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

HEALTH SYSTEMS STRENGTHENING ACCELERATOR

## Context

Availability of essential medicines and health supplies (EMHS) across all levels of care is a cornerstone for the success of any health care intervention 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 national warehouse stock status and pipeline information. The tools were cumbersome for the MOH Quantification and Procurement Planning Unit staff to prepare, update, and use. This limited timely decisions on actions such as quantification and ordering, shipment expedition, expiry monitoring, stock prioritization, and distribution planning.

With technical assistance from the USAID Strengthening Supply Chain Systems (SSCS) Activity, led by Management Sciences for Health, the MOH/Department of Pharmaceutical and Natural Medicine (DPNM) and Division of Health Information (DHI) collaborated with other supply chain partners* to develop an online warehouse stock status dashboard and report (OSSR) in the MOH Pharmaceutical Information Portal (PIP). The dashboard provides real-time visibility of the country's EMHS stock status and commodity security at the two national warehouses—National Medical Stores (NMS) and Joint Medical Store (JMS).

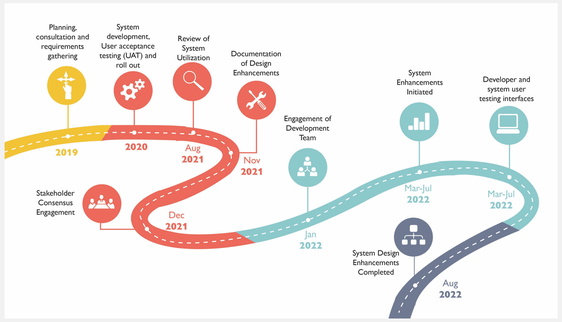
** USAID/Strategic Information Technical Support (SITES), DataCare, Global Fund, Clinton Health Access Initiative (CHAI) US Centers for Disease Control and Prevention (CDC) and UN Population Fund (UNFPA)*

## Activity Description

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

**1. Planning (2018 – 2019)**
- Reviewed existing tools (i.e., Excel workbooks and manual hard copy tool) to generate online system requirements

**2. Requirements gathering (2019-2020)**
- MOH and partners defined OSSR information and systems requirements:
  - MOH leadership & departments
  - Central warehouses (NMS & JMS)
  - Development partners (Global Fund, UNICEF, USAID, CDC, CHAI)

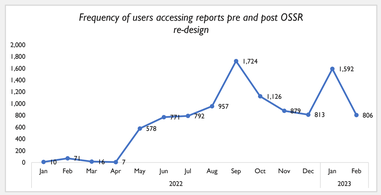


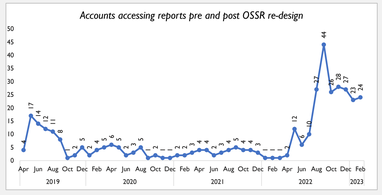

**3. Systems development and testing (2020 – 2021)**
- Team of local system developers engaged and worked collaboratively with MOH DPNM and DHI staff to develop OSSR system interface
- MOH and key stakeholders conducted user acceptance testing
- Reviewed system utility and user feedback to enhance functionality
- Documented redesign requirements considering user feedback

**4. Functionality enhancement and rollout (2022 to date)**
- Developed detailed system wireframes/renderings
- System developers re-engaged to implement functionality enhancements including mobile device interface capabilities
- Trained users on enhancements including creation of institutional login accounts
- Rolled out and monitored dashboard use

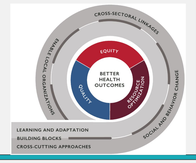
## Activity Impact

National warehouse stock status is visible in real time to all national-level supply chain stakeholders to inform routine decision making. The commodity security working group now uses the OSSR as its main credible source of information on commodity stock status.



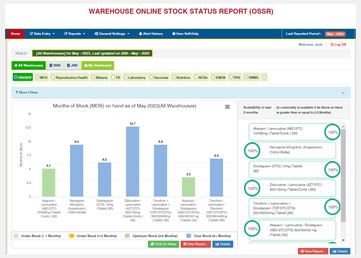




- Access to the OSSR increased 3.5 times from 2,245 times accessed (Jan-Jul 2022) to 7,897 times accessed (Aug 2022-Feb 2023)
- OSSR user access increased from 5 user accounts accessing 190 times per month (Jan-Jul 2022) to 27 user accounts accessing 1,124 times a month (Aug 2022-Feb 2023)




## Evidence

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



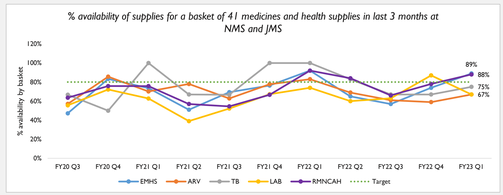

*Desktop view of OSSR dashboard*


*Mobile phone view (Providing data on the go)*

Real-time visibility of central stock information including:

1. Stocks on hand
2. Expiry status and risk
3. Low stock and expiry risk alerts for action
4. Pipeline tracking and monitoring

*Source:* https://ossr.health.go.ug/




Central-level commodity availability improved from an average of 57% to 80% between 2020 and Q1 2023 as a result of timely decision making using the now readily available data from the OSSR.

## Facilitators

**MOH leadership support:** MOH DPNM and DHI effectively led stakeholders to reach consensus on system requirements, design, and implementation support needs. This was important for obtaining buy-in because all key 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 MIS developers with rich text and graphical outlook of the proposed dashboard.

**Creation of institutional accounts and QR codes:** This ensured national stakeholders' wider access to the system while maintaining data security. The QR code eased 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 reports. Creation of institutional access and regular user orientation has improved adoption

**Data integration compatibility:** Compatibility and seamless integration of data from multiple systems into the OSSR was a complex challenge. National warehouses receive data from health facilities, suppliers, and logistics partners which were integrated into the OSSR. This required standardized data formats and effective management protocols to integrate these data.

**Technical expertise to develop the dashboard**: OSSR development required vast 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 resourced 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, bug fixes, 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 DPNM and DHI. 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 systems strengthening, supply chain management, and data and information capabilities. The partners provided knowledge, experience, and networks to support development, training, and use—all 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 eased access 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 data warehouse. 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-centred design principles:** Conducting user research and usability testing was critical to understand end users' needs, workflows, and challenges. This information contributed to the design process and produced an intuitive and user-friendly dashboard.

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