

1 Country Delegation

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2 Introduction

In order to strengthen health systems, the Ministry of Health and Child Care has decided to embrace information communication technology (ICT) through the use of electronic Logistics Management Information Systems (eLMIS) at national and sub national level. Over the years computerised warehouse inventory management system was only adapted at national level (NatPharm) while all other health facilities continue to use paper based LMIS. In 2013 the Directorate of Pharmacy Services designed, developed and piloted a computerised pharmacy inventory management and dispensing software at three selected sites (central, provincial and district hospital). The piloted software is not currently linked with the warehouse inventory management system at NatPharm (Navision) making it difficult to assess national stock situation at any given time.

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In Zimbabwe the general requirements are software that will handle:

- Ordering
- Visibility of stock information at higher levels
- Dispensing
- Stock management
- Reporting on essential data elements; stock on hand , consumption and losses/adjustments
- Interoperability with other software for porting data into databases such as DHIS 2 or Navision
- Mobile client component for sharing logistics data especially from lower levels such as clinics to districts
- Scalability- ability to handle and progressively increase the number of products managed under the system
- Ability to manage other commodities such as laboratory reagents and equipment and other health commodities
- Electronic computerised system and linked at all levels (District ,Provincial and National Level)
- Cost – should be deployed at minimal costs and sustainable with local resources

3 Objectives

The overall objective of the knowledge visit was to:

1. Understand in depth the architecture of eLMIS software in Zambia
2. Understand how the eLMIS functionality (user requirements and detailed specifications) were developed
3. Explore if eLMIS software is compatible or can be customised for Zimbabwean systems
4. Explore the capabilities and limitations of the current software
5. Look and learn practical experience from the sites implementing eLMIS

4 Background of the Zambian LMIS

Our first port of call was the Directorate of clinical care and diagnostic services, Ministry of Health where we met the Deputy Director Pharmaceutical Services Mr Chikuta Mbewe for an overview of the Zambia Health System. The Ministry of Health (MOH) Zambia and Ministry of Community Development, Mother and Child Health (MCDMCH) are the two ministries responsible for health, MOH from the province up to central level, MCDMCH from the District downwards. The country implemented the kit system since 1980 before introducing two additional logistics systems, Essential Medicines Logistics Improvement Programme (EMLIP) and electronic Logistics Management Information System (e-LMIS). The EMLIP system which is paper based, distributes essential medicines and started to operate in 2009. The EMLIP has been expanded to include artemisinin combination treatments (ACTs) and they noted that collection of logistics data for other medicines outside the kits was not possible due to human resources and the general non availability of other essential medicines. Currently the revised EMLIP is being piloted in 3 provinces out of 10 in the country using a push system. This revised system distributes individual items as opposed to kits. Challenges noted so far with EMLIP were supply imbalances and increased emergency orders.

E-LMIS is a web based automated system which was developed by JSI with funding from Bill and Melinda Gates, Rockefeller Foundation among other partners. It is an open source software with consortium of developers who work together to add more functionalities. The team was referred to the implementing partner JSI, for more information.

5 Findings

The team met Wendy Bomett (Senior MIS Advisor and project coordinator for the e-LMIS) and Chris Opit (Senior IT Advisor).

5.1 Overview of the system

Two versions of the system exist, a central edition for Medical Stores and a facility edition. The central edition is linked to the facility edition. It is also currently being implemented in Tanzania. The system is able to track all the commodity categories including laboratory reagents, equipment and medicines and medical supplies. It also tracks dispensed to user data for ARVs and HIV test kits and for other essential medicines uses issues data as proxy for consumption.

System is able to carry out the following business processes

- Requisitions
- Receiving
- Inventory control
- Dispensing

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Table 1 shows the process flow

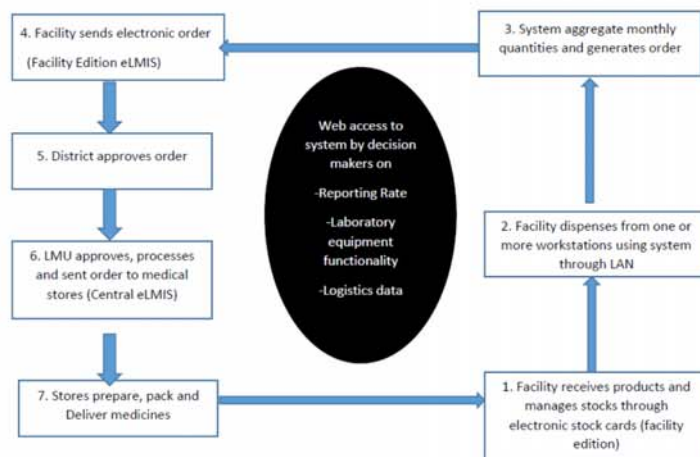
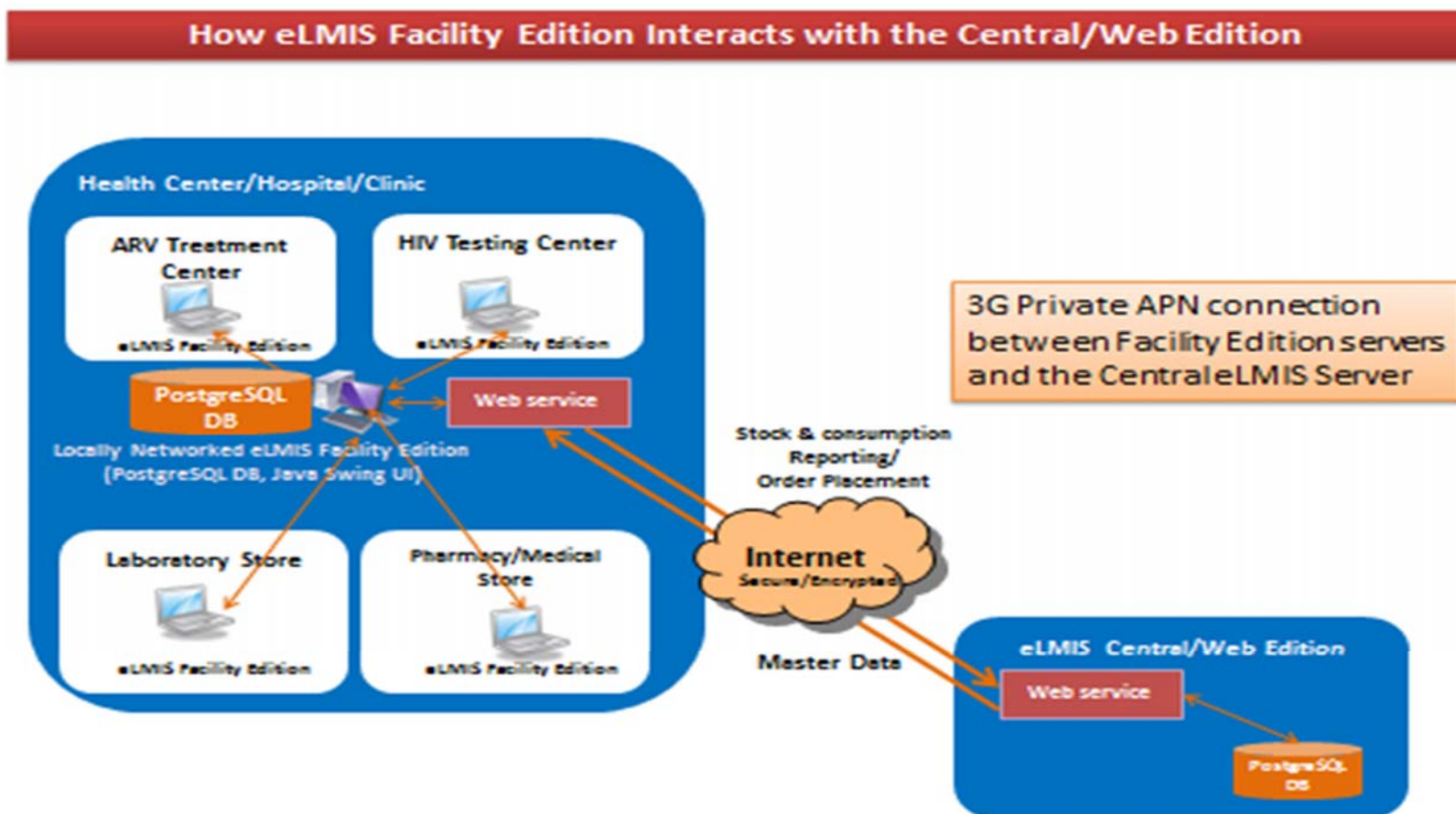


Table 2 below shows how the system interfaces with Central /Web edition



5.1.1 System Architecture

Area	Expectations	Current Capability	Limitations
Infrastructure			
Network infrastructure	Software that can connect multiple workstations	Uses WIFI Hotspot and minimal wire connections	None
Security	Controlled access to the application and database	Roles and right are defined in system	
System interoperability	Allows porting of data from mobile/other software Allows exchange with national HMIS system	This system not using mobile client for data transfer The feature is not Not yet available	No interoperability with mobile phone is supported currently

5.1.2 Inventory Control

Area	Expectations	Current Capability	Limitations
Stock on hand	To view stock on hand at facility, district and national level	Unable to view real time facility edition stock on hand due to time limitations	
Transactions view	To view current and historical inventory transactions	Capable	
Creation of multiple stock locations at facility level	Capable of creation of different stores and locations (bins) allowing for partitioning of stock between different locations.	Capable	Not a Warehouse management system
Reorder levels	Allows the setting up of reorder levels for individual medicines	Capable, seasonality engrained in the system and can be set up at central level	
Range of products managed	Manages all product categories, medical surgical and laboratory	Capable	
Electronic signature	Able to view electronic signature of user	Capable	
Stock adjustments	Ability to create different adjustments and record information on these	Capable	
Batch tracking	Ability to track item by batch throughout supply chain	Not capable	A key feature missing in stock management
Tracking expiry dates, FEFO	Ability to dispense or issue on first expiry first out basis and notify on impending expiry	Not yet implemented in current version	A key feature in stock management

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			which is still missing in the current version
Proof of delivery	Ability to automatically populate quantities issued from central warehouse and PODs	Capable	Quantity delivered do not include batch numbers

5.1.3 Dispensing

Area	Expectations	Current Capability	Limitations
Real time dispensing	Electronic prescription delivery to pharmacy	Uses paper prescriptions delivered to patients	Not linked to Patient management system
Labels	Generate and customize medicines labels	No labelling functionality but customizable	
Electronic stock card	Automatic update of electronic stock card Recording of batch number, expiry dates and batch specific transactions	Capable	

5.1.4 Reporting

Area	Expectations	Current Capability	Limitations
Stock Status Report at facility level	To generate and view stock status report at Facility level	Capable	
Stock Status Report at National Level	Ability to combine facility and medical stores stock status	Not capable	
Generation of reports	Ability to generate customized reports such as , stock status , timeliness, quantities dispensed, adjustments	Capable , in addition an extractor available for more data mining	

5.1.5 Costs

Area	Expectations	Current Capability	Limitations
Licence fees	Affordable annual licence fees	Open source (No need for licensing but development and training of developers and implementers fees are mandatory)	Skills availability, Other hidden costs can be expensive No standardization for enhancement and needs contracting developers. There will be need to train local developers to minimize the cost of customization by external consultants
Setup costs	Affordable set up costs	Average of USD 6000 for hardware and training per facility	

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6 Discussion

Generally the system has functionalities which are easily customized to our settings. It handles requisition, receiving, inventory management and to some extent dispensing. Considering that it is open source, customization does not require significant resources. Zambia is currently using the version 2 of the software and will soon be implementing the version 3 with some enhancements requested by the country.

Notwithstanding this the Ministry of Health expressed reservations on the deployment of the software opting for the World Bank funded project Electronic Zambia Inventory System (EZICS) which has bar coding functionalities among other features. The team also noted that the central level edition is currently not linked to the warehouse management system (WMS), however it is possible to sync the data from the Central edition to the WMS. At the same time it is not possible to view live stock data from facility since system captures reported data at a specific time (monthly).

Lessons learnt and noted from Zambia project:

- Training is a major component for successful deployment of e-LMIS accounting to 40% of the total cost of ownership. Zambia has centralized training to minimize costs.
- Initial procurement costs for hardware and related costs are high
- Coordination between stakeholders crucial to roll out the programme. In the Zambia settings they created an activity based Technical Working Group (TWG) with each partner given a responsibility. They also meet every 6 weeks to discuss on any challenges met and proposed solutions
- Facility turnaround time feature available in system to check on when the submitted orders are held up (transparency). This has assisted in DMOs and PMDs to be more interested in supervision of subordinates on stock management
- Dedicated MIS team crucial in all tasks development through deployment
- Training of local developers and implementers to support the system- Zambia has started work on this and also has Provincial IT Officers to support other aspects of the system

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- Integration with NatPharm Warehouse Management System will have to be explored. Though it can be possible, there are other technical issues to be considered

The team was unable to carry out full assessment/thorough review of the facility edition due to time constraints (the team visited one facility for less than one hour) therefore team could not view live reports such as Report and Requisition Form. Similarly time could not allow a complete review of the Central edition of the software.

7 Recommendations

- The country can adapt and customize the existing eLMIS system visa vis developing a new system. However this is subject to inclusion of the following enhancements;

Feature	Key enhancement
Inventory management	Product batch tracking, FEFO (expiry dates tracking)
Dispensing	Real time dispensing of medicines including printing labels
Reports Generation	Real time sharing of Logistics Data online
System Integration	Compatibility with existing systems; DHIS, ERP (Navision) and mobile systems

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- Further review of the facility edition software especially in remote sites where it has been deployed should be considered. Due to time limitations (2days) allocated for this study visit, the team could not visit remote health facilities to assess the functionality of the system in a rural/remote setting where infrastructure is a limitation.
- Constitute an eLMIS technical working group to drive the adoption and adaptation of the software
- Skills Identification and Training of the JAVA programming and Database Management