COUNCIL OF GOVERNORS

HEALTH COMMITTEE BRIEF

CONSIDERATIONS FOR ENHANCEMENT OF HEALTH PRODUCTS AND TECHNOLOGIES(HPT) LOGISTICAL MANAGEMENT INFORMATION SYSTEM (LMIS)

1. Background

Strengthen the Supply Chain System for Health Products and Technologies is a priority of the Health Sector in a bid to ensuring that essential health commodities are accessible and affordable to the population. As such the flow of goods, services, and information from producers to the end users must be effectively management to meet both supply and demand side needs. A logistical management information system (LMIS), whether paper based or electronic, provides the essential link across the various levels of the supply chain system through aggregation, analysis, validation, and display of data that facilitates logistical decisions and performance of supply chain roles. Such roles include but are not limited to quantification, supply planning, warehousing, distribution, and inventory management.

The LMIS for health commodities has been facilitating county governments in making decisions on rational order management, redistributions, managing inventory as well as managing expiries. The systems have been more elaborately established for the health commodities covered under the vertically run health priority programs, that are managed by the national Ministry of Health, such as HIV Commodities, Malaria commodities, TB drugs and related supplies, Family Planning, and vaccines. These have supported close monitoring of availability of health commodities at the points of service as well as the central stores.

These systems have also aided in demand forecasting for health products through provision of consumption data. However, current experiences with the application of the LMIS reveals that there are persistent challenges with availability, timeliness, quality, and visibility of health commodities data across the supply chain, that continue to hamper the effectiveness and efficiency of the health supply chain system. Furthermore, attempts to address these challenges have been characterised by fragmentation and unsustainable interventions. The extent of integration of the LMIS components with other systems has however been limited. It is notable strengthening of the LMIS, and the electronic components remain a priority investment area for county governments, national government and partners owing to its potential high impact in resolving supply chain challenges and contribute to desired health outcomes. This brief provides some reflections on the current challenges, emerging issues, and suggests a roadmap for consideration by the Council of Governors Health Committee.

2. Reflections on Current Situation

Several systems supporting various LMIS processes/functions

There are various electronic systems currently under application in support of health commodities logistics management information for the county health supply chain. Since the main supplier for county health facilities is Kenya Medical Supplies Authority (KEMSA), the LMIS and other systems managed by KEMSA comprise a significant component of the national LMIS. As such, the KEMSA's Enterprise Resource Planning (ERP) that incorporates a Warehouse Management System module has been critical in not only providing the linkages with other systems supporting LMIS processes, but also providing data for decisions to both national and county governments. KEMSA has identified the need to install a new ERP in its strategic plan for 2020-2025 but the acquisition process is yet to kick off. The other key systems in use by counties are the Kenya Health Information System (KHIS) or the District Health Information Software 2 (DHIS2) and the Integrated Financial Management Information System (IFMIS).

KEMSA e-LMIS mainly applied in order processing

The extent of linkages with LMIS managed by KEMSA varies across counties. The LMIS is actively used by all counties to process orders for antiretroviral medicines, reproductive health medicines and medical products, medicines for tuberculosis and laboratory diagnostic testing kits for HIV/AIDS and malaria. LMIS has facilitated tracking of quantities needed by facilities especially the Level 4 and 5 facilities. It has contributed to improvements in forecasting and quantification, tracking and traceability of orders within KEMSA and the supply chain, management of county and facility orders, and availability of automated program reports. However, there are persisting challenges in terms of infrastructure (computer and internet) at Level 2 and 3 facilities, inadequate staff skills in IT, incomplete, inaccurate, and delayed reporting: and inadequate integration with other systems.

Summary facility data on consumption and inventory levels captured in KHIS (DHIS 2)

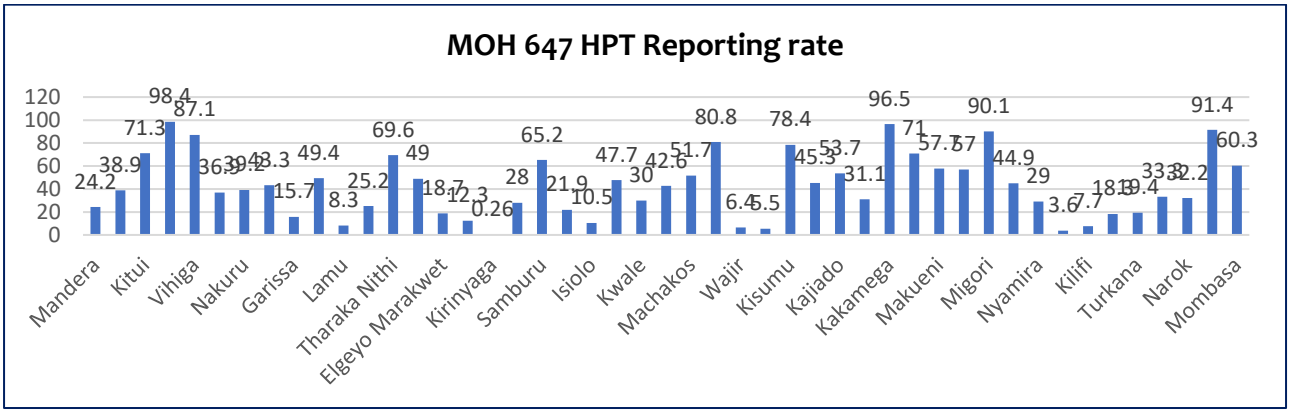
The KHIS captures data on the facility consumption, stock levels and commodity request based on the facility needs, relying on the data from the Facility Data Reporting and Requests (FCDRR) tools maintained by facilities mostly in paper form. So far, the digitised tools covered include the FCDRR for family planning, malaria, TB, and essential HPT. Vaccines are also tracked through the chanjo e-LMIS that is linked to the KHIS. These efforts have improved on the efficiency of generating commodity stock status report and ordering. They have also supported resupply and redistribution, order rationalisation and supportive supervision decisions by county and subcounty health commodity managers. In terms of accuracy and completeness of reporting, the effect has been improved reporting rates through the KHIS with facility reporting on program commodities ranging between 80% - 100%.

One of the most recent reporting tools introduced in the KHIS is the MOH 647 HPT Tracer Register that captures consumption and stock level data on 61 Essential Medicines and Medical Supplies. Since its adoption in January 2021, the reporting rates by county health facilities has increased from a low of 13.6% to 61.4% in June 2021. Timeliness in reporting has also increased from 10% (January 2021) to 60% in June 2021. Although the KHIS provides a platform for analysis of reporting trends,

consumption trends and even production expiration trends, county health teams have not adequately undertaken such analysis to inform key decisions on supply planning at county level.

The recently developed chanjo system for tracking COVID 19 Vaccine has been applied to track distribution of vaccines to health facilities undertaking vaccination, track doses received and administered and provide reports on the number of persons vaccinated. The system has been hampered by challenges relating to accuracy of data owing to connectivity challenges, delays by facilities to update and validate data. Counties are also required to provide weekly summary reports in Excel.

Facility Reporting Rates as per MOH 647 (January to June 2021)



Increased use of dashboards evident

The Ministry of Health (MOH) in close collaboration with partners has developed several dash boards in a bid to promote visibility of data for health supply chain planning and decisions. These include the following: malaria commodities dashboard, ART dashboard/commodity manager, Tibu, UHC/HPT dashboard, immunization dashboard, and RH/FP commodities dashboard. These dashboards are linked to the Kenya Health Information System (KHIS) and draw information from KEMSA e-LMIS; and are also visible by health workers from both national and county governments. The platforms have been used by counties and sub-counties for rationalising their orders for *some* commodities. County teams handling commodities have been sensitized on the various dashboards with support from various implementation partners supporting commodity management strengthening such as USAID funded programs run by Management Sciences for Health, Chemonics, JSI, InSupply Health, and JPHIEGO; FCDO funded Population Services Kenya DESIP; UNFPA; CHAI; and BMGF funded ARC. Despite the notable adoption of dashboards, there have been limitations in the effective use of these tools owing to data quality challenges of the data sources and repositories from which the dashboards draw.

Fragmentation evident in design, implementation, and partner support

Despite the current efforts to move towards integration of the various systems supporting LMIS functions/processes with the KHIS (DHIS 2) and the KEMSA e-LMIS as the core system, fragmentation continues both at national and county level. Whilst it is notable that

There is still fragmentation in introduction and application of electronic systems across the health system levels. At the data collection level, there have been efforts by several counties to digitise their dispensing registers (daily activity registers) through electronic medical records. Such platforms include the web Antiretroviral Dispensing Tool (WebADT), ICAIRE, FUNSOFT, IQ-Care, Kenya EMR,

Quali-Pharm and Power-BI System. These efforts have focused on products that are funded by donors/partners such as ARV, TB drugs and immunizations.

Supply Chain Function/Area	*IT system*
Forecasting and Quantification	Quantimed? , Reality Check
Procurement	e-Procurement, KEMSA ERP
Storage and Distribution	KEMSA ERP and WMS, Chanjo System for COVID 19 Vaccines
Order Processing	KEMSA eLMIS, KHIS, HCMP
Inventory Management	Hospital Information Systems (HIS)– Funsoft, Medboss, Elephant healthcare, EMRs
Quality Management	PPB PEVRS KHIS data on expiries KEMSA ERP
Reporting	DHIS 2(KHIS), KEMSA eLMIS, dashboards

There is lack of harmonisation of the IT Systems and inadequate linkages for interoperability of the IT infrastructure to adequately support the county health supply chain, especially with regards to visibility of products in the last mile since most of HPT functions are managed manually or using standalone systems at the facility level. Towards, improving access, sharing and analysis of data, the Ministry of Health has developed various policies and guidelines including the Kenya Health Information Systems Interoperability Framework (KHISIF) that focus on interoperability of health information systems. There is an appreciation that the existing platforms may be too diverse to achieve the level of interoperability expected and there is a current initiative by the Ministry of Health and Ministry of ICT to develop a national EMR. The roadmap for its development and roll out has yet to be shared with county governments and the Council of Governors. The extent to which the system will meet the LMIS functional gaps of counties is therefore unclear.

Other challenges

Other critical challenges include the following: inadequate capacity in terms of enabling ICT infrastructure, internet access, staff skills; inconsistent use of data attributable to staff turnover; data integrity issues with data reported being at times incomplete and inaccurate especially on inventory levels and inventory movements. Notably, validation of data on HPT consumption, inventory movement and levels as well as replenishment requests has improved with respect to program commodities (HIV, Malaria, TB, RH/FP, and Immunization) but still weak for EMMS.

3. Functional Requirements

County governments are desirous of making investments in systems (software applications) that are robust and demonstrate value for money in the lifetime of such investments. As such they consider moving from paper based reporting and standalone technology such as Microsoft Excel spreadsheets to integrated and networked eLMIS that simplifies data entry and access, improves data quality, visibility and use, a top priority. The desired eLMIS is therefore one with a secure platform of integrated or interoperable applications that enable automatic health supply chain data collection, validation, classification, storage, analysis and visualisation through reports and dashboards.

Critical decisions that are made regarding the health commodities supply chain include the following: How long current inventory will last? when to order additional health commodities; how much to order; whether there are supplies in the pipeline and where they lie, whether or not to move commodities from higher to lower level or across levels; whether or not there are commodities about to expire; should the expired products (or about to expire products) be removed? Whether or not the products due for expiry can be distributed before expiry. All these decisions require accurate timely and appropriate data. This information is ultimately in terms of ensuring that: health commodities investments and resource allocations are evidence-based, health managers can monitor performance of the supply chain in a bid to improve service delivery, health workers continue to provide quality care and that patients also have a mechanism for holding the health providers to account.

Appreciating that the management of health products right from the facilities in the counties to the national level involves various staff, departments, processes, and procedures; and that the resource and infrastructure capacity varies across counties, it is important that the design of the electronic LMIS takes into consideration these issues. In particular, the e-LMIS should help address the following gaps with county health supply chain:

- Continuous /real time monitoring of stock status at the central stores and facility stores
- Provision of adequate data to support forecasting and procurement and supply planning
- Minimises on use of paper tools including counter requisition and issue vouchers(S11), Counter receipt vouchers (S13), bin cards (S3) and Facility Consumption Data Request and Report (FCDRR)
- Timely collection, transmission, and aggregating data from health facilities
- Provides Early warning signals for supply imbalances and stock outs and even overstocks
- Enhanced Availability and visibility of data to identify bottlenecks and stock -outs
- Facility friendly e-LMIS features for access
- Facilitates validation of orders, redistributions, and stock adjustments
- Facilitates tracking and tracing of health commodities through inputs such as GS1 and bar codes

In terms of system features, the desirable features include the following:

- Automated capture of essential supply chain data (opening stock, period receipts, period end stock balances, period issues or dispensed to user data, period loses and adjustments per site/store.
- Capture of supplementary data such as batch expiry tracking data, inventory valuation/pricing, proof of delivery data
- Capacity to track data for many items (SKUs) and service delivery points
- Web based, Mobile App based, and SMS based system
- Multiaccess regardless of location
- Capable of operating offline for routine workflows
- System compatible with data from GS1 data matrix or bar code
- Instant access to stock information from National level to facility level
- Supports predictive analytics for decisions in demand forecasting, supply planning, multi-site inventory control, distribution and redistribution planning, allocations management, automatic reorder point triggers, expiry warnings, temperature monitoring, and asset management for assets such as cold chain, laboratory, and oxygen equipment.
- Enhanced graphics and dashboards to support visibility of supply chain performance monitoring at county, subcounty and facility level
- SMS alerts for key indicators and early warning alerts
- Auto generated reports for program review

- Support for system-to-system data exchange through interoperability with existing electronic stock management tools at county health facilities, importation/exportation of Microsoft Excel reports, scanning technology for optical character recognition (OCR) of printed text and intelligent character recognition (ICR) for hand printed text or partial automation through manual transcription of paper based LMIS reports and stock management records
- Supports integration of data from multiple sources into a single period dataset covering all service delivery sites at the end of the period.

4. Roadmap for Enhancement of the e-LMIS

The fragmented approach towards strengthening of the e-LMIS for health products and technologies has resulted in inefficiencies in data collection, data aggregation, analysis and reporting on health products and technologies. There is need for good data visibility, based on routinely and accurately updated records and timely reporting for guiding decision making and the ultimate improvement in performance of the health supply chain through increased product availability. It is notable that reporting by counties on commodities has improved over time, but the quality of data remains suboptimal thus hampering the use of data in key decisions such as quantification, resupply, and redistribution.

a) Undertake a county focused and in-depth assessment of the requirements for development and implementation of an integrated Logistics Management Information System for the procurement, storage, and distribution of health commodities

- Review of the functionality requirements for county governments and county health facilities in a participatory manner that also builds in learning for the county teams. Even when the need for a new or improved e-LMIS has been identified, county government teams need to be engaged in the confirmation of the needs and throughout the process of development. Past assessments have elaborately captured eLMIS case for various HPT categories such as antiretrovirals, antimalarials, vaccines, anti-TB drugs, family planning products and essential medicines and medical supplies. Categories that have yet to be defined include *oxygen, blood products* and *diagnostics*. County experiences with implementation of other systems such as the County Revenue Collection Systems, Land Management Information System and Hospital Information Systems will provide useful lessons.

- This process should be adequately documented to support future adaptations. The functionality and system requirements document will be critical in gaining agreement on the focus areas and phasing /staging of the eLMIS software implementation. The functional requirements that have been identified as most critical to the county health facilities and that represent the basic functions are as follows: receipt of products from suppliers, issuance of products to health facilities service delivery points and clients, ordering, resupply, and tracking of inventory for stock outs, expiries, and special requirements such as temperature regulation. It is understandable that paper will still be utilised in lieu or in conjunction with the eLMIS tools in some counties. As such offsite functionality needs should also be assessed.

b) Undertake mapping of existing systems

Since county health staff have extensive experience in the application of the paper based daily activity registers and inventory reporting tools as well as the reporting on a monthly and quarterly basis, scale up the eLMIS should continue to leverage on these experiences and platforms. Data is currently captured by the various paper or Excel based tools need to be mapped before the introduction or expansion of the eLMIS. The tools that are currently applied in the supportive supervision and audit aspects of inventory management will also be linked. Comprehensive mapping of current approaches to strengthening the eLMIS is important to identify what is already in existence and gain insights on what needs to be expanded, rationale for expansion and the process of expansion.

Mapping of capacity in terms of the ICT infrastructure, internet connectivity, application of mobiles as well as the capacity for use by the health workers.

c) Define the required objectives and requisite features of the e-LMIS

Experiences with the current fragmented systems supporting the logistics information flow have underlined the need to improve timely captured of data through reducing the time-consuming tasks undertaken by health workers along the health supply chain, especially those relating to completion of multiplicity of forms. County health departments have also highlighted the dire need to improve visualisation of data through dashboards for better forecasting and supply planning as well as providing linkages between supply chain performance data and patient service coverage statistics. Some of the other specific objectives that need to be realised relate to ability to monitor equipment inventory down time for oxygen production generators as well as cold chain equipment for vaccines.

There are essential lessons learned recently with the implementation of the chanjo system in the roll out of COVID 19 vaccines regarding visibility of inventory data. The current KEMSA e-LMIS also offers lessons on tracking of delivery to the last mile that need to be integrated. Therefore, detailed planning for the needs with county involvement is necessary.

In summary, the following aspects amongst others should inform the expanded system requirements:

- Capacity to track inventory and consumption along the supply chain to the lowest level
- Capacity to provide early warning signals for stock outs, expiries, supplementary consumable stocks levels
- Capacity to provide necessary initial and ongoing support to users as well technical assistance in maintaining hardware and software
- A centralized, web-based, system accessible from national, county, subcounty and health facility level
- A system that is also available offline
- A system that potentially integrates with other e-LMIS systems for electronic data collection and reporting, including those considered at the community health units' levels.

A realistic and detailed implementation plan for the e-LMIS spanning over several years should be developed clearly out the phases and the attendant resource requirements.

d) Set up a governance structure to manage system (including changes to the system)

This system should have capacity to provide support to facilities on a need basis, as well as facilitate analysis of the e-LMIS data for use in decision making at all levels. Clarification of information/data governance structures for the health commodities data within the county, subcounty and facility level should be undertaken too. This is crucial in support of implementation of policies, guidelines and

standard operating procedures developed for coordination and use of the e-LMIS system. The need for a dedicated staff to focus on the e-LMIS need to be considered bearing in mind that such resource persons will coordinate reporting, provide ongoing skills building for users on the e-LMIS as well as support trouble shooting. The draft guidance for establishment of county Health Products and Technologies (HPT) units envisages that county departments of health will dedicate a staff to handle LMIS aspects in the unit.

e) Determine the system (including software) of choice

The e-LMIS options should be reviewed based on the agreed requirements and the preferred approach chosen having taken into consideration the required investments.

The determination should consider long term sustainability of the investment from the onset. Total cost of running the e-LMIS needs to be considered including establishment and maintenance costs such as software and maintenance, licensing and data security and user support including setting up of governance units. The extent to which the national and county governments will fund these costs also need to be considered before adoption of the system.

Currently the Ministry of Health has been working closely with the ministry responsible for ICT to design and roll out health information systems as core government systems to support integration and interoperability. Implementation of these systems continues to receive technical and financial support from development and implementation partners in health. It is critical that technical partners supporting implementation of the e-LMIS programs are identified and engaged once the issues highlighted above are clarified.

f) Undertake Phased Implementation

Enhancement of the LMIS should take a phased-out approach, with county governments consultations happening throughout the process. The initial phase will involve laying the groundwork for the e-LMIS through amongst others establishing the coordination structures, developing and dissemination of the relevant policies and standards including the standards for interoperability; improving the ICT infrastructure; skills building for logistical reporting and improving data visibility throughout the supply chain; designing user friendly dashboards for effective analysis of HPT data for decision making; design and monitor key LMIS indicators including stock levels, data accuracy, reporting rates and timelines; progressively digitise documentation at county health facilities to improve supply chain visibility.

5. Key Recommendations for the Council of Governors Health Committee

In support of county governments efforts in strengthening accountability in health supply chain investments and provide timely and accurate data for key decisions on health commodities through expanding the e-LMIS, the COG Health Committee should:

a) Jointly with the Ministry of Health develop and disseminate standards for design and implementation of e-LMIS

b) Engage Ministry of Health to share the roadmap for the roll out of the ongoing Electronic Medical Records (EMR) system, including but not limited to, required initial and recurring investments by counties and transition plan from the current systems in use at county health facilities.

c) Jointly developing a roadmap for enhancement of the e-LMIS covering several years with county governments involving their ICT Directorates/teams

d) Joint mobilisation of partners support to the e-LMIS program

ABBREVIATIONS/ACRONYMS

ARV	Antiretroviral
ADT	Antiretrovirals Dispensing Tool
BMGF	Bills and Melinda Gates Foundation
CHAI	Clinton Health Access Initiative
COVID	Corona Virus Disease
DESIP	Delivering Sustainable and Equitable Increases in Family Planning Program
EMMS	Essential Medicines and Medical Supplies
EMR	Electronics Medical Records
ERP	Enterprise Resource Planning
FCDO	Foreign Commonwealth and Development Office, UK
FCDRR	Facility Commodity Data Report and Request
GS1	Global Standards
HPT	Health Products and Technologies
ICT	Information Communication and Technology
IFMIS	Integrated Financial Management Information System
JPHIEGO	Johns Hopkins Program for International Education in Gynecology and Obstetrics.
KEMSA	Kenya Medical Supplies Authority
KHIS	Kenya Health Information System
KHISIF	Kenya Health Information Systems Interoperability Framework
LMIS	Logistics Management Information System
eLMIS	Electronic Logistics Management Information System
MOH	Ministry of Health
OCR	Optical Character Recognition
RH/FP	Reproductive Health/Family Planning
TB	Tuberculosis
UNFPA	United Nations Population Fund
USAID	United States Agency for International Development