Using DHIS2 for Health Facility Stock Management in Humanitarian Settings

The International Committee of the Red Cross (ICRC) is integrating DHIS2 at health facilities with the institutional supply chain management information system to improve data visibility and pharmacy stock management.

Supply chain management information systems (SCMIS) are at the heart of health supply chains. An effective SCMIS depends on the right combination of people, processes, and technology. At every level of the supply chain, skilled people must record, analyze, manage, and use data. Most supply chains use a basic set of reports and forms, often paper-based, before evolving to digital tools for capturing, reporting, analyzing, and presenting data.

BACKGROUND

The DHIS2 open-source software platform is supported by a project under the Health Information Systems Program (HISP) Centre at the University of Oslo (UiO). The flexible generic data platform has a range of features to capture, manage, and analyze information, extensible through web APIs and an app framework. More than 80 countries worldwide use DHIS2 for collecting and analyzing health data. DHIS2 is offered free of charge as a global public good and provides a simple, user-friendly application for managing stocks and equipment at the facility and community level. It can be seamlessly integrated with full-scale, upstream national logistics management information systems (LMIS).

The ICRC, present in more than 100 countries, protects and assists people affected by armed conflict and other violent situations. The organization provides a continuum of care from first aid to primary health and psychosocial support. The ICRC developed the Pharmacy Stock Management (PSM) Tool, beginning with an 18-month pre-pilot in Somalia; deployment in six countries in 2022; and implementation in 50 health facilities in 2023, to improve health service delivery and health supply availability (figure 1). PSM is now running in 90 facilities across 10 countries.

At Muhda Primary Health Care Center, Nigeria, staff make sure the PSM is accessible to local partners.
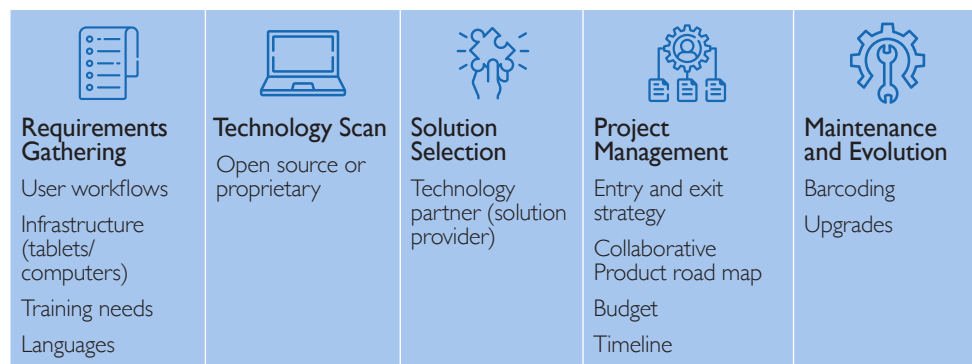
Location: Global

Organization: ICRC

Setting: Humanitarian and crisis settings

Supply chain management practice area: LMIS

HR cadres involved: Supply chain and pharmacy managers

Figure 1. Implementation of the Pharmacy Stock Management Tool

Requirements Gathering	Technology Scan	Solution Selection	Project Management	Maintenance and Evolution
User workflows	Open source or proprietary	Technology partner (solution provider)	Entry and exit strategy	Barcoding
Infrastructure (tablets/computers)			Collaborative Product road map	Upgrades
Training needs			Budget	
Languages			Timeline	

This series of learning briefs focuses on health supply chain practices that can be implemented by humanitarian partners to resolve common challenges and improve the delivery of pharmaceutical and medical commodities.
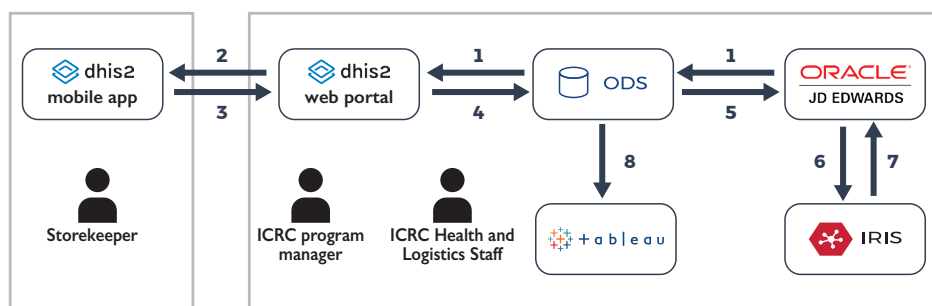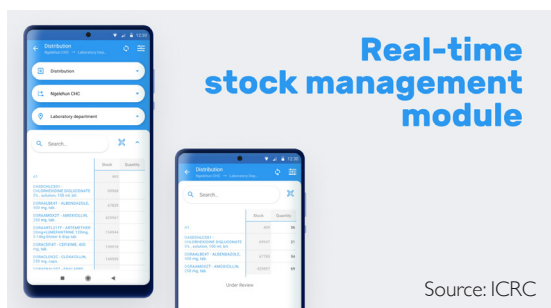
PRACTICE

By integrating its pharmacy stock data through DHIS2, ICRC resolved a range of information challenges, including paper-based management, slow and error-prone processes, limited analysis, and missing last-mile data, which lacked visibility and restricted real-time monitoring and informed decision-making. ICRC developed the system and generously donated the source code to the UiO, which built on it to develop the native DHIS2 version—now a global public good. The PSM Tool is an integrated and standardized medical stock management system that has moved processes from paper to digital management, with improved stock visibility, planning, and optimization.

The PSM Tool integrates three platforms (figure 2) into one holistic solution connected by the operational data store (ODS): a) DHIS2 to enter stock-on-hand and stock distributed; b) IRIS/JDE Oracle to place supply orders with automatic calculation of quantities; and c) Tableau to conduct data analytics.

Figure 2. Data Flows for Holistic Integration of Stock Management

Source: ICRC

Real-time stock management module

Source: ICRC

ICRC selected the DHIS2 solution because of its open-source platform, with offline capability, mobile application, and compatibility with other systems in the ICRC health information ecosystem. The solution includes DHIS2-RTS, a real-time stock management system that allows ICRC to capture supply quantities distributed from the pharmacy, stock losses, and stock corrections by using a mobile device and scanning barcodes.

The stock management process has four steps:

- **Record data on the tablet:** At the end of the month, the storekeeper or pharmacist enters consumption and stock-on-hand data into the DHIS2 stock management system through a tablet or computer.

- **Share and/or change data on DHIS2 web/desktop:** Data entered by storekeepers and pharmacists are synchronized and visible in real time through DHIS2 web-based applications.

- **Place an order on IRIS (ordering platform):** The stock data automatically appear in the ordering system, which uses an embedded formula to calculate quantities when medical storekeepers or managers place their orders.

- **Monitor data on Tableau:** The stock management information feeds into Tableau, which generates analytics and graphs that pharmacists and program managers use to make stock management decisions.
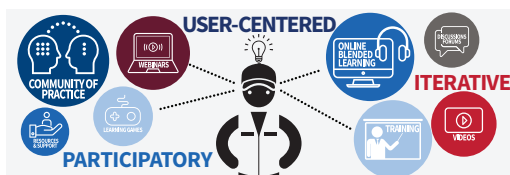
Key Lessons Learned

- **Identify a workflow and design a system that is easy to navigate and understand,** ensuring that users handle few data points and can easily perform actions and manage stock levels.

- **Integrate mobile capabilities** into the system, allowing health facility users to access and input data even in low-connectivity situations. This streamlines processes and makes data collection more efficient.

- **Enable data-driven decision-making** by collecting and analyzing data that are relevant and actionable for health supply chain management. Focus on gathering key information that will support decision-making, even if supply chain expertise is limited.

- **Simplify data entry and calculations** for storekeepers to ensure accuracy and efficiency. Automate calculations and provide clear guidelines to facilitate stock replenishment processes.

- **Assess the organization's technical and deployment capacity** and involve technology partners in implementation phases. Plan and budget roll-out and revision/upgrade trainings.

A key step for adapting to complex settings is to identify a workflow that is easy for the end user, especially when stock management is not a high priority, and pair it with a mobile solution that works offline so data collection can continue even when connectivity is interrupted. The simplicity of collecting only three data points reduces the burden on storekeepers while still allowing health program managers to monitor data and initiate orders accordingly.

As other organizations consider integrating their LMIS with DHIS2, keep in mind that a multi-year information systems project requires careful planning and long-term investment, and that standardization is key to linking data across various platforms. Plan for enough time to develop data concepts and process mapping, and when rolling out a new system, remember that version upgrades will require maintenance windows and downtime that must be planned and communicated. Include budget considerations, especially for integration, dedicated support, and data protection.

DHIS2-RTS is now available to the community as a core feature of DHIS2 and humanitarian partners can use it for health facility-level data collection. Implementation of DHIS2-RTS improves visibility, reliability, and real-time data availability at upstream levels of the supply network, which can help prevent stockouts at health facilities.

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