HEALTH SYSTEMS STRENGTHENING ACCELERATOR

Improving national commodity visibility and tracking using the Pharmaceutical Information Portal

Context

Stock status visibility is critical for making appropriate decisions at all levels of the supply chain. The Ministry of Health Uganda (MOH) has long wanted a consolidated national health supply chain database to facilitate supply chain oversight.

The Pharmaceutical Information Portal (PIP) is currently the MOH's one-stop data repository and business intelligence system for all pharmaceutical and supply chain information. The USAID/Strengthening Supply Chain Systems Activity (SSCS) has improved the functionality of the PIP including the following:

- Real-time medicines management supervision reporting using the structured Supervision, Performance Assessment and Recognition Strategy (SPARS) intervention tools
- Product data master management using the National Product Catalog
- Public health emergency commodity management including ordering and reporting through the emergency electronic management information system
- National online warehouse stock status dashboard
- Online facility stock status reports using the electronic logistics management information system
- Library for supply chain management documents and publications
- Dynamic contact listing for supply chain leadership positions (i.e., District Health Officers, Management Medicines Supervisors, Biostatistician, hospital Pharmacists)
- Supply chain e-learning platforms

The PIP is now the go-to place for all supply chain information needs and is improving national commodity visibility, tracking, and tracing information used by all stakeholders.

Activity Description

The PIP implementation journey is described below.

Planning (2010 – 2011)
- Developed the concept for a pharmaceutical and supply chain data warehouse.

Requirements gathering (2011-2012)
- Developed systems requirements and architectural designs in collaboration with MOH Department of Pharmaceuticals and Natural Medicines (DPNM) and Department of Health Information (DHI)
- Recruited technical experts to develop Uganda's first supply chain data warehouse

**Systems development and testing (2012 – 2014)**
- Developed first PIP prototype in 2012 with initial focus on data aggregation, development of reports, user acceptance tests with key stakeholders, and redesign based on stakeholder feedback

Functionality enhancements and transition to MOH (2014 – 2019)
- MOH redefined PIP functionality and system requirements related to product data master management, public health emergency commodity management, online warehouse stock status dashboards, and e-learning
- Enhanced PIP hardware capacity to meet the new system requirements
- Capacitated MOH staff to maintain PIP functionality
- Transitioned the PIP hardware infrastructure to the MOH Department of Health Information and Information Technology Unit

Enhanced data analytics and visualization (2020 to date)
- Improved data analytics for existing reports
- Improved geolocation tracking in the reporting using GPS
- Planned upgrade of PIP infrastructure and renewal of current licenses
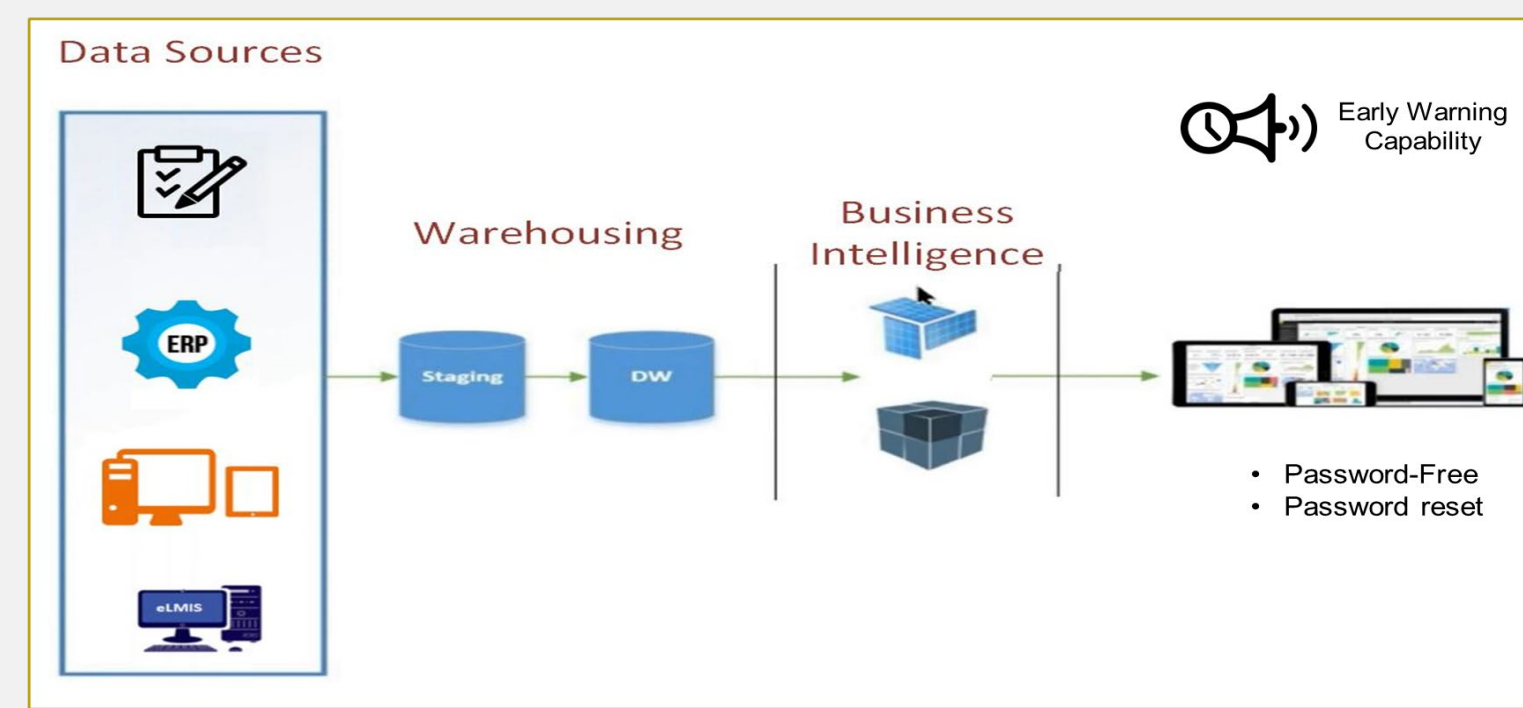

PIP architecture

Activity Impact

The PIP has enabled visibility in the national health supply chain: https://pip.health.go.ug/. Specifically—

- Number of health facilities syncing stock status to the PIP increased from 350 in 2020 to 1,243 in 2023.
- Complete stock status reporting by health facilities improved from 7% (297/4,247) in 2020 to 85% (3,609/4,247) in 2023.
- Digital Supply Chain Self-Assessments conducted at 78 health facilities
- 407 supply chain staff completed supply chain e-learning modules in the PIP
- Visibility of both warehouse and facility stock status by all key stakeholders now inform their routine decision making
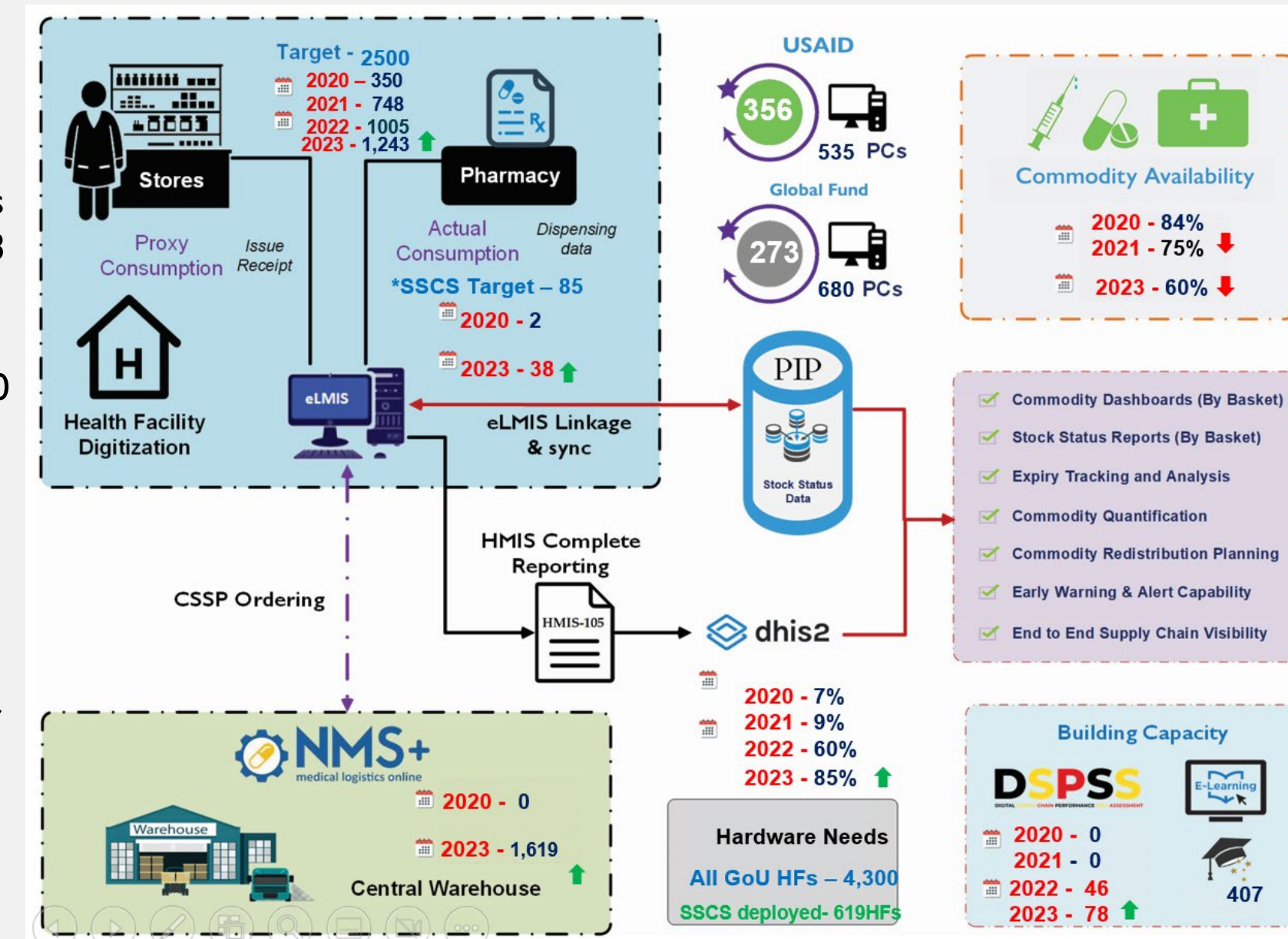
NMS+ - National Medical stores warehouse management system, HMIS- Health Management information System, eLMIS- electronic Logistics Management Information Systems, DSPSS- Digital Supply Chain Performance Self Assessment Strategy, GoU- Government of Uganda, HF- Health facility, DHIS2- District Health Information System 2.

Evidence

Samples of the PIP online data analytics and visualization products are presented below.

PIP analytics and visualization interface

Online eLMIS facility stock status analytics report in PIP
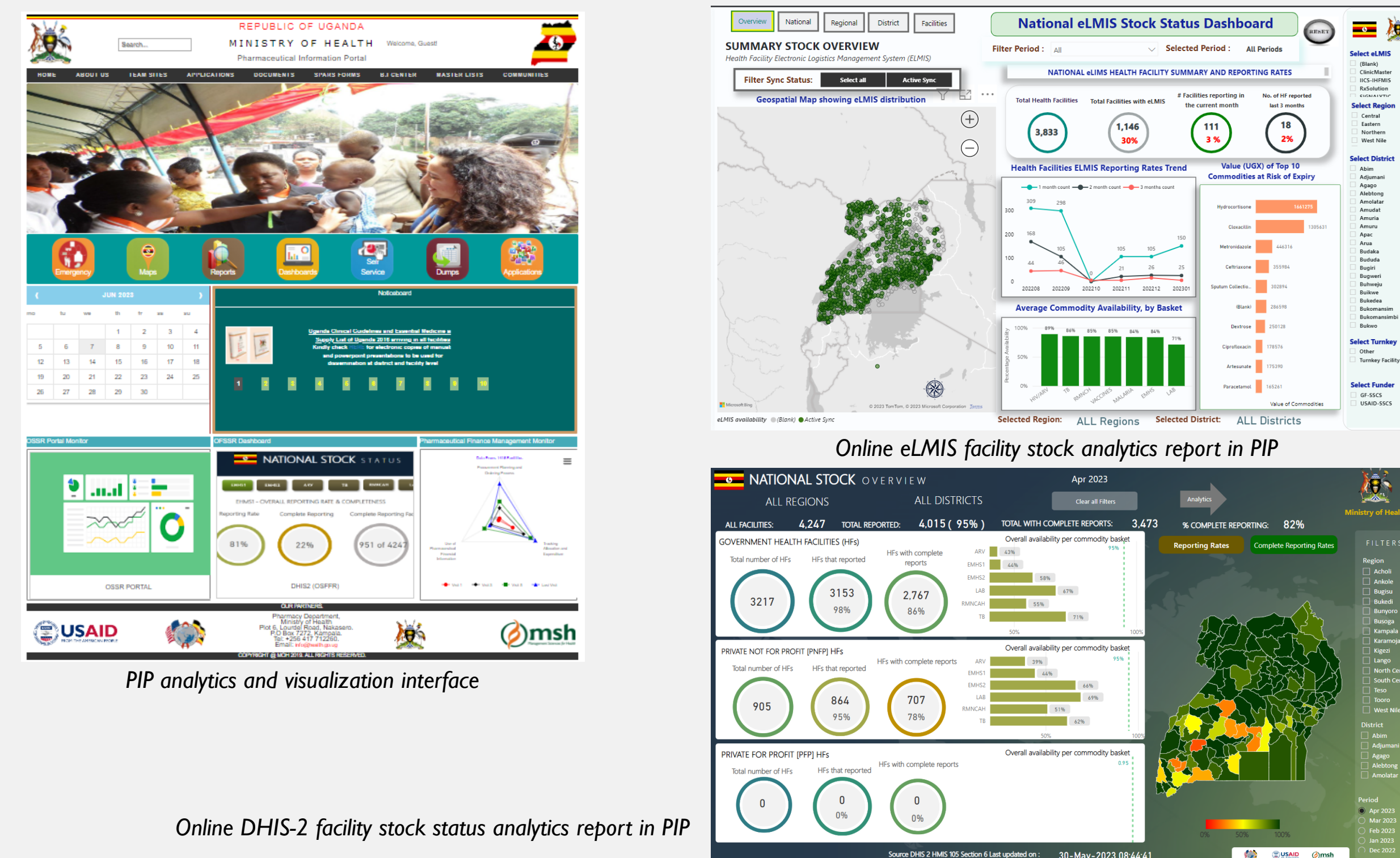
Online DHIS-2 facility stock status analytics report in PIP

Facilitators

- **Buy-in from MOH:** MOH led the identification of PIP systems requirement and functionality needs.

- **Iterative system development:** PIP development was highly iterative among the developers, users, and other stakeholders, which allowed finalized products to be deployed on a rolling basis.

- **Collaboration with US government implementing partners:** SSCS Activity leveraged capabilities and synergies from other US government partners, such as USAID/Strategic Information Technical Support (SITES), to develop and roll out PIP products.

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

- **Linkage of the PIP to various data systems:** Linkage of the PIP to various data sources like, DHIS-2 for HMIS 105-6 reports, facility eLMIS systems and central warehouse management information systems increased utility of the PIP as the one stop data source for supply chain.

Challenges

- Limited staff at MOH's information, communication, and technology department affected the transition process.

- Malware attack affected PIP availability and electronic logistics management information (eLMIS) system data syncing.

- Suboptimal syncing of data from facilities to the PIP due to:
  - eLMIS hardware gaps—only 25% (444/1,774) of facilities have computers in the medicines store
  - Unreliable internet access—only 27% (479/1,774) of facilities have reliable internet
  - Unreliable power—only 39% (700/1,774) of facilities are connected to the main electricity grid (source: eLMIS readiness assessment, 2020)

- Multiple facility-level systems need to be individually linked and integrated to upload supply chain data to the PIP.

- Staff reshuffling among users and poor attitude towards digitalization has slowed system adoption (dedicated change management interventions needed).

Lessons Learned

MOH- or government-led development: MOH DPNM and DHI led PIP development. This was critical for local ownership and guaranteed continuity in systems enhancements and user support at all levels of the supply chain.

Leverage other US government partner capabilities: Leveraging US partners' health systems strengthening, supply chain management, and data and information capabilities fast-tracked development of certain PIP components such as the online stock status report. At subnational level, the partners supported districts and facilities to capture data and use the PIP database.

Early and sustained stakeholder engagement: Involving all major supply chain stakeholders from the beginning ensured that the PIP meets each entity's needs and informs their decision making.

User-centered design: Prioritizing user-centered design principles was critical in PIP development. The continuous need to access PIP data resulted in enhancements such as mobile device-enabled interfaces to ease and scale-up access.

Strong potential: Great opportunity remains to further enhance PIP including automation of supply chain situation alerts based artificial intelligence.