

Building a Strong Supply Chain Workforce in Ghana – The Role of Pre-service Training

By Eomba Motomoke

Abstract

Immunization programs require, among other components, a dependable and efficient supply chain system to deliver vaccines and related supplies. An indispensable part of this system is sufficient numbers of personnel with the knowledge and skills to perform essential supply chain functions. However, in Ghana, like in most resource-limited countries, these personnel are barely available. In this case study, we describe an ambitious strategy that was deployed overtime in Ghana, to create and rapidly expand supply chain management (SCM) competencies which immunization is also a component among health care workers during their formation, through pre-service training. Exposing pre-service students to key SCM concepts and competencies equipped them with urgently needed knowledge and skills that they need to perform these duties. The pre-service training program led to the rapid integration of SCM modules into the curriculum of health care workers in major schools of nursing and pharmacy in the country. We estimate that through this cascade style of training, over 14000 health workers were equipped with SCM skills over a 4 year period, without the need to remove them from their workstations for in-service training. The sustainability and cost-savings of the pre-service training model was also enhanced by utilizing local institutions to lead the customization and delivery of the SCM curriculum to a group of core trainers.

Background

The reorganization of the Ministry of Health (MOH) in Ghana began in 1993 and has continued rapidly, culminating in the establishment of the Ghana Health Service (GHS). The mandate of the GHS is to provide and prudently manage comprehensive and accessible health services (including immunization) with special emphasis on primary health care at regional, district and sub-district levels in accordance with approved national policies.

In Ghana, the Immunization supply chain is not integrated with that of other commodities. Vaccines stored at the national cold room in Accra (the national capital) are moved to the respective regional cold rooms which are under the care of the regional public health units. Vaccines are then distributed to the district administrations for storage under the management of the disease control officers. Vaccines do not move directly from the regional cold rooms to the facilities like other commodities due to the limited storage facilities in most of the primary health care facilities in the districts. From the District, vaccines are moved to the sub-district level before they are drawn by health workers to their respective facilities (usually community health nurses) with cold chain boxes on immunization days. Inventory management, transaction and consumption records for vaccines are maintained by the disease control units at the district levels. Facilities that have storage units (cold chain fridges) keep records on the stocks they hold.

In the context of Ghana's immunization program and supply chain in general, it would be ideal to delineate the role of SCM to dedicated professionals with formal qualifications in SCM skills, such as college degrees or diplomas. In Ghana, however, this is not yet the case. The supply chain in Ghana (like in many developing countries) is that aside bigger facilities (Hospitals, District Health administration and sometimes Polyclinics) almost all the lower facilities which account for more than 50% of health facilities do not have dedicated supply chain professionals. In these smaller health facilities, the role of the supply chain manager is still disproportionately and inadequately performed by health care personnel, who are already overburdened by clinical duties in health systems that are overwhelmed by extremely high patient loads. Yet, supply chain tasks, which are not usually part of formal job descriptions of these health workers, can contribute to a significant portion of their workload. The situation is further exacerbated by the lack of formal training in supply chain competencies for health care workers and pharmacists.

In Ghana, the vaccine supply chain starts at the central level where there is a central cold chain room for the storage of the commodities under the management of the EPI (Expandable Programme on

Immunization). From the central level, vaccines move to the regional cold chain rooms under the management of the Regional EPI coordinator. The pipeline continues to the District Health Administration, (DHA) where management is under a Disease Control Officer. From the district, Community Health Nurses (CHN) manage all other tiers of the supply chain for vaccines. Prior to the introduction of SCM in the training schools, nurses only had some little theory on storage condition which was part of a course under Health Management. During the training needs assessment (TNA), the evaluators noticed that the SCM was most of the time not taught at all due to so many competing programmes in the semester.

Principals of schools who were interviewed held a strong view that a standalone detailed competency-based supply chain course will be appropriate since most often than not, nurses become the managers of commodities(including) vaccines in facilities they find themselves.

Strategy and Implementation

The Pre-service training strategy

Pre-service training (PST) refers to knowledge and skills delivered to individuals in a specific field of study before they enter the workforce. The terms pre-service training and pre-service education are used interchangeably and refer to undergraduate and postgraduate coursework. The goal of the PST strategy in Ghana was to create a continuous supply of health care workers for the GHS who were competent in SCM before they entered the workforce.

The objectives of this strategy were to:

- Work with local stakeholders from relevant institutions (e.g. Pharmacy Schools, Nursing Schools, Ministry of Health leadership, Regional health leaders, GHS leadership, Health workers' organizations, Pharmacy Council, Nurses and Midwives Council) to create consensus about the need for PST and adopt the strategy
- Identify and select a pool of lecturers and master trainers to work with the external consultants to adapt the SCM curriculum to the local context of Ghana
- Convene a national workshop to develop a pool of lecturers and master trainers who would roll out the SCM training to local universities
- Integrate the SCM modules into the curricula of local pharmacy schools and nursing schools involved in the training of future health care workers
- Create a team to monitor the progress of the PST model and propose modifications to the GHS as appropriate

Implementation approach to the Pre-service training model in Ghana

The process that was followed to create a new PST program in SCM in Ghana is summarized in the steps below:

Step 1: Getting Started

- ***Conceptualized the program:*** the external consultants carried out a scoping exercise to help propose a structure for the PST program. The consultants, together with the Ministry of Health (MOH) and GHS conducted a needs assessment that revealed that although current pharmacy schools, nursing and midwifery courses at the country's training institutions included some information related to SCM, it was haphazardly and incompletely incorporated. Within single universities and pharmacy schools, topics were primarily theoretical; they did not include formal, in-depth SCM modules; nor did they include hands-on practice to reinforce classroom training. This process was used to enhance the ownership of the PST by different stakeholders.

Step 2: Engage key stakeholders and conduct preliminary planning

- ***Engaged national/local/institutional policy makers that regulate education/health/labor:*** these findings were presented to training institutions, professional bodies, regional health leaders and other stakeholders to discuss and validate. Based on their assessment, stakeholders approved inclusion of SCM in the academic curricula of all health institutions as a sustainable approach to SCM capacity building.
- ***Preliminary planning:*** a stakeholder working group (SWG) was formed to initiate a regular schedule of meetings. The SWG consisted of donors, government officials from health and education

ministries, and academic partners. The SWG met to make considerations of supply chain courses already offered, and the specific requirements of local academic institutions, regulatory bodies, and government agencies.

Step 3: Develop PST implementation plan

- ***Developed a strategic plan:*** the SWG created a national implementation framework with objectives, tasks and roles, timeline, budget, and monitoring and evaluation (M&E) plan.

Step 4: Develop curriculum

- ***Conducted a training needs assessment:*** the SWG created an instrument to gather data on training needs using a variety of data collection methodologies, such as in-depth interviews, focus groups, and a review of existing documents. In addition, observation visits to relevant academic institutions, as well as to warehouses, stores, and other facilities integral to supply chain management were made to gain an accurate understanding of operations of the various levels of the country's logistics



Figure 1: Participants at a Training of Trainers and curriculum review workshop in Accra, taken by Eomba Motomoke

system. Interviews were held with a variety of informants, including personnel currently working in the supply chain, policymakers, representatives from the ministries of health and education, stakeholders from relevant professional associations, training institution faculty, administrators and students whose courses include or could include supply chain content. The principal key informants were: Managers of the health training schools at the MOH, Principals of Nursing and Midwifery training schools, Leadership at the Nurses and Midwives Council, NMC (the regulator of nursing and midwives training in Ghana). Others are logistics managers at the Ghana Health Service, GHS and some students.

Also, a need assessment conducted in Ghana with Ministry of Health (MOH) and Ghana Health Services (GHS)—revealed that although current nursing and midwifery courses at the country's training institutions included some information relevant to SCM, it was incomplete in content, and scattered throughout the curricula. Within single universities and pharmacy schools, topics were primarily theoretical, without formalized, in-depth SCM modules, nor did they include hands-on practice to reinforce classroom training.

These findings were presented to stakeholders for discussion and validation, based upon which stakeholders endorsed incorporation of SCM into the academic curricula of all health institutions as a sustainable approach to SCM capacity building.

There were also one-on-one interviews with key stakeholders together with some phone interviews.

Staff at service delivery points were included. Key questions for the needs assessment were:

- What do the logistics workers need to know and be able to do to perform their jobs well?
- What gaps in their knowledge and skills currently exist and which of them can be addressed through PST?
- ***Drafted technical content:*** a subcommittee for curriculum development was convened from among members of the SWG. The subcommittee consisted of members with knowledge of supply chain management concepts and adult learning theory. The curriculum was designed to deliberately include site visits to health facilities, such as clinics, hospitals, or warehouses, so students could see first-hand how the public health supply chain works. This helped make abstract principles more real to students. A technical guide, student materials and plan for site visits were developed.

- The curriculum subcommittee updated the SCM course content for nursing and midwifery training institutions and to incorporate the updates into existing curricula. The subcommittee also developed a model curriculum for pharmacy schools. A complete SCM curriculum was developed as a stand-alone two-credit course; it had defined modules for each lesson available to lecturers and required a hands-on visit to a regional medical store, local clinic, or other health facility as part of the successful completion of the course.

Step 5: Orient Lecturers

- **Identified and trained lecturers:** a team of lecturers from nursing schools, pharmacy schools and other health care worker colleges in Ghana convened for a master trainers' workshop (see Progress and Results for the number of lecturers and instructors trained). The team was oriented on the technical content of the curriculum through a curriculum review process, it was competency-based training-of-trainers, and using adult learning methodology with a test given at the end. The trainees had to pass the competency test in order with 80% in order to be certified as trainer. This orientation was conducted by international consultants specializing in health commodity logistics. The orientation provided opportunity to practice teaching using adult learning theory. The lecturers also had the opportunity to review and comment on curriculum content, especially regarding ways they would make it more relevant to their settings. This exercise not only improved the content, but also enhanced their sense of ownership and pride.

Step 6: Implement Program

What did the logistics workers need to know to be able to perform their jobs well?

- Key among the knowledge required to adequately perform their job were:
 - 1) Proper filling of inventory control tools (Bin cards and store ledgers)
 - 2) Proper knowledge of storage conditions and how to properly store commodities
 - 3) How to take stock
- The PST program was implemented with support from SWG and SCM professionals. The external consultant attended some of the classroom sessions and site visits to provide feedback to the trainers.

What were the specific gaps in their knowledge and skills? And how did this inform the curriculum?

- Though management of commodities lies with Pharmacists and Nurses who end up at health facilities, almost nothing was said about commodity management in their entire training at school. They end up at facility stores without knowing about max min levels (how to manage the inventory), filling of bin cards which is the basic tool for managing commodities among other things and how to request the right quantity to avoid stock out. Unfortunately, auditors implicated them during the yearly mandatory auditing for minor errors which could have been avoided if they had knowledge on inventory management.
- These among others led to the decision to introduce SCM in the Pharmacy schools and Nursing Training Colleges.

Step 7: Monitor, Evaluate, and Revise

- **The SWG monitored the process per the M&E plan:** relevant data was collected and analyzed. Such data included:
 - Did the new content and methodologies meet the intended learning objectives?
 - Did the curriculum content build on existing knowledge and abilities of students? Is this new knowledge useful and applicable?
 - Was the new program/course supported by the institution's deans, directors, and faculty
 - Are the students satisfied with course?
 - What proportions of students complete/pass the program/course? How many classroom hours were spent on the new content?

Progress and Results

There was a rapid uptake of the PST program in academic institutions in Ghana. For instance, in 2013, 23 pharmacy lecturers were initially given an orientation in SCM and adult learning theory.

Another 13 lecturers were given a similar orientation in 2015.

Additional training-of-trainers' workshops for 14 master trainers in 2014 introduced coursework adapted for nurses. The master trainers used the acquired knowledge to train 208 nursing and midwifery tutors. There was also a rapid cascade of this SCM training for future health workers in Ghana. For example, in the 2013–2014 academic year, 325 final-year pharmacy students at the Kwame Nkrumah University of Science and Technology and the Central University College were the first to have the standardized SCM coursework included in their undergraduate training. As part of their course, students visited a regional medical store to observe in practice what they had been taught in school. Lecturers, tutors, and students who successfully completed the program unanimously agreed with the relevance and timeliness of SCM training as part of student education. They noted its focus on practical issues when working with patients, sensitization to the logistical component of healthcare, and enhanced career opportunities.

After training in Elmina, Senior Lecturer and Head of the Clinical Pharmacy Department, Dr. Barima A. Afranie, said,

“The experience has been fantastic! For the first time in my life, I have been exposed to the real act of teaching even though I have been a ‘teacher’ for some years now. The entire course has been presented in such a fluid manner that [the] majority of us are just awed at different approaches used to accomplish this task. And that can only come from an organized, knowledgeable team of professionals.”

By October 2015, an estimated 15,600 nurses and midwifery students—in 104 health training institutions currently included in the SCM training improvements—received formalized SCM training. This exceeds the number of nurses and midwives reached through the current in-service training workshops and on-the-job training.

Challenges

Ensuring funding and resources remains a high priority as Ghana moves to assume full responsibility for sustaining the programs. One solution was to transfer a portion of financial cost for logistics, materials, and certification to the student fees. Fully incorporating learning modules into curricula across universities was also critical if the initiative was to continue. Based on a 2014 survey, students and instructors generally preferred doing so through a two semester, two-credit option and additional field exercises, both at the beginning of and throughout the course. Current pharmacy students in the bachelor of pharmacy phase-out program in all three pharmacy schools in Ghana received training in SCM through a two-credit hour course. Beginning in the fall of 2016, the course was incorporated into the fourth year of the new doctor of pharmacy program.

There were also initial challenges encountered with convincing students, lecturers and some government officials about the benefits of adopting a PST program for SCM competencies. This resistance was eventually overcome by developing and disseminating customized messages about the benefits of PST for each of the stakeholder groups.

Lessons Learnt

When effectively implemented, PST models implemented in Ghana offered many potential advantages when compared to in-service training and continuing professional development models. These benefits include:



Figure 2: Students from Kwame Nkrumah University of Science and Technology interact with a pharmacist during a site visit taken by Kwesi Playe, USAID | DELIVER PROJECT

- **Benefits to future patients:** Equipped with the latest knowledge and skills, new graduates entering the workforce can immediately focus on their supply chain duties instead of taking time to build their competencies through in-service sessions or on-the-job training, benefiting facility operations and, ultimately, the patient. The benefit is also derived when a clinician/mid-wife etc... is adequately equipped to understand the principles of SCM to enable him/her make management decisions on critical areas such as procurement, ordering, store management etc. even in deprived areas where the clinician plays both roles as clinician and SC manager.
- **Cost savings:** PST reduces the need for costly in-service training (IST) and technical assistance. This, in turn, eliminates the need for the financial incentives and participant allowances associated with these interventions, resulting in additional budget savings. In Table 1, we compared direct costs of the PST model with in-service training in Ghana. We found an estimated total direct cost per student of \$15 for the PST model compared to \$128 for the in-service training model.
- **Sustainability:** Because PST is embedded in and relies on local institutions for its propagation, it enjoys a continuity not afforded to ad-hoc IST, which depends on funding availability and management priorities.
- **Rigorous knowledge and skills evaluation:** PST is supported by national or institutional policies that approve/accredit curricula and specify competency requirements and standards. This helps ensure that the technical content is standardized across institutions over time while also providing opportunities for program evaluation and continuous improvement.
- **Professional recognition:** PST offers formal recognition and status that bolster career paths and can lead to acknowledgment of SCM workers as professionals.
- **Rapid mitigation of workforce deficiencies:** PST in SCM helps develop adequate numbers of motivated and qualified SCM workers, helping to address the acute shortage of healthcare workers in developing countries.

Table 1: Projected cost comparison (\$) of the PST model compared to In-service training in Ghana

	Pre-service training (US \$)	In-service training (US \$)
Consultancy expenses	24,000	24,000
Curriculum integration expenses ^a	6000	-
Workshop expenses ^b	40,000	300,000
Materials ^c	8000	60,000
Tuition fees ^d	156000	-
Total cost	234000	384,000
Number of students trained (by 2015)	15600	3000
Number of tutors trained	300	300
Cost per student	15	128
Cost per tutor ^e	260	1280

^a Not necessary for in-service training since this occurs beyond formation

^b Based on a nominal workshop fee of \$100 per participant per workshop

^c Estimated unit cost of \$20 per workshop participant

^d Estimated cost \$10 per contact hour per student

^e Excludes tuition fees since tutors are exempt

A major factor that determines the success of the PST model is stakeholder engagement. Key lessons learned from the Ghana experience in stakeholder engagement for PST include:

- Limit the number of partners working on the PST effort. Too many can delay or prevent implementation of the project.
- Identify the right local partners for initial contact. The Ministry of Health (MOH) and local supply chain organizations are good resources to consult for this information.
- Establish an implementation plan with clear roles and responsibilities and share it with all stakeholders.
- Establish a coordinating body (Working group) that is functional to monitor the process and address gaps.

- Obtain a signed agreement such as a “Memorandum of Understanding” with the country’s MOH and institutions of higher learning that are involved in the project. This will help ensure a common commitment to the goals, timelines, and responsibilities.
- Identify and select the host institution based on what is best for the country. Different institutions can host PST courses, e.g., a pharmacy college, nursing school, school of Laboratory technology, etc.

NEXT STEPS

Accreditation of the SCM courses demonstrates the commitment of the Government of Ghana, health training institutions, and professional councils—they now consider SCM an essential part of any well-trained health workers’ education and are willing to incorporate those skills into appropriate health training programs.

SCM is now established as part of the national exit exam for nurses. With the future implementation of two semester courses in pharmacy programs, pharmacy students will also be required to take an exam on the content.

We strongly recommend that when the curriculum is reviewed to integrate immunization SCM considerations like: storage, temperature control, transport and shipments etc... some special considerations in managing vaccines and immunization commodities; and also to involve technical and vocational schools, such as polytechnics since they also produce dispensing technicians.

Appendices

Appendix 1: Quality survey results from the PST post assessment at Holy Family Nursing and Midwifery Training College, Berekum.

A. REPORT ON TEACHING SUPPLY CHAIN MANAGEMENT

HOLY FAMILY NURSING AND MIDWIFERY TRAINING COLLEGE, BEREKUM

Positive Teaching Experience

The teaching of supply chain management (SCM) has enlightened me on the need to eliminate waste from the health delivery system in order to enhance service delivery.

It has helped me to see the need to plan and organize activities pertaining to the services that are rendered at the various health facilities.

It has helped improve my teaching skills as I am able to employ various teaching methodologies in order to meet the learning needs of students. Moreover, I am able to adhere to a prescribed curriculum for teaching.

Testimonies from Teaching Orientation sessions

My teaching orientation has absolutely changed after teaching adults. In the past, my major teaching method was lecture. But now various teaching methods such as discussion, group work and demonstration



have been incorporated to enhance teaching.

Students' initial response to my new method of teaching was not encouraging as they were not used to it. However, with time, they became appreciative of it since it made it easy for them to learn.

The feedbacks from students indicate that they are ready to make the necessary impact in service delivery at their various clinical sites. They however acknowledged the need for continuous education in order to achieve complete impact on service delivery.

Figure 3: Nurses students and their instructor during a Supply Chain Course. Picture taken by Kwesi Playe

Testimonies from Students

1. Under monitoring and supervision, it has helped me to be able to supervise junior students to perform specific nursing tasks on the ward.
2. It has enabled me to understand when to and when not to make orders to the stock at a ward. These stocks may include; infusions, adhesive tapes and hand sanitizers.
3. SCM has enabled me to keep equipment or materials at the appropriate storage places and to handle them with care.
4. It allows me to keep proper records of items at the shelves for proper accountability.

Appendix 2: Links related to Supply Chain reform in the Ministry of Health

www.who.int/hiv/amds/countries/gha_EstimatingCostLogistics.pdf

www.kit.nl/.../1275_FINAL%20REPORT%20POW2006%20REVI...

<https://thejournalofbusiness.org/index.php/site/article/.../267/280>

Appendix 3: INTEGRATION OF SUPPLY CHAIN MANAGEMENT (SCM) COURSE/MODULE INTO VARIOUS CURRICULA OF NURSING AND MIDWIFERY TRAINING SCHOOLS



NURSES AND MIDWIVES' COUNCIL OF GHANA

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In case of reply, the number and date of this letter should be quoted

Our Ref:

NMC/95/VOL.24/546

Your Ref:Date: **September 17, 2014**

AS PER DISTRIBUTION LIST ATTACHED

Dear Sir/Madam,

INTEGRATION OF SUPPLY CHAIN MANAGEMENT (SCM) COURSE/MODULE INTO VARIOUS CURRICULA OF NURSING AND MIDWIFERY TRAINING SCHOOLS

Availability of affordable and quality essential health commodities to prevent and treat sicknesses is germane to the attainment of MDGs 4, 5 and 6. Commodity availability also depends on the functioning of effective Supply Chain System manned by qualified and highly motivated staff across all levels of the Supply Chain System.

However, the Ghana health commodity supply chain has been characterized by inadequate human resource capacity to efficiently manage the system. Reports from several analyses of the Supply Chain System and from regular monitoring and supportive supervisory visits to service delivery points have confirmed major weaknesses in the areas of procurement, storage and stock/inventory management at all levels of the health delivery system. The problem is even more pronounced at the lower levels (sub-district and community). These form about 75% of health facilities and are mostly staffed by all cadre of Nurses and Midwives.

In addressing the above challenges, the Nursing and Midwifery Council has collaborated with the MOH-HRHD, the USAID I DELIVER PROJECT and the Ghana Health Service and is at the final stages of the curriculum review. It is worth mentioning that Supply Chain Management (SCM) for health commodities has been integrated into the new curriculum (To be completed by the first half of 2015).

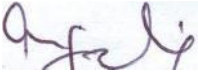
To facilitate the teaching-learning process, a module on SCM has been developed for guidance. Two tutors from each school have been trained on these modules. Training materials have also been developed and distributed to all schools.

The Council is by this letter respectfully requesting all Heads of Nursing and Midwifery training schools to begin the teaching of the SCM course starting from this 2014/2015 academic year. The NMC also wishes to bring to the notice of all schools that the SCM course would be a "stand-alone" one and shall be two (2) credit hours, it shall also be examinable.

Kindly find attached the course structure.

Thank you.

Yours faithfully,



Felix Nyante (FWACN)

Ag. gistrar



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SUPPLY CHAIN MANAGEMENT 2 CR (1L 6F)

Course description

This course is designed to equip the student with the knowledge and skills in Supply Chain and its relationship to commodity security.

Course objectives

By the end of the course the student will

- a. describe the components of a Health Supply-Chain Management system
- b. describe the role of Facilities and staff (Nurses and Midwives) in Health Supply Chain Management
- c. demonstrate an understanding of the Logistics Management Information System in Ghana and be able to fill the LMIS forms and records currently in use
- d. describe the purpose of Storage of Health commodities
- e. explain why it is important to Assess stock status
- f. determine order/supply quantities using Maximum-Minimum inventory control procedures
- g. describe the guidelines for conducting a monitoring and supervision visit for logistics

Course content

1. Introduction to Health Supply Chain Management

- h. Concept of commodity security
- i. Purpose of Health Supply Chain Management System
- j. Components of a Health Supply Chain Management System
- k. Definition of key supply chain terms
 - i. Pipeline
 - ii. Lead time
 - iii. Push/pull
 - iv. Issues data
 - v. Dispensed-to-user data
 - vi. Physical inventory

2. Facilities and staff

- l. Roles in managing SCM
 - m. Relationships between the various roles
 - n. The roles of the nurse in SCM
-

3. Logistics Management Information System

- a. Purpose of LMIS
- b. Essential Data for logistics management
- c. Types of logistics records
- d. Purpose of reporting
- e. SCM forms used in Ghana
- f. Completing the Bin Card
- g. Completing the Report, Requisition, Issues and Receiving Voucher
- h. Using Job Aids to complete forms

4. Storage of Health Commodities

- i. Purpose of storage
- j. Guidelines for proper storage
- k. How to conduct a physical and visual inspection of a warehouse
- l. Receiving and Issuing commodities

5. Assessment of Stock

- m. Explanation of stock assessment
- n. Reasons to assess stock
- o. When to assess stock
- p. Assessing stock using dispensed-to-user data

6. Maximum-Minimum Inventory Control

- q. Definition of terms (maximum months of stock, minimum months of stock, review period, lead time, safety stock emergency order point)
- r. The storekeeper's decision rule
- s. Determining the quantity needed and quantity requested using the units of issue

7. Monitoring and Supervision

- t. Difference between monitoring and evaluation
- u. Monitoring indicators
- v. Conducting a supervisory visit
- w. Characteristics of a good supervisory visit