

Question 2: What are effective and sustainable mechanisms or processes to integrate local, community, sub-national, national, and regional voices, priorities, and contributions into health system strengthening efforts?



The NMS+ Enterprise Resource Planning System – Multisectoral Systems Strengthening through Deployment of ERP Systems

Kiarie Macharia (USAID Uganda), Anthony Anammah (USAID Uganda), Stephen Kisuze (National Medical Stores, Uganda)

Context

Describe the context in which the activity takes place. What is the health problem that you are trying to solve? What health system challenges contribute to this problem? Which voices were engaged in solving this problem before your activity started? Who was missing from the discussion and what was the impact of that absence?

The Government of Uganda (GoU) had demonstrated modest progress in reversing multiple health challenges in the past two decades and embraced universal health coverage (UHC). Significant progress was made in achieving UHC by ensuring progressive health care access, financing, and utilization of health services for its entire population. However, a critical component of the UHC, which is a strong and robust health supply chain (HSC) system, was not functioning optimally. Despite the achievements in universal health, there were still persistent, lifesaving challenges created by a nonresponsive health supply chain to the population of Uganda. Significant weaknesses remained in the health sector, in general and health supply chain specifically. One of the key components of the HSC that required attention, according to the GoU's 10-Year Health System Supply Chain Road Map, is the Health Supply Chain Information Systems.

Below were the key challenges that needed to be addressed -

- Supply chain data use in day-to-day decision-making was still significantly weak and required improvement at all levels of the supply chain in the country.
- The lack of supply chain data visibility and systems integration of data from the community level and other parallel mass interventions continued to create challenges in supply chain planning and decision-making at all levels.
- Weak linkage among quantification plans, procurement plans and annual budgets
- Limited use of available information for decision making
- Inadequate of earlier proffered IT solutions alignment to bigger GoU ICT initiatives and approaches

One critical component of the Uganda's HSC, that plays a significant role in the management of Uganda's HSC is the National Medical Stores (NMS). NMS was established by an act of parliament Cap 207, 1993 and is mandated to procure, store and distribute Essential Medical and Health Supplies (EMHS) to public health facilities. For NMS to be able to satisfactorily play this statutory role of procurement, logistics and supply chain management, availability of supply chain for decision making is critically important. And this data should not only be available for internal decision making among the different units within NMS (Finance, HR, Operations, Procurement, etc) but also for intergovernmental working relationships with other MDAs - Ministry of Finance, Planning and Economic Development, Ministry of Information Communication Technology and National Guidance- National Information Technology Authority Uganda (NITA-U), to mention a few. However, NMS's ability to satisfactorily perform its duties as mandated by law are hampered by the above-mentioned challenges. To facilitate the resolution of these challenges, the deployment of an Enterprise Resource Planning (ERP) was proffered as a business/IT solution to address the afore-mentioned challenges and enhance its statutory role in relation to other MDAs.

Activity Description

What systems-thinking approach did you take to address the health problem identified above? What government agencies or other stakeholders did you work with, why did you choose them, and how did you engage them? Describe in detail the process or mechanism used to integrate local, community, sub-national, national, or regional voices, priorities, and contributions into this approach. How did you build community, government/stakeholder ownership or buy-in? It may be useful to describe your theory of change.

The need to have an improved ERP (better than an already existing ERP) was drawn out of consensus as agreed upon in the course of the drafting of GoU's 10-Year Health System Supply Chain Road Map, a strategy policy documented that was put together by the GoU, with support from key stakeholder in Uganda's HSCs (including NMS) and as well other stakeholders from other sectors other than health. The 10-year HSC Roadmap was developed through a collaborative process in consultation with all key stakeholders in GoU's health system. Prior to the process of development of the road map, there was a mapping of all the relevant stakeholders with the intent of ensuring the key voices were heard and multiple perspective of all stakeholders was guaranteed, as envisioned in USAID's Vision for Health Systems Strengthening 2030 and outlined in WHO's Systems thinking for health systems strengthening. The development of this policy road map entailed drawing on systems thinking approach to designing an intervention that takes into cognizance the need for this intervention to have system wide effects and is sustainable. The roadmap was drawn under the guidance of a government inter-ministerial task force (IMTF) on the health supply chain consisting of the Ministry of Finance, Planning and Economic Development (MoFPED) (as chair); Ministry of Public Service (MoPS); Ministry of Health (MoH); Ministry of Local Government (MoLG); Office of the Prime Minister as overall coordinator; and the GoU semi-autonomous agencies, namely National Planning Authority (NPA), National Drug Authority (NDA), and Pharmaceutical Society of Uganda (PSU), USAID, United Nations agencies and others. The 10-year Health Supply Chain Roadmap is a part of the wider GoU economic development needs and meeting commitments, developed to guide the enhancement of planning, leadership, and stewardship, as well as financing of the HSC by the GoU. This evidently shows that the intended intervention was designed to support progress towards GoU's national goals and as well to foster country ownership.

Therefore, the deployment of the NMS+ Enterprise Resource Planning System, was a solution borne out of in-depth systems thinking, with multisectoral input, intended to address a problem posed by a component of HSC, which by extension was affecting the optimal functioning of the HSC (in particular) and the entire Uganda health system (in general). The NMS+ Enterprise Resource Planning System is aligned with the GoU's 10-Year HSC Road Map, as it addresses four out of the top ten issues addressed by the road map –

- Enable effective mechanism for coordinated national multi-sectoral effort to effectively bring all government institutions/partners to work in an integrated manner
- Address the supply chain infrastructure across all levels of the Uganda health system
- Address the quality, quantity, reliability and use of the national health supply chain information system
- Develop and implement national health supply chain sustainability approaches going beyond partners

Enterprise Resource Planning System for the National Medical Stores (NMS), called NMS Plus (NMS+)

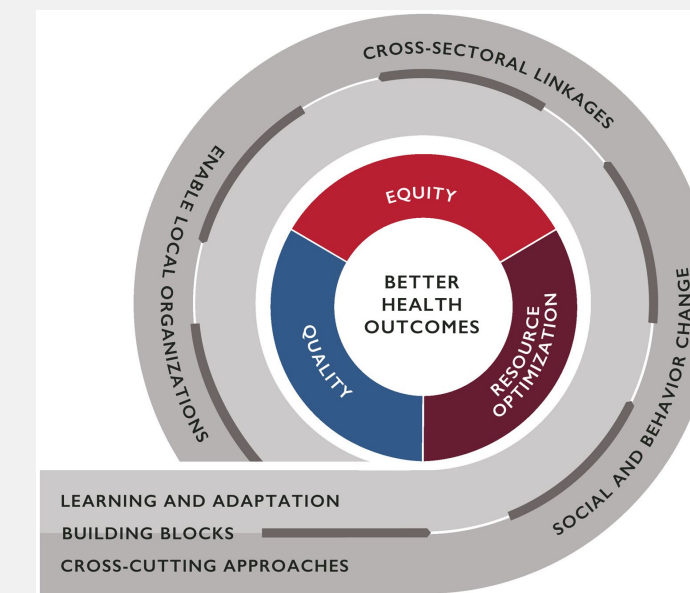
- This a software system that helps to run a large part of an enterprise's business, supporting automation and processes in finance, human resources, supply chain, client services, procurement, and more. NMS's ERP system is NMS+.
- Underlying technology is Oracle E-business Suite ERP System, Oracle Database System, Oracle Linux OS, VMware virtualization platform, Dell/EMC Hyper-converged Infrastructure, HP Aruba Network Solution, McAfee Antivirus, and Sophos/Cyberoam.
- Implementation Architecture is disaster ready (Realtime replication between primary system at NMS HQ, secondary system at National Disaster Recovery Site)



Activity Impact

How did this activity strengthen the health system? Which components of the health system did you act on (for example, did you support improvements in financing, cross-sectoral coordination, governance, local ownership, information, human resources, behavior of health system actors, service delivery, or medical products, vaccines, or technologies)? How does this activity contribute to health equity, quality or resource optimization? Be sure to explain the causal pathway by which your engagement of new voices contributed to this impact.

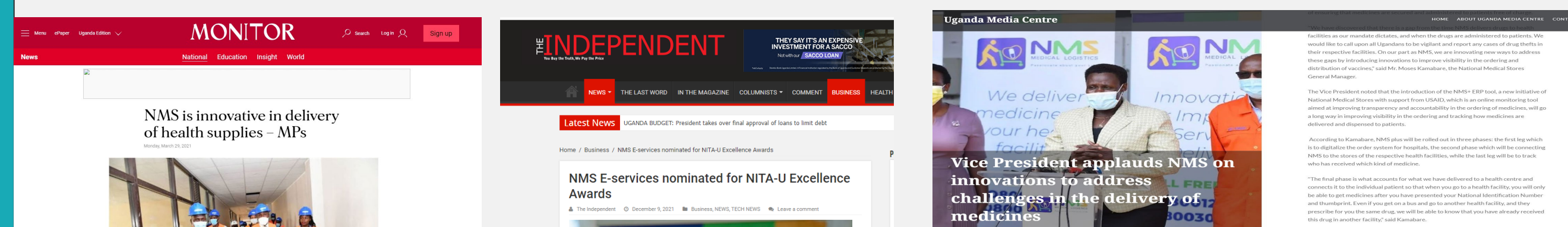
- The deployment of the NMS+ Enterprise Resource Planning (ERP) System has impacted not just the operations of NMS as key agency of GoU but as well different other components of Uganda's HSC and health systems. The NMS+ ERP -
- Has enabled MoH to encourage health workers to participate in the ERP related activities such as piloting, user training, testing, among others.
 - Has allowed MoH to advocate for and drive change management from paper-based processes to digital enabled ones especially in the area of data collection & reporting.
 - Has allowed MoH to drive the use of NMS+ CSSP as the primary ordering portal for EHMS resulting into the convergence of parallel ordering platforms into one.
 - Enabled enhancing of health worker digital skills through partnerships where health implementing partners trained over 1,700 lower health facility workers and 272 higher level health facilities whereas NMS trained over 3,000 health facility workers. To date total stands over 7,000 health workers trained.
 - Provided a basis for streamlined and better coordinated program with regards to ordering, tracking, and reporting.
 - Streamlined business processes at NMS to establish end-to-end visibility from procurement planning, budgeting, procurement, order processing, distribution, financial reporting, i.e. eliminated operational silos, increased speed of operations, capacity of transactions, accuracy of data and overall effectiveness.
 - Provides data for analytics, has also created a reliable platform for reporting, system integration and innovation. i.e. order deadlines tracking, order fulfillment, extraction and dissemination of patient statistics related with program orders.
 - Serves as application programming interface, for data sharing between partners and official government systems (UgHub – National Information Technology Authority Uganda (NITA-U), Electronic Health Management Information Systems (eHMIS) – MOH/The Integrated Intelligent Computer System (IICS), The District Health Information System (DHIS)). UgHub is an application and Data Integration platform integrated across Government Systems to enable seamless sharing of data in a rational, secure, efficient, and sustainable manner.
 - Has enhanced stronger governance system – Board established a specific committee to oversee the ERP implementation, to ensure that all intended outcomes are achieved.
 - Facilitated compliance and risk management (Legal framework – (National Information Technology Authority Uganda (NITA-U) Approval, Cyber laws, NMS Strategic Plan, Business Process Re-engineering)
 - Encouraged transparency and accountability, which were intentionally built into the implementation of the NMS+ ERP.



Evidence

What evidence do you have that the integration of local, community, sub-national, national, and regional voices, priorities, and contributions in this approach was successful? What evidence do you have that this approach led to health or health system impacts? How can you best show what your activity accomplished? How do you know that you met your goals? Is the evidence able to be measured? Graphs or charts may be useful here to show this evidence.

- The deployment of NMS+ ERP and engendered the following, as described in the systems strengthening impacts mentioned above (including health systems strengthening) in the following areas -
- The issue of weak linkage among quantification plans, procurement plans and annual budgets was satisfactorily addressed. For all the health facilities, their procurement plans for all health facilities are now visible on NMS+ Client Self-Service Portal (CSSP). The CSSP is the commodity ordering module of NMS+.
 - The limited use of available information for decision making has also been resolved. Procurement plans, order data, and other statistics are now readily available and shared with different stakeholders
 - Interoperability of all existing HIS with the DHIS2, PIP & other ERPs has now been established through integration with UgHub to provide distribution data done
 - NMS+ ERP has facilitated the alignment of bigger GoU ICT initiatives and approaches - Engagements with East African Community(EAC)(a regional intergovernmental organization of seven East African countries), GoU MoH, National Drug Authority (NDA), National Identification & Registration Authority (NIRA), NITA-U, Ministry of ICT and National Guidance
 - Active participation in the development of the different National registers (of specific interest is the National Product Catalogue) through the Digital Health Sub-Committee & HIIRE has increased the interoperability of warehouse information systems with different product coding languages.
- In view of all the above-mentioned successes, NMS received a number of accolades –
1. NMS is innovative in delivery of health supplies – MPs - <https://www.monitor.co.ug/uganda/news/national/nms-is-innovative-in-delivery-of-health-supplies-mps-3340820>
 2. NMS E-services nominated for NITA-U Excellence Awards - <https://www.independent.co.ug/nms-e-services-nominated-for-nita-u-excellence-awards/>
 3. Vice President applauds NMS on innovations to address challenges in the delivery of medicines - <https://ugandamediacentreblog.wordpress.com/2021/07/23/vice-president-applauds-nms-on-innovations-to-address-challenges-in-the-delivery-of-medicines/>



Facilitators

What aspects of the health system, context, or external partner support helped make this successful? For example, were there existing working groups in place that enabled efficient coordination between stakeholders on this activity? Did you use a tool or knowledge resource from a global partner like WHO or UNICEF to help inform your activity?

- The design of the activity included input from USG agencies (USAID, CDC, DOD) and the Government of Uganda. Development partners (CHAI, UNICEF, GFATM) were involved in the design of the activity.
- A governance structure was developed before the project started. The governance structure had three levels (Project Executive Team, ERP Solution Development & Delivery Team, and the Roll-Out Team). The structure identified several working groups composed of various stakeholders which included internal National Medical Stores (subject matter experts), local government, Ministry of health, Information technology compliance entity (NITA-U), Health facilities, and implementing partners.
- The governance structure clearly described the reporting process and coordination.
- The activity utilized various WHO guidelines/tools such as; WHO recommendations on digital interventions for health system strengthening. The WHO Global strategy on digital health.

Challenges

What were some problems or challenges that you faced during your activity implementation? Did you expect these challenges or were they unanticipated? How did you respond to these challenges?

- The National Medical Stores did not have a data center and the necessary computer equipment to run the ERP system. This challenge was anticipated. USAID engaged a vendor to procure and setup a new primary data center for the ERP.
- Another challenge was lack of knowledgeable resources in the selected technology. This was resolved by recruiting staff within the region instead of locally. USAID also accelerated the training of NMS staff in the upcoming technologies.
- Change resistance. A new system was seen as a threat, and staff members were comfortable in the legacy system. While this challenge was anticipated, and planned for, the magnitude encountered was higher. This was addressed by having several NMS staff undergo change management training to practitioner level. A qualified change management consultant was engaged.
- COVID 19. The epidemic brought about challenges that had not been anticipated. The government-imposed lockdowns, and restricted movement made it very difficult for knowledge transfer, and various tasks to be accomplished. While the ERP contractor staff were able to continue with implementing virtually, NMS staff required refresher training after the lockdown.
- Lack of modern computers in the health facilities. The ERP system provided online ordering capability for public health facilities. There was a need for computers, and internet connectivity, and staff training on how to use the new tools. This challenge was addressed by reaching to partners such as GF to provide computers, engaging multiple implementing partners to support training in all regions. This was accomplished and over 1600 HFs make their orders online. Over 7000 HFs staff were trained on the ordering tool.
- Other challenges included; unreliable power at the lower-level health facilities, poor or no internet at the lower-level health facilities

Lessons Learned

What lessons have you learned while you implemented this activity? How will this impact future activities or approaches? What advice would you give to other implementers and health systems actors in other countries that might want to adapt your approach?

The following lessons and further actions were identified to build upon the successes already achieved in the Uganda HSC due to the deployment of the NMS+ ERP -

- Continuous improvement efforts with regards to the upgrades of implemented functionality of NMS+/NMS+ CSSP at NMS and other key systems in the sector.
- Complete and rollout of different integrations to strengthen data sharing and avoid duplication
- NMS continues to take part in strengthening governance and oversight of digitization within sector. The 10 year digitization road-map, the GS1 traceability initiatives and all other initiatives at the MoH level. NMS intends to consolidate gains made to date, through:

- Promotion and awareness building among stakeholders
- Change management among prospective users, patients and partners
- Extension of digitization to more processes
- Capacity building through refresher training for users, technical training at MoH/NMS level
- Leverage government initiatives, NBI, UgHub, etc

