Warehouse Improvement Plan and Draft Operating Procedures for the Central Warehouses of the Directorate General of Health Services and the Directorate General of Family Planning in Bangladesh

May 2014

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Warehouse Improvement Plan and Draft Operating Procedures for the Central Warehouses of the Directorate General of Health Services and the Directorate General of Family Planning in Bangladesh

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May 2014

This report is made possible by the generous support of the American people through the US Agency for International Development (USAID), under the terms of cooperative agreement number AID-OAA-A-11-00021. The contents are the responsibility of Management Sciences for Health and do not necessarily reflect the views of USAID or the United States Government.

About SIAPS

The goal of the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program is to assure the availability of quality pharmaceutical products and effective pharmaceutical services to achieve desired health outcomes. Toward this end, the SIAPS result areas include improving governance, building capacity for pharmaceutical management and services, addressing information needed for decision-making in the pharmaceutical sector, strengthening financing strategies and mechanisms to improve access to medicines, and increasing quality pharmaceutical services.

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Miller, Roger and Peterson, Matthew R. 2014. *Warehouse Improvement Plan and Draft Standard Operating Procedures for the Central Warehouses of the Directorate General of Health Services and the Directorate General of Family Planning in Bangladesh.* Submitted to the US Agency for International Development by the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program. Arlington, VA: Management Sciences for Health.

Key Words

Assessment, Bangladesh, Central Medical Stores Depot, central warehouse, family planning, health services, logistics, medical supplies, medical supply chain, warehouse strengthening

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CONTENTS

ACRONYMS

cm	centimeter
CMSD	Central Medical Stores Depot
CWH	central warehouse
DGFP	Directorate General of Family Planning
DGHS	Directorate General of Health Services
FEFO	first expiry, first out
GDP	good distribution practice
GOB	Government of Bangladesh
IT	information technology
KPI	key performance indicator
LMI	Logistics Management Institute
LMIS	Logistics Management Information System
MHE	material-handling equipment
MOHFW	Ministry of Health and Family Welfare
MSH	Management Sciences for Health
NGO	nongovernmental organization
RFID	radio frequency identification
SDP	service delivery point
SIAPS	Systems for Improved Access to Pharmaceuticals and Services
SOP	standard operating procedure
SPS	Strengthening Pharmaceutical Systems
TA	technical assistance
TBD	to be determined
USAID	US Agency for International Development
WHO	World Health Organization
WMS	warehouse management system

ACKNOWLEDGMENTS

This report, and the analysis it documents, would not have been possible without the leadership of Dr. Zubayer Hussain, Systems for Improved Access to Pharmaceuticals and Services (SIAPS)/Bangladesh Country Director. His astute understanding of the challenges in the health and family planning sector was invaluable. The consultant team understood both his intent and personal desire to see productive outcomes from this initial assessment undertaken on behalf of the Directorate General of Family Planning (DGFP) and the Directorate General of Health Services (DGHS). Special thanks are also extended to Mr. Md. Abdullah, Logistics Staff Lead, SIAPS/Bangladesh for his exceptional efforts to organize and facilitate all aspects of the office and field visits needed to conduct the assessment.

The consultant team would also like to thank Brigadier General Syed Iftekhar Seyin, Director, Central Medical Stores Depot, and his staff, along with Mr. Md. Saiful Islam, Director, DGFP Central Warehouse, and his staff, and Mr. Md. Kafil Uddin, Joint Secretary/Director for Logistics and Supply, DGFP, for their hospitality, cooperation, and insights.

We wish to express our sincere appreciation to the US Agency for International Development (USAID)-funded SIAPS Program, implemented by Management Sciences for Health (MSH), and to USAID, for their leadership and technical support for the implementation of this technical assistance that will assist the DGFP and DGHS to achieve their visions and their missions on behalf of the people of Bangladesh.

Wonder Goredema, Mavere Tukai, and Emmanuel Nfor provided technical guidance and oversight from the SIAPS home office in Arlington, Virginia, USA. They also reviewed and provided input to and feedback on this report, contributing to its finalization.

EXECUTIVE SUMMARY

This report summarizes technical findings and recommendations to assist two important supply chain management organizations that support the Government of Bangladesh's (GOB) Ministry of Health and Family Welfare (MOHFW). The first organization— the Ministry's Central Medical Stores Depot (CMSD)—is headquartered in Dhaka. It serves as the central procurement and distribution arm of the Directorate General of Health Services (DGHS). The second organization—the central warehouse (CWH) of the Directorate General of Family Planning (DGFP)—is also located in Dhaka. It supports the DGFP's family planning and reproductive health commodity storage and distribution requirements.

During phase one of the project, conducted in November and December 2013, a rapid evaluation involving document review and site visits in and around Dhaka enabled the development of recommendations, a comprehensive action plan, and draft procedures to improve the operational performance and capacity of each organization.

Although the CWH and CMSD share a similar mission—the centralized procurement and distribution of medical products—they are very different in the technical execution of their missions. Consequently, this report presents different findings and recommendations for each organization.

In phase two, short-term recommendations will be implemented, the draft warehouse management standard operating procedures will be further defined and elaborated, additional procedures and other documentation will be drafted, if needed, and a human resource performance improvement capacity building approach and associated materials will be developed. While the focus of this project is on warehouse strengthening at the two Dhaka locations, the supply chain management practices and procedures it produces are equally applicable to other DGHS and DGFP supply chain organizations throughout Bangladesh. The objective of this project is to create "building block" capabilities that, once implemented within the CMSD and CWH, may be subsequently replicated across the country. We also describe "foundational" recommendations that should be implemented throughout the supply chains in order for them to function as an integrated end-to-end system (i.e., Dhaka-to-consumer).

Like any other supply chain, the DGHS and DGFP supply chains are complex, dynamic systems with many constituent parts. The DGHS supply chain begins with suppliers and continues with the movement of medicines and medical supplies through the CMSD structure, into the District Reserve Stores and Upazila stores levels until they reach clinics, hospitals, and other treatment facilities throughout the country. The DGFP supply chain likewise begins with family planning commodity suppliers and continues to service delivery points (SDP) at over 30,000 locations across Bangladesh.

Our review of the CMSD's processes revealed an organization that lacked the basic documentation needed to define and disseminate information about its own processes and operations. For this reason, this report includes a set of draft operating procedures that, when finalized, have the potential to significantly improve the organization's effectiveness and

accountability to its stakeholders. SIAPS will use these standard operating procedures (SOP) as the basis for a workforce training program during the next phase of the project. Also included in the report are recommendations about changes in business practices (such as a systematic method for product identification and a standard warehouse locator system) that will provide a more stable foundation for future operations. Lastly, a set of recommended investments in the CMSD organization are offered. An investment in human capacity, equipment, logistics technology, and infrastructure is needed to strengthen the CMSD's warehousing and distribution capacity. Given its current procurement and inventory management practices, CMSD requires at least twice as much storage space as it currently has. Anything less than 14,864 square meters (160,000 square feet) will cause sub-optimal stores management, quality assurance and surveillance, and receiving, storage, and issue business practices. The optimal space determination was prepared partly through a visual inspection of current space utilization and partly based on interviews with the CMSD leadership. Designated storage locations are more than 100% occupied in the CMSD facility, and stored materials occupy every single aisle and loading area. Given the CMSD's current procurement and inventory management practices, it was determined that a facility double the size of the current facility is justified. However, this is a rough order of magnitude estimate that should be more carefully studied before the DGHS commits to acquiring more space. In addition, the key problem at the CMSD may not really be shortage of space, but rather inefficient utilization of the available space. Much of what should be done for the CMSD and the DGHS supply chain has already been implemented in the DGFP supply chain. It may therefore be possible to adapt and customize many of the business practices and procedures used in the DGFP for use by the DGHS.

The review of the CWH's processes revealed a considerably more functional organization operating as a part of a much better integrated DGFP-wide supply chain. For example, the consultant team's requests for CMSD documentation revealed that most processes and organizational responsibilities in the CMSD are undocumented. On the other hand, a very thorough and well-illustrated storage and distribution procedures manual (in Bengali) describing the DGFP supply chain was available. At the same time, there remains substantial room for improvement within the CWH. However, as measured by product availability at the SDP level and product stock-outs (particularly for products deemed critical), problems are much less common in the DGFP supply chain. As with the CMSD, a targeted set of improvements to physical infrastructure is recommended, including: better use of material-handling equipment (MHE); improvements to business practices, such as the management of worker safety and storage practices; and targeted investments intended to improve operational performance, such as upgrades to warehouse interior lighting, storage racks, and warehouse floor surfacing to improve workers' ability to operate in the CWH facility.

Both the DGHS and DGFP can begin implementing many of the recommended improvements now. For example, both organizations could develop warehouse location identification systems that will allow their workers to know precisely where all products are stored in their facilities. Annex 2 provides a suggested implementation method for such a locator system. Once foundational changes, such as a product identification method in the DGHS and improved storage capability in the CWH have been initiated, other changes may be launched.

Both the CMSD and CWH face other longer-term challenges. The physical facilities within which they operate are not ideal for the storage of medical products. Neither facility has adequate controlled temperature and refrigeration storage space. Both facilities are overcrowded and contain too much inventory for efficient operations.

Ultimately, both facilities should be replaced with new, more modern structures capable of functioning as 21st century distribution centers. Neither facility can be sufficiently modernized to enable this. At the same time, the consultant team recognizes that building projects of the scale and scope envisioned is a long-term process.

Both the CMSD and CWH have the potential to provide improved supply chain management services to the MOHFW by making relatively small changes in the near future.

This report addresses improvements in warehouse business processes, warehouse management procedures, organizational functional units, work flow charts, bin and bulk storage locators, and key performance monitoring indicators, as well as providing a baseline performance assessment of both facilities.

INTRODUCTION

Background

Pharmaceutical systems rely on well-functioning pharmaceutical supply chains to effectively deliver medicines to the end user. A key component of the pharmaceutical supply chain logistics system is warehousing, storage, and distribution of commodities. Poor warehousing and distribution results in shortages, stock-outs, and millions of dollars in lost pharmaceuticals and other essential products due to expired products in warehouses and inefficient distribution to clients. Countries can reduce wastage, expand availability, and save money by improving the storage and distribution of pharmaceuticals.

The goal of the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program, which is funded by the US Agency for International Development (USAID) and implemented by Management Sciences for Health (MSH), is to assure the availability of quality pharmaceutical products and effective pharmaceutical services to achieve desired health outcomes. SIAPS collaborates with five core partners, including Logistics Management Institute (LMI), and six specialized resource partners.

In Bangladesh, SIAPS is working with the Ministry of Health and Family Welfare (MOHFW) to strengthen the management of pharmaceuticals and other health commodities. The broad areas of technical assistance (TA) provided by SIAPS include supply chain management, pharmaceutical services, and pharmaceutical regulatory systems, with a focus on maternal, newborn, and child health and tuberculosis-related essential medicines and supplies.

SIAPS is assisting the Directorate General of Health Services (DGHS) and the Directorate General of Family Planning (DGFP) to improve the performance of their respective central warehouses and the pharmaceutical management of family planning and other public health commodities.

To achieve this goal, SIAPS collaborated with LMI to address gaps in the warehouse and commodity distribution systems. LMI has a strong track record in logistics management. It has supported various US Government activities, including in the field of global health. LMI has collaborated with MSH's Center for Pharmaceutical Management under SIAPS and its predecessor project, Strengthening Pharmaceutical Systems (SPS), on several previous logistics management system strengthening tasks in Bangladesh, including a 2010 logistics management system assessment for the entire MOHFW.[1,2,3] The assessments identified critical barriers that

[1] Miller R, Gonsalkorale R, and Addison D. *Comprehensive Assessment for the Government of Bangladesh, Directorate General of Health Services, Central Medical Stores Depot.* Submitted to the US Agency for International Development by the Strengthening Pharmaceutical Systems (SPS) Program. Arlington, VA: Management Sciences for Health; 2010.

[2] Systems for Improved Access to Pharmaceuticals and Services. *Bangladesh: Work Plan: October 2011–September 2012*. Submitted to the US Agency for International Development by the Systems for Improved Access to Pharmaceuticals and Service (SIAPS) Program. Arlington, VA: Management Sciences for Health; 2011.

adversely impact supply chain operations, and recommended improvements to warehousing operations, storage, and distribution management of essential public health commodities.

Purpose

The purpose of the TA was to improve the storage, inventory management, and distribution systems of the DGHS' Central Medical Stores Depot (CMSD) and the DGFP's central warehouse (CWH).

Approach

Two LMI consultants traveled to Dhaka and worked with SIAPS/Bangladesh and US office staff to provide TA to the CMSD and the CWH. The TA approach included five distinct activities, in accordance with the warehouse improvement statement of work:

- Conduct a review of relevant DGHS and DGFP documentation.
- Conduct an in-country baseline performance assessment.
- Conduct data analysis with in-country SIAPS staff in Dhaka.
- Provide warehouse improvement and strengthening recommendations to the DGHS, DGFP, and SIAPS staff.
- Debrief USAID and MOHFW staff members.

Document Review

The LMI consultants conducted a review of relevant DGHS and DGFP documentation in November 2013. A visit to Bangladesh was conducted November 9-22, 2013, which enhanced the consultant team's knowledge. The document review included:

- Desk research and the development of a draft warehouse strengthening plan for the DGHS and DGFP to address the short- and medium-term recommendations of the previous assessments.
- Discussion, review, and revision of the strengthening plan, in consultation with SIAPS/US and SIAPS/Bangladesh staff, DGHS and DGFP staff, and other relevant in-country stakeholders.

[3] Johnson M, Addison D, and Mbatha T. *Assessment of the Government of Bangladesh, Directorate-General of Family Planning Warehousing and Logistics Systems*. Submitted to the US Agency for International Development by the Strengthening Pharmaceutical Systems (SPS) Program. Arlington, VA: Management Sciences for Health; 2010.

In-Country Rapid Situation Analysis

Rapid reviews of the CMSD and CWH were conducted in and around Dhaka from November 9-22, 2013. The following tasks were completed:

- Met with key stakeholders in Dhaka to review and evaluate the current status and capacity of the DGHS and DGHP warehouses in Dhaka.

- Reviewed relevant documents (circulars, manuals, standard operating procedures [SOP], etc.) governing logistics management and distribution operations across the different working units of the DGHS and DGFP's warehouses.

- Visited the DGHS and DGFP warehouses, nearby health facilities, and other entities to understand the current logistics management and distribution systems, and to document progress in the implementation of recommendations from the previous assessments.

- Interviewed relevant DGHS and DGFP staff and officials and their warehouse staff as well as staff from other related entities and stakeholders to gather necessary information regarding the existing logistics management and distribution systems, in conjunction with SIAPS/Bangladesh staff.

- Met with the relevant key officials to obtain consensus on the findings regarding current practice, procedures, systems, and recommended improvement options. Reviewed and finalized the draft warehouse strengthening strategy and plan in collaboration with key DGHS and DGFP officials, and SIAPS/Bangladesh staff.

- Drafted a warehouse improvement plan with prioritized actions and supporting rationales/objectives. The improvement plan includes recommended interventions/activities to fix identified gaps and related implementation details.

- Drafted descriptions of proposed warehouse system strengthening tools, including medical product naming and location identification procedures (Annex 2) and prioritized warehouse SOPs (Annex 3).

- Assisted the DGHS/CMSD and DGFP/CWH to conduct rapid staff performance evaluations at the warehouses.

- Analyzed and determined the space required for optimal product storage in both warehouses.

- Collected key performance information for the DGFP, including product availability at the service delivery point (SDP) level, and product stock-outs, particularly for products deemed critical. Problems in these areas are much less common in the DGFP supply

chain. The collection and assessment of such key performance indicators were not possible for the CMSD because of the lack of data.

Focus Areas

The objective of the TA is to develop a phased warehouse improvement plan for the DGHS and the DGFP, based on the findings and recommendations of previous assessments. Annex 1 is the recommended warehouse improvement plan. Annex 2 contains two other proposed improvements (medical product naming and location identification procedures) that can be implemented independently from the overall plan in Annex 1. Annex 3 contains a set of proposed draft warehouse management procedures, which are designed to be adapted, as needed, and finalized for the DGHS, or to be adapted, as needed, and used to improve existing DGFP/CWH processes and procedures.

FINDINGS

Organizational Structure of the CMSD and DGFP Central Warehouses

Figures 1 and 2 depict the internal organizational structures of the CMSD and DGFP central warehouses. The DGFP central warehouse structure does not include the 20 regional warehouses that report to the warehouse director because they are technically separate organizations.

Each organization appears to provide a basic yet functional approach to its organizational mission. Further analysis, however, would likely reveal gaps that may be addressed in the next phase of the project.

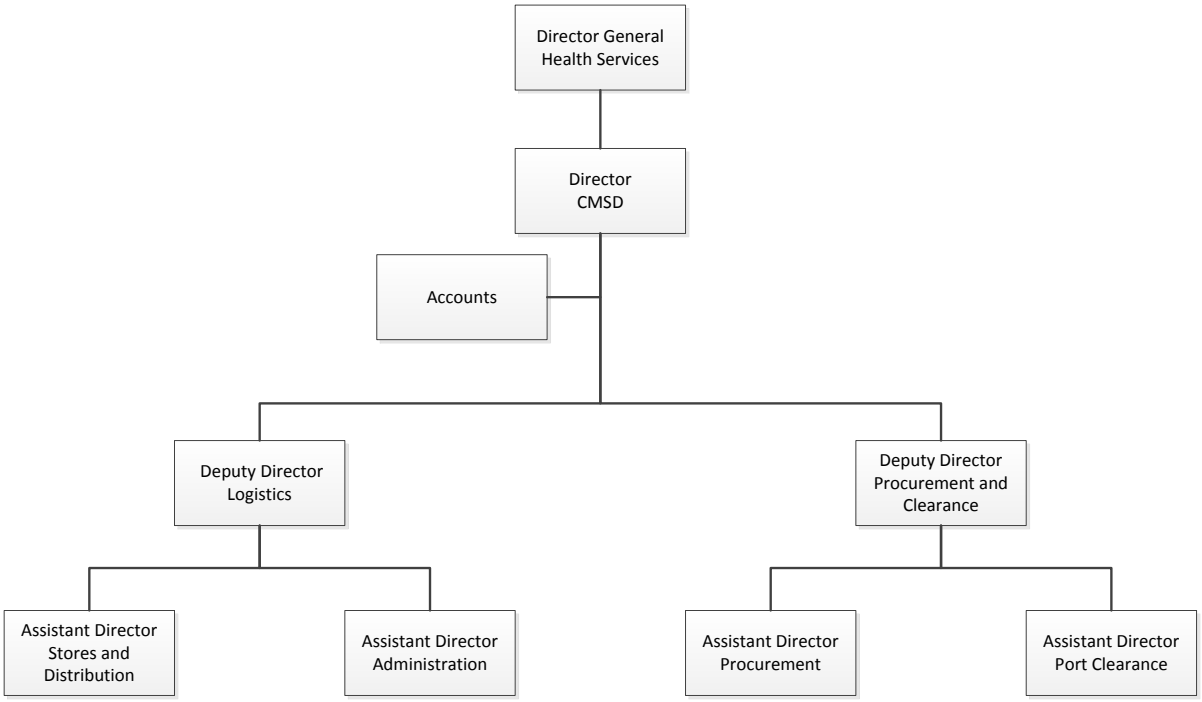

Figure 1. CMSD organizational chart

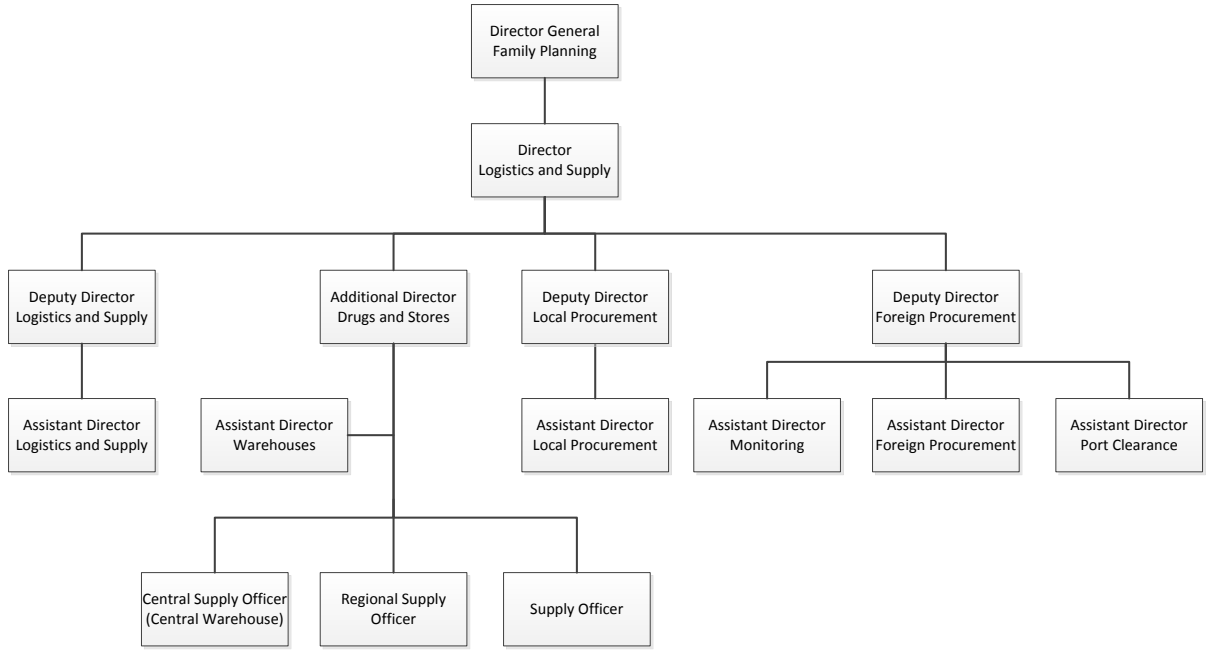

Figure 2. DGFP central warehouse organizational chart

Overall Findings: CMSD

- The CMSD has made progress since 2010, including reductions in excess material, improved cleanliness, improved external security, better warehousing practices, improved space utilization, and better overall governance.

- Significant issues remain, however, including lack of temperature controlled storage, insufficient back-up power, insufficient storage capacity, lack of internal security, lack of occupational safety and health measures, lack of a location identification system, needed physical improvements, and lack of consistent product identification procedures. The CMSD also lacks written documentation on quality control surveillance procedures.

- There is no current documentation of warehouse operating procedures or logistics guidelines. Draft warehouse SOPs are provided in Annex 3.

Distribution Structure

The DGHS distribution structure, of which the CMSD is a key element, encompasses the following organizations:

- Manufacturer sites (including the Essential Drugs Company Limited)
- CMSD

- District Reserve Stores
- Upazila stores
- Hospitals, teaching hospitals, and other treatment facilities
- Import and port clearance operations in Chittagong

For the DGHS supply chain to function properly, it is important for all of these organizations to coordinate and communicate their various supply chain support activities, capabilities, limitations, and schedules.

Figure 3 shows the pharmaceutical, medical product, and medical equipment flow throughout the DGHS distribution structure.

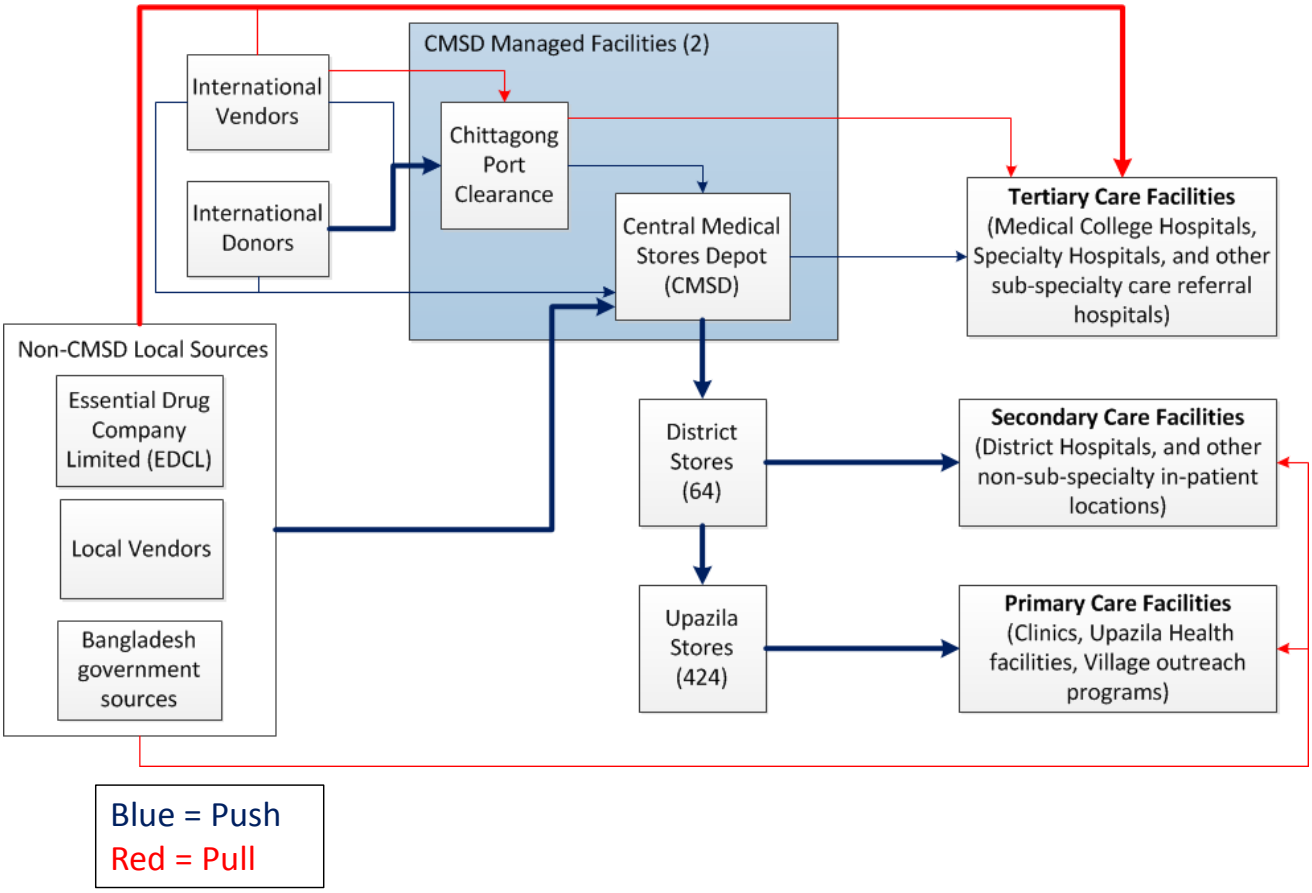

Figure 3. DGHS commodity flow chart

Infrastructure Capabilities

- The CMSD storage facility is currently storing substantially more inventory than it can efficiently or effectively manage, store, and distribute. Current storage conditions make it impossible for storekeepers and other warehouse staff to use material-handling equipment (MHE) because the aisles are choked with inventory.

- The CMSD has inadequate storage racks to manage its stored goods. Of the CMSD's 80,000 square feet of storage, only 16,000 square feet of the total area have storage racks. These racks are primitive and in poor condition. In many areas, product is stacked, without racking, and cartons have fallen on the floor.

- Although the CMSD is not supposed to be a long-term storage location (its mission is to receive, inspect, and distribute material), much of the product in its Dhaka facility appears to have been in storage for as long as several years. This is probably at least in part due to the fact that the DGHS does not have a demand-based system driven by customer requests. Aged inventory indicates that the DGHS is probably procuring products that customers do not or cannot use, meaning that the CMSD receives and stores products that expire or perish before they can be distributed.

    - Given current inventory management practices and policies, the CMSD should ideally have at least twice its 80,000 square feet (about 7,500 square meters) of space. The organization needs an estimated 160,000 square feet (approximately 15,000 square meters) within which to receive, store, and issue products. This is a rough order of magnitude estimate that should be more carefully studied before the DGHS commits to a strategy to acquire more space. To arrive at a fully accurate estimate of the CMSD's true storage facility needs, the DGHS should first determine the following:

        - How much active inventory (inventory that customers currently use and that the CMSD distributes) does the organization manage?
        - What is the CMSD's inventory objective, as measured in the number of days or months of inventory the organization intends to store?
        - What are the preferred stock levels throughout the supply chain? How much should be stocked at lower levels of the supply chain? What are the stock turnover, inventory holding required service levels, etc.?
        - How much excess inventory will the organization manage, and for how long? How long does the disposal process take, and how are disposition decisions made?
        - How long does the inspection and testing quarantine process take?

- The key problem at the CMSD may not really be shortage of space, but rather inefficient utilization of the available space.

- Temperature-controlled and cold chain storage space is inadequate to meet the CMSD's requirements. Air conditioning systems for the temperature-controlled space are unreliable and inadequate. An optimally functioning operation would require as much as 40,000 square feet of air conditioned space. Optimal cold chain storage requirements for effective operation could not be calculated because the CMSD has limited to no access to data/information from that part of the country's supply chain. However, these requirements need to be determined.

- MHE is inadequate for the CMSD's requirements.

- Capacity of the CMSD can be measured by the following estimates of work volume and complexity:

- The facility stores as many as 117 essential medicines.
- The CMSD's logistics management information system contains 937 catalog master item records. Many of the records are duplicates, none are systematically numbered, none permit adequate financial inventory accounting, and there is no indication that item master records, once entered into the file, have ever been comprehensively updated.
- The facility includes approximately 13,000 square feet of temperature-controlled space. (Note: the air conditioning was not functioning during our visit. We were advised that it had been inoperable for at least two months prior to our arrival.)

Inventory Management

- The DGHS lacks an end-to-end Logistics Management Information System (LMIS) to track products throughout the supply chain. It is using such information technology (IT) in only extremely limited ways. The DGHS could benefit from the integration and use of other logistics technologies (such as bar codes) that could be integrated into their existing IT architectures.

- There is mostly manual recordkeeping.

- Shipment is based mostly on a "push" system rather than a demand-based "pull" system. Until improved information about what customers really need and what products are actually stored at the various storage locations is available, a demand-based system will not be possible. When it is instituted, however, such a system could greatly improve forecast accuracy, greatly reduce excess and unused products, and (most importantly) greatly improve customers' trust in the supply chain.

- The CMSD inventory accuracy is difficult to determine because products are not uniformly identified and there is no warehouse locator system.

- The CMSD is focused on procurement and distribution. Storage, logistics, and supply chain operation is not a core mission and, therefore, the CMSD has not developed the processes, skill sets, documentation, and systems to perform those functions.

- Documentation at the process level does not exist within the CMSD. Recordkeeping requirements are not written or published, and procedures for the management of any core logistic procedures do not exist. This means that the workforce is inadequately trained, records are not kept (for the most part) and, consequently, the supply chain operates in a chaotic fashion.

Overall Findings: DGFP Central Warehouse

- The DGFP and the CWH maintain documented SOPs and logistics guidelines.

- The DGFP has implemented a "best practices" supply chain information management system. The best practices include end-to-end visibility of the products in the supply chain, uniform identification of products, careful monitoring of inventory levels, excellent reporting practices by Upazila and district stores managers, and excellent user documentation (in Bengali) of system operations, basic logistics functions, and recordkeeping and reporting requirements.

- Challenges remain, including the need for physical modernization and improvement, environmental and safety enhancements, and storage racks/shelving.

Distribution Structure

The DGFP distribution structure includes the following organizations and components:

- The CWH in Dhaka.

- Regional warehouses in 20 locations across Bangladesh, which are managed on a day-to-day basis by the CWH director.

- Upazila stores in 488 locations across Bangladesh.

- SDPs in over 30,000 locations throughout Bangladesh.

As with the DGHS supply chain, operational requirements dictate that all of these organizations coordinate and communicate their various supply chain support activities, capabilities, limitations, and schedules. In contrast to the DGHS supply chain, the DGFP supply chain is significantly closer to achieving its operational objectives.

Figure 4 shows the pharmaceutical, medical product, and medical equipment flow throughout the DGFP distribution structure.

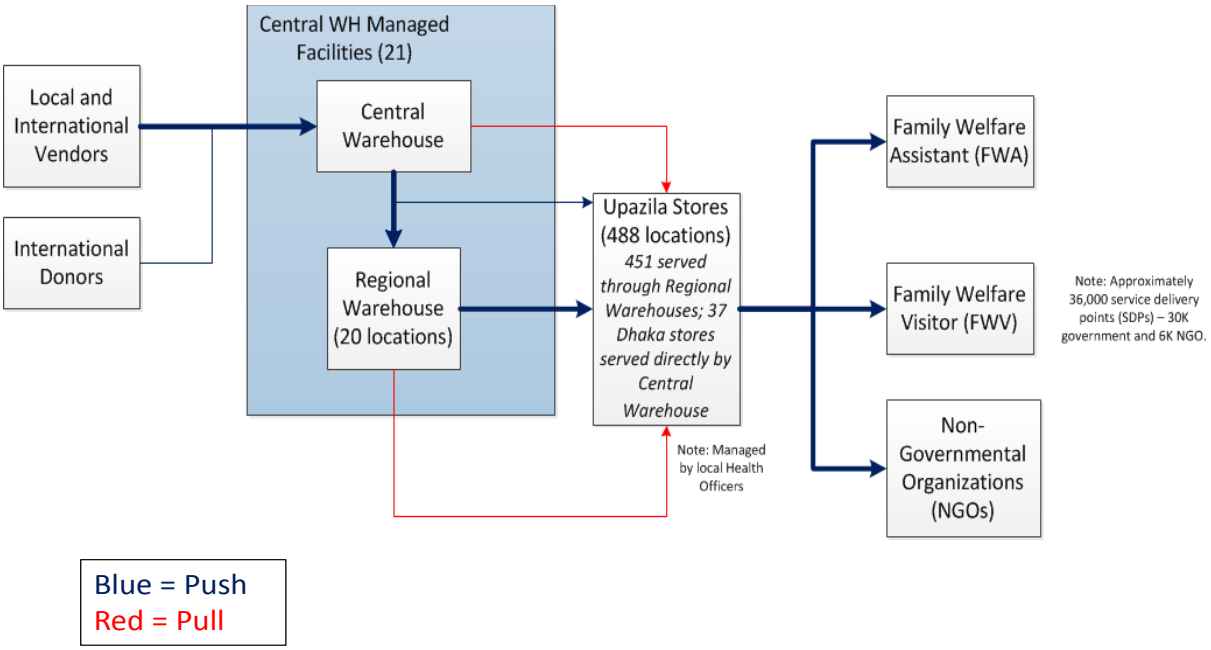

Figure 4. DGFP commodity flow chart

Infrastructure Capabilities

- The CWH also supervises 20 regional stores warehouses.
- No temperature controlled storage.
- MHE issue
- Volume
- 14 critical, centrally-monitored items.
- 300–400 other items in the supply chain.
- 18,500 square feet plus about 12,000 square feet of other temporary (non-warehouse) storage space. (Note: storage needs for family planning products are highly seasonal because of the way annual procurements are conducted. Our visit took place toward the end of one cycle and several months before the beginning of the next cycle. The warehouse was nonetheless overcrowded when we visited. It appears, therefore, that the current facility is too small to meet the DGFP's needs. Optimally, the DGFP should have at least 36,000 square feet of storage space, preferably in the form of one warehouse in a suitable location. If possible, the DGFP could rent or lease space flexibly so that it could use the additional space only at the point in the cycle when it is needed.)

Inventory Management

- The DGFP uses an end-to-end LMIS to track products throughout the supply chain. The Directorate would benefit from the integration and use of other logistics technologies (such as bar codes) that could be integrated into its existing IT architectures.
- There is increasingly automated recordkeeping.

CONCLUSIONS AND RECOMMENDATIONS FOR NEXT STEPS

CMSD

- Coordinate and collaborate with relevant local partners and stakeholders to implement prioritized interventions, as described in the comprehensive warehouse improvement plan (Annex 1).

- Develop and implement a systematic product identification and warehouse location identification procedure (Annex 2).

- Develop written procedures and other guidelines (Annex 3), including key performance indicators and sources of performance information.

- Consider physical operational/maintenance improvements, including:

    - Develop a plan to clear stored products from aisles, corridors, and other non-storage areas of the CMSD facility.
    - Develop a plan to acquire more storage racks, conveyors, and other storage equipment.
    - Institute better environmental controls for storage areas, including a maintenance schedule for ventilation and air conditioning systems.
    - Improve the receiving and loading area.
    - Improve management of MHE, including a scheduled and unscheduled maintenance program. If additional MHE is required, develop a plan to acquire it.
    - Improve cold chain practices and capabilities, including the acquisition of additional cold storage refrigerators and the maintenance of all cold storage equipment.
    - Improve occupational safety.
    - Conduct and document quarterly, or at least annual, physical inventories.

- Develop and conduct a formal logistics training program, including training on key performance indicators and performance management practices. The training plan should include corrective actions needed to address gaps between performance targets and actual performance.

Develop priority procedures and guidelines based on the drafts provided in Annex 3 (in descending order of priority):

- Receiving and Storage
- Issuing and Distributing Material
- Physical Inventory Procedures
- Management and Disposal of Excess Material/Equipment
- Performance Measurement and Monitoring
- Logistics and Information Technology
- Physical Security and Environmental Control/Monitoring

The general outline that may be used for each SOP is:

- Introduction
- Purpose
- Applicability
- References
- Procedures
- Best practices
- Measures and outcomes
- Revision history

Draft warehouse SOPs are attached to this report in Annex 3.

DGFP Central Warehouse

- Coordinate and collaborate with relevant local partners and stakeholders to implement prioritized interventions as described in the warehouse improvement plan (Annex 1).

- Undertake plant and equipment modernization and improvements:

    - Warehouse floor surface maintenance
    - MHE

- Address environmental and safety issues:

    - Warehouse interior lighting
    - Temperature control for sensitive items
    - Partition flammable item storage areas (i.e., oxygen tanks)

- Improve storage racks and shelving:

    - Acquire reverse gravity racks for medical gas cylinder storage.

Both the DGHS and DGFP need to implement the recommendations described in Annex 1. First steps should include the implementation of two foundational procedures stated below. The first foundational process will involve the development of a comprehensive item identification process for all pharmaceutical, medical supply, and family planning items managed in their respective supply chains. The second foundational process involves the development of a uniform, comprehensive procedure to identify warehouse storage locations. Additionally, the DGHS should study and adapt as many of the DGFP's "best practices" as possible. Other short-term steps include:

- Develop SOPs based on the generic drafts provided in Annex 3.
- Using these procedures, develop modular training materials.

- Use a train-the-trainer approach. Use the to-be-developed curriculum materials based on the system strengthening technical information contained in this report and in Annexes 1, 2, and 3. The procedures in Annex 3 are structured to focus on individual warehouse, distribution, and logistics processes, such as operations management, transportation and distribution processes, and other core supply chain functions.

The materials contained in this report and its annexes constitute deliverables 1, 2, and 4 for this phase of the project. Each of these deliverables should be further developed when the next phase of the project commences.

The challenge for both the CMSD and CWH leadership is for the organizations to do the significant work needed to take them to the level of performance at which they are each capable.

Limitations

It would have been good to measure key performance indicators (KPI), to provide objective insights into how well the CMSD is doing. However, KPIs were not developed nor measured at the CMSD because of the lack of supply chain data. A key performance monitoring system or KPIs could not be developed for the CMSD. The DGFP, on the other hand, already has an effective key performance monitoring system. KPIs were used to shape TA recommendations for the DGFP.

Analysis of optimal storage space requirements for both warehouses (DGFP and DGHS) was not done.

ANNEX 1. RECOMMENDED WAREHOUSE IMPROVEMENT PLAN

Part A. CMSD

Short-Term

Action A1. Implement the standard item identification method (Annex 2 contains specific guidance).

1) Objective. Develop a clear item identification method (Annex 2) to enable accurate, complete inventory accounting and management.
2) Intervention/Activity to Fix the Gap. Develop item identification numbers as described in Annex 2. As noted in the Executive Summary and elsewhere in this report, without item identifiers, inventory cannot be properly accounted for, valuated, and managed.
3) Responsible Party. Director, CMSD
4) Timeframe. Next six to twelve months.
5) Performance Indicator(s). 99% of all items in the CMSD facility have uniform, clearly-readable item identification numbers attached to inner and outer pack boxes/containers within 12 months.
6) Resources Needed. Computer to record numbers; label printer to print labels; warehouse labor to affix labels.
7) Expected Output. Improved inventory accuracy.

Action A2. Implement standard warehouse location system (Annex 2 contains specific guidance).

1) Objective. Implement a standard warehouse location system (Annex 2).
2) Intervention/Activity to Fix the Gap. Develop a standard warehouse location system as described in Annex 2. As noted in the Executive Summary and elsewhere in this report, without a proper locator system, inventory cannot be correctly located and is subject to loss, pilferage, improper quality control, and/or diversion.
3) Responsible Party. Director, CMSD
4) Timeframe. Next six months.
5) Performance Indicator(s). 97% of items are accurately located in standard locations.
6) Resources Needed. Paint to mark locations. Shelf and bin labels to number locations.
7) Expected Output. Improved inventory accuracy.

Medium-Term

Action A3. Develop written SOPs and other guidelines (Annex 3 provides the list of the SOPs and the proposed format).

1) Objective. Develop written SOPs and other guidelines.

2) Intervention/Activity to Fix the Gap. Develop written SOPs for a range of the CMSD's functions and responsibilities. Written SOPs enable workforce development and document processes that are otherwise subject to individual and arbitrary deviations.
3) Responsible Party. Director, CMSD
4) Timeframe. Next 12–18 months.
5) Performance Indicator(s). All CMSD staff have read and understand the contents of all seven SOPs described in Annex 3.
6) Resources Needed. Approximately 40 hours of labor to develop each SOP (12–48 pages each).
7) Expected Output. Better-trained CMSD staff.

Action A4. Consider undertaking physical operational/maintenance of the CMSD storage facility, including better environmental controls for storage areas, improvements to the receiving and loading area, and improved cold chain practices and capabilities.

1) Objective. Ensure that the CMSD conforms to World Health Organization (WHO) Good Distribution Practices (GDP).
2) Intervention/Activity to Fix the Gap. Numerous physical repairs and installation of equipment, including adequate cold storage space. The current condition of the facility makes day-to-day work in it dangerous, inefficient, and largely manual. It also gravely threatens commodity security throughout the country's supply chain.
3) Responsible Party. Director General for Health Services
4) Timeframe. 12–36 months.
5) Performance Indicator(s). Improved commodity security for CMSD products.
6) Resources Needed. Substantial (> 100,000,000 Taka)
7) Expected Output. GDP-compliant CMSD storage facilities.

Action A5. Improve occupational safety of CMSD staff.

1) Objective. Provide occupational safety protection for the CMSD warehouse staff members.
2) Intervention/Activity to Fix the Gap. Basic occupational safety is a requirement of WHO GDP guidelines. The current lack of occupational safety measures is, in all likelihood, a violation of Bangladeshi labor law. Therefore, the CMSD should:

    a) Acquire safety shoes, hard hats, and lifting harnesses for all warehouse staff.
    b) Acquire warning signs, traffic mirrors, and audible alarms for transit corridors.
    c) Provide eyewash stations near hazardous materials.
    d) Improve fire safety measures.
    e) Develop and conduct occupational safety training for all warehouse staff.

3) Responsible Party. Director, CMSD
4) Timeframe. Six to eighteen months.
5) Performance Indicator(s). All warehouse staff wear safety clothing and accessories.
6) Resources Needed. Safety clothing and accessories, and occupational health warehouse accessories.

7) Expected Output. Safer facility with fewer workplace accidents.

Action A6. Plan for annual logistics training for storekeepers, ledger keepers, and other CMSD staff. (This action item is already included in the current SIAPS work plan.)

1) Objective. Develop an annual logistics training plan for storekeepers, ledger keepers, and other CMSD staff.
2) Intervention/Activity to Fix the Gap. Develop a comprehensive CMSD training plan. The current workforce receives no comprehensive supply chain, storage, distribution, and quality assurance training.
3) Responsible Party. Director, CMSD
4) Timeframe. Six to eighteen months.
5) Performance Indicator(s). Fully trained staff competent to perform as needed.
6) Resources Needed. Time and expertise.
7) Expected Output. Annual CMSD training plan.

Action A7. Strengthen information systems and reporting across the CMSD and the DGHS.

1) Objective. Develop an information portal and LMIS, based on the one used throughout the DGFP.
2) Intervention/Activity to Fix the Gap. Adapt and adjust the architecture and information systems used to support the DGHS's supply chain. Today there is no information on the current architecture and information systems, or the desired information systems, and therefore no systematic plan to modernize the Directorate's supply chain information architecture.
3) Responsible Party. Director General, Health Services
4) Timeframe. One to three years.
5) Performance Indicator(s). An LMIS implemented throughout the DGHS supply chain, from the Upazila level to the CMSD facilities in Dhaka and Chittagong.
6) Resources Needed. To be determined (TBD).
7) Expected Output. A DGHS-wide LMIS and web portal.

Part B. DGFP CWH

Short-Term

None.

Medium-Term

Action B1. Perform plant and equipment modernization and improvement.

1) Objective. Perform plant and equipment modernization and improvement.

    a) Seal warehouse floor surface with latex or composite sealant.

b) Repair MHE.

2) Intervention/Activity to Fix the Gap. Acquire and apply floor surface sealant. The warehouse floor is deeply pitted and very rough, which prohibits operation of MHE anywhere in the facility.
3) Responsible Party. Additional Director (Drugs and Stores), DGFP
4) Timeframe. 12–24 months.
5) Performance Indicator(s). MHE usable on 100% of the warehouse floor surfaces.
6) Resources Needed. TBD.
7) Expected Output. More accessible and usable central warehouse.

Action B2. Implement warehouse environmental and safety improvements.

1) Objective. Improve warehouse safety and environmental factors.
2) Intervention/Activity to Fix the Gap. The warehouse is too poorly lit for staff to be able to read labels and identify products. The warehouse's lack of temperature control means that products are improperly exposed to environmental extremes, which is a violation of WHO GDP guidelines. In all likelihood, these conditions degrade the efficacy of the products the warehouse contains.

    a) Install improved warehouse interior lighting.
    b) Install a new HVAC system for temperature control of sensitive items.
    c) Partition off flammable item storage areas (i.e., oxygen tanks).

3) Responsible Party. Additional Director (Drugs and Stores), DGFP
4) Timeframe. 12–24 months.
5) Performance Indicator(s). Improved usability and accessibility of all DGFP central warehouse storage areas.
6) Resources Needed. TBD.
7) Expected Output. More accessible and usable central warehouse.

Action B3. Improve storage racks and shelving.

1) Objective. Improve warehouse storage racks and shelving.
2) Intervention/Activity to Fix the Gap. Acquire and install reverse gravity or upright storage racks for small (95 gallon) medical gas cylinder storage. The current storage configuration is unsafe for both the workforce and the products they manage.
3) Responsible Party. Additional Director (Drugs and Stores), DGFP
4) Timeframe. Three to fifteen months.
5) Performance Indicator(s). Improved safety and accessibility of medical gas cylinders stored in the DGFP central warehouse.
6) Resources Needed. TBD.
7) Expected Output. Safer, more accessible medical gas cylinder storage area.

ANNEX 2. MEDICAL PRODUCT NAMING AND LOCATION IDENTIFICATION PROCEDURES

Synopsis of Current Practice

Current practice in the CMSD (and throughout the rest of the DGHS supply chain) is that medical products and storage locations are not uniformly identified. This means that there is no consistent, universally-used identifier (either a product name or number) used to receive, store, issue, and track products in the supply chain. As a result, it is impossible to know how much stock is available or required to keep the supply chain functioning, difficult (at best) to know what stock is valued at, and difficult (at best) to know where stocks are needed to support customer requirements. The lack of a storage location identification system means that only the storekeeper who puts stocks into a storage location knows where they were placed, if he remembers. This is a critical gap that by itself is crippling the supply chain and causing countless second- and third-order problems.

Medical Product Naming Procedures

- Audience: The CMSD and its business partners, Line Directors, Desk Officers, District Reserve Stores, and others.
- Purpose: To describe a possible method of naming, describing, and numbering medical and non-medical products stored in the CMSD.
- Secondary purpose: To describe the benefits of standard product names and numbers.
- Products should be given a standard name and identification number based on unique characteristics, such as:

    - Generic medicine name
    - Brand
    - Size
    - Color
    - Materials content

Medicinal products (e.g., essential medicines) should be named as follows:

Generic (non-trade/non-brand) name + dosage + intake/form of use + unit size or amount

Example:

Ibuprofen, 200 mg, oral capsule, 100s/bottle
(NOT “200 mg Profen tab” or “Profen pill 200 mg”)

or Propofol, 10 ml, injectable, 12 ampoules/box
(NOT “Diprivan 10 ml for injection”)

or Pseudoephedrine HCL, 10 mg, oral capsule, 24/box
(NOT "Sudafed 10 mg tabs")

Standard Product Name Tips

- Do not use brand name or manufacturer name.
- Always indicate package type and unit size as sold by or to the customer. If bottles of 100 capsules come in cases (outer packs) of 12 bottles, the product name will always reflect the unit size as sold to or purchased by customers (i.e., "bottle", not "case").
- Products of equivalent type, size, material composition, and clinical/medical function should have the same product name (e.g., "Forceps, Rongeur, 8", stainless steel" or "Curette, rounded tip, 6 ¼", stainless").
- Product name is independent of clinical specialty use (e.g., a maxillofacial surgeon, general surgeon, and obstetrician/gynecologist will all use a "curette, rounded tip, 6 ¼", stainless").

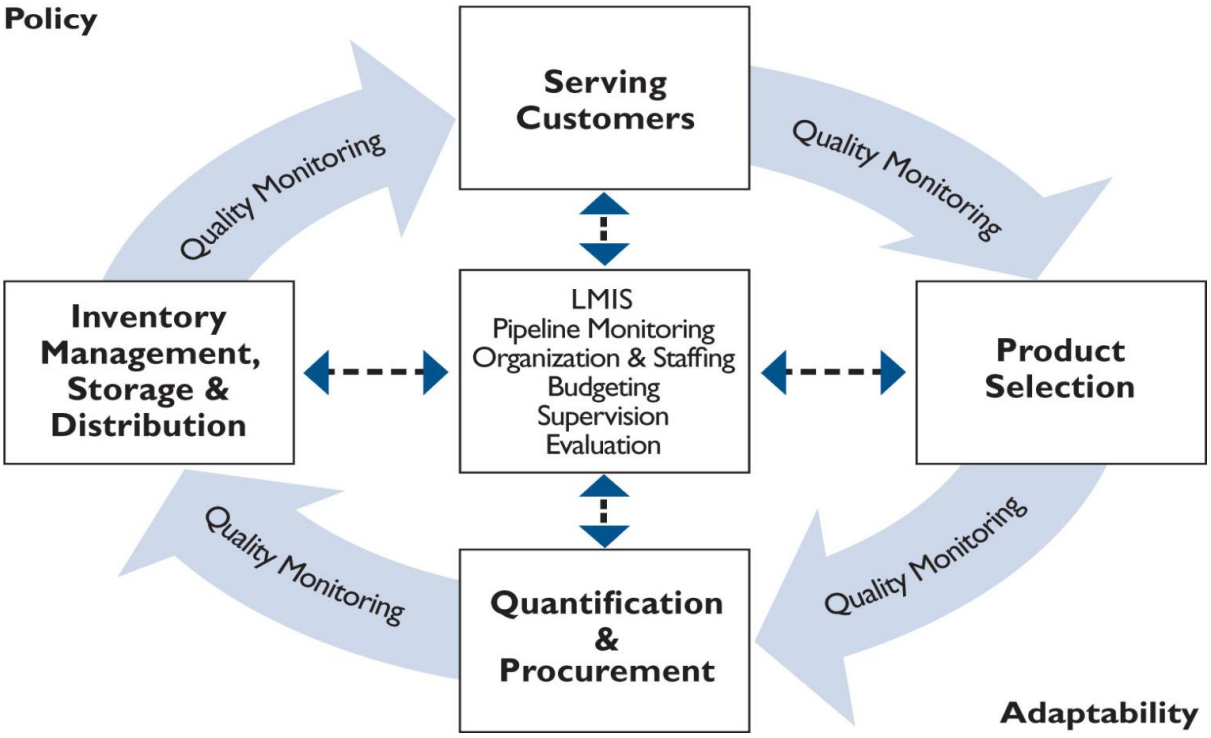

Figure 5. Logistics cycle depends on standard, consistent product identification

All parts of this cycle must work together; therefore, standard naming and product identification across the entire cycle are essential.

Location Identification Procedures

- Audience: CMSD and its business partners, Line Directors, Desk Officers, District Reserve Stores, and others.
- Purpose: To describe a possible method of identifying warehouse locations throughout the DGHS.
- Secondary purpose: To describe the benefits of standard warehouse locator systems.

General. Actual storage of material is determined by the Master Storage Plan and the locator system. Once identification and acceptance of the material is made (i.e., bulk or bin, and re-warehousing is determined), the material is processed and placed in storage.

Selecting the Storage Location

a. Receipts, such as large quantities of bulky items, may be directed to a specific door for unloading directly into a permanent storage location. Precautions should be taken to ensure that all required receiving inspection procedures are followed.

b. Receipts of shelf-life items should be stored in a manner to facilitate first in, first out issue procedures. If possible, receipts of the same shelf-life items with different manufacturer dates should be stored in separate locations. If this is not practicable, material with the oldest manufacture date should be placed in the front of the location.

c. Receipts of bin quantities should be directed to the assigned bin location.

d. Receipts of bulk quantities should be directed to a bulk location, as specified below:

(1) Specific storage requirements include items such as sensitive, temperature/ humidity controlled and demand frequency.

(2) General storage that has been designed based on the Master Storage Plan, which identified item demand frequency. The principal purpose is to ensure efficient selection and shipping principles to reduce forklift travel and internal handling time, such as:

(a) Fast-moving items close to set out and assembly areas; and

(b) Large quantity issue items near shipping doors for direct out-loading.

ANNEX 3. PROPOSED DRAFT GENERIC WAREHOUSE SOPS FOR ADOPTION AND ADAPTATION, AS NEEDED

This annex contains standard operating procedures for the following prioritized warehousing functions:

1) Receiving and Storage
2) Issuing and Distributing Material
3) Physical Inventory Procedures
4) Management and Disposal of Excess Material/Equipment
5) Performance Measurement and Monitoring
6) Logistics and Information Technology
7) Physical Security and Environmental Control/Monitoring

There is a common format for each SOP. The format includes the following sections:

- Introduction: SOP name, reference number, date of publication or revision, number of pages
- Purpose
- Applicability/Authority/Responsibility
- Primary references
- Procedures
- Best Practices
- Measures and Outcomes
- Revision History

These draft procedures serve as guidelines for key warehousing functions and activities. They are designed specifically to be used and further customized by the CMSD and the SIAPS/ Bangladesh office to improve warehouse efficiency and performance. These SOPs may also be applied to other DGHS warehouses across all levels of the supply chain. They can also be adapted, as needed, to improve existing processes and procedures at the DGFP warehouses and stores at all levels of the supply chain.

SOP #1 - Receiving and Storage

Introduction:

Insert SOP name, reference number, date of publication or revision, number of pages

Purpose

This SOP provides guidelines for receiving and storage of material. The receiving function's objective is to ensure that vendors provide the right product, in the right quantities, in the right condition, and on schedule. The receiving function includes scheduling deliveries, unloading the product from the transportation carrier, accurately counting the product, inspecting for damage

and verifying product quality, identifying the product by name and identification number, entering the product into inventory, and transferring the product for storage in a designated location.

Applicability

This SOP was developed specifically for the CMSD management and staff. However, it also applies to its supply chain partners (e.g., District Reserve Stores and Upazila stores). The concepts can also be adapted, as needed, and applied to improve existing processes and procedures at the DGFP central warehouse and in the rest of the DGFP supply chain.

References

- Supply Chain Council. *Supply Chain Operations Reference (SCOR) Model*, Revision 11.0; 2012.
- USAID | DELIVER Project, Task Order 1. *The Logistics Handbook: A Practical Guide for the Supply Chain Management of Health Commodities*. Arlington, VA.: USAID | DELIVER Project, Task Order 1; 2011.
- USAID/DELIVER Project. *Guidelines for Warehousing Health Commodities*, first edition. Arlington, VA: John Snow, Inc./DELIVER, for the U.S. Agency for International Development; 2005.
- Mulcahy DE. *Warehouse and Distribution Operations Handbook.* New York: McGraw-Hill Inc.; 1994.
- Coyle JJ, Bardi EJ, and Langley CJ. *The Management of Business Logistics*. Eagan, Minnesota: West Publishing Company; 1996.
- Lambert DM, Stock JR, and Ellram LM. *Fundamentals of Logistics Management.* New York: McGraw-Hill; 1998.

Procedures

Receiving activities are as follows:

- Delivery – the receiving function should schedule truck deliveries to even out workload and avoid congestion on the dock.
- Unloading – the truck is physically unloaded manually or using material handling equipment (MHE), such as forklifts and pallet jacks.
- Verification of quality and quantity – receiving personnel should verify that the received items match the purchase order, packing slip, or shipping invoice and that the product quality is acceptable. Methods of verification include the following:

    - 100 Percent Accept Method – accept pre-approved vendor shipments based on history of excellent past performance and adherence to specifications. This method still requires periodic random checks to ensure continued quality performance.
    - Random Sample (7% to 10%) Method – random samples are taken from the vendor's delivery. If quality and count are accurate, the entire shipment is accepted.

  - 100 Percent Verification (Check) Method – receiving department counts and inspects each item.

The following are some common product quality problems:

- Damage to packaging or the product itself.
- Cartons not labeled with the date of manufacture or expiration on outer and inner packaging.
- Information on boxes or cartons is illegible.
- Dirty, torn, or otherwise damaged boxes.
- Missing products or empty boxes.
- Contents not identified on multiple cartons.
- Water-damaged cartons.
- Products found outside the warehouse or clinic.
- Cartons with holes and/or frayed edges.

Section 8.2 of *The Logistics Handbook: A Practical Guide for the Supply Chain Management of Health Commodities* provides guidance on actions to be taken to address specific quality problems.

- Product identification – the product should be identified with a standard, consistent product identification number and naming convention (Annex 2) to ensure accurate inventory records at the central warehouse and to provide the ability to report on inventory levels and consumption rates at all levels of the supply chain.
- Item storage – the item is placed into storage in a designated location, which is recorded in the inventory system or stock record. While warehousing emphasizes movement of goods, storage is often required due to:

  - Seasonal demand
  - Erratic demand
  - Forward buying
  - Quantity discounts

The following are some storage guidelines:

- Clean and disinfect storeroom regularly.
- Store supplies in a dry, well-lit, well-ventilated storeroom out of direct sunlight.
- Secure storeroom from water penetration.
- Ensure that fire safety equipment is available and accessible, and that personnel are trained to use it.
- Store condoms and other latex products away from electric motors and fluorescent lights.
- Maintain cold storage, including a cold chain, for commodities that require it.
- Keep narcotics and other controlled substances in a locked place.
- Store flammable products separately from other products. Take appropriate safety precautions.

- Stack cartons at least 10 centimeters (cm) off the floor, 30 cm away from the walls and other stocks, and not more than 2.5 meters high.
- Store medical supplies away from insecticides, chemicals, old files, office supplies, and other materials.
- Arrange cartons so that arrows point up. Ensure that identification labels, expiry dates, and manufacturing dates are clearly visible.
- Store supplies in such a manner that they are accessible for first expiry, first out (FEFO), counting, and general management.
- Separate and dispose of damaged or expired products immediately.

Section 8.1 of *The Logistics Handbook: A Practical Guide for the Supply Chain Management of Health Commodities* provides information on why each of these storage guidelines is important.

Best practices

Receiving and storage best practices include the following:

- Expedite the receiving and put-away process (if required) to preserve shelf-life and to make products available for issue as soon as possible.
- Verify quantities received against packing list and note any discrepancies.
- Record each receipt in the inventory system and assign a warehouse location.
- Neatly store materials in racks or on shelving (off the floor). Racking and shelving helps to better utilize space and to organize materials.
- Store supplies so that they are accessible for FEFO, counting, and general management.
- Only store inventory long term when absolutely necessary; use cross-docking when the inventory destination is known at the time an item is received.

Measures and outcomes

The key measures of success for the receiving and storage function are as follows:

- Cycle time measures – measures of the speed of the process, including time to process a receipt and make an item available for issue.
- Location accuracy – measures the accuracy of the locator system, i.e., does the inventory record match the item and physical location.
- Inventory turns – measures how quickly inventory flows through the warehouse.

Revision history

Change Number	Date of Change	Recorded By	Section Changed	Notes
0	1/6/2014	LMI	Original	

SOP #2 - Issuing and Distributing Material

Introduction:

Insert SOP name, reference number, date of publication or revision, number of pages

Purpose

This SOP provides guidance for issuing and distributing material from the warehouse. Issuing and distributing material includes customer order selection, or order picking, as well as shipping. The fundamental concept of customer order selection is to provide the order-picker with clear instructions (i.e., a pick sheet) that detail the pick position (or location), describe the item, indicate the quantity, and provide the delivery address. Adhering to this concept will increase the likelihood that customer orders will be issued and delivered in an accurate and timely manner. Shipping, or distribution, includes product staging and physically moving the items onto carrier transportation equipment.

Applicability

This SOP was developed specifically for the CMSD management and staff. However, it also applies to its supply chain partners (e.g., District Reserve Stores and Upazila stores). The concepts are also applicable to the DGFP central warehouse and the rest of the DGFP supply chain.

References

- Supply Chain Council. *Supply Chain Operations Reference (SCOR) Model*, Revision 11.0; 2012.
- USAID | DELIVER Project, Task Order 1. *The Logistics Handbook: A Practical Guide for the Supply Chain Management of Health Commodities*. Arlington, VA.: USAID | DELIVER Project, Task Order 1; 2011.
- USAID DELIVER Project. *Guidelines for Warehousing Health Commodities*, first edition. Arlington, VA: John Snow, Inc./DELIVER, for the U.S. Agency for International Development; 2005.
- Mulcahy DE. *Warehouse and Distribution Operations Handbook.* New York: McGraw-Hill Inc.; 1994.
- Coyle JJ, Bardi EJ, and Langley CJ Jr. *The Management of Business Logistics*. Eagan, Minnesota: West Publishing Company; 1996.
- Lambert DM, Stock JR, and Ellram LM. *Fundamentals of Logistics Management.* New York: McGraw-Hill; 1998.

Procedures

Issuing activities are as follows:

- Process order – receive and approve customer orders (pull system) or schedule distribution (push system) based on a plan.
- Order selection – identify, select, retrieve, and accumulate items from inventory to satisfy orders.
- Prepare for shipment – package and label items for shipment. Multiple items are often packaged together for shipment to a single customer.
- Arrange for transportation – schedule organic or commercial transportation resources.
- Prepare shipping documentation and load for transport.

Best practices

Issuing and distribution best practices include the following:

- Deduct order quantity from inventory system.
- Keep order-picking instructions as clear and simple as possible.
- Verify picked quantities against order and shipping documentation.
- Adequately pack and secure cargo to avoid damage during shipment.
- Transportation decision should consider availability, accessibility, transit time, and reliability.

Measures and outcomes

The key measures of success of the issuing and distribution function are as follows:

- Order fulfillment cycle time – measures the speed to process customer orders.
- Order accuracy – measures whether the physical items selected match the pick instructions.

Revision history

Change Number	Date of Change	Recorded By	Section Changed	Notes
0	1/6/2014	LMI	Original	

SOP #3 - Physical Inventory Procedures

Purpose

Introduction:

Insert SOP name, reference number, date of publication or revision, number of pages

This SOP addresses physical inventory procedures. A critical activity of the inventory control function is to verify that the physical inventory matches inventory records. Physical inventories ensure and promote confidence in the inventory records. The only way to be sure that inventory records are accurate is to physically count warehouse material on a periodic basis.

Applicability

This SOP was developed specifically for the CMSD management and staff. However, it also applies to its supply chain partners (e.g., District Reserve Stores and Upazila stores). The concepts are also applicable to the DGFP central warehouse and the rest of the DGFP supply chain.

References

- Supply Chain Council. *Supply Chain Operations Reference (SCOR) Model*, Revision 11.0; 2012.
- USAID | DELIVER Project, Task Order 1. *The Logistics Handbook: A Practical Guide for the Supply Chain Management of Health Commodities*. Arlington, VA.: USAID | DELIVER Project, Task Order 1; 2011.
- USAID DELIVER Project. *Guidelines for Warehousing Health Commodities*, first edition. Arlington, VA: John Snow, Inc./DELIVER, for the U.S. Agency for International Development; 2005.
- Mulcahy DE. *Warehouse and Distribution Operations Handbook.* New York: McGraw-Hill Inc.; 1994.
- Coyle JJ, Bardi EJ, and Langley CJ Jr. *The Management of Business Logistics*. Eagan, Minnesota: West Publishing Company; 1996.
- Lambert DM, Stock JR, and Ellram LM. *Fundamentals of Logistics Management.* New York: McGraw-Hill; 1998.

Procedures

Physical inventory activities are as follows:

- Inventory count – compare quantity on-hand to inventory management system records. Count methods include the following:
    - Random count – an employee inspects and counts a randomly selected item.

  - Cycle count – inventory is categorized based on movement, value, importance, etc. The cycle count program requires a predetermined number of items to be counted from each category during a specific timeframe.
  - Fiscal count (or wall-to-wall inventory) – once-a-year count of all items in the facility. This count is usually made at the end of the accounting year and supervised by an outside third party or auditor.

- Location accuracy and item condition – in conjunction with physical inventories, verify warehouse location accuracy and item condition.
- Reconcile inventory and correct any errors – the on-hand inventory records are adjusted to match the physical on-hand count. Any large discrepancies should result in re-counts prior to system update. Any significant remaining discrepancies should be investigated and corrected if an error (e.g., receiving error) is found.

Best practices

Physical inventory best practices include the following:

- Follow good storage practices (e.g., only one carton is open at a time) to facilitate faster physical inventory.
- Conduct physical wall-to-wall inventory annually.
- Use ABC analysis (i.e., ranking inventory by importance) and cycle counting if a facility shutdown is not possible or to supplement the annual count.

Measures and outcomes

The key measures of success of physical inventories are as follows:

- Location accuracy rate – measures the accuracy of the locator system.
- System balances match on-hand quantities – measures whether physical counts match inventory records.

Revision history

Change Number	Date of Change	Recorded By	Section Changed	Notes
0	1/6/2014	LMI	Original	

SOP #4 - Management and Disposal of Excess Material/Equipment

Introduction:

Insert SOP name, reference number, date of publication or revision, number of pages

Purpose

This SOP provides guidelines for managing and disposing of excess material and equipment. Damaged (or expired) product cannot be distributed because of poor quality while obsolete product has not been ordered for a long time. Disposal of obsolete or damaged product creates storage space, improves housekeeping, improves employee productivity, and reduces product damage.

Applicability

This SOP was developed specifically for the CMSD management and staff. However, it also applies to its supply chain partners (e.g., District Reserve Stores and Upazila stores). The concepts are also applicable to the DGFP central warehouse and the rest of the DGFP supply chain.

References

- Supply Chain Council. *Supply Chain Operations Reference (SCOR) Model*, Revision 11.0; 2012.
- USAID | DELIVER Project, Task Order 1. *The Logistics Handbook: A Practical Guide for the Supply Chain Management of Health Commodities*. Arlington, VA.: USAID | DELIVER Project, Task Order 1; 2011.
- USAID/DELIVER Project. *Guidelines for Warehousing Health Commodities*, first edition. Arlington, VA: John Snow, Inc./DELIVER, for the U.S. Agency for International Development; 2005.
- Mulcahy DE. *Warehouse and Distribution Operations Handbook.* New York: McGraw-Hill Inc.; 1994.
- Coyle JJ, Bardi EJ, and Langley CJ Jr. *The Management of Business Logistics*. Eagan, Minnesota: West Publishing Company; 1996.
- Lambert DM, Stock JR, and Ellram LM. *Fundamentals of Logistics Management.* New York: McGraw-Hill; 1998.

Procedures

Disposal of excess material activities are as follows:

- Identify damaged, expired, and low/no-demand items. The following are examples of products that are candidates for disposal:
    - An item in the storage area that has accumulated dust.
    - Equipment that is damaged.

  - A product that has reached its expiration date.
  - Items that a management report indicates have not been issued in a long time.

- Collect and organize items in a designated warehouse location, update inventory records, and request disposition authority.
- Based on the disposition decision, schedule transportation and transfer the items for sale, donation, or disposal.

Best practices

Management and disposal of excess material best practices include the following:

- Continually review warehouse inventory to identify excess material.
- Separate and dispose of damaged/expired products quickly.

Measures and outcomes

The key measures of success of managing the disposal of excess material are as follows:

- Percentage of excess material in total inventory – measures allocation of storage space for active items.
- Excess cycle time – measures speed of disposition after excess is identified.

Revision history

Change Number	Date of Change	Recorded By	Section Changed	Notes
0	1/6/2014	LMI	Original	

SOP #5 - Performance Measurement and Monitoring

Introduction:

Insert SOP name, reference number, date of publication or revision, number of pages

Purpose

This SOP provides guidelines and best practices for performance measurement and monitoring. Performance measurement and monitoring provide crucial feedback and report results of warehouse improvement efforts. A common, standard methodology for relating improvement interventions to strategic goals and objectives helps to mobilize resources to improve performance. Performance measurement and quality monitoring are a continuous process that

requires key stakeholder agreement and active participation of staff members at all levels in the organization. Improved logistics system performance will lead to better customer service and enhanced ability to efficiently provide products when and where they are needed.

Applicability

This SOP was developed specifically for the CMSD management and staff. However, it also applies to its supply chain partners (e.g., District Reserve Stores and Upazila stores). The concepts are also applicable to the DGFP central warehouse and the rest of the DGFP supply chain.

References

- Supply Chain Council. *Supply Chain Operations Reference (SCOR) Model*, Revision 11.0; 2012.
- USAID | DELIVER Project, Task Order 1. *The Logistics Handbook: A Practical Guide for the Supply Chain Management of Health Commodities*. Arlington, VA.: USAID | DELIVER Project, Task Order 1; 2011.
- USAID/DELIVER Project. *Guidelines for Warehousing Health Commodities*, first edition. Arlington, VA: John Snow, Inc./DELIVER, for the U.S. Agency for International Development; 2005.
- Mulcahy DE. *Warehouse and Distribution Operations Handbook.* New York: McGraw-Hill Inc.; 1994.
- Coyle JJ, Bardi EJ, and Langley CJ Jr. *The Management of Business Logistics*. Eagan, Minnesota: West Publishing Company; 1996.
- Lambert DM, Stock JR, and Ellram LM. *Fundamentals of Logistics Management.* New York: McGraw-Hill; 1998.

Procedures

Performance measurement and monitoring activities are as follows:

- Conduct assessment – identify the current state and environment; map the high-level supply chain; describe functional units; and define interrelationships.
- Analyze data and develop recommendations – perform supply chain analysis; define the desired future state; perform gap analysis; and develop recommendations to close the gaps.
- Define goals and objectives – define the desired outcomes of an intervention and how success will be measured.
- Develop plan and implement changes – align interventions with objectives; develop implementation strategy; and execute improvement initiatives.
- Monitor progress – review progress in the achievement of goals; make any necessary adjustments; and document and communicate lessons learned.

The figure below depicts the program cycle for supply chain improvements.[4] Section 9 of *The Logistics Handbook: A Practical Guide for the Supply Chain Management of Health Commodities* provides detailed information and tools for the monitoring and evaluation of supply chains.

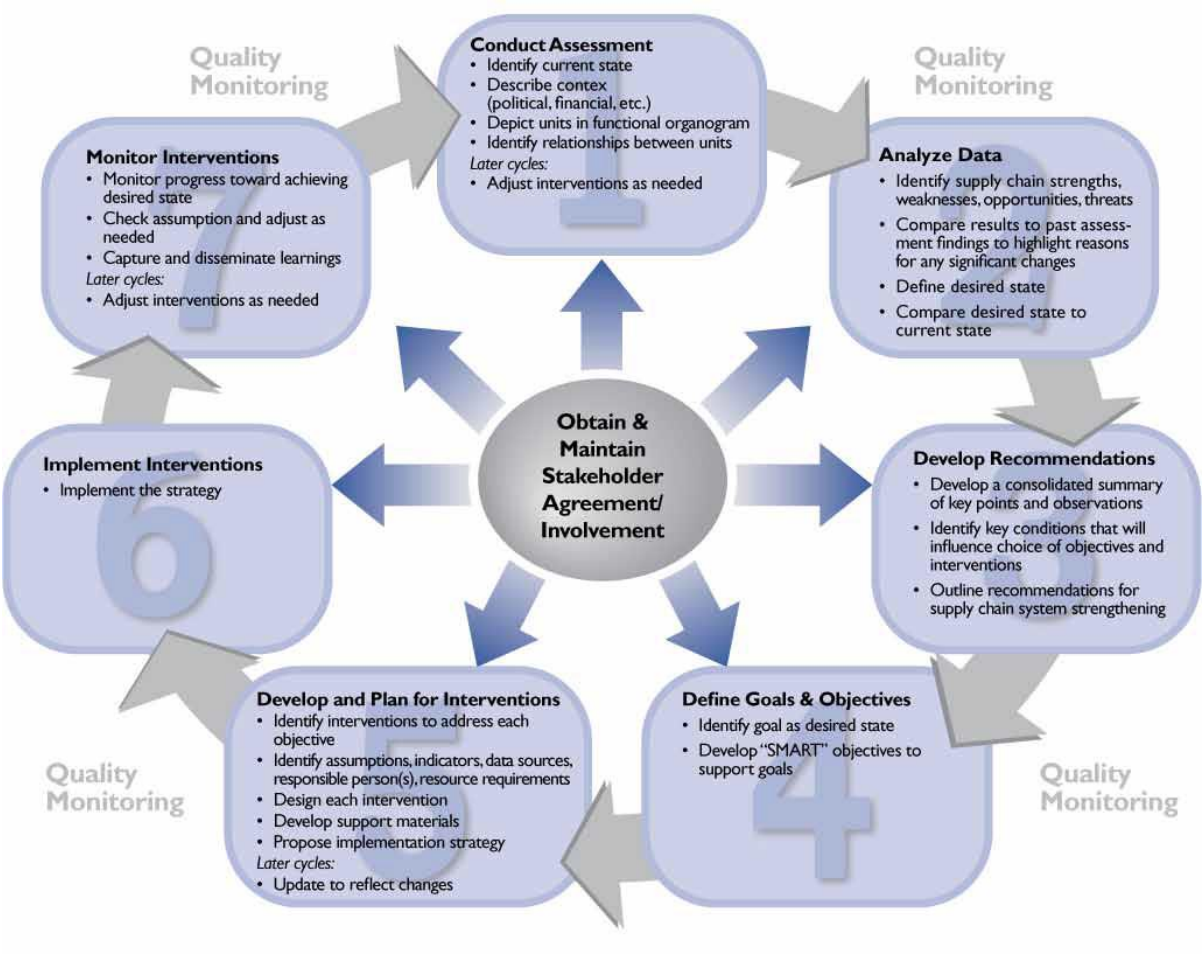

Figure 1. Supply chain improvement cycle

Best practices

Performance measurement and monitoring best practices include the following:

- Implement performance measurement and monitoring as a continuous process improvement system.
- Use SMART objectives (Specific, Measurable, Appropriate, Realistic, and Time-bound).

[4] USAID | DELIVER Project, Task Order 1. *The Logistics Handbook: A Practical Guide for the Supply Chain Management of Health Commodities*. Arlington, VA.: USAID | DELIVER Project, Task Order 1; 2011.

- Think big (consider the entire supply chain), scope small (define a short-term effort that contributes to strategic goals), and scale fast (implement quickly to maintain project momentum and demonstrate success).

Measures and outcomes

The key measures of success for performance management and monitoring are as follows:

- Indicators, or project metrics are defined that provide evidence of progress toward desired results (e.g., on budget, on schedule, etc.).
- Performance metrics will vary based on the specific improvement desired. It is important to have relevant baseline metrics and to monitor and measure changes in the metrics over time.

Revision history

Change Number	Date of Change	Recorded By	Section Changed	Notes
0	1/6/2014	LMI	Original	

SOP #6 - Logistics and Information Technology

Introduction:

Insert SOP name, reference number, date of publication or revision, number of pages

Purpose

This SOP provides guidance on the infusion of technology into the logistics system. Automating the logistics information management system (LMIS) can improve decision making and enable end-to-end supply chain reporting. Warehouse management systems (WMS) are technologies that integrate software and optionally, bar code and radio frequency identification (RFID) capabilities, to process orders and maintain inventory control within a distribution or warehouse facility. A WMS supports tasks normally performed in a warehouse, including receiving, storing, packing, and shipping products as well as managing inventory.

Applicability

This SOP was developed specifically for the CMSD management and staff. However, it also applies to its supply chain partners (e.g., District Reserve Stores and Upazila stores). The concepts are also applicable to the DGFP central warehouse and the rest of the DGFP supply chain.

References

- Supply Chain Council. *Supply Chain Operations Reference (SCOR) Model*, Revision 11.0; 2012.
- USAID | DELIVER Project, Task Order 1. *The Logistics Handbook: A Practical Guide for the Supply Chain Management of Health Commodities*. Arlington, VA.: USAID | DELIVER Project, Task Order 1; 2011.
- USAID/DELIVER Project. *Guidelines for Warehousing Health Commodities*, first edition. Arlington, VA: John Snow, Inc./DELIVER, for the U.S. Agency for International Development; 2005.
- Mulcahy DE. *Warehouse and Distribution Operations Handbook.* New York: McGraw-Hill Inc.; 1994.
- Coyle JJ, Bardi EJ, and Langley CJ Jr. *The Management of Business Logistics*. Eagan, Minnesota: West Publishing Company; 1996.
- Lambert DM, Stock JR, and Ellram LM. *Fundamentals of Logistics Management.* New York: McGraw-Hill; 1998.

Procedures

Consider automating the LMIS to track end-to-end supply chain performance.

- Logistics Records
    - Stock keeping records – information about products in storage, including stock-on-hand and losses/adjustments.
    - Transaction records – information about products being moved.
    - Consumption records – information about products being consumed or used.
- Logistics Reports – provide at all levels of the supply chain with the right information, at the right time, in the right place, in the right quantity, of the right quality, and the right cost.

Consider implementing a WMS, as follows:

- Assess the benefits of a WMS, including the following:
    - Reduction in information errors and information lead times.
    - Increased storage capacity and space utilization.
    - Increased warehouse staff productivity.
- Understand the WMS software functions, including:
    - Manage products
    - Manage storage locations
    - Manage customers
    - Manage suppliers

  - Receive products
  - Record customer orders
  - Pick customer orders
  - Record purchase orders
  - Calculate current stock-on-hand
  - Record physical inventory results
  - Adjust quantities of stock

- Develop the business case, form a WMS project team, analyze warehouse needs, define WMS solution type, select a WMS vendor, test the WMS, train users, and conduct roll-out.

Best practices

LMIS best practices include the following:

- Collect, organize, and report data to improve logistics decision making.
- Collect data about commodities, including quantities issued, dispensed, used, received, lost/stolen/damaged, ordered, etc.
- Essential logistics elements include stock-on-hand, consumption, and losses/adjustments.
- Analyze data daily to assess stock status.
- Compile and report summary data monthly, quarterly, and yearly.

WMS best practices and lessons learned include the following:

- Use barcodes and RFID to increase data accuracy and speed data collection.
- Accurate inventory data is key to the success of the WMS implementation.
- Ongoing, local technical support is critical to continued WMS operational success.

Measures and outcomes

The key measures of success of the logistics information and technology activities are as follows:

- System records match physical inventory.
- End-to-end supply chain reporting is enabled.

Revision history

Change Number	Date of Change	Recorded By	Section Changed	Notes
0	1/6/2014	LMI	Original	

SOP #7 - Physical Security and Environmental Control/Monitoring

Introduction:

Insert SOP name, reference number, date of publication or revision, number of pages

Purpose

This SOP addresses the physical warehouse facility, including both security and environmental control. Physical security includes controlling access to the facility as a whole as well as protecting stock in the facility. Proper environmental controls ensure the safe storage of medical supplies and equipment. Inadequate environmental controls lead to product spoilage and unsafe working conditions.

Applicability

This SOP was developed specifically for the CMSD management and staff. However, it also applies to its supply chain partners (e.g., District Reserve Stores and Upazila stores). The concepts are also applicable to the DGFP central warehouse and the rest of the DGFP supply chain.

References

- Supply Chain Council. *Supply Chain Operations Reference (SCOR) Model*, Revision 11.0; 2012.
- USAID | DELIVER Project, Task Order 1. *The Logistics Handbook: A Practical Guide for the Supply Chain Management of Health Commodities*. Arlington, VA.: USAID | DELIVER Project, Task Order 1; 2011.
- USAID/DELIVER Project. *Guidelines for Warehousing Health Commodities*, first edition. Arlington, VA: John Snow, Inc./DELIVER, for the U.S. Agency for International Development; 2005.
- Mulcahy DE. *Warehouse and Distribution Operations Handbook.* New York: McGraw-Hill Inc.; 1994.
- Coyle JJ, Bardi EJ, and Langley CJ Jr. *The Management of Business Logistics*. Eagan, Minnesota: West Publishing Company; 1996.
- Lambert DM, Stock JR, and Ellram LM. *Fundamentals of Logistics Management.* New York: McGraw-Hill; 1998.

Procedures

Physical security and environmental monitoring activities are as follows:

- Secure supplies from loss and theft.

  - Take necessary perimeter security measures by assessing physical barriers, fencing, gates, and lighting.
  - Use video monitoring systems that track the movement of people and vehicles.
  - Lock and control access to both internal and external doors.
  - Establish procedures for the identification of all employees, visitors, and vendors as well as procedures for challenging access to unauthorized people.
  - Review shipping and receiving procedures to ensure product security.
  - Control access to sensitive items by storing them separately in controlled areas in the warehouse.

- Maintain adequate environmental controls and employee safety.

  - Monitor temperature controlled areas to ensure safe storage of temperature-sensitive items.
  - Control for pest infestation.
  - Protect items from the elements.
  - Take appropriate safety precautions, including employee safety shoes, lifting belts, eye washes, etc.
  - Train employees on safe warehouse practices and proper environmental control of medical products and equipment.

Best practices

Physical security and environmental monitoring best practices include the following:

- Control facility access and keep controlled substances secured.
- Maintain appropriate safety standards, including access to fire safety equipment.
- Store supplies in well-lit, dry, and well-ventilated areas protected from the elements.
- Maintain cold storage, including cold chain, for items that require it.

Measures and outcomes

The key measures of success for physical security and environmental monitoring are as follows:

- Reduced loss and damage of products – measures change in loss and damage over time.
- Number of days without an accident – measures effectiveness of safety procedures.

Revision history

Change Number	Date of Change	Recorded By	Section Changed	Notes
0	1/6/2014	LMI	Original	