Information Systems for Supply Chain Management:

The case for connecting separate and interoperable technology applications for Logistics Management Information System and Health Information Management Systems data

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Background

Routine health information systems (RHIS) are essential for monitoring and evaluation (M&E) health service delivery, and for planning and managing resources. Two pillars of RHIS are health management information systems (HMIS) that collect and use service data from health facilities, and logistics management information systems (LMIS) that collect and use medicines supply data from health and storage facilities.

In recent years, donors and country governments have invested heavily in software applications for both types of systems. While they have some elements in common, their purpose and characteristics are different. Using dedicated, fit-for-purpose software solutions for each system, and connecting them where possible can leverage the strengths of each while still allowing them to separately meet the unique needs of their business processes and primary users.

Unique Characteristics of LMIS and HMIS Systems

An LMIS and an HMIS operate separately in most cases because there are fundamental differences in the nature of these systems:

LMIS data are first and foremost used for logistics transactions, particularly determining how much of each medicine, vaccine, reagent or consumable to supply to each facility to meet service delivery needs, and facilitating the ordering or allocation process for the supply. Data flow up the pipeline so that decision makers can make informed, operational decisions on supplies flowing down the pipeline. These data may flow at regular or irregular intervals, often have to be evaluated longitudinally to make a resupply decision for a single period or event, and are typically

incorporated into transactional workflows (e.g., ordering, receiving, supplying, alerting when an out-of-specification condition is reached). In many systems, health workers use the data for managing their stores and requisitioning new supplies. Of course, logistics data are also used for monitoring supply chain performance, and should also be used to validate (and be validated by) HMIS data on service delivery.

HMIS data consist of incidence of disease, client/patient information, and health services rendered (patients per regimen, vaccine coverage, etc.), and are used to support planning, monitoring, and management in health facilities and organizations. These data are normally reported on an aggregate basis for a fixed reporting period, are usually evaluated by individual reporting period, and are not typically used for transactional workflows. They can be used to determine disease patterns or to track health services used, as well as to monitor and evaluate health service delivery. Some programs, such as immunization, use service and/or demographic data to inform supply chain actions, particularly forecasting and replenishment.

The difference in nature and use of the two systems means that it can be difficult to use one for the other's purpose. Making an LMIS flexible enough to capture a wide variety of service data and calculate a wide variety of summary indicators would be difficult. Making an HMIS capable of supporting the business logic of logistics processes and capturing logistics transactions would be equally difficult. However, with the increasing diffusion of both systems, there are opportunities for them to complement each other. These opportunities are primarily at the point of care and at the policy level.

As low- and middle income countries (LMICs) transition to electronic health information systems, DHIS2 has been widely implemented; it is open source, freely available, and offers

excellent adaptability and sleek visualization tools.

A variety of electronic LMIS (eLMIS) software solutions have been deployed in low- and middle-income countries, including HCMIS (Ethiopia) Logistimo (India, Myanmar, and South Sudan), OpenLMIS (Benin, Côte d'Ivoire, Mozambique, Tanzania, and Zambia), and OneNetwork (Rwanda). These systems are designed specifically to support the automation of supply chain workflows and business logic, which can include inventory management, demand planning, requisition/allocation, order fulfillment, receipt confirmation, track-and-trace, etc.

Both DHIS2 and eLMIS solutions have their strengths, but each has been designed to meet the specific needs of HMIS or LMIS. How can they work together?

Exchanging Data between HMIS and LMIS Systems

The most obvious points of integration for an HMIS and LMIS are at the point of care and at the policy level. At the point of care, if a small service delivery site such as a health post, or a community health worker does not manage many commodities, they could report their service and supply data on a single HMIS form and the data could be captured in the HMIS application. These data would then be passed electronically to the LMIS application for evaluation and fulfilment. This would reduce the reporting burden on the health care worker and move the complexity of resupply calculations and supply chain workflows to the LMIS.

At the policy level, decision-makers want to see a holistic picture of how the health system is functioning. To do that, one needs to combine HMIS and LMIS data for a more robust picture

of what is happening in the health system. The first attempt to develop an integrated dashboard combining data from an eLMIS and DHIS2 took place in 2015 in Tanzania. While successful, the team working on the integration had to work through a number of challenges, learning lessons that are informing the development of dashboards in other countries. Many of the challenges were those inherent to any integration project, including lack of a common facility list, differences in product lists and labeling standards, and incongruent reporting periods (monthly HMIS vs. quarterly LMIS) while issues of data interpretation were more specific to the complexities of HMIS and LMIS data. Each of these challenges was resolved.

Conclusion

HMIS and LMIS have their own distinct natures and uses which makes it difficult to combine both applications in one system. However, there are opportunities to connect HMIS and LMIS applications at the point of care and at the policy level to improve the efficiency and overall management of the health system.

Additional Resources

People, Processes & Technology: Enabling Successful HMIS/LMIS Integrations
http://www.lifesavingcommodities.org/wp-content/uploads/2016/09/UNC_Integrated-Dashboard-White-Paper-FINAL.pdf

Computerizing Logistics Management Information Systems: A Program Manager's Guide
http://deliver.jsi.com/dlvr_content/resources/allpubs/guidelines/CompLMIS_PMG.pdf

Considerations for the Integration of HMIS and LMIS
http://www.lifesavingcommodities.org/wp-content/uploads/2014/08/14-126-

Considerations-for-the-Integration-of-HMIS-and-LMIS_format.pdf

Digital LMIS Innovations: Linking the information silos: Tanzania's HMIS – LMIS data exchange yields lessons for broader interoperability
http://thepump.jsi.com/digital-lmis-innovations-linking-the-information-silos-tanzanias-hmis-lmis-data-exchange-yields-lessons-for-broader-interoperability/

eLMIS Selection Guide
http://deliver.jsi.com/dlvr_content/resources/allpubs/guidelines/eLMIS_SeleGuid.pdf

Open Source Solutions for Data Management: A Comparison Guide
http://www.lifesavingcommodities.org/wp-content/uploads/2016/09/UNC_ComparisonGuide_FINAL_08302016.pdf

Integrated RMNCH Dashboards: Linking HMIS and LMIS data to improve supply chain performance for reproductive, maternal, newborn and child health
http://www.lifesavingcommodities.org/wp-content/uploads/2015/05/Dashboard-Activity-Overview-20-April-2015.pdf

HMIS-LMIS Integration: Generalized Use Cases based on Assessments in Three Countries
http://www.villagereach.org/wp-content/uploads/2017/01/HMIS-LMIS_Integration_Use_Cases.pdf