Digital Square Webinar: Global Good COVID-19 Adaptations Part III (OpenLMIS and OpenELIS)

October 28, 2020
Agenda

- Welcome and Opening - Bianca Poll (5 min)
- OpenLMIS - Gaurav Bhattacharya and Nobel Cubahiro (20 min)
- OpenELIS - Casey liams-Hauser (20 min)
- Questions & Closing (15 min)
Overview

- Heightened need for close management and visibility of supply chains: limited supplies, inform global allocation and procurement, limited resources
- Number of countries using excel or paper-based systems or unable to quickly adapt electronic systems to incorporate COVID-19 commodities
- OpenLMIS adapted for managing COVID-19 commodities and tracking equipment
- Offered as a cloud-based solution for quick deployments and virtual trainings
- Limited configurations to certain standard options and pushing customizations to later stages to enable efficient use of resources and rapid and replicable deployment
OpenLMIS COVID-19 Edition

- Partnership between CHAI, VillageReach and SolDevelo
- OpenLMIS for COVID features:
  - Stock management at all levels of the supply chain
  - Creation, submission and approval of requisitions and replenishments
  - Proof of delivery to track shipments and order fulfilment
  - Monitoring and reporting the location and operational status of Ventilators and other equipment
  - Dashboards and reports to track consumption, understand demand and manage the program, and
  - Product catalog management to create and update/manage product list through an integration with PCMT
OpenLMIS COVID-19 Edition

- Localization and Deployment Accelerators
  - Master data collection templates
  - Reference audio-visual training materials, training needs and guides
  - Deployment guide
  - Reference project team and governance structures

- Build local capacity
  - To manage majority of support needs
  - To handover system to local stakeholders
Cameroon Supply Chain System: Product Flow

Suppliers (90% Abroad, 10% Local)

CENAME

10 Regional Funds for Health Promotion

Private for-profit wholesaler

Public Health Facilities

Private Pharmacies/ Medical Offices/ Clinics/ Polyclinic

Large Hospitals (1st, 2nd category)

Beneficiary Population

Private non-profit purchasing centers

Central Level

Regional Level

Peripheral Level

Health Facilities and non-profit networks
Cameroon Supply Chain Information Systems – Before COVID-19

<table>
<thead>
<tr>
<th>System</th>
<th>Supported Supply Chain Functionality</th>
<th>System</th>
<th>Supported Supply Chain Functionality</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAGE</td>
<td>Procurement</td>
<td>DHIS 2</td>
<td>Quantification</td>
</tr>
<tr>
<td></td>
<td>Warehousing and Inventory Management</td>
<td></td>
<td>Order Management</td>
</tr>
<tr>
<td></td>
<td>Distribution</td>
<td></td>
<td>Reporting</td>
</tr>
<tr>
<td></td>
<td>Reporting</td>
<td>VinData</td>
<td>Ordering</td>
</tr>
<tr>
<td>Pentaho</td>
<td>Reporting and Analytics</td>
<td></td>
<td>Receiving</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Inventory Control</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Dispensing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SMS4Life</td>
<td>Reporting (ordering)</td>
</tr>
</tbody>
</table>

Digital Square | connecting the world for better health
<table>
<thead>
<tr>
<th>System</th>
<th>Supported Supply Chain Functionality</th>
<th>Level Supported</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAGE</td>
<td>Procurement</td>
<td>CENAME</td>
</tr>
<tr>
<td></td>
<td>Warehousing and Inventory Management</td>
<td>CENAME, Regional</td>
</tr>
<tr>
<td></td>
<td>Distribution – Picking</td>
<td>CENAME</td>
</tr>
<tr>
<td></td>
<td>Reporting</td>
<td>CENAME Regional</td>
</tr>
<tr>
<td>Pentaho</td>
<td>Reporting and Analytics (being developed)</td>
<td>Central (MOH, DPML)</td>
</tr>
<tr>
<td>DHIS 2</td>
<td>Quantification</td>
<td>Central (MOH)</td>
</tr>
<tr>
<td></td>
<td>Order Management (for HIV/AIDS)</td>
<td>District, Central</td>
</tr>
<tr>
<td></td>
<td>Reporting</td>
<td>District, Central</td>
</tr>
<tr>
<td>VinData</td>
<td>Ordering</td>
<td>Health Facility (select)</td>
</tr>
<tr>
<td></td>
<td>Receiving</td>
<td>Health Facility (select)</td>
</tr>
<tr>
<td></td>
<td>Inventory Control</td>
<td>Health Facility (select)</td>
</tr>
<tr>
<td></td>
<td>Dispensing</td>
<td>Health Facility (select)</td>
</tr>
<tr>
<td>SMS4Life</td>
<td>Reporting (ordering) (malaria)</td>
<td>Health Facility (select)</td>
</tr>
<tr>
<td>Program-specific tools</td>
<td>Quantification</td>
<td>Central (MOH)</td>
</tr>
<tr>
<td></td>
<td>Donations Management</td>
<td>Central (MOH)</td>
</tr>
<tr>
<td>Manual systems</td>
<td>Procurement – Purchasing, Inbound</td>
<td>CENAME</td>
</tr>
<tr>
<td></td>
<td>Ordering</td>
<td>Health Facility (most health centers)</td>
</tr>
<tr>
<td></td>
<td>Receiving</td>
<td>Health Facility (most health centers)</td>
</tr>
<tr>
<td></td>
<td>Inventory Management</td>
<td>Regional</td>
</tr>
<tr>
<td></td>
<td>Inventory Control</td>
<td>Health Facility (most health centers)</td>
</tr>
<tr>
<td></td>
<td>Distribution – Transport</td>
<td>CENAME</td>
</tr>
<tr>
<td>Other – Stock Management Tool</td>
<td>Reporting (vaccines only)</td>
<td>Regional</td>
</tr>
<tr>
<td>Other – GPS</td>
<td>Transport</td>
<td>CENAME</td>
</tr>
</tbody>
</table>
OpenLMIS COVID-19 Edition: Cameroon Deployment

**Pre-configuration**
- March-June 20
  - OpenLMIS latest version
  - Allow easy and rapid deployment
  - Master data collection

**Customization**
- June-July 20
  - Cameroon COVID supply chain
  - Two programs: COVID commodities & Labs
  - Remote virtual training of trainers

**Testing**
- July-August 20
  - Adjustment on the OpenLMIS training instance
  - Migrating to the production instance

**Deployment**
- August-Present 20

**Target**
- 300 sites
  - 13 Central and regional Warehouses
  - 190 districts
  - 100 treatment and testing sites

**Current achievements:**
- 60 sites
### Impact of OpenLMIS Implementation

<table>
<thead>
<tr>
<th>Before OpenLMIS Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Supply chain for COVID commodities not well defined</td>
</tr>
<tr>
<td>○ Product flow</td>
</tr>
<tr>
<td>○ Information flow</td>
</tr>
<tr>
<td>● Frequent stock-outs at all levels</td>
</tr>
<tr>
<td>● Requisition system not well defined</td>
</tr>
<tr>
<td>● Lack of visibility of COVID stock at all levels of the supply chain tiers</td>
</tr>
<tr>
<td>● Lack of visibility into COVID equipments</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>After OpenLMIS Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Supply chain well defined</td>
</tr>
<tr>
<td>● MOH and CHAI estimate 50% reduction in stock-outs rate in facilities where OpenLMIS is deployed</td>
</tr>
<tr>
<td>● Requisition system well defined and done with OpenLMIS</td>
</tr>
<tr>
<td>● Real time visibility of COVID commodities stock, which allowed decision-making</td>
</tr>
<tr>
<td>● COVID equipments inventory and mapping</td>
</tr>
</tbody>
</table>
Cameroon Future State

Integrated eLMIS

Essential Medicines
- Tuberculosis
- Malaria
- Reproductive Health
- COVID
- Vaccins
- VIH & AIDS

Scope

Products
- More than 500 products
- 50 equipments

Supply chain levels
- 1 Central warehouses
- 10 Regional warehouses
- 190 Districts
- 5,000 health facilities

Users
- More than 10,000 users

Interoperability
- Interoperability with SAGE
- Interoperability with DHIS II
- Interoperability with other systems (OpenLMIS)

Continuous improvements
- Refining dashboard and reports
- Adding more modules: Cold chain management, batch number management, distribution and transport tracking

Digital Square | connecting the world for better health
OpenLMIS COVID-19 Edition: Detailed Information


Gaurav Bhattacharya  
Director, Information Systems, CHAI  
gbhattacharya@clintonhealthaccess.org

Nobel Cubahiro  
Program Manager, Supply Chain, COVID & Emergencies, CHAI Cameroon  
ncubahiro@clintonhealthaccess.org
Casey liams-Hauser
An open source Enterprise Laboratory Information System for Global Health

Casey Iiams-Hauser, MIA
What Is OpenELIS?

The OpenELIS Global software is an open enterprise-level laboratory information system built on open source web-based technologies that has been tailored for low-and-middle income country public health laboratories.

The software serves as both an effective laboratory software solution and business process framework. It supports the effective functioning of public health laboratories for best laboratory practice and accreditation.

Designed to support quality laboratory services and test results from high volume clinical and reference laboratories.
Enhanced Laboratory Workflow

PRE-ANALYTICAL

Patient Registration and Test Order

Sample Collection and Registration

Quality Assurance

POST-ANALYTICAL

Results Reporting and Laboratory Service Reports

Biological/Manual Validation

Technical validation

Analytical

Lab Analyzer Test Import And Results capture

Testing

OpenELIS Global
As of October 2020

Geographic Coverage

84 Reference + Clinical Labs in Cote d’Ivoire
41 Reference + Clinical Labs in Haiti
20 Clinical Labs in Vietnam
~50-70 Bahmni OpenELIS Implementations
Key Features

- FHIR R4 & HL7 2.5.1 Interoperability with OpenMRS
- Analyzer Interface Plug-In Library
- Viral Load Scaleup
- Multilingual - English and French
- Customizable workflow
- Viral Load Dashboard – Cote d’Ivoire
- COVID testing workflows
COVID19 Adaptations - Requirements

• A way to ensure that key public health data was captured from every person entering Mauritius
  – The people had to be uniquely identified
  – Had to collect enough information to allow contact tracing
  – Had to create a COVID19 test for each arriving passenger
  – Had to communicate the results of the test quickly to both the passenger and the Ministry of Health and Wellness
  – Needed a paperless workflow as much as possible (e-signatures, analyzer interfaces, interoperability with existing systems)
We designed a web form for passengers to enter in the key information, which emails a barcode with a unique ID and submits an order via FHIR to the Airport Lab.

1. Passengers fill the online portal, either before leaving or from a mobile device and receive a barcode.

2. An official at the health desk looks up the lab order in OE, associates it with a preprinted barcode on the specimen bag.

3. Swab is taken and the passenger departs.
Public Health Passenger Locator Form

To protect your health, public health officers need you to complete this form whenever they suspect a communicable disease onboard a flight. Your information will help public health officers to contact you if you were exposed to a communicable disease. It is important to fill out this form completely and accurately. Your information is intended to be held in accordance with applicable laws and used only for public health purposes. Thank you for helping us to protect your health.

Note: The data collected from the Locator Form, either online or on arrival at the SSR International Airport, Plaisance, is solely used for the purpose of screening infectious diseases, including COVID-19 public health surveillance. The legal basis for using and processing personal information is in accordance with the Data Protection Act 2017. Passengers' personal data will be retained for a minimum period of 2 years or more depending on the duration of the COVID-19 pandemic and other infectious diseases. One year after this period, the passengers' personal data will be destroyed.

It is strongly recommended to fill the locator form prior to your travel date in order to avoid any administrative delays at the Airport.

Passenger Type

Are you a Resident, or Non-Resident of Mauritius?*
- Resident
- Non-Resident

Back  Next
OpenELIS Workflow
The post result actions

After the test has been validated, the result is sent to the passenger via SMS and email

From: ahl-lab@safemauritius.govmu.org
Date: Tue., Oct. 27, 2020, 16:42
Subject: SARS-CoV-2 (COVID-19) RNA Testing Results
To: 

SARS-CoV-2 (COVID-19) RNA testing results have been finalized. If you are not awaiting test results please call XXXXXXXXXXX and delete this notice.

Caleb S: Negative

For privacy, only the first name and last initial of the person who the result is for is displayed.

MOH personnel follow up for the remaining testing protocol or to advise on next steps
### What’s Next For OpenELIS Global?

#### Now
- Version 2.1 Released
- FHIR R4 API
- FHIR based consolidated server for lab records
- SMS and email results
- Test Request and Result Exchange with OpenMRS
- E-Signatures for patient reports
- WHO SLIPTA compliant for accreditation
- Version 2.2 (Imminent release) Accession Numbers overhaul

#### Next
- Version 2.3 (Q1 2021)
  - STAT orders
  - FHIR based Client Registry and SHR built on OpenCR
  - Links to the SORMAS disease surveillance system
  - Referral orders supported over API
  - One scan reception, improvement for high volume workflows
  - Overhaul of alerts and Electronic orders display

#### Future
- Data Analysis plugins for Consolidated Server
- Updates to core technology (EG: Ubuntu 20 LTS)
- User defined test algorithms
- Microbiology enhancements
- Aliquotting Support

Complete Road Map: roadmap.openelisci.org
Thank you!

- Thank you to our whole team at Digital Initiatives Group at I-TECH, University of Washington (DIGI) who worked many nights and weekends to get this all done.
- A huge thank you to the team at Mauritius Ministry of Health and Wellness.
- Thank you to all of you for your time.

More information at OpenELIS-global.org, by emailing DIGI at digit@uw.edu or me, Casey liams-Hauser at caseyi@uw.edu.
Questions?

Thank you!
Digital Square is supported by:

Digital Square is a PATH-led initiative funded and designed by the United States Agency for International Development, the Bill & Melinda Gates Foundation, and a consortium of other donors.

This presentation was made possible by the generous support of the American people through the United States Agency for International Development. The contents are the responsibility of PATH and do not necessarily reflect the views of USAID or the United States Government.