Utilization of the online stock status dashboard to optimize health supply chain service delivery at national warehouses in Uganda

Context

Availability of essential medicines and health supplies (EMHS) across all levels of care is a cornerstone for the success of any health innovation or program. Visibility of stock status at the national level is critical for deciding on appropriate actions that provide adequate availability of EMHS both centrally and at subnational level.

For a long time, the Ministry of Health Uganda (MOH) has largely used paper-based and standalone MS Excel tools to monitor availability of EMHS both centrally and at subnational level.

Activity Description

The OSSR was developed and implemented in four phases as outlined below.

   - Reviewed existing tools (i.e., Excel workbooks and manual hard copy tools) to generate online system requirements
   - MOH and key stakeholders conducted user reviews.
   - Collaboration between system developers and users provided approval.
   - User-centered design principles:
     - Prioritizing user-centred design principles:
       - Early stakeholder engagement and involvement:
         - Collaboration between system developers and users provided approval.
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   - Facilitators:
     - MOH leadership support: MOH DPHM and DH effectively led stakeholders to reach consensus on system requirements, design, and implementation support needs. This was important for obtaining buy-in by all stakeholders needed to provide approval.
   - Challenges:
     - User adoption of the dashboard:
       - Although key supply chain stakeholders should use the OSSR to inform decision making, usage was initially low due to delayed shift from the routinely shared soft and hard copy reports to the now purely online access of the information.

2. Requirements gathering (2019-2020)
   - MOH and partners defined OSSR information and system requirements.
   - Data integration compatibility: Data integration compatibility was a complex challenge. National warehouses receive data from health facilities, suppliers, and logistics partners which were integrated into the OSSR. This required standardised data formats and effective management protocols to integrate these data.
   - Integration with the PIP:
     - OSSR development leveraged US government partners’ health supply chain strategic, supply chain management, and data and information capabilities. The partner provided knowledge, experience, and networks to support development, training, and use—key to ensuring OSSR sustainability.
   - Lessons Learned:
     - MOH or government-led development: OSSR dashboard development was led by the MOH DPHM and DH. This was critical for local ownership and continuity that ensures the OSSR addresses the MOH and stakeholders’ national health commodity management requirements.
     - Leveraging other US government partner capabilities: OSSR development leveraged US government partners’ health supply chain strategic, supply chain management, and data and information capabilities. The partner provided knowledge, experience, and networks to support development, training, and use—key to ensuring OSSR sustainability.

   - Team of local system developers engaged and worked collaboratively with MOH DPHM and DH staff to develop OSSR system interface.
   - MOH and key stakeholders conducted user acceptance testing.
   - Mobile-enabled interface eased access to OSSR:
     - Clear and detailed wireframes detailing system design and functionality enhancement requirements and design (which ensured ownership and the adequate collection of user needs).

4. Functionality enhancement and rollout (2022 to date)
   - Developed detailed system wireframes/renders.
   - System developers re-engaged to implement functionality enhancements including mobile device interface capabilities.
   - Training users on enhancements included creation of institutional login accounts.
   - Rolled out and monitored dashboard usage.
   - Activity Impact:
     - Frequency of users accessing reports per and just OSSR in design.
     - centrifuged availability of EMHS basket in last 3 months at national warehouses.
   - Evidence:
     - The OSSR is accessible on desktop and mobile devices and stakeholders are using it to make real-time decisions as illustrated below.

Evidence

The OSSR is accessible on desktop and mobile devices and stakeholders are using it to make real-time decisions as illustrated below.

Frequency of users accessing reports per and just OSSR in design.

- Access to the OSSR increased 3.3 times from 1,243 times accessed (Jan-Jul 2020) to 3,787 times accessed (Aug 2022-Feb 2023)
- OSSR user access increased from 5 user accounts accessing 190 times per month (Jan-Jul 2022) to 27 user accounts accessing 1,124 times a month (Aug 2022-Feb 2023)

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- MOH and key stakeholders conducted user reviews.
- Collaboration between system developers and users provided approval.
- Prioritizing user-centered design principles: Conducting user research and usability testing was critical to understand users’ needs, workflows, and challenges. This information contributed to the design process and produced an intuitive and user-friendly dashboard.

Facilitators

MOH leadership support: MOH DPHM and DH effectively led stakeholders to reach consensus on system requirements, design, and implementation support needs. This was important for obtaining buy-in by all stakeholders needed to provide approval.

Collaboration between system developers and users: Throughout the dashboard development, system developers and users took an agile collaboration approach that enabled instant testing of system functions and enhancements from user reviews.

Early stakeholder engagement and involvement: National stakeholders were engaged from inception (i.e., system requirements and design) which ensured ownership and the adequate collection of user needs.

Development of detailed wireframes/design rendering: Clear and detailed wireframes detailing system design and requirements provided' MS developers with rich text and graphical outlines of the proposed dashboard.

Creation of institutional accounts and QR codes: This ensured national stakeholders’ wider access to the system while monitoring data security. The QR code linked user access to the OSSR online dashboard.

Challenges

User adoption of the dashboard:

- Although key supply chain stakeholders should use the OSSR to inform decision making, usage was initially low due to delayed shift from the routinely shared soft and hard copy reports to the now purely online access of the information.

Data integration compatibility:

- Data integration compatibility was a complex challenge. National warehouses receive data from health facilities, suppliers, and logistics partners which were integrated into the OSSR. This required standardised data formats and effective management protocols to integrate these data.

Technical expertise to develop the dashboard:

- OSSR development required technical expertise in areas such as software development, data visualization, and web design that were not readily available within the project team. We leveraged on other USG partner IT development resources to assemble a team of developers with the necessary skills and experience to build the OSSR dashboard.

Sustainability and maintenance:

- Developing the OSSR is not a one-time effort. It will require maintenance, regular data updates, and system enhancements, and technical support. OSSR sustainability will require dedicated resources and a long-term plan. The SSCS Activity is engaging the Ministry of Health to develop and implement a transition and sustainability plan as part of the 10-year health supply chain roadmap 2022-2032.

Lessons Learned

MOH or government-led development: OSSR dashboard development was led by the MOH DPHM and DH. This was critical for local ownership and continuity that ensures the OSSR addresses the MOH and stakeholders’ national health commodity management requirements.

Leverage other US government partner capabilities: OSSR development leveraged US government partners’ health supply chain strategic, supply chain management, and data and information capabilities. The partner provided knowledge, experience, and networks to support development, training, and use—key to ensuring OSSR sustainability.

Early and sustained stakeholder engagement: Early and sustained inclusion of major supply chain stakeholders ensured that the OSSR functionality met each entity’s needs to inform decision making.

Phone-enabled interface was accessed to OSSR:

- OSSR development leveraged Uganda’s widespread use of mobile technology, which will enhance its accessibility and usability. Optimizing the dashboard for mobile devices will allow users to access stock information even on-the-go.

Integrating with the PIP:

- The OSSR was developed and hosted in the PIP database. This strategically meant OSSR users could access other useful information like facility stock status and health facility supply chain performance within the PIP.

Prioritizing user-centered design principles: Conducting user research and usability testing was critical to understand users’ needs, workflows, and challenges. This information contributed to the design process and produced an intuitive and user-friendly dashboard.

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