ELECTRONICALLY MANAGING YOUR SUPPLY CHAIN INFORMATION

eLMIS SELECTION GUIDE

THE VALUE OF AN ELECTRONIC LOGISTICS MANAGEMENT INFORMATION SYSTEM (eLMIS)

A well-designed, well-operated supply chain is critical to the success of any health system. To ensure essential health commodities are available to the right clients, when they need them, supply chain managers need to have visibility into all functions of the supply chain, such as procurement, warehousing, inventory, distribution, funding, and policy. Some functions can operate independently, which is why a strong logistics management information system (LMIS) is needed. A strong LMIS can ensure data visibility throughout each function, and essential logistics data can be communicated to supply chain managers for decisionmaking. Information is the engine that drives the logistics cycle; without information, the logistics system would not run smoothly.

As technology continues to evolve in public health systems within developing countries, managers are beginning to demand up-to-the-minute, accurate data, which helps them to manage product flow better for all levels within the system.

Many countries that are managing public health supply chains have adopted an open source eLMIS, which has no initial or recurring licensing fees and electronically collects, organizes, and presents logistics data that have been gathered across all levels of the system. As one of its most important functions, an eLMIS enables logisticians to quickly collect the data needed to make informed decisions, which ultimately improves customer service by minimizing losses and stock imbalances while moving public health commodities more efficiently to where they are needed most.

With the introduction of the eLMIS, program managers now have quicker access to aggregate and/ or specific data at their fingertips. With electronic reports, automated approval workflows, and email/ Short Message Service (SMS) notifications, processing time for requisitions can dramatically decrease. An eLMIS enables district health management teams to easily identify overstock and understock situations and then to redistribute stock to meet patient needs and reduce losses through commodity expiry. Additionally, data is visible to authorized users throughout the requisition/order process, allowing managers to pinpoint where supportive supervision may be necessary to assist their staff.

For program managers, policymakers, donors, and implementing partners, dashboards and detailed management reports streamline the aggregate nationwide raw data, making it easier to process for decisionmaking.

In this guide, you will find information about what it takes to be eLMIS ready, including profiles of three eLMIS applications developed by the USAID | DELIVER PROJECT; they are available for customized development to meet specific in-country needs. These three examples are a sample of possible eLMIS solutions; for additional options that may be available, see page 16 in the *Contact Information* section for contact details to request additional information.

QUESTIONS TO ASK BEFORE SELECTING AN eLMIS APPLICATION.

To implement any information technology (IT) application, strategic and comprehensive planning is necessary to ensure a smooth, successful deployment within budget. The following are important considerations before implementing an eLMIS application.

DO YOU ALREADY HAVE AN EFFECTIVE LMIS PROCESS IN PLACE?

To effectively implement an eLMIS, stay within budget, and deploy within a reasonable time, select an eLMIS application that is based on an existing, effective LMIS currently in place in-country. Using a pre-existing LMIS—with the roles and responsibilities clearly defined and procedures generally followed—will help identify the functional requirements and the essential data elements that are currently being captured versus data that should be captured.

DO YOU HAVE ENOUGH TIME TO PROPERLY IMPLEMENT AN eLMIS?

Smaller systems for smaller organizations may need one or two months; however, as the scale increases, the implementation may require six months to one year. Implement the eLMIS deliberately and carefully, department by department—i.e., procurement, warehousing, finance tracking, etc.—to ensure that each team has completely adjusted before moving to the next step.

DO YOU HAVE THE FINANCIAL RESOURCES?

Cost will always be important. As an organization, you must justify any cost. More important than whether or not it is affordable, you need to know its value. In addition, if a budget has been set, this will allow for proper planning, accountability, and visibility into the progress of the eLMIS implementation, allowing for better control and management of budget, time, and resources.

DO YOU HAVE SENIOR LEADERSHIP BUY-IN AND SUPPORT?

Do you have the buy-in of the senior leadership of your organization? Will they be champions for the project and follow through on important decisions? Can you depend on them? Do they have the authority to make institutional policy changes?

PEOPLE   **PROCESS**   **TECHNOLOGY**

Implementation of an eLMIS solution can cost several hundred thousand dollars or several millions depending on the level of development, number of sites, host country readiness, infrastructure, team capacity, etc. It is important to consider the cost of ownership, not only development, when calculating total cost of implementation.

CAN THE SYSTEM BE INTEGRATED/IS IT COMPATIBLE?

Given the sensitive data and the multifunctional uses of various applications, you need to consider and determine how well a new piece of software can be integrated with the rest of your business or external systems. Is it compatible with your other software, or is extra work needed to make it compatible?

DO YOU HAVE THE APPROPRIATE STAFF?

Your choice of eLMIS software also depends on your staff. If you have an in-house IT department, do they agree with your choice of software? Your IT staff will run, monitor, and keep the software working. If they are not comfortable with or able to adapt to your choice, you could face issues around end-user support and basic application maintenance.

CLOUD VERSUS CLIENT-SIDE STORAGE?

Today, a general trend for many systems is to move to the cloud, whereby the application is operated and maintained by a third party and the application is accessible via the Internet. Whether this is beneficial or not depends on practicality, government policies, and availability of in-country resources. If the security of your information is a concern, for instance, you may want to trust and invest in your own secure servers. The advantage to using cloud storage is the flexibility of the storage space; cloud storage can also reduce expenses and the strain on resources required to monitor your own servers. Cloud services often come with automatic redundancy and well-defined policies on maintenance and security patching that your staff would otherwise need to be trained to do.

However, government policies on data ownership and how data can be stored often limit the options. Other considerations include in-country infrastructure—i.e., electricity and Internet connectivity—and in-country capacity to maintain local servers. Some countries may find it challenging to adequately staff their IT organizations with individuals who have the right skills.

DO YOU HAVE THE APPROPRIATE SUPPORT AND BACKUP?

If something goes wrong, how well supported are you? All systems should have backup and a support plan as a mandatory practice. The level of support depends on the actual company behind the software. A reliable company offering proper support, potential patches, and other assistance is a wise investment. Also, consider the location of vendor support; for instance, is it important to have a local vendor? Do they need to be in the same time zone? What is the vendor's policy on providing support? Can they provide local support, if necessary?

DO YOU HAVE THE POTENTIAL TO GROW?

Finally, ask about the future growth potential for both you and the software. All the previous factors can be considered within this. If, in the short term, you expect to take on new activities and functions within the LMIS, you will need software that can accommodate, adapt, and expand with your business.

DISTRIBUTION
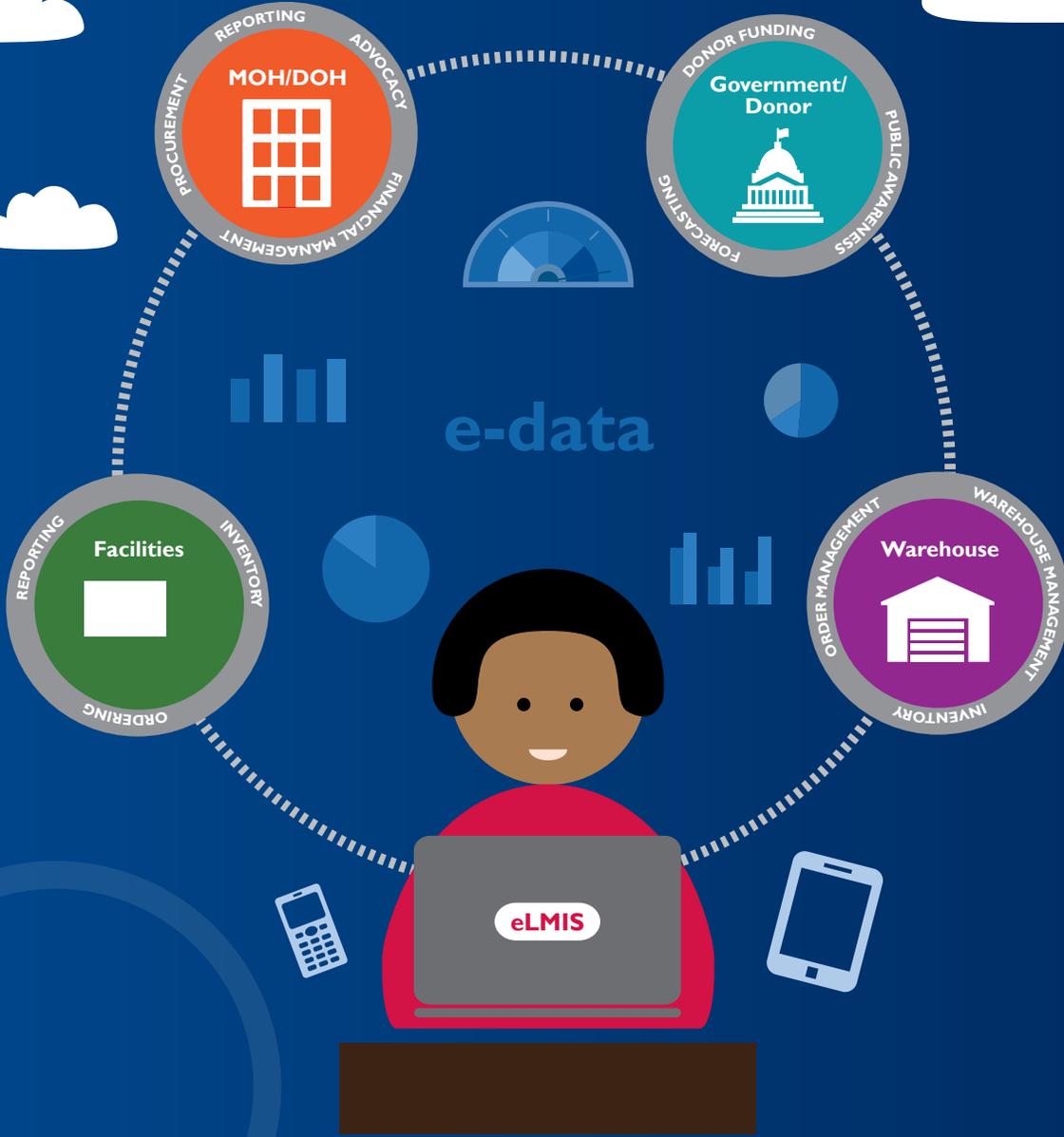
ARE YOU eLMIS READY?

PAKISTAN: VACCINE/CONTRACEPTIVE LOGISTICS MANAGEMENT INFORMATION SYSTEMS (vLMIS / cLMIS)

OVERVIEW

Since 2009, the USAID | DELIVER PROJECT in Pakistan has assisted the Government of Pakistan (GOP) in strengthening their supply chain system. Toward that end, in 2010, the project implemented a web-based LMIS and a warehouse management system (WMS) in the Karachi Central Warehouse (CWH). The CWH received contraceptive commodities and distributed them throughout the national supply chain. Using a phased approach, more and more districts and stakeholders started reporting their logistics data into the LMIS. With its success, in 2012, tuberculosis (TB) commodities were added to the system; it was rolled out in March 2013. After TB commodities were included, the contraceptive part of the LMIS became the contraceptive logistics management information system (cLMIS); the TB commodities became the tuberculosis drugs management information system (TB-DMIS).

After the measles outbreak in February 2013, the GOP asked U.S. Agency for International Development (USAID) to include vaccine products in the LMIS. A workshop was held in Islamabad, Pakistan in June 2013 in which stakeholders from the following organizations and groups participated:

• Federal Expanded Programme on Immunization (EPI) cell of the Ministry of National Health Services, Regulation and Coordination (MNHSRC)

• Prime Minister's Polio Monitoring and Coordination cell

• Provincial and regional departments of the health EPI units

• U.S. Agency for International Development (USAID)

• United Nations Children's Fund (UNICEF)

• World Health Organization (WHO).

At the workshop, participants discussed vaccine logistics-related topics including inventory management practices, storage, distribution, supervision, human resource capacity, and existing data collection mechanisms; strengths, weaknesses, challenges, and priorities were also considered. After the workshop, using follow-on deliberations and final reports, they developed a set of recommendations.

At this stage, the USAID | DELIVER PROJECT developed a detailed implementation plan to strengthen the vaccine logistics system in Pakistan. The plan had two phases. In the first phase, important modules—such as inventory management and consumption reporting—were implemented; they went live in January 2014 on http://v.lmis.gov.pk/.

Approximately 2,000 LMIS operators completed orientation/training on the application by June 2014. The second phase of the plan was implemented in September 2014 when cold chain equipment management (CCEM), campaign management, and GS1* barcode modules were included in the vaccine LMIS (vLMIS). The GS1 barcode implementation pilot started in December 2014 and was successfully completed in the federal and provincial districts and other selected districts.

SPECIFIC FEATURES/FUNCTIONS

cLMIS

The cLMIS, an important part of Pakistan's public health LMIS, manages all the contraceptive and reproductive health commodities for the public and private sectors, as well as the nongovernmental organizations. After the web-based cLMIS is introduced, managers, logisticians, and donors have better visibility into the supply chain; they can make better decisions to ensure that products reach the clients who need them. The cLMIS enables authorized users at various locations to enter data and to access cLMIS reports through a web browser. Reports include stock status reports, months of stock reports, and other information necessary for the supply chain to function. By improving the timeliness and quality of logistics data, the cLMIS effectively improves decisionmaking for supply chain management. In January 2015, the cLMIS was scaled up to the subdistrict level to accommodate the health facilities' consumption data reporting. The Public Welfare Department (PWD) in three provinces—Punjab, Khyber Pakhtunkhwa, and Sindh—is currently reporting the data at the health facility level.

---

1 GS1 Pakistan is a not-for-profit partner of the USAID | DELIVER PROJECT that provided implementation services for barcoding in vLMIS and cLMIS.
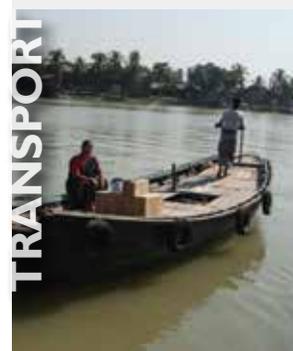
vLMIS

The vLMIS is also an important part of Pakistan's public health LMIS. It handles all the vaccine commodities for EPI Pakistan. The web-based vLMIS application has given managers, logisticians, and donors better visibility into the supply chain through a multilevel dashboard based on numerous key performance indicators (KPIs). It helps them make better decisions to ensure that vaccines are available for the population at all supply chain levels (the national, provincial, and district levels; *tehsils* (administrative divisions); and union councils). The vLMIS enables authorized users at various locations to enter data and access vLMIS reports through a web browser. Reports include stock status reports, months of stock reports, wastage reports, cold chain capacity reports, and other information critical for the functioning of the supply chain.

TECHNOLOGY

The vLMIS and cLMIS, which are web-based LMIS, were developed using open source technology. The systems have central databases that bring all the logistics information together, and they produce a variety of reports for different users.

- Operating system for servers:
    - Linux
    - Microsoft Windows server
- Operating system for end users:
    - Microsoft Windows XP/7/8x
- Browsers:
    - Mozilla Firefox 2 and above
    - Google Chrome
- Internet:
    - minimum 512 kbps

- Development tools:
    - PHP
    - Zend Framework
    - Javascript
    - JQuery
    - Fusion Charts
- Database:
    - MySQL

BENEFITS

Logistics data and storage capacity have increased visibility. This means that managers can make better decisions and strengthen supervision and monitoring, which will improve the availability of commodities. Donors and stakeholders can access web-based reports needed for informed decisionmaking about forecasting and procurement planning. Federal and provincial staff can access stock status reports from districts and service delivery points immediately after data entry. Warehouse and store managers can access inventory and take corrective actions more efficiently.

The specific benefits of vLMIS include added transparency and visibility for stakeholders, made possible by the automated system that tracks stock and inventory. Critical information, such as batch number, expiry date, and VVM stage, is entered into the application and this automated stock tracking has provided Pakistan with data visibility to ensure efficient decisionmaking. The vLMIS also ensures effective use of cold chain assets according to the standardized vaccine preservation requirements. Availability of cold chain data within the vLMIS minimizes the factors affecting the vaccine wastage, as well as cold chain breach.

There are many vertical health commodity distribution systems for various programs that make overall logistics management at each level of the supply chain a very difficult task. There are linkages among various stakeholders at the district, provincial, and national levels for requisition, delivery, and storage of health commodities. Therefore, cLMIS ownership by GOP helps to provide the stock status and data reporting to accommodate all stakeholders (public and private), as well as the linkages. The uniformity and seamless integration provided by cLMIS enhances the data visibility at all levels for contraceptive commodities. Dashboards in cLMIS enable provincial and regional health and population departments to see the contribution of the private sector in the respective geographical areas. Critical information, such as batch number and expiry date, is entered into the application; this automated stock tracking has provided the country of Pakistan with data visibility to ensure efficient decisionmaking. Automated requisitioning is another achievement for cLMIS which allows district level users from public and private sector stakeholders to submit requisition requests to CWH, Karachi.

ETHIOPIA: HEALTH COMMODITY MANAGEMENT INFORMATION SYSTEM (HCMIS)

OVERVIEW

The health commodity management information system (HCMIS) in Ethiopia is an open source, custom software solution; it was developed in Ethiopia for the country's health commodity supply chain. First developed and deployed in 2009 to manage inventories in health facility pharmaceutical stores (Facility Edition), it was adapted in 2010 for the Pharmaceuticals Fund and Supply Agency (PFSA) to use in its network of distribution hubs (Warehouse Edition).

Initially conceived as a WMS for PFSA, the warehouse edition has evolved with the demands of the business. It now includes other processes, including sales, finance, and replenishment; at PFSA's central level, it includes pricing and pipeline monitoring. This evolution, driven by a continuous cycle of new functions based on user needs, has resulted in a robust enterprise-level software solution that delivers many of the features found in costly commercial enterprise resource planning (ERP) applications. Additionally, it is configured to feed financial data to the new accounting software—Peachtree— which PFSA recently deployed.

The USAID | DELIVER PROJECT developed and implemented the HCMIS; a core team of local programmers continues to support the system's evolution, and the team provides help desk services for user and administrator support. USAID has provided most of the funding for the HCMIS; additional support from the Bill & Melinda Gates Foundation helped the programmers adapt the system for vaccine management.

As of 2015, the HCMIS platform has been implemented in

• more than 500 health facilities

• the entire PFSA network of the central stores and 11 hubs

• central and 18 regional cold rooms for vaccines.

SPECIFIC FEATURES/FUNCTIONS

HCMIS WAREHOUSE

The two primary tasks in the hub are *warehouse management* and *inventory control.* The warehouse management task manages the movement and storage of stock in the hub. Overseeing and recording deliveries and pickups, maintaining inventory records, location tracking, and controlling inventory levels are some of the crucial functions in the hub.

Inventory control is a major functionality at the facility stores. Paramount importance is given to the receiving and issuing of pharmaceutical supplies, managing the movement of items, and finding a specific item in the facilities.

The HCMIS Warehouse automates warehouse and cold room transactions from goods receipt to issuing; additional features include location tracking and pricing and cold room data and vaccine-specific features, such as volumetric analysis and vaccine vial monitoring. The HCMIS includes web-based dashboards for managers, enabling them to visualize data from all PFSA locations and generate reports on key operational and performance indicators, including stock status, stock aging, demand, etc. These dashboards only display reports; data cannot be entered through the web portal. Web access is also being deployed to PFSA partners, including the Federal Ministry of Health.

HCMIS FACILITY

The HCMIS Facility contains the essential data required to manage and account for all health commodities managed by facilities, including donated items and the commodities purchased with the revolving drug fund (RDF). Analytical tools provide users and managers with reports on cost, price only (value per batch to determine charge to the patient), as well as value of inventory, expiries, and near expiries. The HCMIS Facility also manages transactions for issuing commodities to dispensing units within the facility, capturing consumption, stock balance, and losses and adjustments to calculate issue quantity. All the data are aggregated into a single Report and Requisition Form (RRF) that facilities can generate electronically and use to order from PFSA.

The HCMIS has not yet reached its full potential. HCMIS Facility, a desktop module, is not linked in real-time to the HCMIS Warehouse, so real-time data visibility at the facility level is a target for the future. This future state depends more on Internet access and reliability than on any weakness in the HCMIS architecture, which was built in SQL. With Internet access, facilities can email their RRFs to their designated PFSA hub, but the lack of enabling laws for electronic signatures also results in duplicative efforts; to commit funds for RDF commodities, emailed RRFs must be printed and signed, and they must be sent to PFSA with payment. The lack of Internet infrastructure for linking the HCMIS Facility with PFSA's HCMIS Warehouse also makes updates to commodity lists and pricing harder and prevents facilities from checking PFSA's availability of items before ordering.

TECHNOLOGY

The technology used in the HCMIS was selected after a careful deliberation of various factors, including (1) availability of skilled and qualified developers/programmers, (2) adoption and acceptance of technology in other sectors and the local IT job market, and (3) cost-effectiveness of the technology expenditure requirements.

The HCMIS, a graphical application software, requires users to have a computer with the right hardware and software components. Users must also have basic computer skills and familiarity with graphical user interfaces (GUI). The HCMIS also requires Microsoft .NET Framework 3.5 and Microsoft SQL server (later than 2005) to be properly installed and configured.

The HCMIS is designed to be user-friendly, reliable, error free, and secure. Therefore, it is appropriate for users with various backgrounds—ranging from those with limited computing experience to advanced users and experts. In addition, the HCMIS codebase is comprehensively commented, conventions are explained, and ambiguities are noted to ease the task of maintenance for future developers.

- Operating system for servers:
  - Microsoft Windows server
- Operating system for end users:
  - Compatible virtually with all Windows Operating Systems (OS), later than Windows XP
- Browsers:
  - Mozilla Firefox 2 and above
  - Google Chrome
- Internet:
  - Minimum 512 kbps
- Development tools:
  - Visual Studio 2010+DevExpress
- Database:
  - Microsoft SQL Server Express Edition
- Diagrams:
  - Software Ideas Modeler 3.30
- Running environment:
  - Net Framework 3.5

BENEFITS

The HCMIS is helping health facilities to improve commodity management, data visibility, and overall performance. Users with various backgrounds—ranging from those with limited computing experience to advanced users and experts can use HCMIS due to its user-friendly interface.

The HCMIS Warehouse has given managers the ability to oversee and record deliveries and pickups, maintain inventory records, and track inventory location. They can use this detailed information to best manage their inventory at all times. Web-based dashboards enhance decisionmaking by adding the capability of visualizing the most updated data from all PFSA locations then using data from stock status and demand reports to make decisions about forecasting, resupply, and inventory management.

Since HCMIS Facility gives facility managers visibility to every health commodity in their store, including donated items and the commodities purchased with the RDF, managers can now provide stakeholders with instant information regarding all expiries, costs, and inventory. Users and managers can react quicker to changes in inventory and make more informed decisions about which products and how much of those products are needed to bring any facility up to adequate stock quantities, reducing the number and length of stockouts.

TANZANIA/ZAMBIA: OPEN LOGISTICS MANAGEMENT INFORMATION SYSTEM (OpenLMIS)

OVERVIEW

Since 2006, the USAID | DELIVER PROJECT has supported the Governments of Tanzania and Zambia by strengthening their public health supply chains. During this time, the project identified similar challenges in both countries related to health commodity reporting and requisitioning, order fulfillment, and data visibility in their public health supply chains. In the fall of 2011, to address these challenges, Tanzania and Zambia embarked on a collaborative journey to develop the business requirements for management information systems that could meet their needs. As a result, and with the recognition that both countries shared many of the same requirements, the Ministry of Health of Zambia and the Ministry of Health and Social Welfare of Tanzania formed a joint project to procure an eLMIS that could be deployed in both countries.

After an extensive landscape analysis found that no existing solution met the operational needs of the two countries' public health supply chains, the project initiated a multidonor, multipartner initiative that leverages a number of investments from donors to support a common vision of improving supply chain data and systems in developing countries. As part of the OpenLMIS initiative, the countries shared their detailed software requirements, which became the basis for the software development effort. In concert with all partners working to support the vision of making this tool freely available to other countries, the project created a state-of-the-art, full-featured, configurable, and extensible open source eLMIS to meet the needs of health commodity supply chains in low-income countries. Throughout the process, country ownership and stakeholder engagement were of paramount importance. From the beginning, ministry stakeholders were frequently consulted on the requirements for the software development.

The high-level design goals for the system were to (1) support real-time management of all health commodities, from the point of origin to the point of delivery; (2) be able to adapt to the unique requirements of each country; (3) be interoperable with other medical information systems (e.g., WMS, medical record systems, laboratory information management systems, ERP systems, and health information management systems);

and (4) facilitate data collection in low-infrastructure environments for review, aggregation, analysis, and forecasting.

SPECIFIC FEATURES/FUNCTIONS

In Tanzania, the eLMIS collects data from more than 6,000 service delivery points; in late 2015 and early 2016, it will expand to TB and vaccines to include all vertical public health programs in the country. In Zambia, the eLMIS collects data from more than 2,000 service delivery points, including four vertical programs—essential medicines, ARV, HIV testing, and lab—delivering services and commodities to public health facilities. District staff enter data for the facilities if computers and reliable Internet access are not available; however, where they are available—and at facilities that are not already using the Facility Edition to automate data collection and transmission to the central database—facility staff can use the web-based interface to enter report and requisition data directly into the eLMIS.

The central-level, web-based eLMIS is integral to Tanzania's and Zambia's public health supply chains. They interface with the ERP and WMS software used in each country, respectively, to process orders for delivery by the Medical Stores Department (MSD) in Tanzania and the Medical Stores Limited (MSL) in Zambia.

In addition to the web-based eLMIS deployed centrally in Zambia, an offline Facility Edition was piloted and is being deployed to 319 high-volume service delivery points, including major hospitals and large health centers. The Facility Edition automates stock control cards and daily activity registers in these facilities, and it automatically compiles and sends data via a web-based interface to the central eLMIS. The result is a reduced data collection burden on health facility workers and simplified end-of-the-month reporting and requisition process.

Central eLMIS and Facility Edition

• Multiprogram, multilevel reporting system

• Program-specific product and data collection forms configurable to match the current LMIS paper forms now in place

• Product catalog included

• Application Program Interface (API) to share master data, such as facility lists and product lists/codes with related systems

• Data sync between the Central eLMIS and Facility Editions

• Submission of stock data by the facilities

• Requisition and approval workflow
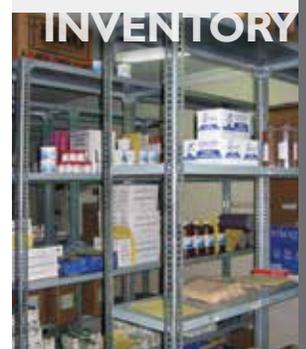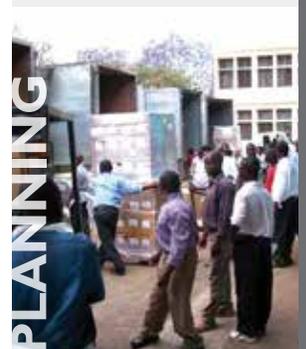
Central eLMIS

- Orders are exported to ERP/WMS system for fulfillment

- Reporting:
    - reporting rate
    - non-reporting facilities
    - summary report
    - supply status by facility
    - stock imbalance by facility
    - stocked out
    - district consumption comparison
    - consumption average by product
    - adjustment summary
    - report and requisition feedback
    - order and item fill rate

- Dashboards

- Email and SMS notifications/alerts

- Facility profile data and geographic information systems

- Laboratory logistics

- APIs to compare and contrast key data with health management information systems (HMIS)

*Tanzania's system includes additional features related to vaccine management and reporting

Facility Edition

- Stand-alone, offline-enabled Facility Edition of eLMIS

- Automated stock control cards

- Automated Daily Activity Registers

- Hub and spoke multitier stock management

- Automated HIV testing and ARV dispensing workflows

- Simplified report and requisition (R&R) completion and electronic submission

TECHNOLOGY

The Central eLMIS/OpenLMIS is a web-based LMIS that allows users to enter logistics data from different physical locations through a web-based interface. The system uses a central database to bring all the logistics information together, and it produces a variety of reports for different users

based on their defined system roles. It has been designed to be scalable, configurable, and secure, and it can be hosted on a government-controlled server or in a secure cloud-based data center. The Facility Edition server can be installed on a desktop class machine within a facility, with stand-alone devices used for data entry at each dispensing point connected via wireless or Ethernet networks.

- Operating systems:
    - Linux (Central Edition)
    - Linux/Windows/Android (Facility Edition)
- Browsers:
    - Internet Explorer 7 and above
    - Mozilla Firefox 2 and above
    - Google Chrome
- Programming Languages:
    - Java Spring Framework (Central Edition)
    - Java FX (Facility Edition)
- Database
    - PostgreSQL

BENEFITS

For program managers, policymakers, donors, and implementing partners, dashboards and detailed management reports help process the aggregate nationwide raw data for decisionmaking. With automated calculations and data checks, arithmetic errors are eliminated and data entry errors are significantly reduced. With electronic reports, automated approval workflows, and email/SMS notifications to the next reviewer, supply chain managers see significantly faster processing time where previously, issues such as unreliable transportation and manual processes caused delays. Additionally, the eLMIS provides district health management teams with the ability to easily identify overstock and understock situations and redistribute stock to meet patient needs and reduce losses through commodity expiry. Data are visible to authorized users throughout the requisition/order process, allowing for managers to pinpoint where supportive supervision may be necessary to assist their staff.

Ultimately, the health systems are reducing wastage through improvements to the R&R processes and data visibility while also improving the availability of health commodities at the service delivery points. The supply chain now works more efficiently to provide essential health services to the people of Tanzania and Zambia.
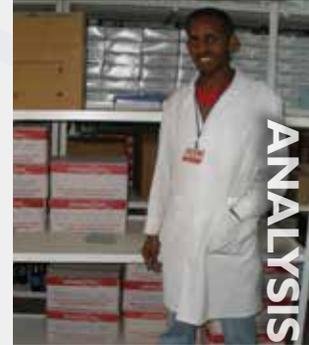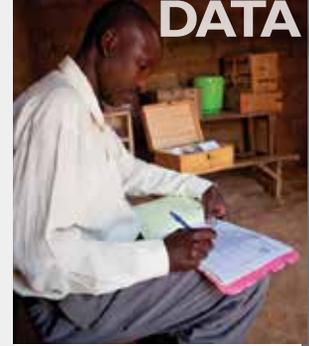
Note: This is a comprehensive list; however, we will focus on a high-level summation of the features/functions.

Characteristics	TZM-eLMIS (C)	HCMIS (W)	PaK-eLMIS
Technical			
Web access	Yes	Yes (Partial)[1]	Yes
Desktop application	Yes—Facility Edition	Yes	No
Offline access	Yes—Facility Edition	Yes	Yes (Partial)[3]
Data collection strategy	TZ- Data entry by facilities staff on paper forms. Data entry clerks enter at central level. ZM- Facility data entered electronically (if Facility Edition site) or on paper forms. Data entry clerks enter electronically at central level.	FE data (paper or electronic) are entered by facility staff; data entry clerks input at HE.	Data entered at facility level (paper or electronic), aggregated and entered electronically at districts.
Real-time reporting	No	No	Yes
Inventory management	No	Yes	Yes
Data source	Secondary—(Output of paper-based system entered in e-LMIS)	Primarily—Part of workflow based (Application use is a part of critical transactions)	Both secondary and primary inventory management is part of the workflow. Consumption reporting is based on paper system
Independent directory service	No	Yes	No
Unit of measures	Count	Any [2]	Any
Dashboard	Yes	Yes	Yes
Reports	Yes	Yes	Yes
Inventory Management			
Purchase order workflow	No	Yes	No
Print official purchase order (invoice)	No	Yes	No
Receipt workflow	No	Yes	Yes
Print official receipt invoices	No	Yes	Yes
Requisition, rationing, & approval workflow	No	Yes	Yes
Dispatch	No	Yes	Yes
Print pick list	No	Yes	Yes, but online only
Print dispatch invoice	No	Yes	Yes, but online only
Dispatch confirmation at physical stores	No	Yes	Yes, but online only
Losses and adjustments at physical central stores	No	Yes	Yes
Batch number tracking	No	Yes	Yes
Manages donated commodities	No	Yes	Yes
Manages RDF (Revolving Drug Fund)	No	Yes	No
Moving average costing	No	Yes	No
Pricing, margin, & overrides	No	Yes	No
Invoicing	No	Yes	No
Returns management	No	Yes	No
Warehouse Management			
Receipt workflow	No	Yes	Yes
Requisition processing	No	Yes	Yes
Requisition approval processes	No	Yes (decentralized to hubs)	Yes
On-spot analytics capabilities on approval	No	Yes	Yes
Batch tracking	No	Yes	Yes
In warehouse expiry tracking	No	Yes	Yes
First-to-expire, first-out (FEFO)	No	Yes	Yes
Pick list	No	Yes	Yes
Issue confirmations	No	Yes	Yes
Pick face management	No	Yes	Yes
Warehouse location types (cold chain, rack, shelf, controlled)	No	Yes	Yes
Batch tracking (in warehouse)	No	Yes	Yes
Batch tracking (to whom a certain batch has been dispatched to)	No	Yes	Yes
Cold Chain/Asset Management			
Cold chain 2–8o C	Yes	No	Yes
Cold chain -20 o C	Yes	No	Yes

Characteristics	TZM-eLMIS (C)	HCMIS (W)	PaK-eLMIS
Ice box and vaccine carrier	Yes	No	Yes
Ice packs	Yes	No	Yes
Power generators	Yes	No	Yes
Voltage stabilizers	Yes	No	Yes
Vehicles	Yes	No	Yes
Reports	Yes	No	Yes
Cold chain capacity calculation at 2–8°C	Yes	No	Yes
Cold chain capacity calculation -20°C	Yes	No	Yes
Inventory reports	Yes	No	Yes
Storage reports	Yes	No	Yes
Assets reports	Yes	No	Yes
Cold chain graphs	Yes	No	Yes
Cold chain assets transfer	Yes	No	Yes
Cold chain assets status update	Yes	No	Yes
Cold chain assets searching	Yes	No	Yes

GIS—Web Mapping

	TZM-eLMIS (C)	HCMIS (W)	PaK-eLMIS
GIS—Web Mapping	Yes	No	Yes

Vaccination (Special Immunizations Activities) Campaigns Management

Characteristics	TZM-eLMIS (C)	HCMIS (W)	PaK-eLMIS
Campaign types	No	No	Yes
Campaign editions	No	No	Yes
Vaccine selection	No	No	Yes
Readiness reports	No	No	Yes
District level	No	No	Yes
Teams level	No	No	Yes
National indicators	No	No	Yes
Campaign days data Entry	No	No	Yes
Catchup days data entry	No	No	Yes
LQAS reports	No	No	Yes
Campaign reports	No	No	Yes
Catchup reports	No	No	Yes
Donated Commodity Management	No	No	Yes
Configurable program areas	Yes	Yes	Yes
Funding source management	No	Yes	Yes

User and Roles

Characteristics	TZM-eLMIS (C)	HCMIS (W)	PaK-eLMIS
Supports access control by program area	Yes	Yes	Yes
Warehouse supported	Yes	Yes	Yes
User role by store	No	Yes	Yes

Other Features

Characteristics	TZM-eLMIS (C)	HCMIS (W)	PaK-eLMIS
Capture report and requisition from facilities	Yes	Yes	Yes
Ability to view reports and requisitions	Yes	Yes	Yes
Approval procedures that include geographic structures (district, region, central, etc.)	Yes	No	Yes
Placing order after approval procedures	Yes	Yes	Yes
Proof of delivery at warehouse level	Yes	Yes	Yes
Proof of delivery at facilities	No	No	Yes

Reports

Characteristics	TZM-eLMIS (C)	HCMIS (W)	PaK-eLMIS
Real-time current stock status	No	Yes	Yes
Stock status trend analysis	Not Yet	Yes	Yes
Consumption trend	Not Yet	Yes	Yes
Losses and adjustments	Yes	Yes	Yes
Aggregate consumption report	Yes	Yes	Yes
Order fill rate report	Yes	No	No
Reporting rate report	Yes	No	Yes

Integration

Characteristics	TZM-eLMIS (C)	HCMIS (W)	PaK-eLMIS
Sends order	Yes	No	No
Receives shipment data	Yes	No	No

Lab Logistics

Characteristics	TZM-eLMIS (C)	HCMIS (W)	PaK-eLMIS
Facility equipment inventory	Yes	No	Yes
Support contract management	Yes	No	No
Maintenance log. management	Yes	No	Yes

[1] Daily transactions are recorded using Windows application that connects to a local server at warehouses; reports are accessible via the web.

[2] Lab supplies are liquid and measured in liters and therefore need to allow measuring in decimal of units.

[3] Transactions are recorded using the barcode scanner application that connects to the LMIS web services, whenever the Internet is available.

POST-REQUISITES/
NEXT STEPS

POST-REQUISITES

As part of the launch process for your eLMIS application, either you or your selected vendor will provide eLMIS application support to the end users for a brief period. Your organization should evaluate support options at its disposal to assist with providing this support moving forward. Some types of support mechanisms to consider are the following:

- Email feedback: Consider providing your user community with a way to submit feedback via email. Email provides a quick, easy way for them to use a tool they know.

- Centralized feedback capture: Depending on the technical sophistication of your organization, this could be as simple as a spreadsheet in a shared folder or as complex as a portal available inside and outside the organization.

- Office hours and help desk dial-in: This is the most common support mechanism because it offers regular office hours that give your users a consistent support mechanism. Scheduling this time in advance will also reassure users that they have a defined, future time when support resources will be available to answer questions or address concerns.

CONTACT INFORMATION

- Based on these system descriptions, if you can adopt and develop one of the eLMIS systems for your business or country and you would like more information, please contact Ramy Guirguis, rguirguis@usaid.gov or Lindabeth Doby, ldoby@usaid.gov.

ACRONYMS

API	Application Program Interface
CCEM	cold chain equipment management
cLMIS	contraceptive Logistics Management Information System
CWH	Central Warehouse
eLMIS	electronic Logistics Management Information System
EPI	Expanded Programme on Immunization
ERP	Enterprise Resource Planning
GIS	Geographic Information System
GOP	Government of Pakistan
GUI	Graphical User Interface
HCMIS	Health Commodity Management Information System
IT	Information Technology
KPI	Key Performance Indicators
LMIS	Logistics Management Information System
MIS	Management Information System
MNHSRC	Ministry of National Health Services, Regulation and Coordination
MSD	Medical Stores Department
MSL	Medical Stores Limited
OpenLMIS	Open Logistics Management Information System
PFSA	Pharmaceuticals Fund and Supply Agency
PWD	Public Welfare Department
RDF	Revolving Drug Funds
R&R	Report and Requisition Form
SQL	[special purpose programming language]
SMS	Short Message Service
TB	Tuberculosis
TB-DMIS	Tuberculosis Drugs Management Information System
TZM	Tanzania/Zambia eLMIS
UNICEF	United Nations Children's Fund
USAID	U.S. Agency for International Development
vLMIS	vaccine Logistics Management Information System
WHO	World Health Organization
WMS	Warehouse Management System

TOOLS AND RESOURCES

Guidelines for Implementing Computerized Logistics Management Information Systems (CLMIS), Second Edition

Malawi: Business Case for an Electronic Logistics Management Information System

Improving Pakistan's Vaccine Supply Chain for Better Health Outcomes

eLMIS: An implementation of OpenLMIS in Tanzania and Zambia

Health Officials in Zambia Get Trained on New eLMIS to Foster Better Access to Medicines Nationwide

Improving Health Outcomes in Zambia

Tanzania Celebrates the Launch of the eLMIS Charter and System, the Logistics Management Unit Charter, and Guidelines for Donations

Zambia: eLMIS Improves Data Management and Processing Time at Medical Stores Limited

Improving Health Outcomes in Zambia and Tanzania through Technology Innovation

1616 Fort Myer Drive, 16th Floor
Arlington, VA 22209 USA

USAID | DELIVER PROJECT
FROM THE AMERICAN PEOPLE