SCALE UP OF RXSOLUTION eLMIS IN UGANDA

BACKGROUND

An efficient commodity supply chain is the cornerstone of a well-functioning health system. To ensure an uninterrupted supply of essential medicines to clients, decision makers need to have visibility into inventory of health commodities up and down the supply chain. An electronic logistics management information system (eLMIS) provides better data visibility into the supply chain, enabling data-driven decisions that lead to improved commodity availability and patient health care outcomes.

Before 2010, health supply chain managers in Uganda were unable to effectively monitor stock management in health facilities. A lack of reliable and timely data for evidence-based decision making was a contributing factor. The logistics management systems at public health facilities were paper based and had limited capability for data analysis. Without tools to track, analyze, and manage stock information, it was difficult to prevent stock-outs, overstocks, and expiry of medicines. This led to a persistent problem of inadequate supply of essential medicines and supplies in the health facilities.

Recognizing this challenge, the Uganda Ministry of Health (MoH) embarked on a program to improve the capacity and performance of health facilities in inventory management. In 2010, the MoH chose RxSolution, an integrated pharmaceutical management software, to automate inventory management in high-level public and private not-for-profit (PNFP) health facilities in the country.

RxSolution is an eLMIS developed with support from the US Agency for International Development (USAID). It is freeware developed in South Africa by pharmacists1 with experience implementing stock solutions in low-resource settings. The system supports best practices for procurement, storage, and dispensing of medicines and health supplies and is specifically designed to manage medicines and health supplies from start to finish, from the planning stages of procurement to the moment the product is given to the patient.

The software has the following modules:
- A medicines product catalog
- Procurement and ordering
- Receiving
- Requisition and issuing
- Stock taking
- Patient registration
- Prescribing
- Dispensing
- Reports

Additional innovations implemented for the RxSolution roll out in Uganda include:
- A centralized medicines and health supplies product catalog, electronic ordering from PNFP facilities to the Joint Medical Store
- An automated system installation package (RxBox)
- Real-time data synchronization to the MoH Pharmaceutical Information Portal (PIP) data warehouse for stock status reporting
- Enhancement of reports in RxSolution to fit the Ugandan setting

Figure 1 shows the RxSolution modules and the innovations added for Uganda. The majority of health facilities where RxSolution has been implemented are using only the inventory management modules, but a small number also use the patient management and dispensing modules.

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1 RxSolution overview. Available at http://siapsprogram.org/tools-and-guidance/rxsolution/ USAID Systems for Improved Access to Pharmaceuticals and Services
IMPLEMENTATION APPROACH

RxSolution was selected by the MoH Pharmacy Department and Division of Health Information after a review of 16 other pharmaceutical inventory management tools to support computerization of medicines management in Uganda. The software was selected for its end-to-end functionality, from ordering and receipt to requisitioning, issuing, prescribing, and dispensing, in one integrated package. It was piloted in 2011 in Butabika National Mental Referral Hospital, Masaka Regional Referral Hospital, and Kayunga General Hospital. Scale up of RxSolution throughout the country started in 2014, with substantial roll out in 2015 and 2016. The reports in RxSolution were enhanced to better fit Uganda’s health facility operation and reporting requirements. These included ordering, stock status, expiry, audit, redistribution, and national health management information system reports. The USAID-funded Uganda Health Supply Chain (UHSC) project, implemented by Management Sciences for Health (MSH), led the roll out of RxSolution in the country in collaboration with the MoH and partners. Scale up of RxSolution across the country was achieved through collaboration with health partners working in the different regions of the country who supported and participated in the roll out. Ongoing support for RxSolution in health facilities has been transitioned to these regional partners with MoH oversight.

RESULTS AND ACHIEVEMENTS

As of 2019, RxSolution had been installed in the stores of more than 270 health facilities across the country. All of these facilities synchronize with a centralized medicines and health supplies product catalog and have been set up to automatically submit data to the MoH PIP system for stock status reporting. This has improved access to real-time data and reduced the time it takes for health facility information to reach the MoH. Before RxSolution, these facilities only submitted monthly stock data on 41 tracer commodities through the MoH DHIS2 health management information system, but RxSolution provides real-time data on approximately 300 commodities for connected facilities. RxSolution has also increased health facility efficiency in inventory management through automated generation of inventory reports and provides visibility into commodity wastage due to expiries and overstocks, which has contributed to corrective actions at the national and sub-national levels to ensure optimal availability of commodities. Aggregate reports and dashboards for data from RxSolution sites across the country were developed in the MoH PIP data warehouse system to provide supply chain insights to managers at different levels. The reports are automatically shared routinely by email to various health supply chain stakeholders to provide insights into commodity security at the facility level. Figure 2 shows a sample of the expired items dashboard, while Figure 3 shows a sample of the short dated items’ drillable aggregate report.
Figure 2: Sample of the RxSolution expired items dashboard in the Ministry of Health PIP data warehouse

Figure 3: Sample of the RxSolution aggregate short dated items report in the PIP

Ministry of Health

Region | Facility | Expiry date | Cost | Code | Product Description | Quantity in stock
---|---|---|---|---|---|---
Central
- Bukoba
  - Kawolo general hospital
    - 31-05-2020
    - 8UGX: 210,929
    - Fentanyl (4mg)/Fentanyl (10mg) 50mg/5mg Tablet Comb, (2) 50mg (Blister)
  - Total Cost: 2,760,789.34

- Busitembwa
  - Butungo health center IV
    - 31-05-2020
    - 8UGX: 228,202
    - Pethidine (100mg) 2ml (Injection) (1/100mg) Ampoule (PREPACKED)
    - Total Cost: 3,049,696.58

- Gombe
  - Gokwe general hospital
    - 31-05-2020
    - 8UGX: 151,129
    - Total Cost: 375,119.57

- Kasese
  - Kasese health center IV
    - 11-05-2020
    - 8UGX: 210,929
    - Allopurinol (100mg) 100mg Tablet Comb, (2) 100mg (Blister)
    - Total Cost: 1,545,891.53

- Kabale
  - Kabale health center IV
    - 31-05-2020
    - 8UGX: 210,929
    - Total Cost: 222,841.09

- Kampala
  - Kamuli health center IV
    - 31-05-2020
    - 8UGX: 228,202
    - Pethidine (100mg) 2ml (Injection) (1/100mg) Ampoule (PREPACKED)
    - Total Cost: 4,547,569

- Kasese
  - Kasese health center IV
    - 11-05-2020
    - 8UGX: 210,929
    - Total Cost: 2,760,789.34

- Kasese
  - Kasese health center IV
    - 31-05-2020
    - 8UGX: 228,202
    - Pethidine (100mg) 2ml (Injection) (1/100mg) Ampoule (PREPACKED)
    - Total Cost: 1,545,891.53

- Kampala
  - Kampala health center IV
    - 31-05-2020
    - 8UGX: 210,929
    - Total Cost: 2,760,789.34

- Kasese
  - Kasese health center IV
    - 31-05-2020
    - 8UGX: 228,202
    - Pethidine (100mg) 2ml (Injection) (1/100mg) Ampoule (PREPACKED)
    - Total Cost: 1,545,891.53
Finally, the complete suite of functionality of RxSolution, from stock management to patient registration, anthropometry, vital signs, history, and laboratory results data capture, plus digital prescribing and dispensing, was set up at Makerere University Hospital. The hospital was set up as a model site to show the full capabilities of RxSolution software and to demonstrate requirements for achieving end-to-end traceability of medicines from supplier to patient.

LESSONS LEARNED

Some of the key lessons learned during scale up of the RxSolution eLMIS in Uganda include:

- A policy shift to eliminate paper-based inventory management is required to ensure optimal use of the eLMIS
- Scale up should be achieved in incremental phases to be most effective
- A harmonized product catalog is essential for use across all health facilities that are using the eLMIS
- The eLMIS should primarily be used for day-to-day commodity management operations of the health facility and not simply as a reporting tool
- Most data use in the health facility should be at the source from which the data are generated to support commodity use, management, and availability and then additionally at higher levels
- Reports should be action oriented to inform timely operation and strategic decision making
- System development on a web-based platform would ease maintenance and system upgrades in facilities across the country vis-a-vis the current standalone application architecture of the system
- Collaboration with other partners during scale up is beneficial for all. Collaboration provides for shared costs, faster scale up, and greater reach and fosters a sustainable support structure

WAY FORWARD

An upgrade of RxSolution to a web-based platform is required for easier maintenance of the system. Interoperating RxSolution with other facility systems and supplier warehouse systems is also required to allow for data sharing and to minimize dual data entry in systems. Full capacitation of the MoH and partners to comprehensively support RxSolution is essential for system sustainability.