



# Introducing DHIS2 's Last Mile eLMIS Module

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15:00 CET, October 28th, 2021

#### INTRODUCTION





#### **DHIS2 Platform**

- Capture, management and analysis of information
- Flexible, generic data platform, wide range of use-cases
  - Open source software
  - Extensible through Web APIs and app framework
- Based in University of Oslo with a global HISP network

#### **DHIS2** in Numbers



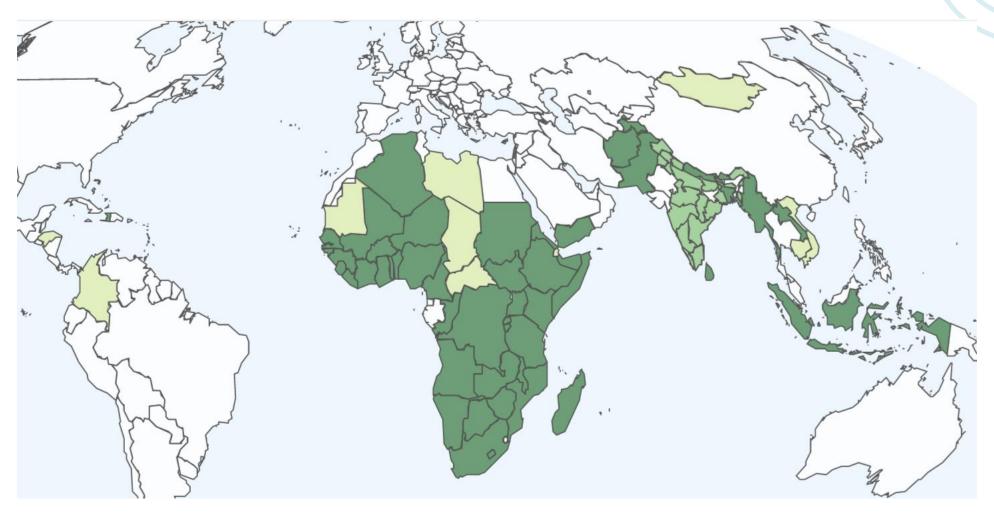
300'000+ monthly users

90+ countries

150 NGOs

12 global/regional organizations

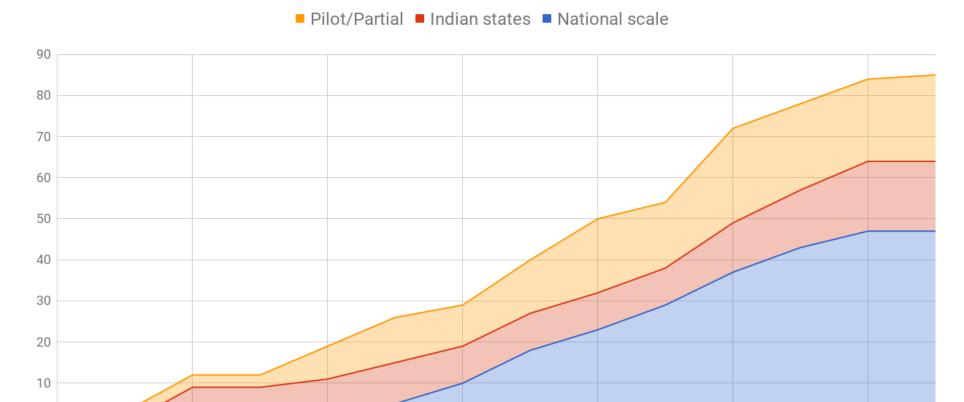
#### **DHIS2 Global Adoption**



Pilot National scale: 60 countries

#### DHIS2 MoH Adoption 2006-2019

Growth in DHIS 2 MoH country implementations 2006-2019



National scale: 60 Indian states: 17 Pilot/Partial: 21

#### Key Areas and Use-Cases

HMIS - 60+ countries at national scale

Health programs - HIV, TB, Malaria, Immunization

Disease surveillance - Uganda, Mali, Sierra Leone, AFRO, WAHO

Tracking of pregnant women - Palestine, Bangladesh, India

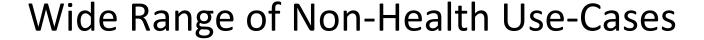
Immunisation registries - Botswana, Rwanda, Ghana

Tracking of HIV/TB patients - Tanzania, Rwanda, Ghana, Senegal

Facility surveys - SA Core Standards, WHO SARA

Inpatient case-based registers - Ghana, Kenya

Facility registry - OpenHIE



Water and sanitation - Zambia, DRC, Mozambique

Logistics - Uganda, Tanzania, Laos, Mali, more

Education - Gambia, Uganda

Agriculture - Tanzania

Forestry - Rwanda

Refugee support - IRC, NRC

Social franchising - MSI, PSI

Food security - Bangladesh

Results based finance - Bluesquare / Benin

Wildlife and nature conservation - TNC

Earthquake recovery - Nepal



Population Services Int (PSI)

Médecins Sans Frontières (MSF)

Save the Children

Red Cross (ICRC)

Int Rescue Committee (IRC)

Int Planned Parenthood Fed (IPPF)

**ICAP** 

IMA World Health (IMA)

Management Sci for Health (MSH)

Marie Stopes International (MSI)

FHI 360

International Medical Corps (IMC)

Norwegian Refugee Council (NRC)

**JHPIEGO** 

PATH

Helen Keller Int (HKI)

RTI International

**CARE International** 

Oxfam

Africare

EngenderHealth

Palladium

#### Used and Supported by Global / Regional Organizations

WHO - Collaborative center, metadata packages, malaria

PEPFAR - DATIM

Gates Foundation - Malaria, disease surveillance

**GAVI** - Immunization

CDC - Global Health Security

Global Fund - Support in 12+ countries

**Economic Community Of West African States (ECOWAS)** 

East African Community (EAC)

**UNICEF** - Data use in countries

USAID - Support in 12+ countries

#### **Funding**

#### Long-term funding from 8 major donors and UiO

- NORAD
- PEPFAR (OGAC)
- Gates Foundation
- GAVI
- Global Fund
- UNICEF
- CDC
- WHO







Aggregate data

Immunization doses given

People trained in FP

Refugees supported



**Events** 

Facility assessments

Clinical visits

**Educational events** 



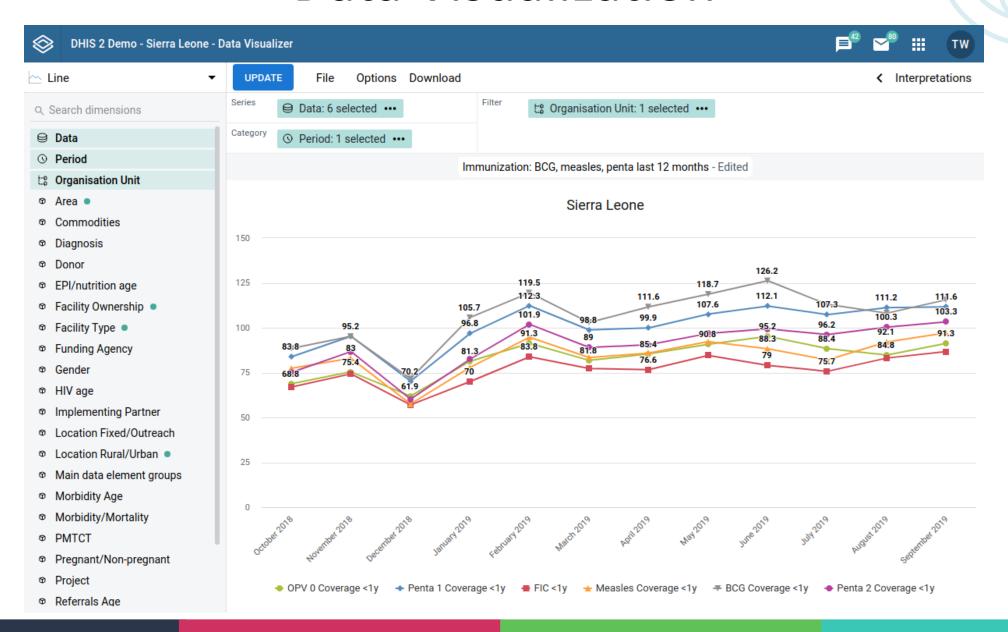
Tracking

Maternal health

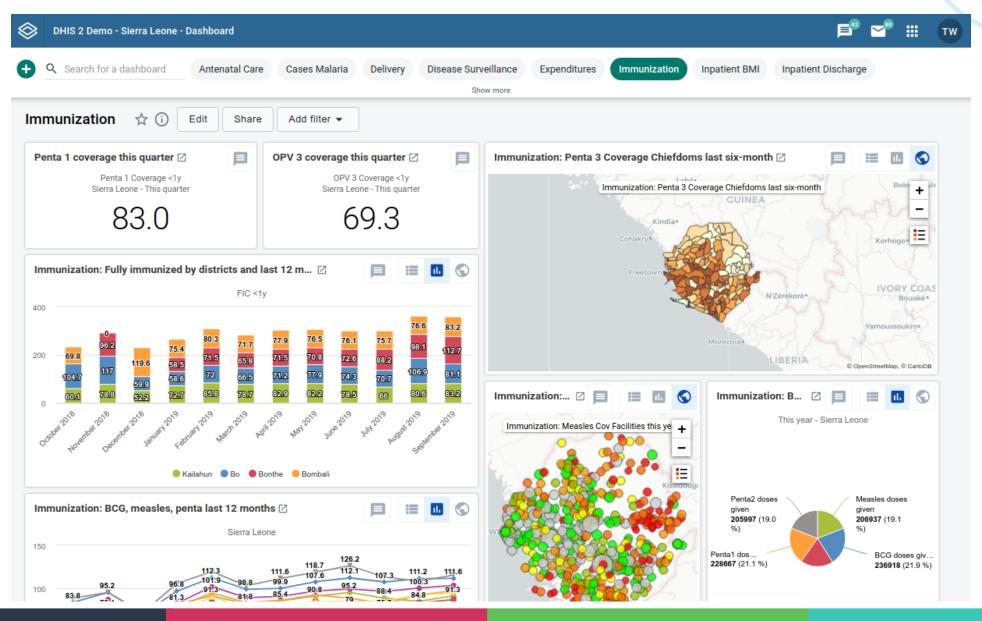
**Immunization** 

Equipment, drugs

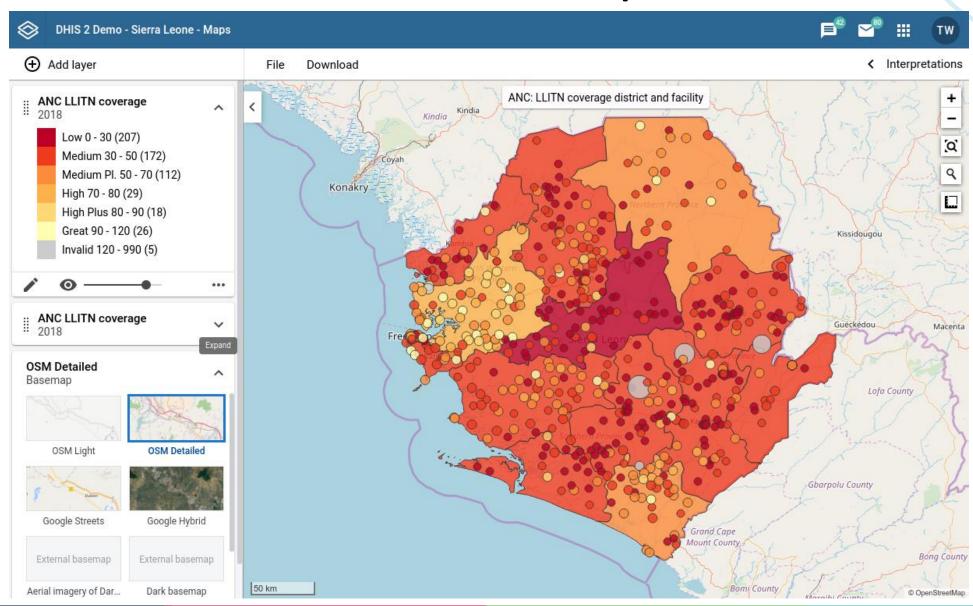
#### **Data Visualization**



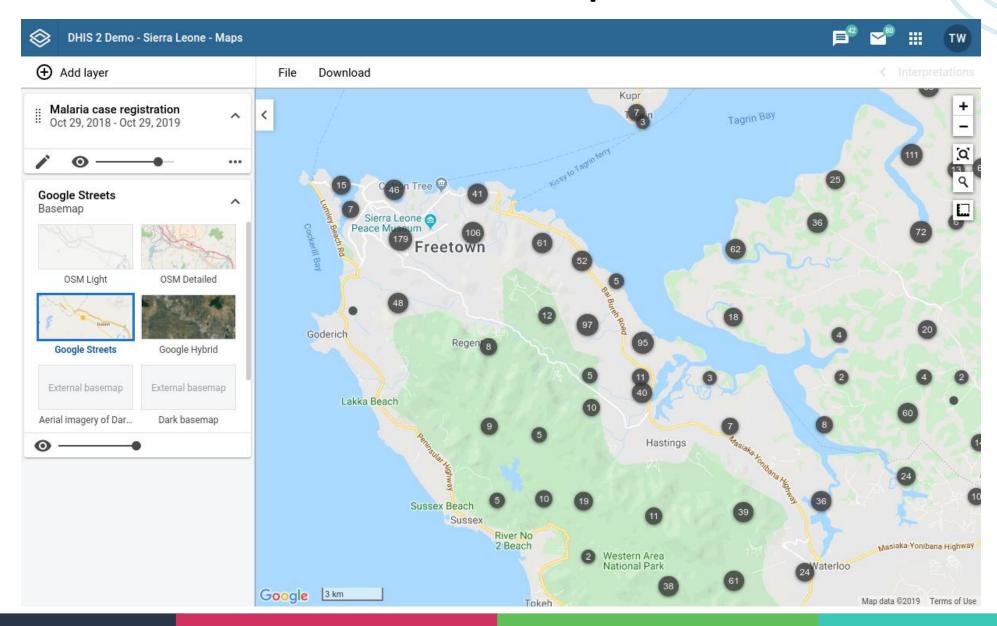
## **HMIS Integrated Dashboard**



### Thematic Maps



### **Event Maps**



# Flexible, Do-it-Yourself Configuration

dhis2 DHIS 2 Demo - Sierra Leone			Apps 🔑 Profile	
m ţ			0	
	Category Option	Category	Category Combination	Category Option Combinatio
Search Category Option	Create, modify, view and delete data element category options. Category options are options with in category.	Create, modify, view and delete data element categories. Categories are used for disaggregation of data elements.	Create, modify, view and delete data element category combinations.	View and edit data element category option combinations. Category option combinations are break-downs of category.
Category				
Category Combination	+ 1	+ ≡	+ ≡	+ 1
Category Option Combination	Category Option Group	Category Option Group Set	Data Element	Data Element Group
Category Option Group	Create, modify, view and delete category option groups, which	Create, modify, view and delete category option group sets,	Create, modify, view and delete data elements. Data elements	Create, modify, view and delet data element groups. Groups
Category Option Group Set	can be used to classify category options.	which can be used for improved data analysis.	are phenomena for which will be captured and analyzed.	are used for improved analysis
Data Element				
Data Element Group	+ 1	+ ≡	+ 1	+ 1
Data Element Group Set	Data Element Group Set	Indicator	Indicator Type	Indicator Group
ndicator	Create, modify, view and delete data element group sets. Group	Create, modify, view and delete indicators. An indicator is a	Create, modify, view and delete indicator types. An indicator	Create, modify, view and delet indicator groups. Groups are
ndicator Type	sets are used for improved analysis.	formula consisting of data elements and numbers.	type is a factor for an indicator, like percentage.	used for improved analysis.
ndicator Croun				







#### Capture app

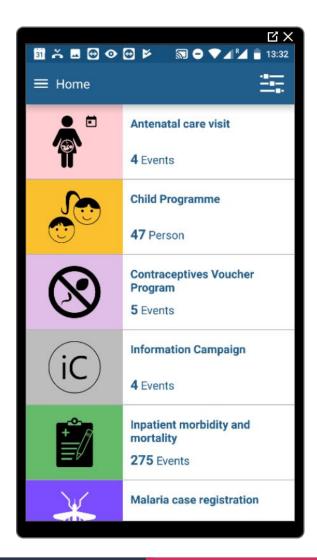
Event programs

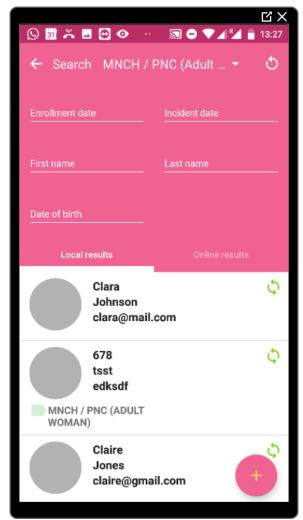
Tracker programs
Aggregate data sets

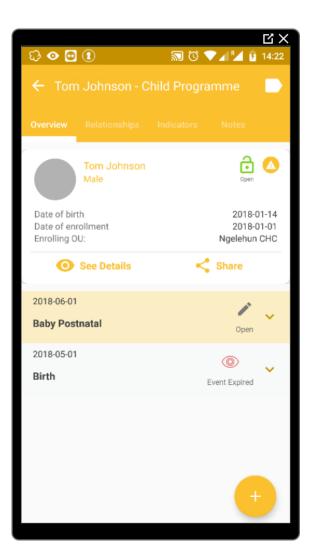
#### Dashboard app

Charts, maps, pivot tables - PWA

### DHIS 2 Capture App







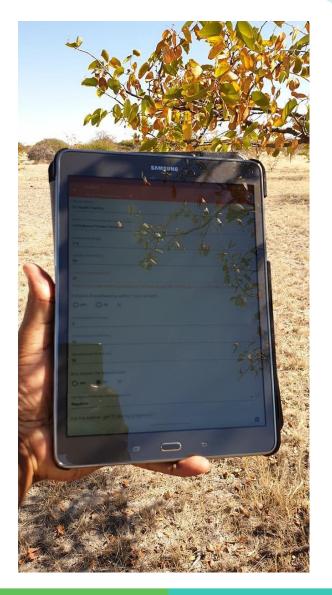
### MSF South Sudan Android Tracker



### **Botswana Immunization Tracker**











#### Standardized DHIS 2 configuration (metadata)

Import directly into a DHIS 2 instance

#### Based on WHO recommendations & guidelines

- Dashboard and indicators
- Data collection forms and data elements
- Tracker programs

#### Existing packages

- Covid-19
- Immunization
- Malaria
- TB case surveillance
- HIV ART register
- Cause of death

#### In development

LMIS (expected Q4-2021/Q1-2022

Improve quality of health programs and strengthen data use



Tanzania

Uganda

Rwanda

Malawi

South Africa

Lusophone Africa

Latin America

West and Central Africa

Nigeria

Vietnam

India

Sri Lanka

Bangladesh

## community.dhis2.org





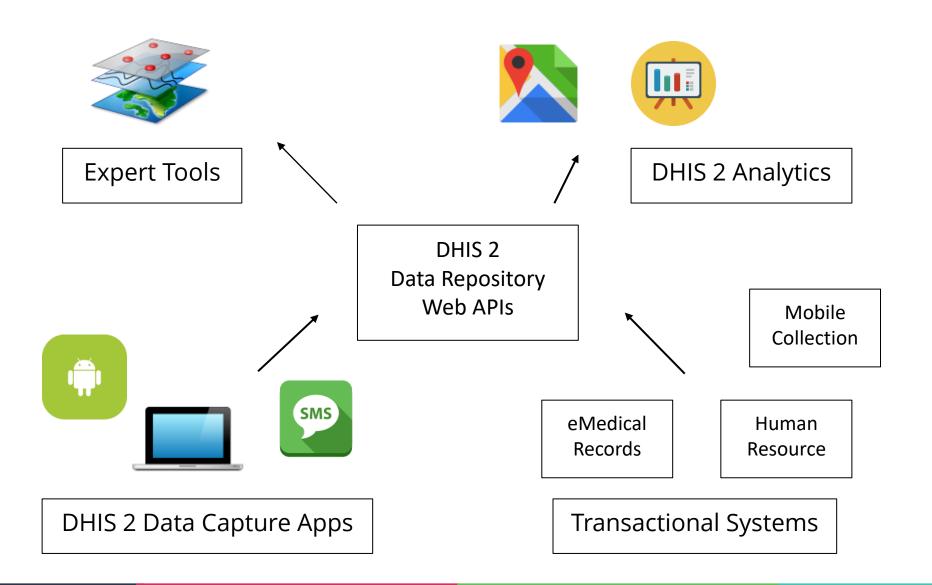
3 / month		How to set custom Notifications from the	
		DHIS2 Community!	Sep 23
8 / month 1 unread	1	Problem Data visualization and data element group  Support - Assistance technique	34n
14 / month	1	Migrating from 2.27 to 2.30 Indicators not showing data  Support - Assistance technique	1
	3	Events capture does not work after reverse proxy configuration with nginx  Implementation - Implémentation	1
57 / month 340 unread 2 new	M	Kigali Tracker Academy 2019 - Discussion and Questions •  The Regional Academies academy	2
	1 unread  14 / month  57 / month  340 unread	1 unread  1 unread  14 / month  57 / month 340 unread	Problem Data Visualization and data element group Support - Assistance technique  Migrating from 2.27 to 2.30 Indicators not showing data Support - Assistance technique  Events capture does not work after reverse proxy configuration with nginx Implementation - Implémentation  Kigali Tracker Academy 2019 - Discussion and Questions The Regional Academies academy

### academy.dhis2.org



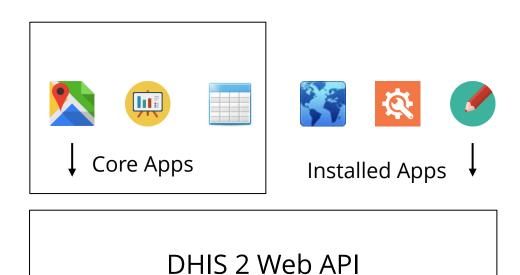
Becoming an expert in DHIS2, step by step

## Open and Interoperable Platform

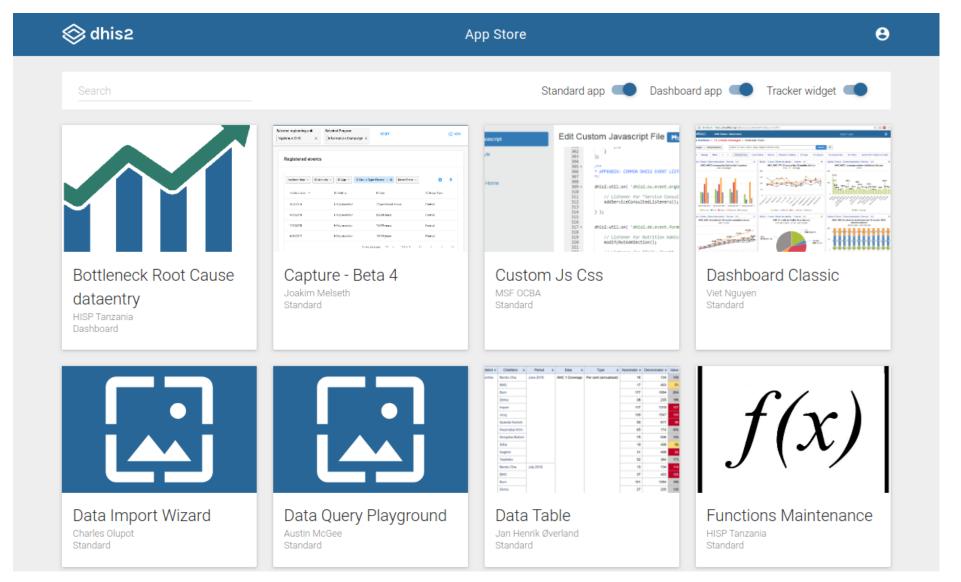




- Extend with specific features without forking the system
- Utilize external development resources
- Encourage innovation



## play.dhis2.org/appstore

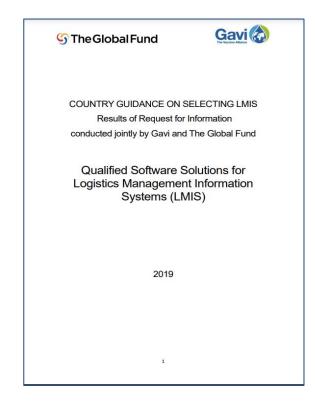


End-User Stock Management Tool for Effective Logistics Management & Improved Health Service Delivery

### **Guiding Documents**



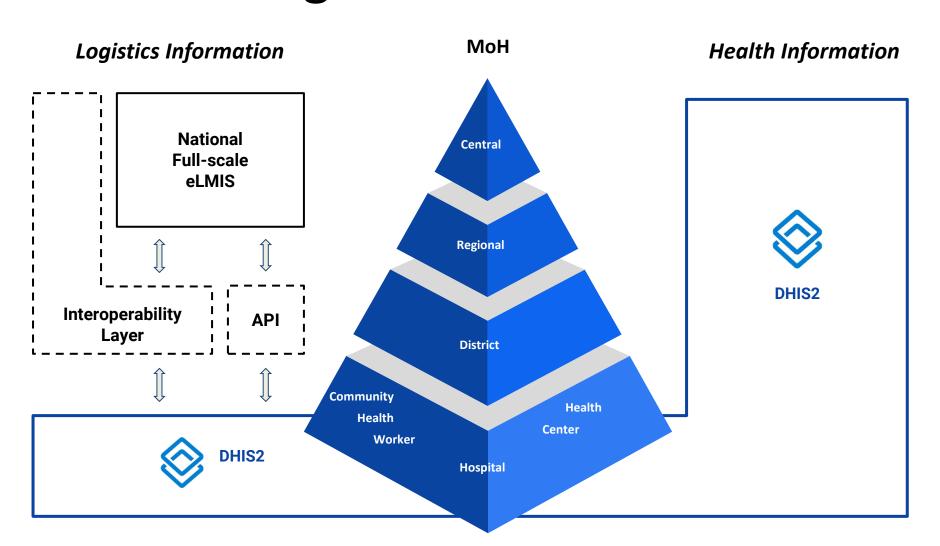




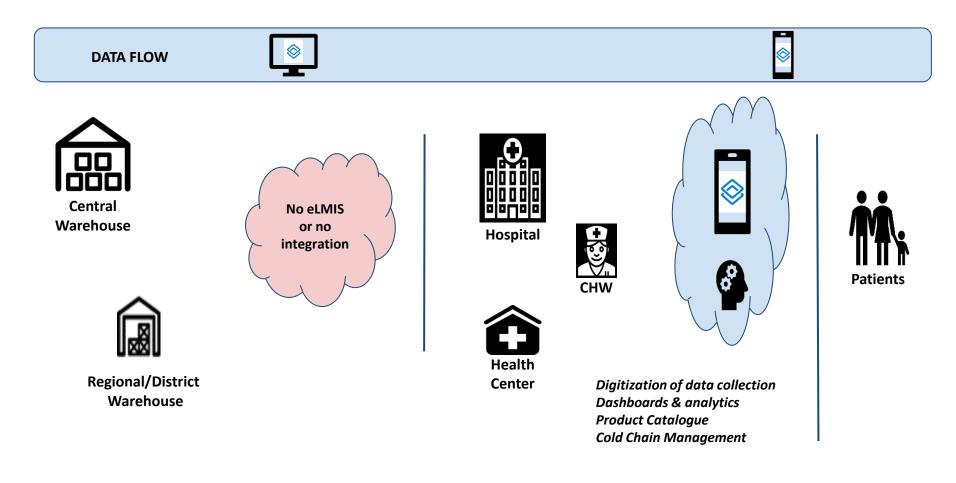
- End to end visibility
- Real time data
- Transactional, event-driven system and aggregate based reporting
- Interoperability with HIS
- Cold chain monitoring

- Country Guidance on Selecting LMIS 2019 Global Fund & GAVI
- Target Software Standards for Vaccine Supply Chain Information Systems 2019 GAVI

## eLMIS Integration Architecture - DATA FLOW



## Use-case 1: Aggregate stock reporting

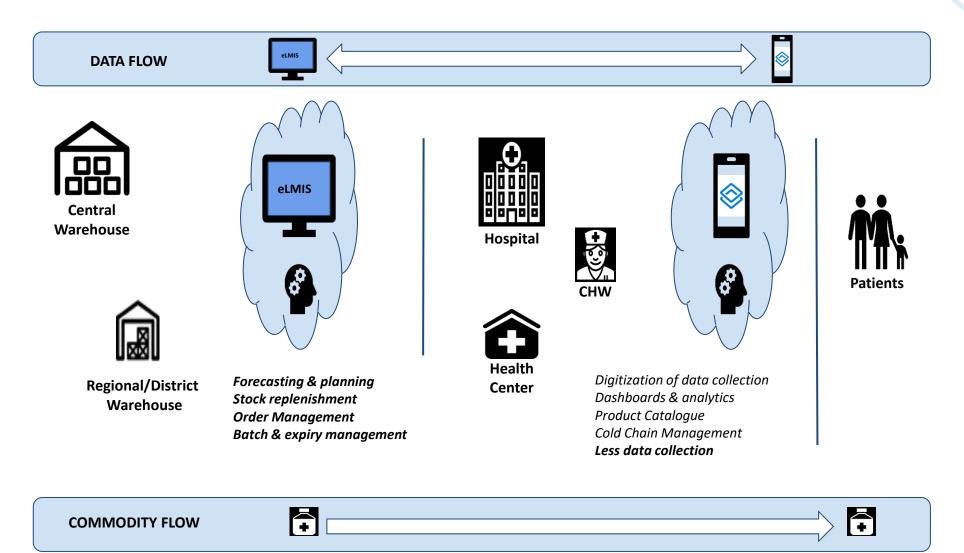


**COMMODITY FLOW** 

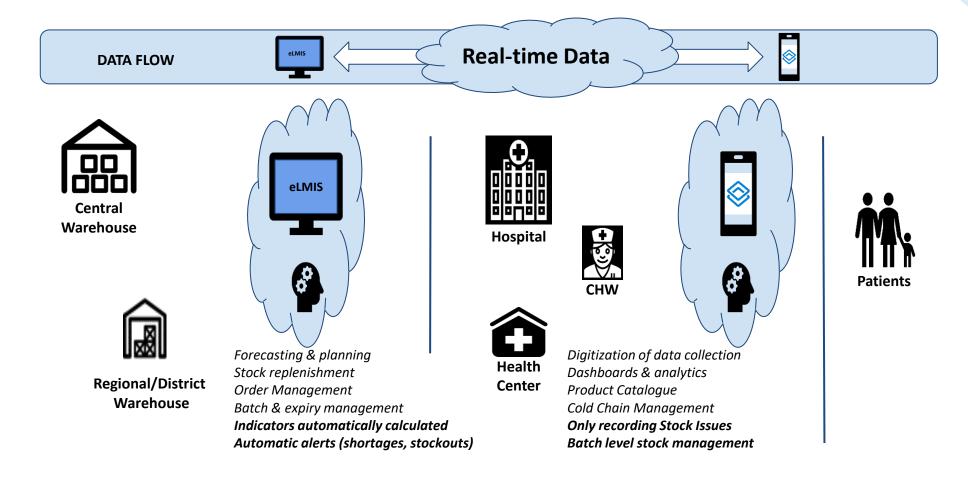




## Use-case 2: Aggregate + eLMIS Integration



## Use-case 3: Tracker + Integration



**COMMODITY FLOW** 







#### **Upstream eLMIS**

**DHIS2 End-User eLMIS** 

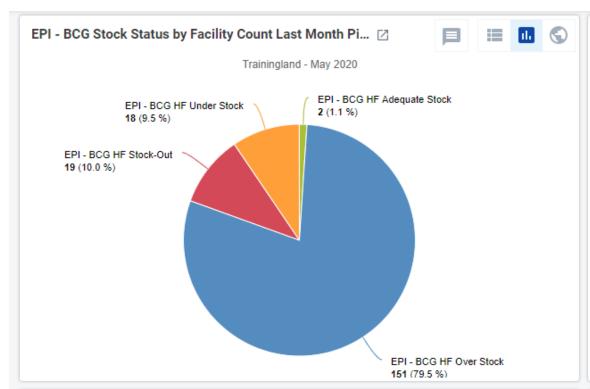
- Supply Network Management
- Sourcing & Procurement
- Warehouse Management
- **Transport Management**
- **Order Management**
- **Inventory Control**
- Performance Management

- **National Standard List**
- Standard Items Catalogue
- Order Management
- **Demand Planning &** Forecasting
- **Inventory Control**
- Performance Management
- Batch & serial number management (Track&Trace)

- **Stock Management**
- **Order Management**
- Performance
  - **Management Dashboards**
- (Cold Chain Management)
  - (Track & Trace)
  - (Product Catalogue)



## Overview of Stock Levels Nationally

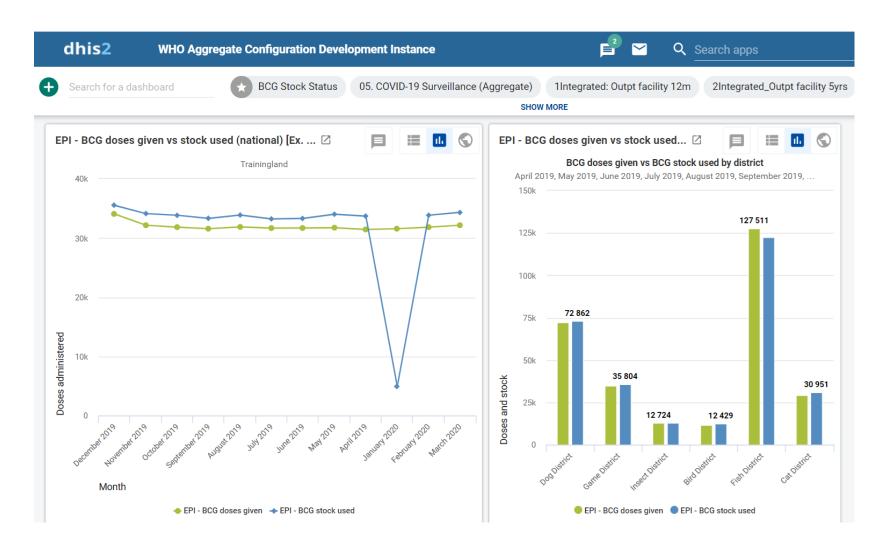




# Doses given vs. Stock used

On the left; doses given (green) vs. stock used (blue) national

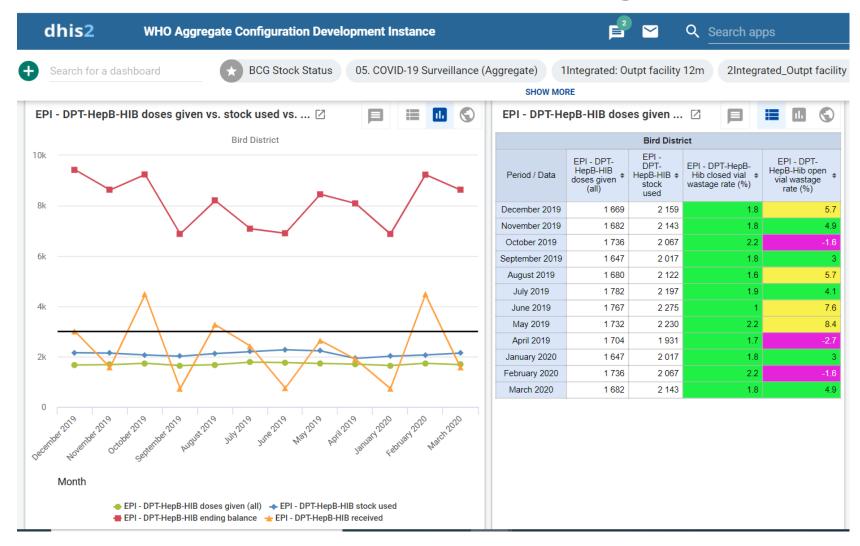
On the right; On the left; doses given (green) vs. stock used (blue) by district



# Doses Given vs. Stock Used vs. Wastage Rate

On the left; doses given (green) vs. stock used (blue)

On the right; close vial wastage rate and open vial wastage rates in %. Colour coded by rate





Months of stock coverage from the last reporting reporting period (last month) by facility

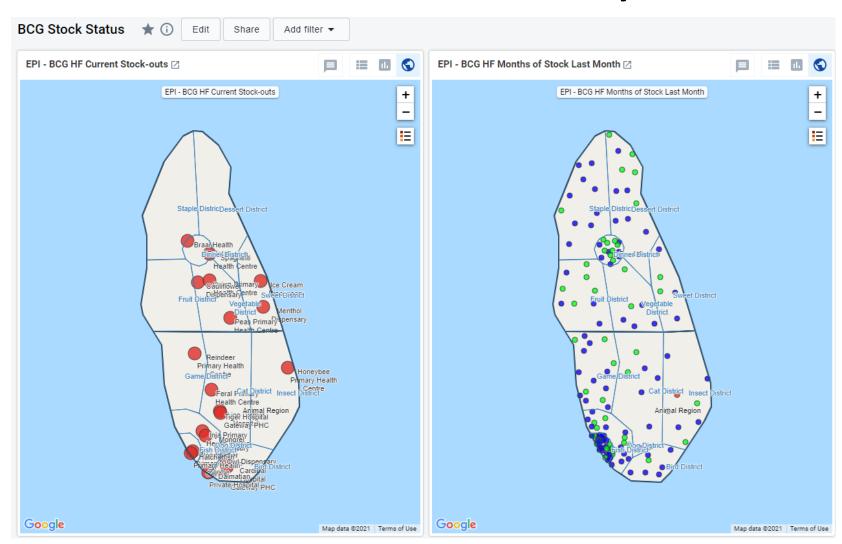
Colour coding showing under stock, adequate stock and overstock

		月	
Period	March 2020	April 2020	May 2020
Organisation unit / Data	EPI - BCG HF Months of Stock \$	EPI - BCG HF Months of Stock \$	EPI - BCG HF Months of Stock
Butterfly Primary Health Centre	6.8	6	
Cockroach Dispensary	3.9	2.8	
Spider Dispensary	4.2	3.1	
Moth Dispensary	3.8	2.9	
Grasshopper Health Centre	3.5	2.6	
Beetle Health Centre	2.9	2	
Worm Dispensary	2.5	2.3	
Honeybee Primary Health Centre	3.2	4.7	
Fly Hospital Gateway PHC			
Tiger Hospital Gateway PHC	2.5	3.4	
Wildcat Primary Health Centre	6.5	5.3	
Ginger Dispensary	2.9	3.7	
Panther Health Centre	4.1	3.2	
Leopard Health Centre	5.2	4.3	
Cheetah Health Centre	3.8	3.1	
Siamese Primary Health Centre	2.8	3.6	
Feral Primary Health Centre	3.4	3.3	

# BCG Stock Status and Availability

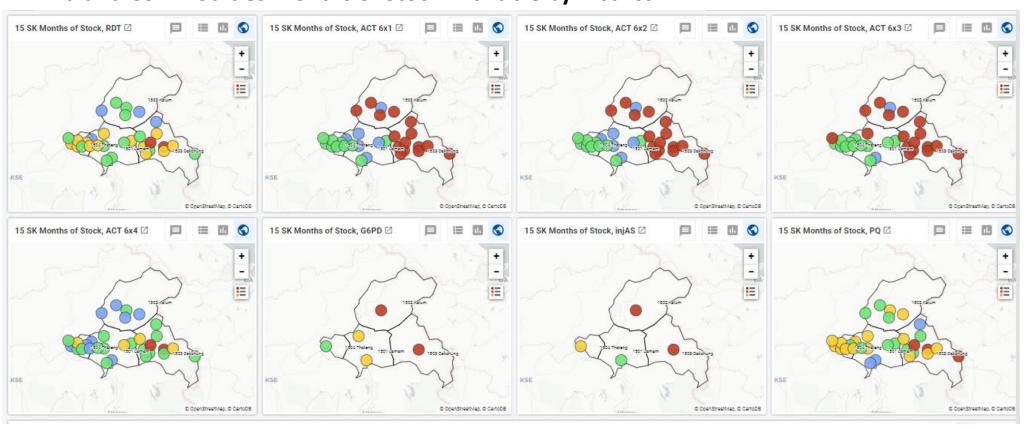
On the left; current stock-outs marked in red

On the right; months of stock coverage from the last reporting reporting period (last month)



# Months of stock available by facility

## **Malaria Commodities Months of Stock Available by District**

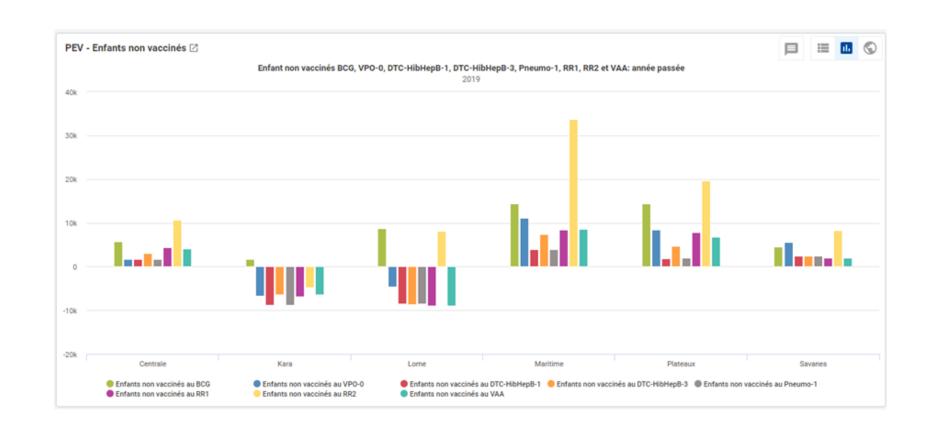


# Identifying under immunized children

Under immunized children per vaccine type and district.

Negative values indicate that more children than registered stock were immunized.

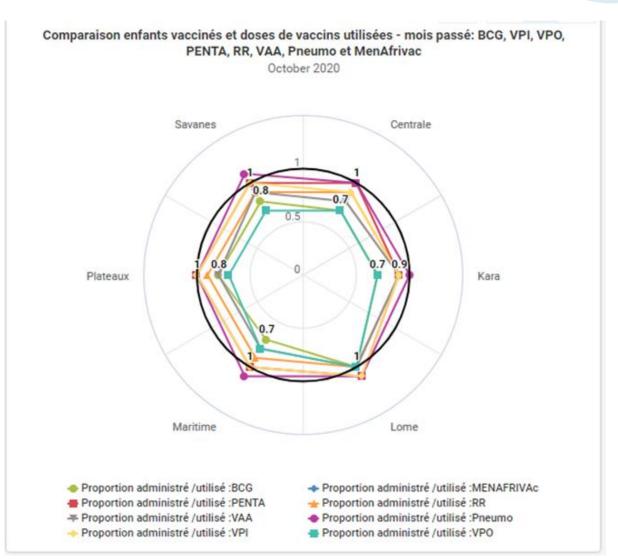
Leads to further information gathering and corrective action



## Children vaccinated vs. Stock used

This dashboard item shows indicators that are a proportion of children immunized per antigen over doses used last month.

If the indicator is above the limit of 1, it means more children are vaccinated than doses used.



# Cold Chain Equipment monitoring

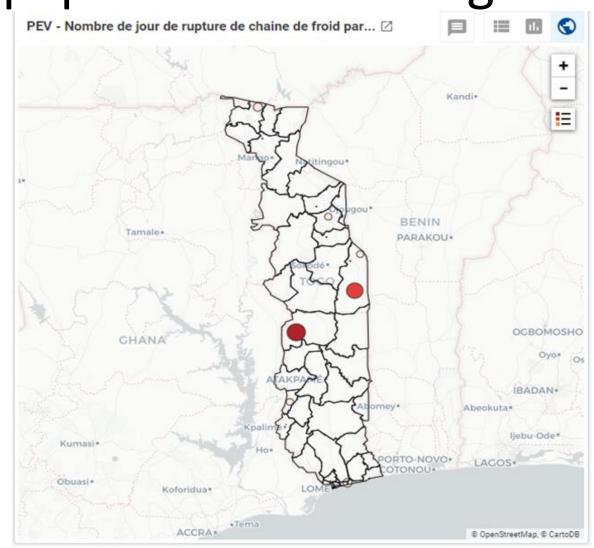
The dashboard to the right displays the number of facilities that have reported cold chain disruptions in the last 3 months.

Nombre (compte) de struc	tures ayant rappo	orté une rupture de la	a chaine de froid
Nombre de	jours de rupture	de la chaine de froid	d
Organisation unit / Period	August 2020 ¢	September 2020 ¢	October 2020 ¢
Blitta	3	2	1
Sotouboua	1	1	
Tchamba	1	1	2
Tchaoudjo		2	
Dankpen	2	2	
Keran	1		
Kozah		1	1
District II	1		
District IV	1		
Ave	2	1	
Bas Mono	1	1	1
Lacs			1
Vo	1	1	
Anie	1	1	

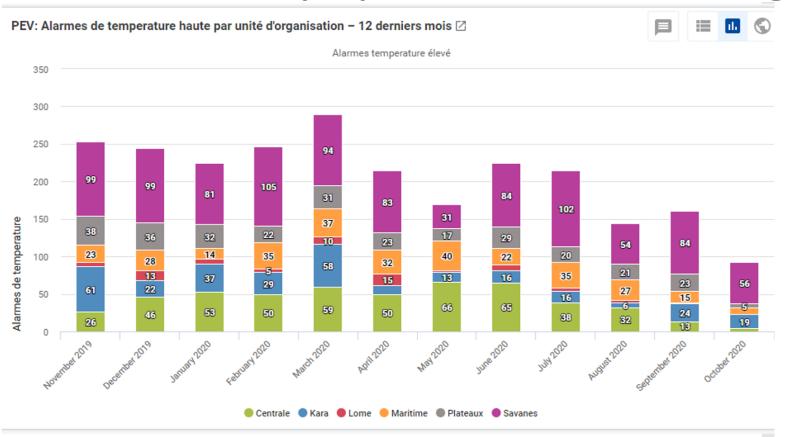
Cold Chain Equipment monitoring

Further, they made a map showing health facilities with size and colour reflecting the number of days of cold chain disruption.

Health facilities with high numbers are marked in dark red and have a larger marker.



# Cold Chain Equipment monitoring



- Number of high temperature alarms reported per subunit x1 over the last 12 month
- · This graph shows that the number is proportional to the distance to the capital

## **SUMMARY**

- DHIS2 is a flexible, generic platform using open source technology widely used as an HMIS
- Used to capture stock data in many countries, including 14 countries for Covid-19 vaccine delivery
- For LMIS it is best used to digitize the facility level stock management and integrate with an upstream eLMIS for professional logistics management and health program management





COVID-19 Immunization Tracker – Sri Lanka

# Stock Monitoring Component



**Priyanga Senanayaka** HISP Sri Lanka



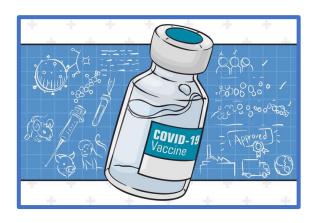






## COVID19 Immunization Tracker (CIT)

## Component 1



**COVID19 Vaccination** 

## Component 2



**COVID19 Stock Monitoring** 

Capture Individual information of COVID19 Vaccine recipients

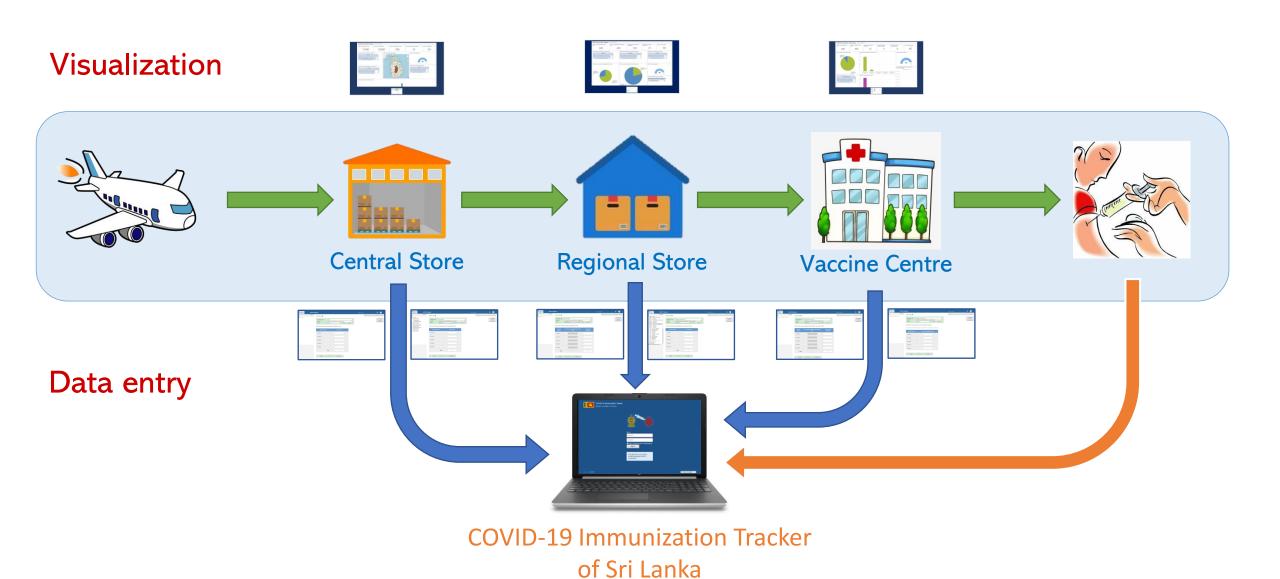






- National Receiving
- National Issuing
- Regional Receiving
- Regional Issuing
- VC Receiving
- VC Stock Balance

# Workflow / Dataflow





## COVID-19 Immunization Tracker Ministry of Health, Sri Lanka



#### Sign in

Username

#### Password

■ Login using two factor authentication

Sign in

This dashboard uses publicly available aggregate data for visualisation.

Powered by DHIS 2 [Change language]

Search apps









⊞-Sri Lanka

## Data Entry 😯

Organisation Unit	Sri Lanka			
Data Set	COVID19 Vaccine Stock Receivi	COVID19 Vaccine Stock Receiving - National Level		
Period	2021-01-15	~	Prev year	Next year

#### COVID-19 Vaccine Receiving at National Level

Vaccine Product	No. of Doses
1. Product 1	
2. Product 2	
3. Product 3	
4. Product 4	
5. Product 5	
Total:	0

Complete Incomplete | Run validation

🗶 Sri Lanka - 2021-01-15 - No Data Element Selected

Run validation

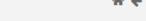
Print form

Search apps









☐-Sri Lanka
☐-Central PDHS
☐-Kandy RDHS
☐-Matale RDHS
☐-NuwaraEliya RDHS
☐-Eastern PDHS
☐-North Central PDHS
☐-North Western PDHS

Northern PDHS
Sabaragamuwa PDHS
Southern PDHS
UVA PDHS
W-Western PDHS

## Data Entry 😯

Complete

Organisation Unit	Kandy RDHS			
Data Set	COVID-19 Vaccine Stock Dist	COVID-19 Vaccine Stock Distribution - to Regions		
Period	2021-01-14	~[	Prev year	Next year

#### COVID-19 Vaccine Distribution to Regional Stores

Incomplete

Vaccine Product	No. of Doses
1. Product 1	
2. Product 2	
3. Product 3	
4. Product 4	
5. Product 5	
Total:	0

Run validation

X Kandy RDHS - 2021-01-14 - No Data Element Selected

Run validation

Print form



Search apps







Handy RDHS

## Data Entry 😯

Organisation Unit	Kandy RDHS		
Data Set	COVID19 Vaccine Stock Receiving -	Regional Level	~
Period	2021-01-15	✓ Prev year	Next year

#### COVID-19 Vaccine Stock at Regional Level

Incomplete

Complete

Vaccine Product	No. of Doses Dispatched from Central Store	No. of Doses Received
1. Product 1		
2. Product 2		
3. Product 3		
4. Product 4		
5. Product 5		
Total:	0	0

Run validation

X Kandy RDHS - 2021-01-15 - No Data Element Selected

Run validation

Print form



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X Sample Vaccination Centre - 2021-01-15 - No Data Element Selected



	<b>←</b>	<b>&gt;</b>
1		

H-MOH - Panvila	
-----------------	--

MOH - Pasbage (Nawalapitiya)

H-MOH - Poojapitiya

H-MOH - Thalathuoya (Pathahewaheta

HOH - Udadumbara

⊕-MOH - Udunuwara

MOH - Wattegama (Pathadumbara)

MOH - Werellagama (Harispattuwa)

±-MOH - Yatinuwara

HNHK - NH Kandy

-QC - Coop - City Pallekale

–QC - Gannoruwa (Agri)

–QC - Gannoruwa (ITI)

-QC - Giragama

-QC - Kundasale

QC - Kundasale - National

-QC - Pallekale

-QC - Passara (UMDI)

OC - Pilimathalawa

QC - Rantambe

–QC - Rantambe

-Sample Vaccination Centre

±-TH Peradeniya

±-TH SBSCH

### Data Entry 😯

Organisation Unit	Sample Vaccination Centre
Data Set	COVID19 Vaccine Stock Distribution - to Vaccine Centers
Period	2021-01-15

#### COVID-19 Vaccine Distribution to Vaccine Centre

Vaccine Product	No. of Doses
1. Product 1	
2. Product 2	
3. Product 3	
4. Product 4	
5. Product 5	
Total:	0

	Complete	Incomplete	Run validation
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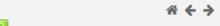
Run validation

Print form

Search apps







LSample Vaccination Centre

## Data Entry 😯

Complete

Organisation Unit	Sample Vaccination Centre		
Data Set	COVID19 Vaccine Stock Receiving - Vaccine Centres	~	
Period	2021-01-15 Prev year	Next year	

#### COVID-19 Vaccine Stock Receiving to Vaccine Centre

Incomplete

Vaccine Product	No. of Doses Dispatched from Regional Store	No. of Doses Received
1. Product 1		
2. Product 2		
3. Product 3		
4. Product 4		
5. Product 5		
Total:	0	0

Run validation

X Sample Vaccination Centre - 2021-01-15 - No Data Element Selected

Run validation

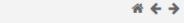
Print form

Search apps



##





Sample Vaccination Centre

Data Entry ?

Complete

Organisation Unit	Sample Vaccination Centre		
Data Set	COVID19 Vaccine Stock Balance - Vaccination Centre		
Period	2021-01-15	<b>∨</b> Prev year	Next year

COVID-19 Vaccine Stock at Vaccination Centres

(This should be filled at the end of each vaccination session)

Vaccine Product	Vaccine Stock Balance today
1. Product 1	
2. Product 2	
3. Product 3	
4. Product 4	
5. Product 5	

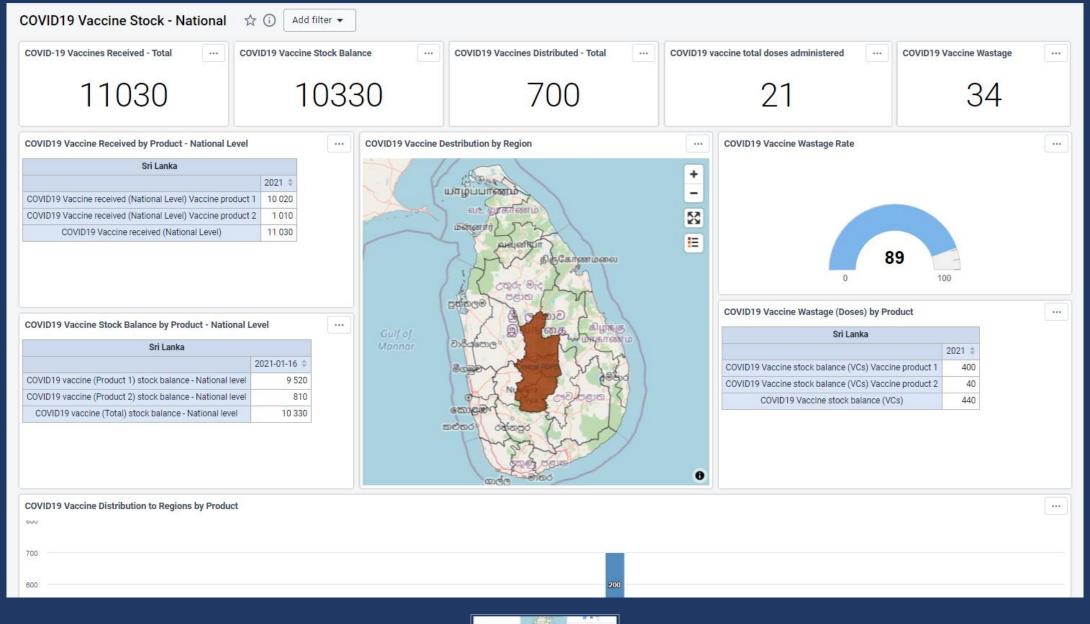
Run validation

Incomplete

Run validation

X Sample Vaccination Centre - 2021-01-15 - No Data Element Selected

Print form Print blank form







COVID19 Vaccine Stock Balance by Product - National Level

COVID19 vaccine (Product 1) stock balance - National level

COVID19 vaccine (Product 2) stock balance - National level

COVID19 vaccine (Total) stock balance - National level

Sri Lanka

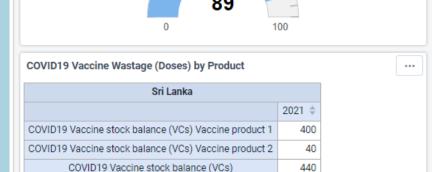
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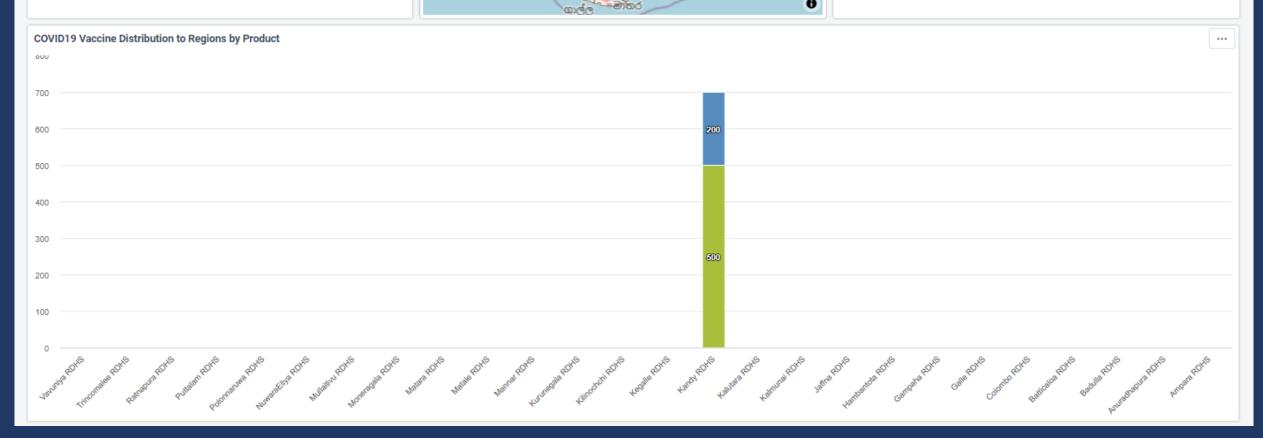
2021-01-16 \$

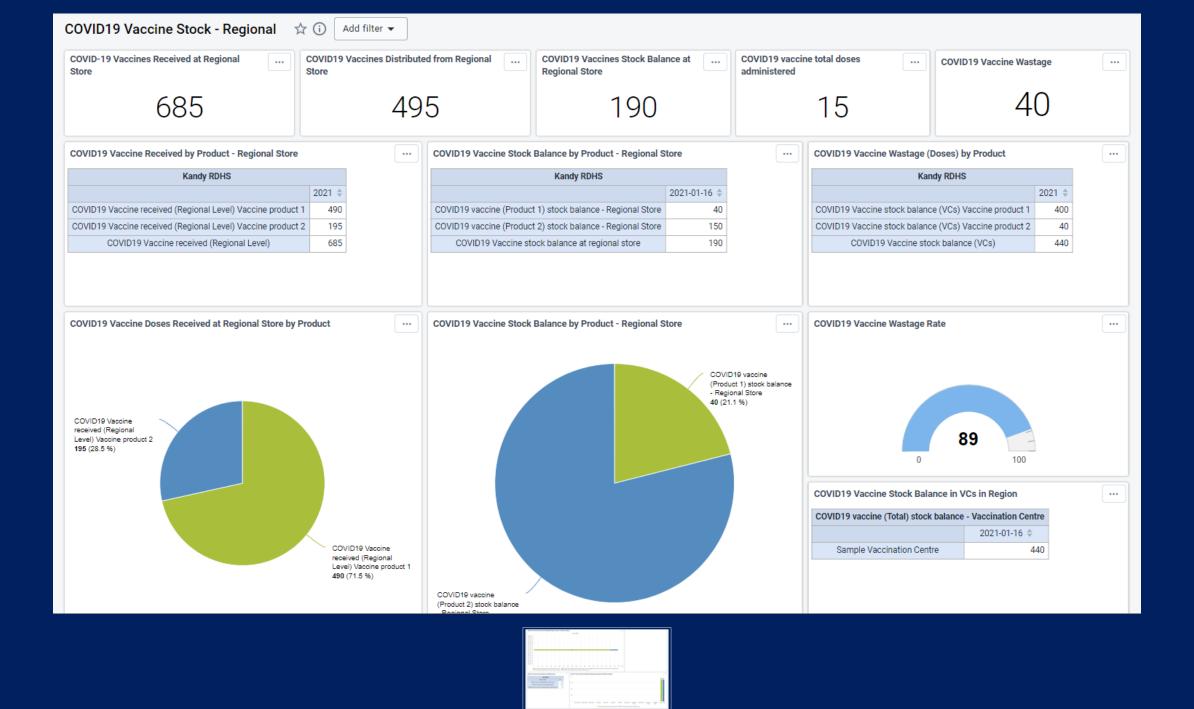
9 520

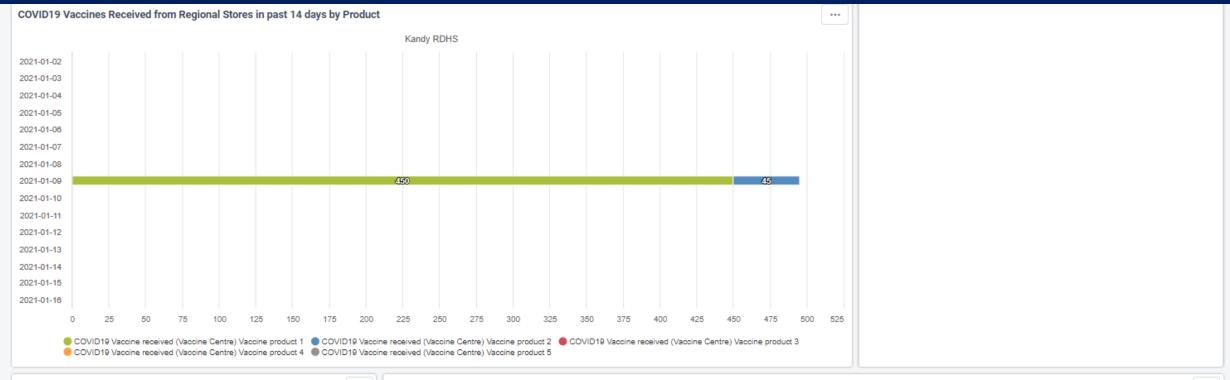
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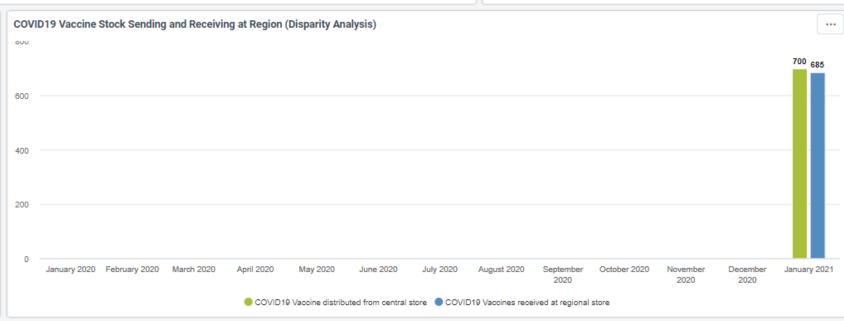


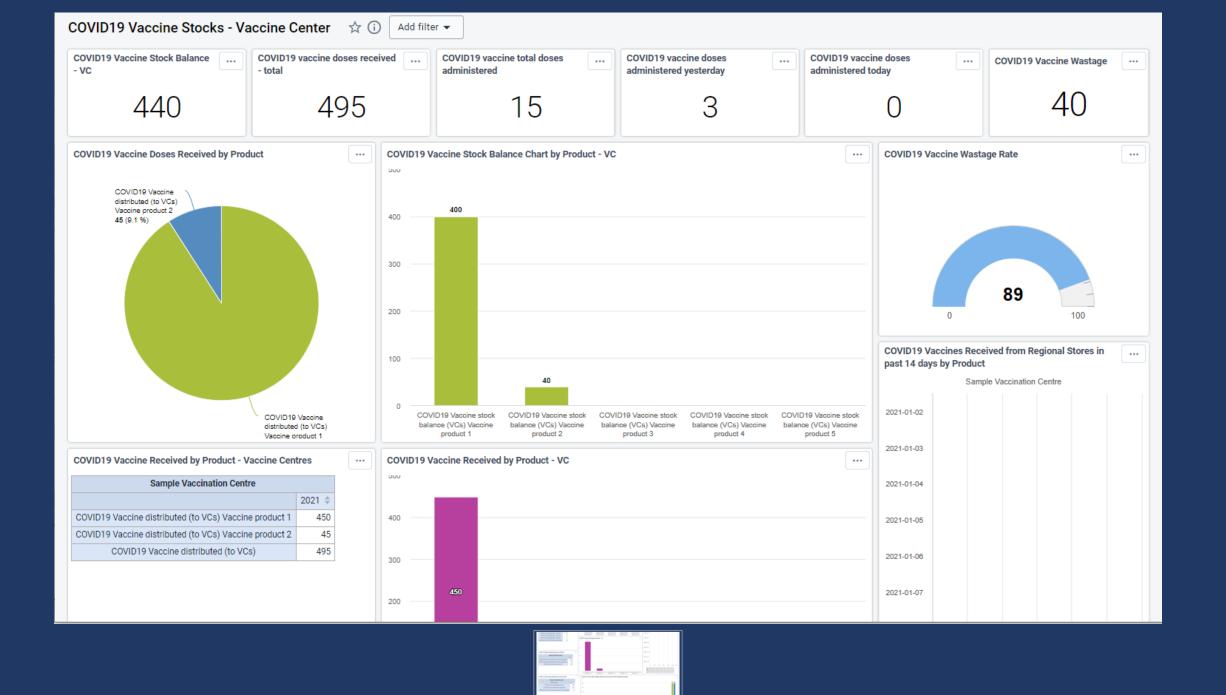




#### **COVID19 Vaccine Stock Disparity at Regional Store**

Kandy RDHS	
Data / Period	2021 \$
COVID19 Vaccine distributed from central store	700
COVID19 Vaccines received at regional store	685
COVID19 Vaccine stock receiving disparity at regional store	-15

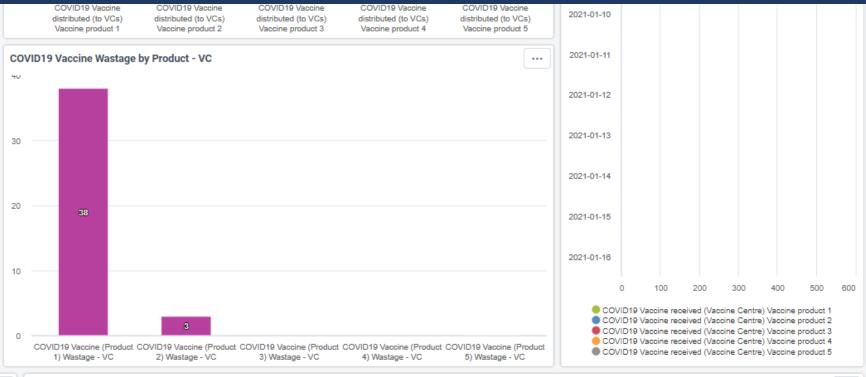




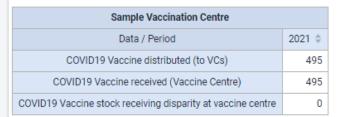
П		
	COVID19 vaccine doses given - Product 1	12
	COVID19 vaccine doses given - Product 2	2
	COVID19 vaccine doses given - Product 5	1
	Total number of COVID19 vaccine doses given	15

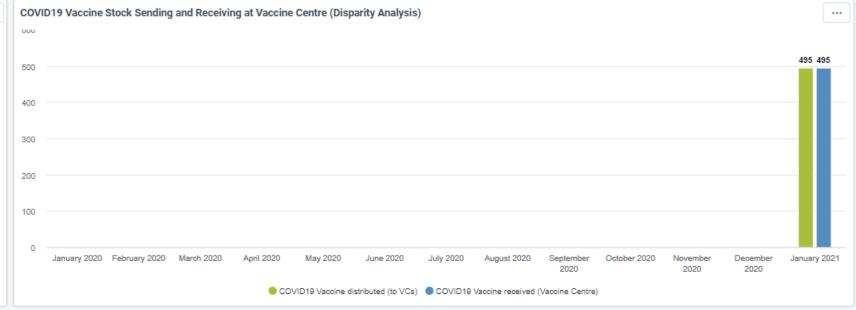
#### COVID19 Vaccine Wastage (Doses) by Product

Sample Vaccination Centre	
	2021 \$
COVID19 Vaccine stock balance (VCs) Vaccine product 1	400
COVID19 Vaccine stock balance (VCs) Vaccine product 2	40
COVID19 Vaccine stock balance (VCs)	440



#### **COVID19 Vaccine Stock Disparity at Vaccine Centre**









## Some facts

- This is a stock monitoring component, not a stock management system
- Possible to visualize by vaccine product, not by vaccine batch number and expiry date





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You will find information and resources on our LMIS page here: <a href="https://dhis2.org/logistics/">https://dhis2.org/logistics/</a>

## CONCLUSION



