines and related commodities. In the current system there are no pharmacists at health facilities below county level, except at major hospitals. In some facilities, dispensers

are helped by nurses/midwives to carry out their supply chain functions. Since nurses and dispensers shoulder the bulk of the supply chain tasks at the periphery, appropriate SCM courses need to be included in nursing and dispenser training curricula. However, the majority of dispensers working in the system have not had any dispenser training. In the future and as a recommendation from this exercise, it is imperative that most people managing commodities at the periphery have undergone the dispenser training and that the training program include significant modules on SCM.

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