

**GHANA HEALTH COMMODITY SUPPLY CHAIN MASTER PLAN**

**LOGISTICS MANAGEMENT  
INFORMATION SYSTEM ASSESSMENT  
REPORT**



**MINISTRY OF HEALTH**



## Table of Contents

LIST OF ABBREVIATIONS .....	4
ACKNOWLEDGMENTS .....	5
EXECUTIVE SUMMARY .....	6
INTRODUCTION .....	8
PURPOSE OF THE ASSESSMENT .....	9
SUPPLY CHAIN CONCEPTUAL MODEL .....	9
THE VISION FOR THE LMIS.....	10
SCOPE OF WORK AND METHOD.....	10
EXPECTATION .....	11
NATIONAL LEVEL.....	12
PROCUREMENT AND SUPPLIES DIRECTORATE (MOH).....	12
STORES SUPPLIES AND DRUG MANAGEMENT DIVISION .....	13
CENTRAL MEDICAL STORES.....	13
REGIONAL HEALTH ADMINISTRATION .....	19
LOGISTICS MANAGEMENT .....	20
REGIONAL MEDICAL STORES.....	21
• MANAGEMENT STRUCTURE .....	21
REGIONAL HOSPITAL .....	25
OVERALL RESPONSIBILITY.....	25
ORGANIZATION/GOVERNANCE .....	26
REPORTING REQUIREMENTS .....	26
LOGISTICS MANAGEMENT .....	27
RECEIPT OF GOODS .....	28
STOCK CHECKS AND REMOVAL OF UNSERVICEABLE STOCKS .....	29
PERIODIC REPORTING .....	29
DISTRICT HEALTH ADMINISTRATION.....	30
REPORTING REQUIREMENTS .....	30
LOGISTICS MANAGEMENT .....	31
DISTRICT HOSPITAL.....	33
ORGANIZATION/GOVERNANCE .....	33
REPORTING REQUIREMENTS .....	34
LOGISTICS MANAGEMENT .....	34
SUB-DISTRICT HEALTH ADMINISTRATION/HEALTH CENTRES .....	38
OVERALL RESPONSIBILITY.....	38
LOGISTICS BUSINESS PROCESSES .....	38
CHPS COMPOUND/ZONES .....	41
SUMMARY OF USER REQUIREMENTS .....	42
EXISTING LMIS INITIATIVES.....	43
OBSERVED GAPS.....	45
PROPOSED SYSTEMS REQUIREMENTS .....	46
TECHNICAL REQUIREMENTS.....	46

MANAGEMENT .....	47
OPERATIONS.....	47
SECURITY .....	47
REPORTING .....	48
KEY POLICY ISSUES TO CONSIDER .....	49

# LIST OF ABBREVIATIONS

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CMS	Central Medical Stores
CHPS	Community Based Health Planning and Services
DHA	District Health Administration
DHMT	District Health Management Team
DH	District Hospital
GHS	Ghana Health Service
HC	Health Centre
KPI	Key Performance Indicators
RMS	Regional Medical Stores
LMIS	Logistics Management Information System
MoH	Ministry of Health
NITA	National Information Technology Agency
PSM	Procurement and Supply Management
SSDM	Stores, Supplies and Drug Management Division
RHA	Regional Health Administration
RH	Regional Hospital
SDHA	Sub District Health Administration

# ACKNOWLEDGMENTS

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This review was done through a collaborative process, which drew on expertise of logistics practitioners at all levels of the health system in Ghana. The report was put together by a core team made up of:

- Dr. Isaac Adams, Director of Research, Statistics and Information Management of the Ministry of health
- Dr. Jojo Wudu Benin, Managing Director, Genelec Support Services Ltd
- Mr. Samuel Ampomah, Head of IT, Ministry of Health

The team worked under the direction of the Supply Chain Master Plan (SCMP) Steering Committee chaired by the Ministers of Health, Hon. Alexander Segbefia and Hon. Kwaku Agyeman Manu and the Chief Director of the Ministry of Health Dr. Afisah Zakariah.

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The team would like to acknowledge the immense contribution of Regional Health Directors and Regional Medical Stores Managers of the Greater Accra, Ashanti, Brong Ahafo and the Northern Regions.

Finally, the team acknowledges the use of material from the Program for Appropriate Technology in Health. *Requirements for Logistics Management Information Systems*. Seattle, WA: Program for Appropriate Technology in Health; 2010.

# EXECUTIVE SUMMARY

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The Ministry of Health, in 2012 developed a Supply Chain Master Plan which was aimed essentially, at bringing some efficiency to the management of health commodities across the country. The plan aims at improved availability of supplies through improved ability to forecast operational demand, timely acquisition, reduced administrative time and increased management efficiency among others.

The purpose of this assessment was to obtain an in-depth understanding of the business processes involved in the management of health commodities in the health sector in Ghana and to outline a set of requirements for the development and implementation of an integrated Logistics Management Information System for the procurement, storage and distribution of health commodities. It also aims at defining a framework for the deployment of a technology platform capable of planning and managing the multi-party value chain processes in the health logistics sector in Ghana.

The assessment was based on a sample of components of the supply chain of the health sector in Ghana. These were selected to represent the key functions and decision-making points of the chain, namely procurement, storage and distribution across the chain. At each level, an assessment of the decision making structure was done, this was followed by a review of the operations of the unit and work processes. The information required for each stage of the process was analysed to provide a framework to guide the definition of the LMIS for the health sector.

The review found six main categories of user requirements which define the current scope of logistics management in the health sector in Ghana. These were:

- Procurement initiation
- Quantification with some level of forecasting
- Procurement (mainly the management of the process)
- Receiving and Storage
- Issuing and Distribution (including disposal of unserviceable stocks and dispensing)
- Reporting

To meet the user requirements the team proposes that system to be deployed should cover all the business processes at all the levels indicated in the logistics management structure with a clear definition of provisions for back up support and training plans. The system and user interface must conform to industry standards agreed by the Ministry of Health, and sanctioned by NITA. They should also be consistent with key principles and standards set out in the National E-Health Strategy. The major hardware and networking platform on which the system will run should be discussed and cleared before adoption and so must future changes

and updates. The system must provide full access to a comprehensive on-line help with capabilities for printing of forms, tables and data fields.

The review team expressed the urgent need for steps to be taken to unify the procurement business process into the CMS and to streamline processes for issues out of the store and to define clear responsibilities of the District Health Administration in logistics management in the health sector.

# INTRODUCTION

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The current supply function of the health sector is driven by two main factors - the need for effective buying and the issue of security and accountability. While these drivers are of prime importance in a good logistics system they become only effective when built into the various activities of the supply chain. Over the years, several efforts have been made to streamline the logistics system in the health sector in Ghana to respond to these drivers. The setting up of a procurement unit in the late 1990 was one such response. However building the capacity for effective buying, especially at the different level of the chain soon translated into high stock holding at the central level. The problem was further compounded by the lack of an appropriate distribution system to ensure that stocks are moved to user points where they will be of effective use and limit loss due to expiry and redundancy.

The structure of the health sector also provides the opportunity for multiple procurement decisions to be made, especially those that are tied to projects or programmes. Information to support such decisions is either rudimentary or non-existent. Stocks are procured largely on the basis of what has been consumed and what items are showing low stock levels and although Ghana has a network of facilities for distribution with scope for stock rationalisation at all levels, a system to ensure that these linkages are explored for the benefit of the sector supply goal remains weak.

Some efforts have been made in the past but these have centred on improvements in inventory management. While computerisation has formed the basis for these developments the appropriate linkages, either manual or electronic, with the regions and districts have received very little attention. In many instances, the development of automated support for the medical stores at all levels has proceeded primarily as an accounting programme and not as a cost accounting system. The material management aspect has not been fully developed and the coverage in terms stocks held at the facility has been limited to drugs and pharmaceuticals.

The problem of computerisation also has to do with the way the process has been managed. There has not been a systematic appraisal of the soft wares deployed in the logistics sector. Most systems in current use do not capture total procurement and distribution information. This may be attributed to the lack of a defined automation programme for supplies, which starts from a complete evaluation of the manual system with computerization as an intervention.

In response to these challenges, the Ministry of Health, in 2012 developed a Supply Chain Master Plan which was aimed essentially, at bringing some efficiency to the management of health commodities across the country. The plan aims at improved availability of supplies through:

- Improved ability to forecast operational demand
- Timely acquisition

- Lower costs through reduced inventories
- Reduction in time expired wastage
- Enhanced reliability and quality control
- Reduced administrative time
- Increased management efficiency
- Improved accountability

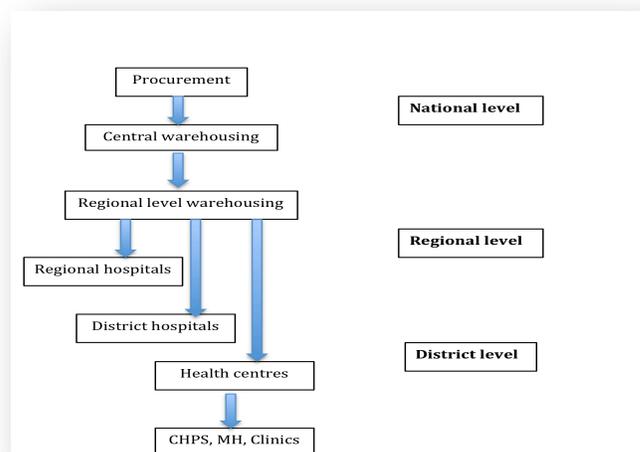
This report is based on an assessment of the logistics system of the health sector and it is aimed at providing a framework for the development of the Logistics Information System component of the Supply Chain Master Plan.

## PURPOSE OF THE ASSESSMENT

The purpose of this assessment obtain an in-depth understanding of the business processes involved in the management of health commodities in the health sector in Ghana and to outline a set of requirements for the development and implementation of an integrated Logistics Management Information System for the procurement, storage and distribution of health comodities in the health sector. The assignment also defines a framework for the deployment of a technology platform capable of planning and managing the multi-party value chain processes in the logistics sector.

## SUPPLY CHAIN CONCEPTUAL MODEL

The health sector in Ghana has a well-defined supply chain domain, processes of which have been developed over several years of efforts to meet operational and administrative demands. This has resulted in a model that has sought to ensure control and ownership linked to the administrative structures and levels of operation in the health sector. The model presented below shows a distinct procurement, warehousing and distribution function and it enables, in principle, to focus and assign responsibilities of key areas of the chain to management structures. It also shows that to obtain an impact on improving the performance of the chain, these key areas need to be examined critically. The assessment was therefore designed around this model and the several inter connecting units that where identified in the course of the review.



In this model, the transactions within each operational unit were assumed to consist of what has been outlined above. The assessment sought to confirm these assumptions and to identify other related but critical transactions that impinge on the performance of the logistics sector.

## THE VISION FOR THE LMIS

*The vision that underpinned the assessment was the Supply Chain Management System would enable routine administrative and commodity utilization data to be generated in real time across the whole of the supply chain of the health sector in Ghana.*

Within this vision is the understanding that a logistics management information system consists of a system of records and reports – whether paper-based or electronic – used to aggregate, analyse, validate and display data (from all levels of the logistics system) that can be used to make logistics decisions and manage the supply chain.

When this vision is realised, adequate quantity of quality health commodities will be available at all times to meet demand of patients and health care providers at every level of the health system in Ghana. It will also lead to a drastic reduction in distribution cost and minimize expiry.

To realize this vision, the assessment sought to:

- Provide a framework for the development of a management information system that will collect, process, and report logistics data. This is to enable decision makers throughout the supply chain have access to accurate, timely, and appropriate data.
- Recommend key components the LMIS for computerization.
- Develop an LMIS outline and process that encompasses all essential activities, including analysis of information needs and LMIS design. Specifically the review sought to generate information to design systems for:
  - Managing facilities involved in logistics in the health sector by enabling users to add, edit, and inactivate facilities in the logistics system.
  - Managing products by enabling users to add, edit and inactivate products in the logistics system.
  - Managing logistics data to enable users to provide summary logistics reports by facility and on schedule.
- Provide options for configuring a computerized LMIS to enable electronic data exchange.

## SCOPE OF WORK AND METHOD

The assessment was based on a sample of components of the supply chain of the health sector in Ghana. These were selected to represent the key functions and decision-making points of the chain, namely procurement, storage and distribution across the chain. At each level, an assessment of the decision making structure was done, this was followed by a review of the operations of the unit and work processes. The information required for each stage of the process was analysed to provide a framework to guide the definition of the LMIS for the health sector. The following were the levels assessed:

### National Level

- MoH Headquarters – Stores And Procurement Directorate
- GHS Headquarters – SSDM

- Central Medical Store

#### Regional Level

- Regional Health Administration
- Regional Medical Stores
- Regional Hospital

#### District level

- District Health Administration
- District Medical Stores
- District Hospital

#### Sub District Health Administration

- Health Centers
- CHPS Compounds

(The specific facilities visited will be found in annex 1)

The assessment was largely qualitative as the team sought to gain a better understanding of the processes used in the management of logistics, establish where gaps existed in line with best practices. User Requirements were then identified based Ghanaian health sector requirements and processes.

The review involved the administration of a semi-structured questionnaire (annex 2) at the selected national, regional, district and facility stores and administrative unit. These were purposefully selected to ensure that all parameters that impinge on supply management, such as distance, size, human resource capacity, level of infrastructure development were covered.

At each facility, the questionnaire was administered to the head of the stores. Senior officers with significant responsibilities were also engaged to verify the responses. The team then walked through the facility to register their observation. The information gathered was analysed by a team of both logistics and information technology experts at three different forums where the requirements for networking and functional scope for an LMIS was proposed based on all the identified functions and reporting requirements.

## **EXPECTATION**

It is expected that the findings and recommendations of this assessment will provide a framework for the review of existing transactional and reporting manual systems, establish the gaps and outline systems requirements and standards to guide the roll out of computer assisted logistics management information system for the health sector in Ghana.

# FINDINGS: THE BUSINESS PROCESSES OF THE LOGISTICS SYSTEM

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The findings presented below are categorised by level of operations of the health sector, the key logistics hubs within the each operational level and key processes essential to the logistics management system.

## NATIONAL LEVEL

The procurement function at the national level is exercised between the Procurement and Supplies Directorate of the Ministry of Health and the Stores Supplies and Drug Management Division of the Ghana Health Service. This dual function has a historical antecedent. During the reforms of the early 1990s, the structure of the then monolithic organization of the Ministry of Health was modified to what is now the structure of the Ghana Health Service, with all the directorates having nationwide responsibilities. The SSDM was therefore responsible for procurement management and had oversight responsibilities for the CMS. With the eventual split of the MoH and the GHS, these responsibilities were not streamlined leading to multiple procurement functions at the national level. This translates into what appears to be multiple channels of procurement into the Central Medical Stores.

### Procurement and Supplies Directorate (MoH)

For essential drugs, procurement is managed by the Procurement and Supplies Directorate. This is based on an annual estimation and forecasting exercise by the National Quantification Task Force. The methodology is mainly based on consumption data, which effectively are the issues data from the medical stores. It is also based on key assumptions derived from service utilization data specific for each item or group of items. Once the decision is arrived at the procurement follows the guidelines stipulated by the Public Procurement Act, Act 663 of 2003. The steps are summarised as follows:

- Quantification concluded by National Quantification Task Force
- Costs estimated by the Procurement and Supplies Directorate
- Thresholds established and procurement method selected under schedule three of Act 663.
- Fund availability established
- Procurement is Tendered
- Contract signed
- Supply plan agreed
- Supply plan Monitored

Programme items follow a similar process except that funding agencies take charge of the process from tendering to contract signing. Programme items are procured by a number of bilateral and multilateral agencies. These include the Global Fund, USAID,

UNICEF, UNFPA and the World Food Programme. UNICEF in particular has its own warehousing, distribution and reporting system in addition to the procurement function.

Typically, programme items go through the following process:

- Quantification by the National Quantification Task Force
- Request is generated based on the quantities arrived at and sent to the funding agency.
- A supply plan is agreed on (this involves updating the current pipeline status and it is revised every month)
- Deliveries are done to the CMS based on the supply plan
- Distribution is based on distribution lists provided by programmes and authorized by the Director Procurement and Supply. Standard Operating Procedures have been developed to guide this process.

### **Stores Supplies And Drug Management Division**

Supplies in the Ghana Health Service is made up of drugs, renewable supplies (dressings stationery and chemicals) and hand held instruments and equipment most of them are programme or project related and depending on the funding source the material management responsibility differ at different stages. However under the current structure, the Stores, Supplies and Drug Management Division is responsible for procurement and distribution of all supplies required for the effective running of health facilities. The division is headed by a Director who is supported by a secretariat.

Procurement decisions are taken by a procurement committee acting on the advise of the Director. A logistics officer who performs the function of clearing and forwarding relates to the director although the lines are not very clear. All notices of arrival are referred to the logistics officer. Most of the information required by the logistics officer is provided only when the goods arrive and this leads to the payment of huge demurrage charges. It appears that the primary objective of the division is to ensure that procurement is consistent and in conformity with laid down regulations. Another responsibility is to assist in defining specification for procurement. Although a supplies catalogue was said to exist, suppliers are usually requested to view samples before quoting. There have been several instances where items delivered have been different from the samples.

### **Central Medical Stores**

The CMS operates under the Procurement and Supply directorate of the Ministry of Health. It is headed by Deputy Director Logistics who has the following senior staff under him:

- Superintendent Pharmacist
- Principal Supply Officer
- Supply Officers
- Storekeepers

The CMS holds national stocks and supplies key institutions in the health sector. Its main clients are:

- Regional Medical Stores
- Teaching Hospitals
- Quasi Government Facilities
- Programmes (RBM, TB, etc.)
- NGOs (PPA, ADRA, etc.) and
- Some Private Hospitals (number appears to be growing)

It also holds stocks for national emergencies. Vaccines storage and distribution, which fall under the Expanded Programme on Immunization (EPI), are handled by a specialised warehousing facility outside the CMS.

The key business processes observed at the CMS were:

- Procurement initiation (request for procurement)
- Receipt of Goods
- Issues (Sales and Distribution)
- Stock Checks And Removal Of Unserviceable Stocks

#### *Procurement Initiation*

**The objective** is to ensure timely procurement of the right items in the right quantity. It is also to ensure that stock levels are routinely maintained within agreed thresholds and stock-out situations are reduced. The key steps observed were:

1. Procurement into the CMS is initiated by a procurement request from the stores to the Warehouse Manager specifying items needed.
2. The requests are collated and translated into a specific procurement request to the head of Procurement and Supply of the Ministry of Health.
3. (The request goes through the procurement process outlined above and once that is done), the Warehouse Manager receives a copy of award notification and updates procurement pipeline.

- *Key issues*

Unique identification of items was seen as paramount to the procurement process. This is to ensure that items are clearly specified and there is a uniform identity along the supply chain. The use of codes to facilitate this process is therefore proposed.

Reorder levels, as triggers for procurement are not well established due to lack of continuity in the supply of items. Several procurement requests can be initiated at different times the need to identify each transaction for reference along the chain was identified in addition to the need for a comprehensive data dictionary (stores catalogue).

Procurement and warehousing functions appear not adequately segregated as the Director Procurement and Supply manages the procurement process and provides approval for goods to be issued out.

- *User Requirement*

To support this business process, it is proposed that:

1. Triggers for initiating requests from the store to be scientifically calculated based on agreed parameters (anticipated consumption for a specified period, say six months)
2. Official request generated by the Warehouse Manager and submitted electronically (scope for review based on final Director Procurement and Supply intervention.
3. System should be able to provide pipeline status linked to specific procurement requests.
  - a. Pipeline status to include expected delivery dates
  - b. Delivery status for staggered deliveries
4. The system builds folders for each request - request submission and review, award notification, invoice, bill of laden receipt advice with each transaction uniquely identified by codes.

### *Receipt Of Goods*

The objective is to ensure that the CMS receives verified quantity and quality of goods into store and determine need for remedial action when necessary. The process observed was as follows:

1. Deliveries of goods into the CMS are first checked against procurement document in each request. This provides first level audit clearance.
2. Goods are then received into quarantine.
3. Request is made to the Food and Drugs Authority for sample checks and clearance. The FDA report triggers acceptance or rejection of items delivered.
4. Acceptance report clears goods to be moved physically into stock
5. Entries are made into Ledgers and onto Tally/Bin Cards.

- *Key Issues*

Procurement action needs an official and definite closure to link the receipts to the request and contract. On receipt of goods, there appear not to be an official report on each procurement action except a Stores Receipt Advice indicating what has been delivered. The need to “close the loop” for each procurement transaction linked to the approved request and the contract was noted.

The FDA authorization should also be coded and identified with the products as they travel through the chain and for reference when needed. Delivery reports need to be generated and submitted to the head P&S to include staggered deliveries, programme items and actions on items rejected by the FDA report.

- *User Requirement*

1. Deliveries should be checked against details specified on the award notification and status indicated (e.g quarantine awaiting FDA clearance) in addition to transaction code

2. Change of status should indicate FDA clearance (number/code) to be captured as part of electronic record of each item
3. Ledgers and tally cards updated electronically to include date of expiry (electronic tally card concept explained below)
4. System to generate a report to Procurement and Supply Directorate to complete the successful procurement or rejection based on FDA report
5. System to provided status of delivery for a staggered delivery contract

**Note:** each item received into storage will then have a transaction code, FDA clearance code, expiry date.

### *Issues (Sale/Distribution)*

The objective is to ensure that accurate quantities of items are moved from storage to users either through a push or pull system. The process observed was as follows:

1. The Warehouse manager receives requisition or distribution list authorised or approved by the head Procurement and Supply.
2. The Warehouse Manager approves issue/sales to be made.
3. An invoice is then generated by the accounts unit
4. A picking order is generated leading to updates on ledger and Tally/Bin cards.
5. Issues are checked with invoiced before release.

- *Key Issues*

All activities at the store level are done manually leading to delays in updating essential store records like ledgers and tally/bin cards. Allocation of stock for a requisition can depend on stock status within the store, competing needs of other stores, consumption patterns, or budgetary status. The system should facilitate such decisions. Approval for issues, in some cases does not take stock balances into consideration thus final quantities issued do not in some cases reflect the approved quantities. Need for electronic ledgers and bin cards were noted.

- *User Requirement*

1. Approved requisition keyed into the system in in the accounts office and invoice and picking orders generated.
2. Picking orders forwarded to the storekeeper electronically.
3. Issues are made in the store and issues voucher generated and forwarded to accounts office.
4. Ledger and bin cards updated in real time as issues voucher is printed.
5. Standard accounting software to be deployed in addition to the above to include but not limited to:
  - Stock adjustment
  - Trial balance
  - Outstanding debts
6. System to generate periodic reports on requisition activity and Distribution report/mapping for selected items, Consumption by value by region

### *Stock Checks And Removal Of Unserviceable Stocks*

The objective is to keep track of stocks to minimize loss and to detect discrepancies early enough to forestall audit challenges. The process observed was as follows:

1. Internal audit led stock checks are done periodically to check level of agreement of physical stock balances with ledger and tally cards.
2. Expired and unserviceable items are also periodically compiled and removed from stock.
3. Approval for issues out of stock for expired and unserviceable is based on audit checks with ledger and expiry dates through an internal memo to Warehouse Manager.
4. Official request for destruction is obtained (from...?)
5. A Board of survey is set up to oversee the disposal process.
6. Entries are then made into the unserviceable ledger

- *Key issues*

Tracking expiry in the store is a manual enterprise. Records on items do not include expiry and there are no early warning systems to provide alerts on expiry threats.

- *User Requirement*

1. System to generate stock balances for periodic stock checks. Differences to be reported to the Warehouse Manager for reconciliation.
2. System blocks issues on expiry
3. List printed out for stock removal
4. System to provide early warning on expiry 3 months to time for each item.

### *Periodic Reporting*

Periodic reports generated by the CMS are based on agreed indicators and they cover:

- Stocks received for the period
- Issues made to the RMSs by item
- Expiry position (usually quantities of items that expired during the period)
- Stock balances and
- Trend of issues by month and by year.

- *Key Issues*

The need for some clarity on the definitions of some of the indicators was observed along side the fact that reporting by the CMS lacked analytical depth. The reports do not indicate what the distribution patterns (e.g. by item category and financially). It also does not show performance. These issues came up as a result of the lack of Key Performance Indicators for logistics in the health sector.

- *User Requirement*

To support this process will provide scope for:

1. MoH to provide a comprehensive Key Performance Indicators
2. System to generate mandated reports based on the KPIs and share with the Chief Director, all directorates of the MoH.
3. System to be configured to generate tabular and graphical reports

4. Analysis to be expanded to cover the following areas in addition:
  - a. stock status
  - b. consumption report by region
  - c. requisition activity reports by region

## REGIONAL LEVEL

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### Regional Health Administration

The Regional Health Administration has the overall responsibility of ensuring effective health service delivery in the region. They are responsible for planning, resource mobilization and monitoring of various activities at the regional level to ensure conformity with national policies and priorities. Although the responsibility is region-wide, the structure of the regional health administration is rather compact and simple, with only four functional units as follows:

<b>UNIT</b>	<b>HEAD</b>	<b>RESPONSIBILITY</b>
Office of the RDHS	Regional Director of Health Services	Provides strategic direction and responsible for policy and planning
Regional Public Health Unit	Deputy Director - Public Health	Coordination of all public health activities including Disease Control
Regional Clinical Care Unit	Deputy Director - Clinical care	Coordination of all clinical care activities and direct oversight of hospitals and clinics in the region
Regional Health Administration and Support Services	Regional Health Service Administrator	Provides administrative support and oversight of administrative units.

The overall functions include:

- The development of regional strategies and region specific policy guidelines
- Analysis of trends in health needs, service delivery and management performance.
- Analysing district budget allocations and expenditures.
- Supervising and monitoring routine data collection and basic service and managerial data including health human resource data required for policy analysis, planning, monitoring and evaluation.

The Regional Health Administration collates data and reports on behalf of the districts. Currently most of these reports are based on the DHIMS II platform and therefore weak in multi-indicator analysis. There is no scope for early warning and reports are mainly routine analysis of trends using the sector-wide indicators. Reporting by the RHA focuses on the following:

- The aggregate volume and type of clinical service provided by all districts
- Aggregate of the volume and type of clinical service provided by other hospitals
- Aggregate public health activities undertaken by district in response to specific programme activities such as malaria control, family planning and nutrition.
- Aggregate Region wide commodity consumption including pharmaceuticals
- Compilation and submission of claims

- Revenue collected

### **Logistics Management**

In the area of logistics management, each RHA has a procurement focal point. These are headed by Regional Procurement Managers or Officers who are directly responsible to the Regional Director of Health services and work closely with the Deputy Director of Pharmaceutical Services (Regional Pharmacist), the Regional Accountant and the Regional Health Administrator in the procurement of goods and services for the region.

Each region also has an Entity Tender Committee headed by the Regional Director as the main decision making structure for procurement into the Regional Medical Store. Some regions, in addition, set up evaluation panels based on technical expertise to evaluate specific bids for the ETC to take decisions on.

The Procurement Managers initiate procurement into the RMS, maintains a supplier database and undertakes scheduled and regular checks on the RMS. They also undertake analyses of regional consumption of goods (drug and non drug) and funds availability to help them advice the Regional Director. Procurement assessment thus takes into consideration fund availability. Their operations are limited to items that pass through RMS with little or no involvement in the procurement of programme drugs.

### *Procurement Business Process at The RHA*

The main objective is to manage procurement of goods into the region and to ensure that the right items are procured at the right time to enable all facilities in the region have the requisite stocks to meet the health needs of the region. The process observed was as follows:

The Procurement Manager initiates the procurement process based on request from RMS Manager to the Regional Director who provides a first level approval.

The request is checked against “consumption” data and stock levels and placed before the ETC.

1. The ETC approves and the appropriate method for sourcing the supplier is used to place the order.
2. A contract is signed a Delivery/ Purchase order is prepared
3. The RMS is informed and the pipeline is updated.
4. Delivery is done at the RMS and the procurement officer is informed through an SRA

In other regions, based on approved threshold, the Procurement Manager initiates a National Competitive bidding or local shopping as stipulated by the Procurement Law. An evaluation panel evaluates bids and the report is sent to the ETC. The ETC’s recommendation submitted to the Regional Coordinating Council who gives approval to award contract. The procurement Officer issues a purchase order and receives acceptance. A contract is then signed a Delivery Purchase order is prepared and pipeline is updated. Delivery is done and the procurement officer is informed through an SRA

- *Key Issues*

It appears that the RHA has little or no involvement in the procurement and distribution of programme drugs. The procurement officer at the RHA recommendation does not take into consideration stock availability at the districts and facility level so once goods are “pushed” out of the RMS a procurement need is generated.

- *User Requirement*

1. Active data base of suppliers regularly updated
2. Access to dashboard on stock balances in the major health facilities and the RMS
3. Data on established thresholds for items
4. Aggregate Region wide commodity consumption including pharmaceuticals

## **Regional Medical Stores**

The Regional Medical Stores are critical points of the health logistics system as they represent the key distribution point within regions. In many instances record keeping at this point becomes a challenge as a result of the workload and the limited human resource. But mainly because these levels have remain under automated over the years.

- **Management Structure**

The Regional Medical Stores operates under the Regional Health Administration. Oversight responsibility is provided by the Deputy Director of Pharmaceutical Services (Regional Pharmacist), the Regional Health Service Administrator, and the Regional Accountant. There is a Regional Medical Store Manager, but in many cases the Regional Pharmacist play this role. Other members of staff include the Principal Pharmacist, Principal Supply Officer, Supply Officers and Storekeepers.

The RMS holds stocks for and supplies to all health facilities in the region (both public and private) and for programmes including the Roll Back Malaria Programme, Tuberculosis programme family planning etc. They also hold stocks for emergencies. Stocks do not reflect that of the CMS as some items are procured from the open market using the regions drug account.

The Regional Medical Stores are critical points of the health logistics system as they represent the key distribution point within regions. In many instances record keeping at this point becomes a challenge as a result of the workload and the limited human resource. But mainly because these levels have remain under automated over the years.

While most Regional Medical Stores operate as collection points for health facilities in the region, some regions operate scheduled delivery to districts on monthly basis. Others also operate monthly scheduled pick-ups (collection) for facilities and districts.

Like the CMS, the key business processes observed at the RMS were:

- Procurement initiation (request for procurement)
- Receipt of Goods
- Issues (Sales and Distribution)
- Stock Checks And Removal Of Unserviceable Stocks

These processes were observed in all Regional Medical Stores visited and they appear fairly standard.

#### *Procurement initiation (request for procurement)*

The objective is to arrive at stocks required for replenishment in support of health care provision at the regional level. The key processes are:

Procurement is initiated by a procurement request from the stores to the RMS Manager specifying items needed. Request generation is based on “consumption” data and stock levels.

1. The requests are collated and presented to the RDHS
2. RMS Manager receives copy of award notification and updates pipeline (after the request goes through the procurement process outlined above).

- *Key Issues*

Reorder levels are used but no proof of a scientifically determined level for each item. Multiple authorizations for procurement was also observed, depending on whether it is from programmes, CMS or the open market

- *User Requirement*

To support this business process, systems should:

1. Estimate stock needs based on past consumption and Minimum threshold
2. Determine current and projected quantities available (through use of dashboard)
3. Display expiry position and threats
4. Generate requisition
5. Display lead time for order fulfillment
6. Validate order by the originator
7. Calculate order cost at time requisition is generated
8. Print and submit requisition, monitor/inquire/maintain order status, approval status, and pipeline status

#### *Receipt of Goods*

The objective is to ensure that the RMS receives verified quantity and quality of goods into store and determine need for remedial action when necessary. The key processes that support this objective also follow the same routine.

1. Goods are checked against procurement document in each request and received into quarantine (Although quarantine as a step in the process was not universal, RMSs that have space keep goods until audit checks are complete).
2. Goods received into stock on audit clearance
3. Entries are made into Ledgers and onto Tally/Bin Cards manually.

- *Key Issues*

The major challenge is that for some items the demand is such that issues are made without fully completing the receipt business. Stock movement data on ledger and bin cards therefore hardly correspond to physical stock count. There are no standards for allocation of space for items except the zoned system (e.g. fluids section, tablets section etc.)

- *User Requirement*

1. Record Receipt and Generate receiving report for submission to the RHA to complete the procurement transaction
2. Record authorization of receipt by appropriate individuals
3. Allocate space/positions for each stock item (Assign location based on product)
4. Update stock records with quantity received per lot, expiry date, etc.
5. Define multiple inventory storage locations (Aisle, Bin, etc.)
6. Record stock adjustments
7. Display and transmit alerts and notifications for stock outs, overstock, under stock

### *Issues (Sale/Distribution List)*

The objective is to assist the RMS to plan for efficient and effective storage and movement of goods and materials and to reduced inefficiencies of under and over supply.

The RMSs are involved in distribution planning and they determine to a large extent where goods, equipment, and materials should be stored and how they should be distributed either through a push or pull system. All issues out of the RMSs are based on approved requisitions. The process observed was as follows:

1. The RMS Manager receives approved requisition or distribution list authorized or approved by the RDHS.
2. The RMS Manager reviews the requests and approves issue/sales to be made.
3. An invoice is then generated by the accounts unit
4. A picking order is generated leading to updates on ledger and Tally/Bin cards.
5. Issues are checked with invoiced before release.

- *Key Issues*

The different strategies used to distribute items from the RMS have their advantages and disadvantages. These must be examined and a standard approach is adopted.

- *User Requirement*

The system should:

1. Provide scope for verification of the requestor, the authorization and credit worthiness, if appropriate
2. Route the requisition to the appropriate store
3. Display current usable stock on hand for requisitioned items by batch
4. Recommend appropriate batch to pick from stock
5. Create Pick List

6. Display stock expiry date
7. Update tally/bin card
8. Record stock adjustments if pick List includes damaged/lost/missing stocks
9. Generate Issue vouchers to update invoice if differences are noted
10. Report on approved request and what was issued out of that should be transmitted to the approval authority.
11. Generate certificate of non-availability to enable facilities to procure from open market.

### *Stock checks and Removal of unserviceable stocks*

The objective is to identify expiry threats and obsolescence early to minimize loss. To meet this objective all RMSs visited reported periodic exercises of removing unserviceable stocks from the stores. Since this has a financial implication the process is expected to be well documented for audit purposes.

1. It starts with an official request for destruction or removal from stock leading to
2. The setting up of a board of survey
3. The identification of the best means of removal and
4. Finally entries into unserviceable ledger.

- *Key issues*

Tracking expiry in the store is done manually due to the non-inclusion of expiry dates in the records on items.

- *User Requirement*

The system should be able to monitor stock movement and expiry by

1. Tracking expiry dates of each item received into stock by batch numbers
2. Generate physical inventory record of items nearing expiry
3. Notify items expired and block issues
4. Prepare report on items and quantities for updating unserviceable ledger

### *Periodic Reporting*

The objective is to prepare comprehensive reports to support decision making at the regional level. Currently periodic reports are generated by the RMSs and these cover:

- Stocks received for the period
- Issues made to the facilities by item
- Expiry position (usually quantities of items that expired during the period)
- Stock balances and
- Trend of issues by month and by year.

- *Key Issues*

The major challenge is that these periodic reports lack analytical depth and they do not respond to specific performance indicators, as there are no KPIs to guide this process.

- *User Requirement*

1. System configured to generate tabular and graphical reports based on agreed KIs
2. Analysis to be expanded to cover the following areas in addition:
  - a. Stock status
  - b. Stock consumption report by districts
  - c. Requisition activity reports by districts

## **REGIONAL HOSPITAL**

This is the level at which specialized care in the broad areas of medicine and surgery is provided. It acts as the referral hospital for the region and provides back up support for district hospitals. In recent times a number of these facilities including the Central Regional Hospital have been converted into teaching hospital.

### **Overall Responsibility**

Provision of specialized clinical and diagnostic care in the broad areas of medicine, general surgery, paediatrics, obstetrics and gynaecology, ENT, Dental and psychiatric care. It is also responsible for technical support for district hospitals, research and training as well as monitoring the quality of care within the region. Those that have been turned into teaching hospitals also provide training in medicine.

In addition to the specialist clinics, Regional Hospital also mentors district facilities and all facilities that refer cases to them. They conduct outreach services, tele-consultation services, in-Service Training, quality assessment, and monitoring to all district hospitals. They are also sites for specialist training and provide back up for family Physician Training in the district hospitals.

Those that have been converted into Teaching hospitals, such as the Cape Coast Teaching Hospital, provide clinical supervision to all hospitals within a catchment area outside the region. The scope of work in a regional/teaching hospital is defined by the mandatory specialist units they must have. However at the core is a district hospital structure around which the specialist services operate.

While regional hospitals remain the sole responsibility of the Ministry of Health, teaching hospitals have a dual allegiance. The medical school is under the Ministry of Education while the service delivery is under the Ministry of Health. For this reason, the intervention of the project will focus mainly on health service provision, including specialist services. This means that all patients seen through the outpatient department, diagnostic services, pharmacy and the wards will constitute part of the data of the hospital, while data related to training will be referred to the ministry of education.

## Organization/governance

The set up of a regional hospital is as follows:

DEPARTMENT	HEAD	RESPONSIBILITY
OPD	Senior Nursing Officer	Management of outpatient services department
Maternity Ward	Senior staff Nurse Midwife	Maternity services
Pharmacy	Pharmacist	Drug supply and management
Laboratory	Lab. Technologist	Provide routine laboratory services, refer specimens for cultures, sensitivity analyses
<b>Records</b>	Biostatistics assistant	Compile/submit reports to HMT
Surgical	Surgeon	Management of surgical procedures
Medical	Physician	Management of medical cases
Administration	Medical superintendent	Overall running of the Hospital
Causality	Nursing officer	Management of emergency services
X-ray	X-ray Technologist	Perform x-rays and ultra sound scans
Dental	Dental Technologist	Dental services
Catering/nutrition	Catering Officer	Provide catering services
Eye	Ophthalmic Nurse	Treatment of eye diseases
Accounts	Sen. Accounts Officer	Keep accounting books & records
General Administration	Health service Administrator	General administration and support services
Estate	Estate officer	Plan preventive maintenance system
Transport	Transport officer	Management of vehicles for service delivery

## Reporting Requirements

The Regional Hospital, like other hospitals, reports mainly on the utilization of services. It also reports on public health activities undertaken by the public health unit of the hospital. Although not a district facility, the hospital contributes to the DHIMS platform and has the added responsibility of notifying the region of suspected cases of epidemics. Specific reporting requirements include:

- Hospital utilization statistics
- Public health activities undertaken within communities in the outreach areas in response to specific programme activities such as malaria control, family planning and nutrition.
- Commodity consumption including pharmaceuticals
- Revenue collected

## **Logistics Management**

Regional hospitals stock a variety of drug and non-drug consumables and other items that are either obtained from the RMS or procured from the open market. Most of them, especially the newly built hospitals have well equipped store systems that allow for the receipt and storage of large amounts of goods. In almost all cases the Pharmacy store system operates separately from non drug stores. Thus the concept of a central store and smaller stores that operate at the point of service delivery appear to exist in all Regional Hospitals including those that have been converted into teaching hospitals.

Each of these facilities has an Entity Tender Committee that oversees the procurement process for all forms of purchases into the store. There are also clear protocols for obtaining items from these stores. The role of the RHA was not clear. Automation was found to be very limited at this level.

## *Procurement Business Process*

The object is to ensure availability of items needed for patient care at all times. To meet this objective a procurement plan is developed at the beginning of every year. This is essentially an aggregate of requirements generated by all user departments of the hospital. The plan is vetted by the ETC and approves it as the procurement plan for the year.

Procurement is initiated by memos from the user departments and these are based on procurement plan. The process depends on whether the items are being sought from the RMS or the open market. Where items are from the RMS the requisition is approved by the Medical Superintendent of the CEO and submitted to the store. With open market procurement, the following key processes are involved:

- Approval is sought based on the memo and a request for quotation is sent out.
- Quotations are evaluated with price consideration being critical
- Evaluation report generated and submitted to the head of facility
- Report put before the ETC for approval
- Awards generated and purchase order issued.

- *Key Issues*

Determining quantities for the procurement plan is based on consumption patterns which are not clearly defined. For the hospital the main source of this information are tally cards in the store. Users are also consulted during the process but it was acknowledged that such sources frequently lead to over estimation of critical items.

- *User requirement*

1. Defining needs based on a combination of consumption data and prescription patterns
2. Capacity to Project utilization
3. Calculate need and generate request
4. Provide current stock levels of each stock item at levels of utilization

## Receipt of Goods

The objective is to ensure that goods procured are received into stock in order to roll out the agreed procurement plan. The key steps observed are as follows:

1. A team, led by the internal auditor and the Hospital Administrator check the items delivered against contract documents and once there is agreement
2. Stocks are physically moved into the stores
3. Ledger entries are then made and bin cards updated.

- *Key issues*

Quarantine functions were not observed, however it is important to note that for each set of items received into stock, the users are involved in the receipt process. Almost all processes observed were manual and no particular system for pipeline monitoring was identified. SRAs were the main documents that indicated that a procurement process was complete.

- *User Requirement*

1. Update stock records with quantity received, expiry date, batch numbers etc.
2. Record stock adjustments
3. Display and transmit alerts and notifications for stock outs, overstock, under stock. Issues and Distribution

The objective is to ensure that patient needs are met at all service delivery points in the hospital. Issues are therefore done based on requests from the various departments based on the following process:

1. Request made by the officer in charge or the head of department using a requisition book.
2. Authorization is sought from either head of pharmacy (for medicines and pharmaceuticals) or the Supply Officer
3. Approval is given by the Hospital Administrator
4. Issues are made on the stores issues voucher.
1. Ledgers and tally cards are then updated but not immediately.

- *Key issues*

Documentation is usually delayed. Reasons given were the low numbers of stores staff and the volume of work. A regional hospital which has recently been converted into a teaching hospital has only two qualified store personnel.

- *User Requirement*

1. Validation of requisition
2. Access to requisition history
3. Display of stock expiry date
4. Real time update of bin card
5. Display of current usable stock on hand for requisitioned items by batch

### **Stock Checks and Removal of unserviceable Stocks**

The objective is to manage expiry and to ensure that items no longer useable are legally taken out of stock. This is done by:

1. Notifying the head of the facility in writing.
2. Setting up of a board of survey made up of representatives of the FDA, Pharmacy Council and the Ministry of Environment. This also includes representatives of the RCC to supervise the disposal of the items.
3. Updating the unserviceable ledger

- *Key Issues*

Challenges in tracking expiry was highlighted as there usual documentation do not include such details and the manual system does not facilitate such activity especially when there are different expiry dates to be concerned with.

- *User Requirement*

1. Capacity to track expiry dates of each item received into stock by batch numbers
2. Generating inventory record of items nearing expiry
3. Preparing report on items and quantities for updating unserviceable ledger

### **Periodic Reporting**

The objective is to prepare comprehensive reports to support decision making at the facility. Reporting is usually done as part of the annual review process where all departments submit reports on performance. The stores department provides reports on:

1. Stock movement for selected items of interest. This includes what was received and what was issued out for the period.

- *Key Issues*

Reporting has little analytical scope. There is not relation of the “consumption” for example to the utilization statistics. It appears that reporting serves the purpose of only indicating stock movement for the period.

- *User Requirement*

1. Need to generate report by table and graphically to show usage by each department
2. Analysis to cover the following areas:
  - a. Stock status report
  - b. Stock consumption report
  - c. Requisition activity reports
  - d. Analysis based on patient utilization

# DISTRICT LEVEL

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## **District Health Administration**

The District Health Administration is the highest administrative health structure within each district. It is headed by a District Director of Health Services and oversees the activities of all health care structures at the district level. The District health Administration is responsible for maintaining quality and effective clinical and public health services in the district. They also assemble and regularly report on performance of the district health system as a whole based on reports from the various sub-districts and health facilities in the district.

Each district may consist of a number of sub-districts (average of five), a hospital designated as a district hospital, other hospitals and clinics including those belonging to quasi-government organizations and those that are privately owned.

The District Health Administration also has responsibilities with respect to drugs and supplies management to:

- Monitor strict application of approved guidelines for stocking, issuing, and recording the use of drugs, contraceptives and medical supplies
- Perform regular inventories of SDHC and DH drug and medical supplies
- Estimate quantities \Co ordinate acquisition and storage
- Centralize requirement of health facilities in the district and purchase materials from RMS
- Receive, verify quantity/quality, and distribute procured items to Health Centers and District Hospital
- Train prescribers in drug use and inventory management
- Sensitize the population on the dangers of using uncontrolled drugs

## **Reporting Requirements**

The District Health Administration is responsible for collating data and reporting on performance on behalf of all health service providers in the district. This includes service providers in the private and quasi government sectors. Reporting is currently based on the DHIMS II platform, which aggregates paper-based reports from the sub-districts and health centres and hospitals within the district. The platform has scope for basic analysis such as trends using the sector-wide indicators. Complex multi -indicator analysis is not done and without basic standards to define thresholds, the platform has no capability to provide early warning. The office of the District Biostatistician houses the DHIMS platform and it is the focal point for collating data for the district. This basically involves the submission of reports, which are then keyed in manually, and reports generated by the system. The DHIMS platform does not manage processes within the health facilities. Specific reports required of the district health administration are as follows:

1. The volume and type of clinical service provided at the district hospital

2. Aggregate of the volume and type of clinical service provided by other hospitals and clinics in the district hospital
3. The volume and type of clinical service provided during outreach
4. Public health activities undertaken within the district in response to specific programme activities such as malaria control, family planning and nutrition.
5. Aggregate district wide commodity consumption including pharmaceuticals
6. Compilation and submission of claims
7. Revenue collected

### **Logistics Management**

Not all District Health Administrations were involved in the management of logistics as described in this section, however, all districts were involved in the receipt and distribution of programme items meant for public health activities. The following refers to those involved in the procurement and distribution of goods for service delivery.

The District Director is the focal person for procurement at the DHMT. They are supported by procurement committees made up of the heads of departments of the District Health Administration. The committee approves procurement proposals by the District Director who then initiates the procurement process firstly from the RMS and then from the open market upon receipt of a certificate of non-availability. The DHA maintains an account from which procurement is paid for. This account is then replenished through purchases by the health facilities.

There were no formal structures for the District Medical Store System separate from that of the DHMT. There were no storekeepers and no qualified accountants. The human resource limitations notwithstanding, the DHA appears to be fully involved in logistics in the district. The DHMT provides oversight responsibility in the operation of the store system. The key business processes observed were as follows:

#### *Procurement Business Process At The DHA*

The objective is to ensure a more coordinated and efficient logistics management function within the district. The following procurement business process supports this objective.

1. Procurement requests collated from health facilities in the district
2. The requests are checked against “consumption” data and stock levels
3. Aggregate procurement request submitted to the RMS
4. Procurement Committee reviews and approves list for open market purchase
5. Items from the RMS are supplied based on invoices and Stores Receipt Vouchers from the RMS. Open market purchases are supported by invoices, which are made available for routine auditing.
6. Goods are received at the DHA stores and are packaged for each facility according to the request and shipped promptly to each facility

- *Key Issues*

A system of contracting with respect to procurement was not well developed as the quantities involved were not huge and suppliers were limited at the district level. Where the district

store system operates, they are based on the need to control the procurement of items into the district facilities and to minimize the challenges involved in individual facilities making long trips to the RMS. The system is therefore not universal and a majority of DHAs have very limited role in mainstream logistics at the districts with the exception of programme commodities.

- *User Requirement*

1. Active data base of suppliers regularly updated
2. Access to dashboard on stock balances/availability in the all health facilities CHPS compounds and the RMS
3. Provide a comprehensive and analytical report on health commodity consumption in the district

### *Receipt And Distribution Of Goods*

Objective is to manage and to operate an effective distribution system within the network of facilities in the district while reducing cost to the to these facilities. This objective is met through basic store management practices that include

1. Entry of goods onto tally/bin cards and ledgers which are updated as and when stores are received and issued.
2. Scheduled distribution system used to deliver to facilities from the store
3. District Director analyses district consumption based in issues out of the store.
4. Annual report, which includes a district, wide Stock Status Report based on a reports from the facilities.

- *Key issues*

The District Medical Store System is not well developed but holds a lot of potential for improved distribution, reduced cost of distribution/transportation, improved forecasting and assessment of consumption as it is close to user ends. A very basic system within the DHMT will enable these objectives to be met and will enhance district wide planning.

- *User Requirement*

1. Estimate need based on:
  - a. Past consumption data
  - b. Target populations
2. Current available and usable quantity of each stock item in health facilities
3. Expiry dates for on-hand stock
4. Generate requisition based on need
  - a. Print and submit requisition
5. Record Receipt
6. Update stock records with quantity received per lot, expiry date.
7. Record stock issues/update quantity on hand
8. Monitor Stock Movement and Expiry
9. Analyze consumption with disease pattern or hospital records
10. Present report based on district performance

## District Hospital

The District Hospital is the focus of clinical care at the district level and serves as the referral point for all Health Centres within the District. It also provides training and technical support for the health centres. The overall responsibility is the provision of referral outpatient and inpatient care requiring a physician, a surgeon and a paediatrician. The District hospital is headed by a Medical Superintendent, who also doubles as the administrative head. A typical District Hospital has all units expected of a referral hospital however in a number of cases the Medical Superintendent is responsible for all specialties with the support of Medical Assistants.

### Organization/governance

The following represents the set up of a typical district hospital:

<b>DEPARTMENT</b>	<b>HEAD</b>	<b>RESPONSIBILITY</b>
OPD	Senior Nursing Officer	Management of outpatient services department
Maternity Ward	Senior Staff Nurse Midwife	Maternity services
Pharmacy	Pharmacist	Drug supply and management
Laboratory	Lab . Technologist	Provide routine laboratory services, refer specimens for cultures, sensitivity analyses
Records	Biostatistics assistant	Compile/submit reports to HMT
Surgical	Surgeon	Management of surgical procedures
Medical	Physician	Management of medical cases
Administration	Medical superintendent	Overall running of the Hospital
Causality	Nursing officer	Management of emergency services
X-ray	X-ray Technologist	Perform x-rays and ultra sound scans
Dental	Dental Technologist	Dental services
Catering/nutrition	Catering Officer	Provide catering services
Eye	Ophthalmic Nurse	Treatment of eye diseases
Accounts	Sen. Accounts Officer	Keep accounting books & records
General Administration	Health service Administrator	General administration and support services
Estate	Estate officer	plan preventive maintenance system
Transport	Transport officer	Management of vehicles for service delivery

## Reporting Requirements

The District Hospital reports mainly on the utilization of services just as health centres. It also reports on public health activities undertaken by the public health unit of the hospital. It is a main contributor to the DHIMS platform. Specific reporting requirements include:

- The volume and type of clinical service provided at the CHPs compounds
- The aggregate volume and type of clinical service provided during outreach
- Hospital utilization statistics
- Public health activities undertaken within communities in the outreach areas in response to specific programme activities such as malaria control, family planning and nutrition.
- Commodity consumption including pharmaceuticals
- Revenue collected

## Logistics Management

An Entity Tender Committee, headed by the Medical Superintendent oversees procurement functions of the hospital. The key players were found to be the Medical Superintendent who is also the head of the facility, the Principal Pharmacist, a Supply Manager who doubles as secretary to the ETC and a Store keeper. The Hospital Accountant and Internal Auditor have responsibilities along the chain. There appears to be little or no links with the District Health Administration in the Procurement functions of the hospital, however as noted above, in districts that operate the District Medical Stores concept, the DHA were involved in the process. Although the Hospital Management Committee was mentioned, their role in the chain was not clear.

The hospital holds stock only for use by the hospital and are issued out to the various departments and Programmes (RBM, HIV/AIDS, TB, FP etc.). Stocks appear to reflect what is available at the RMS but some items are procured from the open market using drug account. The main business processes observed are as follows:

### *Procurement business process*

The objective is to ensure that health commodities for patient care are always available when needed. To meet this objective, the District Hospital procures from both RMS and from the open market. Although procurement is based on the needs of the various departments and units, they only make requests to the storekeeper who initiates procurement based on the stock levels in the store. The process is as follows:

1. Procurement is initiated by the storekeeper through the Supply Manager. The storekeeper submits a procurement request for authorization. Stocks obtained from the RMS are authorised by the Principal Pharmacist or the Supply Manager depending on the items. Stocks obtained from the Open Market is sanctioned by the Entity Tender Committee. All

requests are generated based on “consumption” data, stock levels and specific demands from user ends.

2. The ETC approves and the appropriate method for sourcing the supplier is used to place the order.
3. A contract is signed a Delivery/ Purchase order is prepared

- *Key issues*

It was still not clear how reorder levels were determined but it appears that this is a key determinant for procurement decisions. The issue of multiple authorizations for procurement depending on whether it is from programmes, CMS or open market also comes up at this level of the supply chain.

- *User Requirement*

1. Estimate Need based on
  - a. Past consumption data
  - b. Patient records/diagnosis data
  - c. Target populations
2. Determine Current/Projected utilization
3. Calculate need and generate request
4. Provide current stock levels of each stock item

### *Receipt of Goods*

The objective is to ensure that the commodities requested for by departments and facilities of the hospital are received as requested. Goods are therefore:

1. Subjected to audit checks before being received into stock. Store receipt vouchers are the main documents that support this activity and once there is agreement
2. Stocks are physically moved into the stores
3. Ledger entries are then made and bin cards updated.

- *Key issues*

Receipts done with internal audit involvement however, quarantine functions not seen. Challenge is lack of space and the quantities of items received. Goods are therefore received into stock almost immediately

- *User Requirement*

1. Record Receipt
2. Display storage requirements for items
3. Update stock records with quantity received, expiry date, etc.
4. Record stock adjustments
5. Display and transmit alerts and notifications for stock outs, overstock, under stock.

### *Issues and Distribution*

The objective is to ensure that daily patient management processes are not disrupted by non-availability of essential drugs and materials to work with. Issues are therefore done practically on daily basis from the stores to the various departments and units as follows:

1. The storekeeper receives requisitions duly authorised by heads of departments.
2. He/She then verifies the requisition and proceeds to issue based on the quantities in stock.
3. Issues are made on the stores issues voucher. The usually practice is that not all quantity on the shelves is issued.
4. Ledgers and tally cards are then updated but not immediately.

- *Key issues*

It appears that issues out of the store to departments and units are made almost on daily basis leading to stock movement data on ledger and bin cards hardly corresponding to physical stock count.

- *User Requirement*

1. Validate the requisition
2. Display requisition history
3. Display stock expiry date
4. Update bin card
5. Display current usable stock on hand for requisitioned items by batch

### *Stock checks and Removal of unserviceable stocks*

The objective of this business process is to guard against unwholesome items, especially medicines, being use for patient care. Therefore when the need arises for the removal of items from stock:

1. An official request for destruction is made to the Medical Superintendent.
2. A board of survey is constituted. This includes representation from the District Assembly.
3. The board supervises the destruction and after which
4. Entries are made into the unserviceable ledger

- *Key Issues*

System used is mainly manual and therefore has little scope for tracking expiry and it is usually found at the point of use. The problem is also compounded by the practice of pushing items nearing expiry to facilities to reduce the loss at the RMS.

- *User Requirement*

The system should be able to monitor stock movement and expiry by

1. Tracking expiry dates of each item received into stock by batch numbers
2. Generate physical inventory record of items nearing expiry

3. Notify items expired and block issues
4. Prepare report on items and quantities for updating unserviceable ledger

### *Periodic Reporting*

Monthly, quarterly and annual reporting is based on the “Report, Requisition, Issues and Receipt Voucher”. The RRIRVs are essentially spread sheets with predetermined stock status requirement. They capture the following information without any analysis:

- a. Previous month consumption
- b. Useable stock on hand
- c. Reorder level (requires yes or no answer)
- d. Quantity to reach maximum level
- e. Quantity ordered
- f. Quantity received

For each reporting period, the form is filled manually and sent to the RHA.

- *Key Issues*

Reporting is based on the RRIRV and as explained earlier, this has little analytical scope. It was not clear to the team what real reporting value is other than accounting for use of previous receipts.

- *User Requirement*

The objective is to prepare comprehensive reports to support decision making at the facility and district level.

3. System configured to generate report by table and graphically
4. Analysis to be expanded to cover the following areas in addition:
  - a. Stock status report
  - b. Stock consumption report
  - c. Requisition activity reports
  - d. Analysis based on patient utilization

# THE SUB DISTRICT LEVEL

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## **Sub-District Health Administration/Health Centres**

The sub-district is a demarcated geographical zone within a District. The demarcation is based on local expertise and preferences and is not part of the official geographic map of Ghana. However in the context of health services the zone is the assigned area of operation for a Sub-District Health Team (SDHT). Within this zone exist the first level of the health system comprising a range of health service providers, including private nurses/midwife practitioners, medical practitioners, the CHPS compounds manned by Community Health Workers and Traditional Birth Attendants as well as traditional practitioners.

### **Overall Responsibility**

Sub-District Health Administration is responsible for the provision of approved health delivery packages in the Sub-District. It provides a supervisory function for the CHPS compounds and all other community based health services. The Sub-District Health Administration operates from the Health Centre and it is governed by the same structure as the health centre. All sub district services are therefore planned, delivered and managed from the health centre

Reporting by the Sub District is defined by requirements in the District Health Information System. The sub district however reports as part of the district health administration, which aggregates data from all the sub districts. The sub district reports are made up of those derived from the health centres and recently the CHPS compounds. These reports are mainly paper based and are based on forms designed to collect such data. It appears that the sub district contribution to the sector-wide indicators override the importance of other data at that level. Specific reporting requirement of the sub district focus on:

1. The aggregate volume and type of clinical service provided at the CHPs compounds
2. The aggregate volume and type of clinical service provided during outreach
3. Health Centre utilization statistics
4. Public health activities undertaken within communities in the outreach areas in response to specific programme activities such as malaria control, family planning and nutrition.
5. Commodity consumption including pharmaceuticals
6. Revenue collected

### **Logistics Business Processes**

From a logistics point of view, the Sub-District Health Administration:

- Monitors strict application of approved guidelines for stocking, issuing, and recording the use of drugs, contraceptives and medical supplies

- Performs regular inventories of drug and medical supplies of the health center and facilities within the sub district
- Estimates quantities and coordinates acquisition and storage of drugs and medical supplies
- Collates requisitions and procures drugs and medical supplies from RMS
- Receive, verify quantity/quality, and distribute procured items to Health Centers and other facilities
- Train prescribers in drug use and inventory management
- Sensitize the population on the dangers of using uncontrolled drugs

### *Procurement*

The Objective is to ensure that health commodities for patient care are always available when needed. In all places visited, the health centre acting as the SDHA operates as the focal point for the distribution of public health commodities to facilities within the catchment area. The processes are as follows:

1. Request for procurement is initiated by appropriate units in the health centre and from CHPS compounds and other satellite centres.
2. Requests are collated as procurement request from the Sub District and presented for approval by the District Director
3. Approved request is then presented either as part of the district request (in places where the district medical store concept operates) or as individual sub district request to the RMS.

- *Key Issues*

It appears that the SDHA's role in the logistics process is being threatened in some districts where they are bypassed and the DHA deals directly with facilities in the procurement process. Improving leadership at the Sub district can be enhanced if the role of the SDHA if their role in managing and supervising the acquisition and use of health commodities is enhanced.

- *User Requirements*

1. Estimate Need based on
  - a. Past consumption data
  - b. Patient records/diagnosis data
  - c. Target populations
2. Calculate need and generate request
3. Determine Current/Projected utilization
4. Provide current stock levels of each stock item

### *Receipt And Issues and Distribution*

The objective is to ensure that the health centre and its outreach centres, including the CHPS compounds are fully functional at all times. The sub districts have little capacity for storage apart from what the Health Centre needs. Receipt and distribution is therefore done according

what the requests indicate and are therefore received on behalf of the facilities and almost immediately sent to them.

Like all health facilities, issues from the store are based on requisitions from the various departments and units. The storekeeper receives requisitions duly authorised by heads of departments, verifies the requisition and proceeds to issue based on the quantities in stock. To do this:

1. Goods are subjected to management checks before being received into stock. No quarantined is done and are received on the strength of the store receipt vouchers.
2. Issues are made on the strength of duly authorized Stores Receipt and Issues Voucher
3. Ledger entries are made and bin cards updated.

- *Key Issues*

The sub district responsibility to the community based services needs to reflect strongly in the way logistics are managed at this level. A number of facilities within the sub district have the tendency to operate as independent facilities when supplies do not reach them on time. There appears to be some incentive to engage in “trading” with health commodities at this level hence a strong need for monitoring.

- *User Requirement*

1. Record Receipt
2. Update stock records with quantity received, expiry date, etc.
3. Validate the requisition
4. Display requisition history
5. Update bin card
6. Display current usable stock on hand for requisitioned items by batch
7. Display and transmit alerts and notifications for stock outs, overstock, under stock

### *Stock checks and Removal of unserviceable stocks*

The objective is to identify and report threats of expiry for early action. At this level removal of items from stock is done based on:

1. An official request for destruction after scheduled audit is done and recommendations done to facility management.
2. A board of survey constituted to supervise the disposal. This is mainly from the district health administration and the facility.
3. Items are disposed off or destroyed
4. A report is generated and
5. Entries are made into the unserviceable ledger

- *Key issues*

Quantities at this level are such that expiry is limited. A more critical function is to enable them to report threats of expiry as soon as they are observed.

- *User Requirement*

The system should be able to monitor stock movement and expiry by

1. Tracking expiry dates of each item received into stock by batch numbers
2. Notify items expired and block issues
3. Prepare report on items and quantities for updating unserviceable ledger

### *Periodic Reporting*

The objective is to contribute effectively to the district level periodic report on performance. Currently, monthly, quarterly and annual reporting is based on the Report, Requisition, Issues and Receipt Voucher. These are sent to the District Health Administration and forwarded as part of the district report to the Region.

- *Key Issues*

Reporting is based on the RRIRV and as explained this has little analytical scope and therefore makes very limited contributions to the objective.

- *User Requirement*

1. System should be configured to generate report to cover
  - a. Stock status report
  - b. Stock consumption report
  - c. Requisition activity reports
2. Provide analysis based on patient utilization

### **CHPS Compound/Zones**

Community Based Health Planning and Services (CHPS) compounds and zones represent the lowest level of health services and forms an integral part of the sub district. CHPS compound are, by design, extensions of the health centres around which the sub district is defined and they operate as such. CHPS compounds and zones are manned by one or two Community Health Officers who provide outreach services and basic clinical care to communities assigned to them. They offer limited clinical care and a defined range of public health services. Their management responsibilities include:

- Following approved guidelines for ordering, stocking, issuing, and recording the use of drugs, contraceptives and medical supplies.
- Maintaining current inventory of equipment

It appears that the major reason why data from the CHPS compounds is collected is to be able to account for the contribution of CHPS compounds to service delivery. However there remains a significant gap considering contributions in the area of public health, disease control and health commodities management.

The business processes of CHPS compound differ considerably as they do not operate a store system. they are essentially dispensing units and therefore obtain supplies only to serve clients directly. In this regard, CHPS compounds:

1. Makes requests for supply of items needed either on scheduled basis or as and when needed
2. Makes entries into consumables books
3. Makes entries as an when items are used and indicate stock balances for each transaction
4. Keeps inventory of non consumables

- *Key Issues*

In the area of logistics, CHPS compounds operate as units under the health centre. They receive stocks and dispense or issue out directly to patients. They therefore require a system that will allow them to keep track of items issued and to guide them as to when and how to reorder.

- *User Requirement*

Objective is to document each dispensing activity within the community and at the CHPS compound as and when patients and clients are seen. This requires stock management systems that will allow integration into Sub district report and there should record:

1. Direct entries as stocks are dispensed
2. Sum up issues at defined intervals
3. Have an early warning capability to forestall unavailability
4. Keep track of expiry
5. Generate periodic report
  - a. Stock status report
  - b. Stock consumption report
  - c. Requisition activity reports
  - d. Analysis based on patient utilization

## Summary of User Requirements

The user requirements identified fall into six main categories and they define the current scope of logistics management in the health sector in Ghana. These are:

- Procurement initiation
- Quantification with some level of forecasting
- Procurement (mainly the management of the process)
- Receiving and Storage
- Issuing and Distribution (including disposal of unserviceable stocks and dispensing)
- Reporting

The degree to which these processes are expressed depend on the level of operation. As one moves to the lower levels the business of issuing and distribution becomes more prominent while that of procurement and quantification take the centre stage at the national and regional level.

Linkages between operational levels appear very weak. The reporting mechanism, which is expected to bridge this gap, lacks in many ways. Firstly it appears that Key Performance Indicators, required to define the reporting content and focus have not been established. This creates a visibility challenge to the whole logistics system as performance management is reduced to stock availability and performance monitoring remain on the fringes of performance review processes in the sector.

It appears that managers at the various levels are clear about the systemic weaknesses and at each level, there is enough goodwill to accept innovations that will improve on performance. These innovations, however need to empower managers to take more precise decisions on what and how much to procure, provide clear insight into how to avoid overstocking as well as under stocking and to facilitate the decision of where to procure.

## EXISTING LMIS INITIATIVES

Several systems have been deployed across the country to help manage logistics in the health sector. Some of them are designed as health information systems with scope for reporting on logistics. Most of them have been deployed in specific facilities and are the result of local initiatives of managers at those facilities. Many of them are standard off-the-shelf systems which have been deployed with the primary objective of providing some control over revenue collection and are therefore essentially accounting soft wares with capabilities for managing logistics. Such systems were found to be either weak in the area of logistics management or their full capabilities were not deployed in the facilities they have been installed. This section looks at key ones that were reviewed by the team.

The DHIMS II is a reporting platform deployed at the DHA with collation points at the RHA and the CHIM. It aggregates paper-based reports from the sub-districts and health centres and hospitals within the district. The platform has scope for basic analysis such as trends using the sector-wide indicators. Complex multi-indicator analysis is not done and without basic standards to define thresholds, the platform has no capability to provide early warning. The office of the District Biostatistician houses the DHIMS platform and it is the focal point for collating data for the district. This basically involves the submission of reports, which are then keyed in manually, and reports generated by the system. The DHIMS platform does not manage processes within the health facilities. The DHMS II is now operational in all districts,

however some of the critical areas of reporting, such as human resources and supplies management and financial management are still not captured.

Several Commercial of the shelf systems were also encountered in the review. Their scope ranged from inventory management with strong accounting (including bill management) and invoicing capabilities. These were from multiple developers and it appears that the incentive for their use are either through encounters with the agents as a result of expressed need of management of the institutions. Prominent among them are the Tally System, developed by Tally Solutions of India and deployed as an inventory management system in the Brong Ahafo RMS for the past six years and the InventoryBiz system by DCS Infoway of India and deployed in the Ashanti Region RMS. The mSupply System, developed by Sustainable Solutions from Nepa, has been deployed at the CMS for inventory management and invoicing. The WHO also has the Stock Management Tool, which is an off-the-shelf inventory management system that has been deployed by EPI Cold Stores across the country.

A number of custom-made systems were also seen. The Procurement management system at the SSDM of the GHS was developed by a local consultant to manage the procurement process at that level. The e-LMIS for ARVs was also custom built for the National AIDS Control Program for the dual purposes of managing inventory and dispensing. This has been deployed in ART facilities and RMSs across the country. The team found that with this system, the HIV programme drugs had a spread sheet, which tracked the status of the programme drugs and guided the programme officers on when and how much to order. This system for managing Programme drugs was essentially a stock management system (an enhanced Bin card) that allows for direct entries as stocks are dispensed, sums up monthly issues as consumption and has a early warning capability with a guide to quantities to reorder. The team was informed of a Logistics management system developed by Maxi Systems Ghana Ltd, which is planned for RMSs and Health Facilities but this is yet to be rolled out.

The literature also describes a USAID Deliver Project in collaboration with the National Malaria Control Program which has been in place since July 2009 and promotes the use of EPI-Surveyor, mobile phone survey software for collecting data on Malaria logistics at the service points. They are also sponsoring a project, which is working in GAR, WR and CR to pilot a logistics management system using mobile phones in six districts in the target regions. The system is expected to facilitate data collection from SDPs over SMS through facility workers' personal mobile phones. The SMSs will then be sent to a toll-free short code registered with each mobile network in Ghana. This project that is yet to be implemented.

The key principles underpinning all these initiatives could be summed up as the need to:

- Control revenue
- Minimize loss
- Improve management control of the cost of inventory at each operational level
- Have up-to-date information on stock status at all levels

The need for a system to support logistics management was expressed at all levels assessed. It was however made quite clear to the team that such systems must be based on the existing manual system and care should be taken not to introduce anything that will require a drastic change in the work processes at any level.

## **OBSERVED GAPS**

It appears that all the systems deployed in the health sector presently do not adequately address the full requirements of a logistics management information system as outlined in the vision above. There is a heavy focus on inventory control, which is understandable as the inventory represent huge sums of investment stored in one place. These initiatives can best be described as silos as there are no links with other decision-making levels. It also provides very little scope for data aggregation, analysis and validation even at operational levels.

All procurement officers assessed had systems that allowed them to keep a data base of suppliers but this is just to facilitate local purchasing in as much as supplier selection is concerned. There were no systems to manage the procurement process below the national level and although the processes were fairly standard, some differences observed in the authorization mechanisms will need to be streamlined.

None of the systems reviewed could provide comprehensive real time information for decision-making, whether for procurement or for distribution. These limitations are as a result of inability to access information at different levels due to the absence of administrative linkages as would be required in a functioning LMIS. Most of the systems in use are modular in design with only one module in use. Accessing information under such circumstances is therefore difficult. In reality there is no LMIS in place at any level. The sector can however boast of components of an LMIS in different places of operation but with no links to each other.

The procurement system does not seem to capture programme items at all levels in much the same detail as items obtained from using budgetary allocation or on revolving fund basis. At the regional and district levels a parallel rout exists by which such items are received into stock without passing through the RHA procurement system. This has been a huge source of concern for procurement officers at these levels and does not provide for the collation of comprehensive information as would be required for decision-making.

The manual system, as it operates, provides the basis for comprehensive bookkeeping. Provisions are made for receipts, requisitions and issues with clear authorization. The challenge is that real time checks and reviews are limited and this either causes delays in critical decisions or causes the decisions to be taken without the full benefit of data. The manual system also lends itself to several possibilities of authorization being over looked inadvertently or otherwise.

# PROPOSED SYSTEM REQUIREMENTS

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To meet the user requirements outlined above, the team proposes that any system that will be deployed should have the following general characteristics:

- Clear indication of the total roll out plan covering all the business processes at all the levels indicated in the logistics management structure. This should include a clear definition of provisions for back up support and training plan.
- System and user interface must conform to industry standards agreed by the Ministry of Health, and sanctioned by NITA. They should also be consistent with key principles and standards set out in the National E-Health Strategy.
- The major hardware and networking platform on which system will run should be discussed and cleared before adoption. Future changes and updates should also be discussed so that they are taken up in future budgets.
- The system must provide full access to a comprehensive on-line help with capabilities for printing of forms, tables and data fields.

## Technical Requirements

The minimal technical requirements and features to be considered will be as follows:

- Must be capable of exchanging data with other approved systems such as the DHIMS reporting platform
- Generate and identify unique record numbers or codes for tracking specific transactions (such as procurement, requisitions and issues)
- Provide access from internet-enabled devices
- Support a range of data entry devices and forms
- Enable electronic data interchange (EDI)
- Display item master (fields) appropriate for each corresponding administrative level
- Have the ability to access the system at all levels and stores
- Accept data from multiple input methods including paper, online web forms and using bar code.
- Log transactions at time of data entry
- Provide asynchronous and synchronous data synchronization
- Provide a search interface and use flexible search criteria for accessing transactions by any data element including item number, requisition, vendor, date, location, status, etc.
- Support real time data entry validation and feedback to prevent data entry errors

- Provide appropriate calculations at time of data entry
- Provide atomic updating of a record. Atomicity prevents updates to the database occurring only partially.
- Enable a task to be interrupted and resumed

## Management

Proposed systems must also provide scope for the following management functions:

- Maintain transaction log history
- Enable configuration by role of rights to enter data
- Enable system administration by local staff
- Provide software updates and schedule of future releases and lists of new, changed, and dropped features
- Provide a unique version number for each revision
- Enable the system to detect incompatible versions of software running on different components
- Enable customization to any national and subnational administrative structure or number of levels

## Operations

- Enable earlier versions of a record to be recoverable
- Back up data so that it is recoverable in the event of a system or hardware failure
- Support synchronous and asynchronous updates
- Accommodate loss of connectivity to components
- Be deadlock free (described as a situation where two or more competing actions are each waiting for the other to finish and thus neither ever does)
- Enable access to the central system from all levels of the health system
- Provide real-time response to transactions submitted by connected devices up to the configured national volume level
- Enable deployment in an environment subject to power loss and loss of connectivity

## Security

- Support definitions of unlimited roles and assigned levels of access, viewing, entry, editing, and auditing
- Require each user to authenticate by role before gaining access to system
- Provide flexible password control to align to national policy and standard operating procedure
- Be secured against viruses and malware

## Reporting

- Provide an interface to a third-party report-generation tool
- Generate stock status for individual items at any and/or all levels for any time period
- Generate stock consumption report at any and/or all levels for any time period
- Generate coverage reports for any product or combination of products
- Generate requisition activity reports for any open, modified, and cancelled requisitions for any level, location, and time period
- Generate graphs, pie charts, histograms based on agreed performance indicators by level

# POLICY ISSUES TO CONSIDER

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A number of issues cropped up during the review that may require policy decision in order to meet the broad objectives of the LMIS. This section highlights those issues that may have a direct bearing on the roll out of an LMIS in the health sector in Ghana. The team considers them as important issues that will require direction by the MoH leadership.

- **Unifying Procurement Into the CMS (Repositioning the CMS)**

There appears to be multiple channels of procurement into the CMS. While this may be a reflection of decentralised procurement functions in the system, a unified authorizing structure with respect to goods entering or leaving the CMS will go a long way to streamline information flow and how this resource is managed.

Health care delivery in Ghana is structured around agencies. Each of these agencies is a procurement entity and has considerable autonomy in the procurement of goods and services and therefore has some responsibility in the warehousing and distribution functions. The main health care delivery agencies all have a central warehousing facility where medicines and other nondrug items are kept and they operate as outlets of the CMS, effectively sourcing their requirements from that level. The GHS has ten RMSs and share the CMS with the MoH.

The need for a single authorizing mechanism for the CMS has several advantages, which the team felt cannot be overlooked. First it offers some control over the national procurement process in terms of what quantities to procure, quality assurance and management of the pipeline. It also provides some control over the distribution process and with adequate information will ensure a more effective distribution of goods. It is the view of the team that all agencies (including the GHS) should have the same relationship with the CMS. The team further proposes that the Procurement and Supply Directorate of the MoH should be the sole authorizing entity for goods in and out of the CMS. The Ministry must therefore examine ways of unifying the procurement function of the Procurement and Supply Directorate and that of the SSDM. The Service is however expected to set technical standards for the achievement of health policies which may be construed to include goods and services.

The team also felt the need to examine whether the role of the CMS will be best performed in a semi autonomous capacity. Which will require it to under go a gradual transformation into an organisation which will be self catering but responsible to the Ministry of Health in terms of general policy guide and accountability.

- **Role of DHA**

The role of the DHA in logistics management has been debated extensively. The major challenge appears to be the potential for the creation of another level of bureaucracy within the logistics system that may come with added cost to the service consumer. While these concerns are justified, the team's observation on the field provides ample evidence for the role of the DHA in logistics management and hence the LMIS. Firstly as part of its responsibilities the DHA is expected to centralize requirement of health facilities in the district and purchase materials from RMS on their behalf. The DHA is also expected to receive, verify (quantity/quality), and distribute procured items to Health Centers and District

Hospital. Several districts have taken up this responsibility and are organizing the procurement and distribution functions as stated above.

There are other challenges that have been put forwards at various forums such as the lack of infrastructure for storage, the unavailability of the requisite human resource and the lack of requisite means of transport to support a district wide logistics system. The team observed that for programme drugs and especially for public health items such as vaccines, the DHA were actively involved in acquiring and distributing such items. The team therefore proposes that for the LIMS in particular, the DHA should play a central role in the determination of need, the approval processes for procurement and where feasible should coordinate the distribution of all logistics items.

- **Definition of reporting responsibilities**

The DHIMS, as a reporting platform, was originally configured to accept reports from the supplies sector. However this was limited to essential drugs and was based on the tracer drugs concept. Beyond that there has not been any structured reporting demands within the supply chain. All reports are based on the annual report system where stores which leaves the management of the various stores to “tell their own story”. This system lacks analytical depth and provides little information for comprehensive decision-making.

Some suggestions have been made in this review under the user and systems requirement but the team considers it critical for the clear reporting responsibilities (with terms of reference) to be spelt out. It should also include who to report to and when. This should be based on KPIs that will be outlined and defined in detail by the ministry and should be structured in such a way that intra agency reporting should be quarterly, while agency reporting, structured around their core functions should be bi annual and annual. The team proposes the following for consideration:

1. Primary reporting should focus on facilities and stores and should demand basic information such as quantities received, used and declared unserviceable within a specific period. Such reports should be sent to the DHA
2. DHA reports of aggregate district figures above and analyze consumption against district-wide facility utilization and population figures
3. RHA should analyze trends by district and for the region as a whole and should include economic analysis of region-wide logistics usage. National level report should follow the same trend but use regions as reporting units and add more depth to the economic analysis.

Indicators like per capita consumption of antibiotics among population groups, unit cost of treatment using specific procedures and trend in cost implications of specific diseases should be routinely demanded. The link between usage and revenue should also extend to logistics as a matter of urgency. The team therefore proposes that a team should be constituted to:

1. Identify each level of the chain and what their core business/operations is or should be
2. Agree on performance measures
3. Define reporting responsibilities to allow for performance to be assessed by level
4. Link other reporting systems to enable direct integration of related information such as utilization, disease patterns and financial management

5. Dashboards as decision-making tools should be established at the national, regional and district levels.

The team further proposes that in the roll out of the LMIS, there should initially be a cut off point for computerization. Below this level effort should be made to consolidate the manual system. However the team recognises the importance of a strategic deployment of hand held devises at the lower levels to help minimize errors in the computation of consumption data at such levels and to improve overall record keeping at these levels.

## ANNEX 1

### REGIONS AND DISTRICTS VISITED:

<b>REGION</b>	<b>DISTRICTS AND FACILITIES VISITED</b>
Greater Accra Region	<ul style="list-style-type: none"><li>• Regional Medical Stores</li><li>• Dangbe East District Hospital</li></ul>
Northern Region	<ul style="list-style-type: none"><li>• Regional Health Administration</li><li>• Regional Medical Stores</li><li>• Nanumba North District Health Administration<ul style="list-style-type: none"><li>○ Bimbila District Hospital</li></ul></li></ul>
Brong Ahafo Region	<ul style="list-style-type: none"><li>• Regional Medical Stores</li></ul>
Ashanti Region	<ul style="list-style-type: none"><li>• Regional Health Administration</li><li>• Regional Medical Stores</li></ul>
Eastern Region	<ul style="list-style-type: none"><li>• District Health Administration Atiwa</li><li>• District health Administration Kwahu South</li><li>• Zongo Sub district Administration Koforidua Metro</li><li>• Zongo Health Centre Koforidua Metro</li><li>• Anyinam Health Center, Atiwa District</li><li>• Boma CHPS Compound, Atiwa District</li><li>• Mile 50 CHPS Compound Koforidua</li></ul>
Central Region	<ul style="list-style-type: none"><li>• Cape Coast Teaching Hospital/Central Regional Hospital</li></ul>