



To: USAID Global Health Supply Chain Program – Procurement and Supply Management (GHSC-PSM) Project (PSMNepalProcurement@ghsc-psm.org)

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Re: RFI-Nepal-HQ-001, Logistics Management and Information Systems Solutions

Product capability

RFI Nepal Requirement	OpenLMIS Functionality
Support order requisition process for timely delivery of medicines	Supports requisition workflows based on different configurable rules
Provide users the ability to track inventory, consumption and receipts	Supports end-to-end tracking of products in inventory, including transactions (issues, receipts, losses/adjustments, returns), stock status, aging, consumption, wastage, as well as product value (unit cost)
Provide the managers with the ability to monitor reporting and data quality	Supports monitoring and performance management and including reporting rates, timeliness, completeness, and accuracy
Allow quick and easy access to users/sites so staff can review client profiles and accounts and deliver timely service	Supports different user profiles, with user-friendly UIs and logical workflows, and enables user-defined dashboards
Provide management and operational information to help make timely business decisions	Provides robust decision support for routine operations, performance dashboards for management, and data export and exchange with other applications (e.g. DHIS2) for deeper analysis

I. Institutional capability

This section will highlight the offeror(s) institutional capability offering LMIS solutions that are similar in scope, location, and specifically delineating the value of the offered solutions and client. This is section cannot exceed 3-4 pages.

Background

OpenLMIS is a global initiative to support the development of shareable, interoperable, open-source software for electronic logistics management information systems (LMIS). Developed with support from Rockefeller Foundation, Bill & Melinda Gates Foundation (BMGF), USAID, JSI, the UN Commission on Life-Saving Commodities, PATH and others, key aspects of the OpenLMIS vision are: shared Investment and benefit through an open source community and extensible architecture; interoperability with other health systems; and scalability/adaptability. OpenLMIS is currently deployed in six geographies across

multiple programs and levels of scale (pilot to national), with an additional national-scale implementation planned to launch in July 2017.

The OpenLMIS Community comprises a diverse set of funders, technical partners, and implementers who participate regularly in committee meetings, calls, and forums. These partners, including those listed above and many others, are responsible for the governance and direction of the initiative at large, as well as specific technical considerations relating to features, functionality, and architecture of the software itself.

Early contributions to OpenLMIS by key partners first helped shape the product and define its original code base (v.0.9) for national deployments in Tanzania and Zambia by the USAID | DELIVER PROJECT in late 2013 under the name “eLMIS.” In 2015, eLMIS was also deployed in Côte D’Ivoire, and OpenLMIS software development continued with the v1.0 release, which was deployed by VillageReach to manage vaccine distribution in Mozambique and Benin.

Throughout the development of OpenLMIS, the community has continuously reviewed and upgraded the system as necessary. In September 2015, the community agreed that a single, “core” code line was required that would merge varying code branches of OpenLMIS. This effort to re-work the OpenLMIS code is referred to as the “re-architecture” of OpenLMIS, and is taking the tool from version 2.0 to version 3.0, with additional releases following a release schedule laid out in the [OpenLMIS Product Roadmap](#).

OpenLMIS v3.x

The goal of the re-architecture of OpenLMIS is to migrate from a monolithic architecture that encouraged forking to an all-new, microservices-based architecture that better supports modularity and extensibility, thereby enabling multiple OpenLMIS implementations in different countries to share one global, open source codebase. In addition, the underlying object model has been rewritten to provide support for the latest GS1 standards, which will enable future integration with global systems and provide end-to-end visibility of a supply chain.

OpenLMIS v3-Beta was released in November 2016 and provides services for Requisitions, Reference data, Notifications, and Authorizations; a v3.0 stable, minimum viable product (MVP) release is scheduled for late February 2017. The release schedule, which is subject to change based on dynamic prioritization and requirements from the Governance Committee, is outlined in the OpenLMIS Product Roadmap. Additional quarterly “point” releases are scheduled throughout 2017.

Throughout the release schedule, additional features and functionality will be included that answer the most-requested needs of users based on comprehensive requirements gathering. The current roadmap of existing and new features and their estimated timelines are as listed below:

- **System Architecture (v3.0):** Includes modular architecture and extensibility of the system
 - **Reference web user interface:** Functionally complete reference UI provides access to all core services, as well as everything needed for an LMIS implementation. API layer sufficient to build a completely new interface if needed to meet project needs. Projects that need to customize portions of the reference UI module may fork it and make changes
 - **System administration (estimated v3.1):** Management of users, facilities, products, programs, etc.

- **Configurable notification service (estimated v3.1):** Send email alerts and notifications per user profile settings
- **Requisition Service (v3.0):** Fully customizable requisition process for any number of products, programs, and associations. Highly configurable workflow for review and approval of Requisitions; emergency Requisitions; offline data entry and caching; customizable Requisition template; automatic notifications; calculations of dependent values
 - **Budgeting feature (estimated v3.1):** Setting price schedule for orderable products and supporting the ability to view available budgets to compare requisition costs
 - **Program data (estimated v3.1):** Supporting program data variability with forms and fields
 - **Offline functionality for Requisitions (v3.0)**
Users can select a requisition to save offline, modify the requisition freely, and then sync the requisition back to the OpenLMIS Requisitions Service once they are online again. Data is downloaded to the browser's local storage, and is automatically uploaded when connectivity returns
- **Fulfillment (v3.0):** Basic order and Proof of Delivery (POD) APIs, exporting order files, viewing PODs and orders
 - **Shipment and receipt for external fulfillment (estimated v3.1)**
 - **Local fulfillment (estimated v3.2):** Process to fill stock as requested by a lower level facility from a warehouse
- **Stock management**
 - **Lot management (estimated v3.1):** Lot/batch tracking
 - **Enhanced electronic stock card (estimated v3.1):** Mirrors a physical stock card, recording and serving as log of issue/receipt, stock on hand (SOH), adjustments, etc.
 - **Offline functionality for stock management (estimated v3.2):** Enter data and complete any stock management activities even with intermittent or no connectivity
 - **Equipment management (estimated v3.2):** General equipment functionality, specialized cold chain equipment is a separate function
- **Reporting and Analytics (full functionality estimated v3.2)**
 - **Business intelligence (BI) tool support for Reporting (v3.0):** ETL available that pulls data into tables available to Tableau for reporting and data visualization
- **Vaccines module with cold chain equipment support (estimated v3.3):** Manage vaccine need calculation, requisition/push, distribution, stock management, cold chain, and reporting
- **Global Standards One (GS1) associations (under discussion)**
Inclusion of GS1 product codes and trade items, and incorporation of the USAID Logical Reference Model (LRM)

Facility-based Mobile Solution

Ministries of Health in several countries have particularly identified the access to quality, accurate, and timely logistics data, and a lack of inventory management capacity at primary health centers (PHC), as key challenges. In the absence of high quality facility-level data and inventory management, decision-making around supply planning, forecasting, distribution, and delivery is speculative, and prevents the reliable availability of drugs at the point of care, leading to consistent stock-outs and expirations. While there are some software tools available that automate logistics data and inventory management processes at PHCs, free and open source tools that meet the requirements of multi-program stock management for 100+ commodities, or that integrate with automated requisitions and higher-level systems are not available.

The Clinton Health Access Initiative (CHAI) has piloted facility-based Android systems in Mozambique using CommCare Supply and in Nigeria using DHIS2, and has conducted in-depth analyses of systems across countries to inform requests from MOHs. Existing systems have several challenges, including: proprietary and therefore expensive; focus primarily on tracer commodities; dependent on specific development teams for customization; unable to integrate with higher-level systems in an easy manner; are not able to incorporate business logic needed for inventory management (e.g. DHIS2).

In response to these identified needs and challenges, CHAI with ThoughtWorks as its technical and software development partner built SIGLUS, a free and open source facility-based Android application that uses OpenLMIS v.2.0 as its backend for the Mozambique Ministry of Health (MOH). Highlights of the SIGLUS application include:

- Automated calculations and pre-populated forms to reduce pharmacists' workload
- Stock alerts to help pharmacists better understand and plan their inventories
- Automatic sync and offline mode to support normal workflow under network situations in low-resource areas

Overall, SIGLUS currently offers the following functionality that has been prioritized in close collaboration with MOH Mozambique and other stakeholders:

- **Offline Functionality:** allows all activities to be conducted in offline mode. Requires short connectivity periods to sync to server
- **Requisitions:** place orders to relevant higher-level stores for commodities in each program, based on a schedule or on an emergency basis. SIGLUS can feed into both pull and push systems and generates suggested amounts based on localized historical data
- **Receipts:** receive stock through fulfillments of orders or from other sources such as donations, private sector, or stores that do not have OpenLMIS; also allows receipt and unpacking of medical kits
- **Issues:** record stock issued to dispensing points, other facilities, or community health workers, to update stock balance
- **Adjustments:** record losses (with loss reasons), physical stock counts based on a schedule, and other adjustments
- **Basic Reports:** the system covers basic reports such as stock on hand, low stock, monthly consumption
- **Electronic stock card:** generates an electronic stock card that reflects paper stock cards that displays all transactions for any period and stock on hand
- **Alerts:** receives alerts when stock is below minimum or stocked out, and notifications for when orders or physical stock counts are due
- **Batch information:** is able to track and record transactions by batch numbers
- **Workflows:** provides workflows around inventory and requisitions with customized form UIs, as well as form approval workflows
- **History:** provides up to 13 months' history view for stock movements
- **Analytics and Error Reporting:** the system gives information on how users are using the system itself, along with real-time reporting and logging of errors that occur in the system

Note that SIGLUS was built specifically for Mozambique's needs, using OpenLMIS v2.0 as the backend. The app will be significantly modified to create a mobile solution that would allow other countries to more easily configure it for their local needs without requiring extensive software development, and

also to work with OpenLMIS v3.x. This modification will be done using Nepal's local requirements and business processes as a reference and for immediate deployment in Nepal.

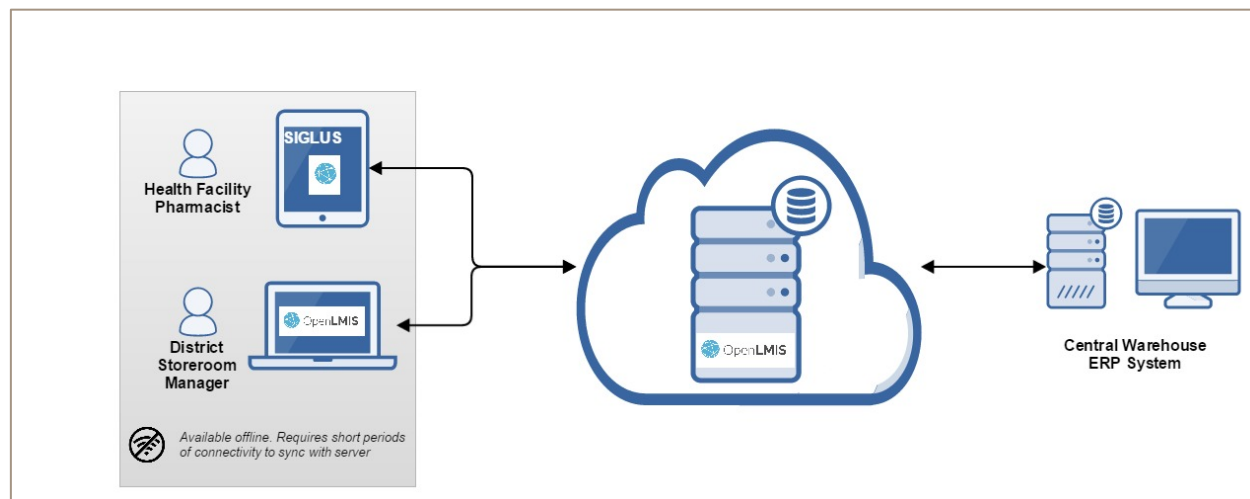


Figure 1. High-level demonstration of communication between systems

Users can either use the tablet or web application interface. As noted earlier, the tablet supports all functions offline. The application supports an offline mode for key activities. Both table and web app front ends require periods of connectivity to sync with the server. The central or regional ERPs can connect or interoperate with OpenLMIS via APIs or FTP transfers. The choice of integration is made based on the system and desired integration points.

Vendor Consortium

In order to provide a complete LMIS solution that fits the particular needs of the Nepal context, VillageReach is submitting an RFI response on behalf of a consortium of partners who would provide support on the implementation of OpenLMIS as the primary electronic LMIS and SIGLUS as the tablet application. This consortium includes John Snow, Inc. (JSI), ThoughtWorks, and VillageReach. The Clinton Health Access Initiative (CHAI), while not a part of the applicant consortium, will provide support on business analysis and technical support for deployment as part of its ongoing work on OpenLMIS and development of SIGLUS for use across different geographies.

II. Past performance

Past Performance: This section will highlight the offeror(s) past performance offering LMIS solutions similar in scope, location, and specifically delineating the value of the offered solutions and client. This section cannot exceed 3-4 pages.

John Snow, Inc.

John Snow Inc. (JSI) has implemented electronic or computerized supply chain logistics management information systems across the globe, especially in resource-constrained environments. With a strong focus on people and processes, we work with clients to define human-centered requirements; re-engineer business process; develop and deploy software applications; train and support users; and build capacity in data analysis, systems administration, and change management, while emphasizing local ownership.

JSI through the USAID | DELIVER PROJECT worked closely with the Tanzania and Zambia Ministries of Health to help inform the initial requirements for the first version of OpenLMIS built by VillageReach and ThoughtWorks in 2012. Prior to the installation of OpenLMIS under the local name “eLMIS” in these countries, Tanzania and Zambia programs had been using a combination of paper-based forms, Access-based tools, and mobile technology for data capture on tracer products. Both countries needed a robust, web-based electronic LMIS system able to handle requisitions for all logistics systems nationwide. Working with the Ministries of Health in these countries and using the Collaborative Requirements Development Methodology (CRDM) developed by PATH, a series of stakeholder workshops were held in Zambia and Tanzania, and a set of requirements was agreed upon for joint implementation of an LMIS system that could handle both countries’ requirements. These requirements then informed the development of the first version of OpenLMIS.

eLMIS was initially piloted in Tanzania in 2013 by JSI via the USAID | DELIVER PROJECT. Since that initial pilot, eLMIS has scaled to over 6,000 service delivery points supporting supplies requisitioning for over 500 products in all programs including malaria, TB, HIV/AIDS, lab commodities, essential medicines, and vaccines. eLMIS has also been expanded to a national level deployment to support routine immunization data collection and stock management nationally, which includes cold chain management, real-time district vaccine stock management, tracking vaccine issues and receipts, routine data collection, vaccine replenishment, and national-level reports. In addition, eLMIS is integrated at a national level with the country’s warehouse management software (WMS) Epicor 9. In Tanzania, stockout rates for all product goods dropped from 32% with a manual logistics system to 23% when using eLMIS, and frequency of stockouts greater than seven days dropped from 24% to 15%. Additionally, eLMIS was also deployed as in Zanzibar in 2014, and went live in all districts in 2015. The system is integrated with mSupply, the WMS at the Zanzibar Central Medical Store.

In Zambia, OpenLMIS also operates under the name eLMIS and was implemented by JSI via the USAID | DELIVER PROJECT. Since initial piloting, eLMIS has scaled to support requisition processes for over 2,000 service delivery points for ARV, HIV testing, essential medicines, and labs, with an additional standalone offline facility edition in 319 high volume service delivery points. At the national level, eLMIS is integrated with the MACS warehouse management software. In Zambia, timeliness of reporting was improved in several ways by using eLMIS versus a manual logistics system. The time it took for health facility data to reach the central level went from more than 15 days to less than one day. Feedback reports could be sent to health facilities within minutes, compared to one to two weeks previously. Monthly reports and orders were sent to districts and the central level in just a few minutes, versus a day to two weeks using a manual system. Finally, data was available to decision-makers within one week, versus taking a month or more previously.

In Côte d’Ivoire, JSI deployed and translated into French the Tanzania version of OpenLMIS. Deployment included set-up and configuration, testing, user training, pilot to 50 sites, national scale-up to 329 sites (as of September 2016), and training for system support and administration.

VillageReach

VillageReach manages the implementation of OpenLMIS in Mozambique, where the tool supports informed push vaccine delivery under the local name “SELV.” There, the software manages supply chain and immunization program data at the health facility level, providing the visibility vaccine program managers at different levels need to report on key indicators, identify supply chain bottlenecks, review program performance, and identify and address cold chain gaps. The provinces using the software have seen drastic improvements in data quality, and no other vertical program in the province has seen this level of data accuracy and quality. The near real-time access to data on a monthly basis has led to vast

improvements in both the management of vaccine supply chains (low to no stockouts at facilities, better cold chain uptime, improved delivery schedules) and in the quality of data available. A vaccine management system has also been deployed in Benin based on the success of OpenLMIS in Mozambique.

The Clinton Health Access Initiative (CHAI)

CHAI has worked extensively with the Ministry of Health and Central Medical Store in Mozambique to develop SIGLUS, an Android stock management application specifically designed to work in low-infrastructure low-connectivity settings. The goal behind this was to fill a critical gap between health facility and higher tiers with a fully functional commodity agnostic stock management system that enabled efficient stock management and provided high quality, reliable data.

CHAI developed SIGLUS in partnership with ThoughtWorks, which provided software development services. SIGLUS was piloted at nine facilities with a minimum viable product starting in April 2016. This provided visibility over stock movements and inventories at the health facility level to stakeholders and supply chain decision makers for the first time, and ongoing agile development allowed for improvements to the MVP based on user feedback. Based on the successful pilot and an extensive evaluation by MOH Mozambique regarding the system's technical and operational viability, SIGLUS was officially approved for national scale-up in August 2016. As of January 2017, SIGLUS exists at 30 health facilities across four districts. SIGLUS will be deployed in 100 facilities by September 2017 and will be scaled up further thereafter.

Prior to building SIGLUS, in 2013 CHAI, with ThoughtWorks as its software development partner developed a Facility Stock Management tool (FaStMan) for the MOH in Nigeria. FaStMan is an Android application with nearly identical aims and functionality as SIGLUS but uses DHIS2 as a backend. FaStMan has been deployed in 170 health facilities across 13 Local Government Areas (LGAs) in 3 states. Amongst other products, it has been used as a key source of vaccine stock and consumption data and feeds into higher-level systems including NLMIS, DHIS2, and Navision at the regional and national tiers of vaccine supply chain.

In addition to SIGLUS and FaStMan, in India CHAI has developed Inventory Management System (IMS), a technology solution developed at the request of the National AIDS Control Organization (NACO) to provide them with complete visibility of inventory transactions and ensure consistent availability of HIV/AIDS commodities and services. The system has been deployed at all ART centers in India and is in the process of scaling up to all Integrated Counseling and Testing Centers. It is also being considered for inclusion of Tuberculosis and Malaria commodities. CHAI has also developed and deployed LMIS in various other countries including Kenya, Laos, Myanmar, and Sierra Leone and has deep end-to-end experience in national multi-program LMIS.

ThoughtWorks

ThoughtWorks' experience in the LMIS space includes developing early versions of OpenLMIS with VillageReach, working on the FaStMan tool with CHAI for MOH Nigeria, and most recently working with CHAI on the SIGLUS tool in Mozambique. In addition to playing a significant software development role in these engagements, ThoughtWorks continues to provide overall expertise in the Agile methodology being used. With SIGLUS in particular, ThoughtWorks provided Agile expertise around software development, business analysis, user experience design, quality assurance, automated testing, and project management. ThoughtWorks also engaged in-country at times with CHAI Mozambique and the MOH Mozambique with workshop facilitation, onsite user interviewing and testing, and training of the Ministry and pharmacists on both the OpenLMIS web portal and the SIGLUS tool.

Along with the other vendors, ThoughtWorks is also highly involved with the OpenLMIS committees: governance, product, and technical. Within these communities, ThoughtWorks contributes their expertise and experience to the overall vision, product, and technical direction of OpenLMIS. Currently, this focus is around ensuring successful building and delivery of the new 3.x version of OpenLMIS in 2017. Recently, ThoughtWorks began software development work for initial versions of the stock management piece of the OpenLMIS re-architecture. The plan is to finish an MVP version of this stock management piece for the OpenLMIS 3.1 release in May 2017.

Conclusion

OpenLMIS is a powerful, adaptable solution that can be expanded and tailored to meet the needs of decision-makers and program managers by building on previous experiences in multiple geographies. With multi-program capacity, one solution can be leveraged across multiple programs, decreasing total cost of ownership (TCO) and improving sustainability. OpenLMIS is interoperable with different systems at multiple levels, including DHIS2, mobile data collection platforms, and warehouse ERP systems, eliminating data flow bottlenecks throughout supply chain levels. Proven implementations at scale in six geographies display both the adaptability and global applicability of OpenLMIS, while also demonstrating the value of an open source global health information system solution for supply chain and program integration. The existing platform of OpenLMIS is a proven, flexible solution with high potential for scale and adaptation to real-time decision-making and management needs.