



# Improving cold chain equipment management in Uganda with a data centered approach and ODK-X

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Shaping a resilient and adaptive immunization program



# Presentation Outline

- **Project background**
- **Initial Pilot**
- **System Overview**
  - ODK-X system structure
  - CCE App structure
- **Key activities conducted**
- **Results**
- **Lessons learnt**
- **Next steps**

# Project Background



## ODK-X application

- Aims to digitize CCE inventories, functionality status, and document maintenance & repair history
- Generates data set for EPI managers to more effectively manage CCEI

## Reasons behind it

- Conducting annual national inventory update is very costly (\$100,000 - \$200,000)
- The country currently relies on an outdated CCE inventory records close to 10yrs back.
- Lack of CCE visibility at lower levels, inadequacy of real-time data to help resolve the different issues around cold chain
- The Ministry of health-UNEPI embraced the use of Open Data Kit (ODK) e.g. the integrated supervision tool



UNEPI, PATH and all key stakeholders in vaccine management committee (UNICEF, WHO, National Medical Stores, CHAI) together with support of University of Washington tested the use of the ODK-X CCE inventory application across three districts in Uganda

# Initial Pilot



## *Goal, Objectives, location and duration*

### **Project Goal**

- The overall goal of the pilot is to evaluate the ODK-X application as a viable, digital solution for generating updated and accurate CCE inventories.

### **Primary pilot objectives:**

- Assess the functionality of ODK-X application for collecting and updating CCE inventory
- Assess the acceptability of ODK-X with users & data managers

### **Secondary objective:**

- Document maintenance and repair services and spare parts used
- Document the geographical location data of CCE

**Project duration: 6 months**

**Location: 3 districts (Kampala, Wakiso and Nakaseke)**

# Key Activities



**Tool development:** The tool was Developed by the UW with country input from UNEPI, NMS and key stakeholders (WHO, UNICEF, CHAI and PATH)

**Training:** 15 DCCT/As and 15 central/national level staff trained on ODK-X use by UW and PATH

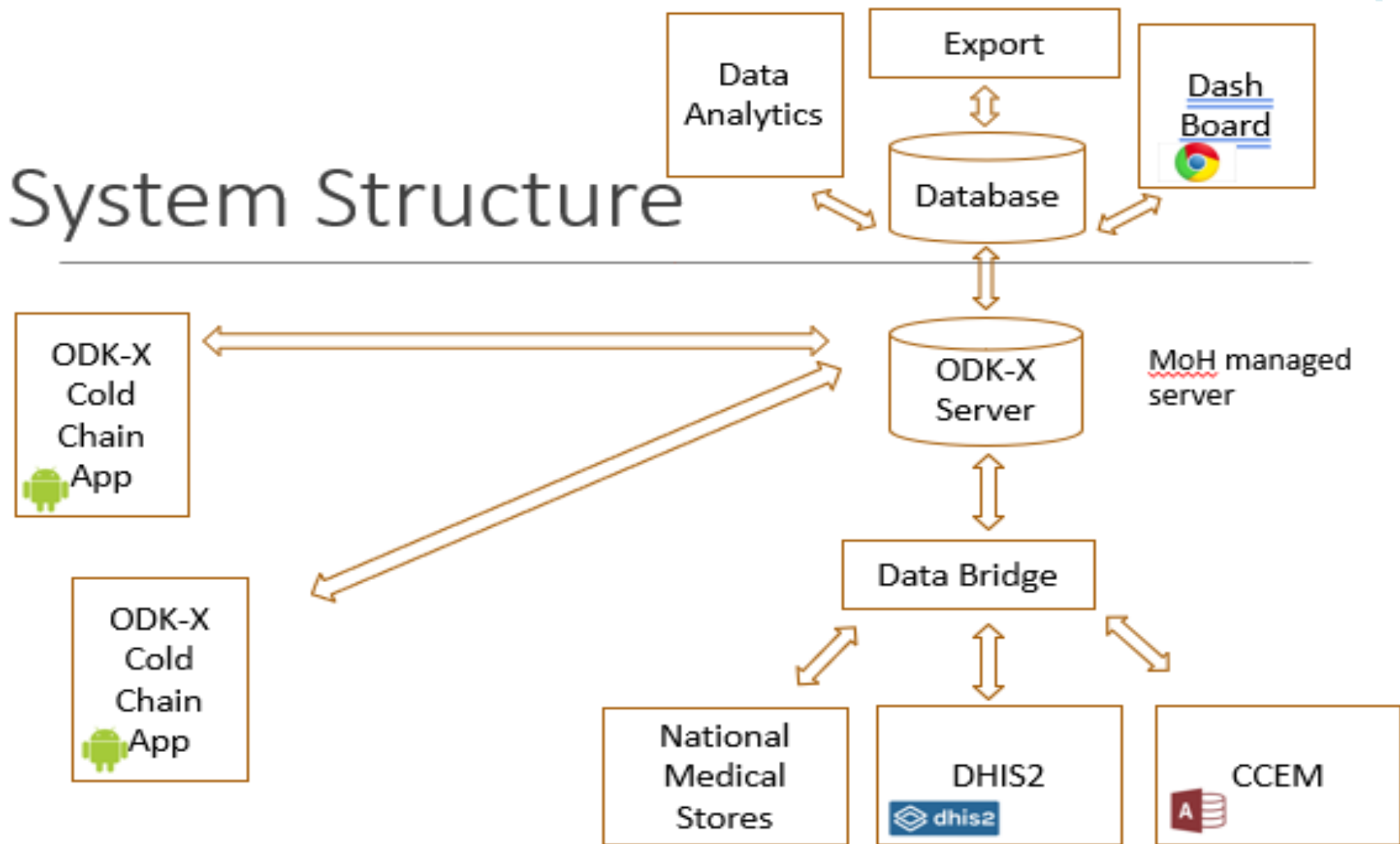
**ODK-X data collection:** From February through April 2020\*, 15 DCCT/As sent CCEI data using ODK-X and reviewed by central staff. Monthly results presented in UNEPI monthly vaccine management meetings.

**Endline:** Acceptability feedback remotely collected from DCCT/As (n=11) and central staff (n=5) at the end of April 2020.

\* Use of the ODK-X application for reporting CCE inventory and maintenance/repair data continued beyond April 2020.



# System Structure



UGANDA/KAMPALA/CENTRAL DIVISION

View Map of All Health Facilities

View List of All Health Facilities

Filter Health Facilities By Type

View All Refrigerators

View All Refrigerators Needing Service

View All Cold Rooms

View All Cold Rooms Needing Service

View Refrigerator Models

# CCE app structure

Geographic hierarchy  
(Region, District, etc.)

Can see how many  
CCE are in a facility

Can quickly see CCE in need  
of attention or repairs

## Nakaseke District Vaccine Store

UGANDA/MUBENDE/NAKASEKE

View Facility Information

Refrigerator Inventory  
(8)

Add Refrigerator

Cold Room Inventory  
(0)

Add Cold Room

Edit Facility

Delete Facility

# Refrigerator 005

## Basic Refrigerator Information

<b>Facility:</b> CHILDREN'S CLINIC	<b>Manufacturer:</b> Vestfrost
<b>Year Installed:</b> 2009	<b>Model ID:</b> MK 074
<b>Status:</b> Functioning	<b>Refrigerator ID:</b> 7ca43228-d37d-4cea-a60d-c60142d7692b
<b>Reason Not Working:</b>	<b>Serial Number:</b> 20084423627
<b>Service Priority:</b>	<b>Catalog ID:</b> E375M
<b>Date Serviced:</b>	<b>Voltage Regulator?</b> Not Applicable
	<b>Temperature Monitoring Device?</b> Functioning

# Functionality status

CCE details including functional status, if voltage regulator or TMD are present, etc.

Edit CCE status

Edit Refrigerator Status

Add Maintenance Record

View Facility Information

Choose the current use status:

- Installed - In Use
- Installed - Not In Use
- Not Installed - Waiting For Installation
- Not installed - Removed From Service
- Missing

Functional status:

- No known issues
- Needs attention

Reason not working:

- Needs Spare Parts
- Unknown/Needs Investigation
- Lack of Power/Fuel
- Awaiting Installation
- Awaiting Decomissioning
- Lack of Technician Availability
- Not Applicable

Choose priority for maintenance if applicable:



Maintenance Logs    < Back    Next >

**Enter the date of service**

2020 / 10 / 05

**Enter actions taken**

not specified

**Select type of maintenance**

Repair

Preventative

Other

Maintenance Logs    < Back    Next >

**Who performed the service?**

Warranty/Service Provider

CCE Technician

Facility Staff

Other:

**Enter technician name**

not specified

**Enter technician phone number if available**

not specified

# Maintenance logs

← Add maintenance record. As well as what type of maintenance

- Track who did the visit

Log record of Repairs or preventative maintenance with classifications of the actions for tracking purposes

Depending on the maintenance conducted there is Spare parts list to track what spare parts were consumed

Maintenance Logs    < Back    Next >

**Enter the date of service**

2020 / 10 / 05

**Enter actions taken**

not specified

**Select type of maintenance**

Repair

Preventative

Other

**Select type of preventative maintenance**

Cleaning - cabinet

Cleaning/drying - storage compartment

Cleaning - solar panels

Defrosting

Tightening

Check seals

Check/clean cooling unit

**Enter additional preventative maintenance notes**

not specified

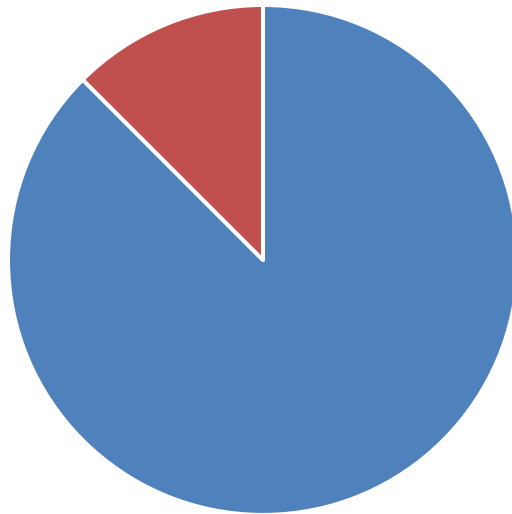
# Results: Functionality



## Updating CCEI

- Data reported from 80.15% of the 394 HCFs in the study districts
- Data reported from 80.77% of the 486 CCE in the study districts
- Frequency of temperature excursion:

## Analysis: CCE functionality



■ Functional ■ Non-functional

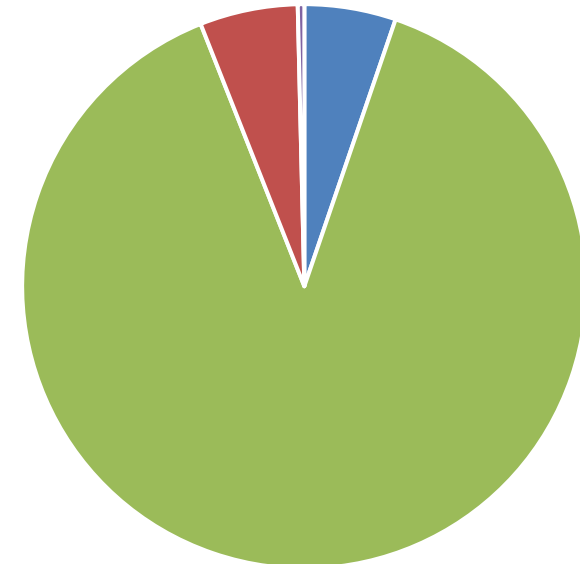
### Analysis:

60 non-functional CCE out of 489 in study as of July 10, 2020

### Prioritizing repair:

**129** Out of 795 entries showed CCE with either freeze (35) or high alarm (94) data

## Analysis: CCE temperature performance



■ Freeze alarm ■ Temperature between 2-8C ■ High alarm ■ Blanks

# Results: Functionality



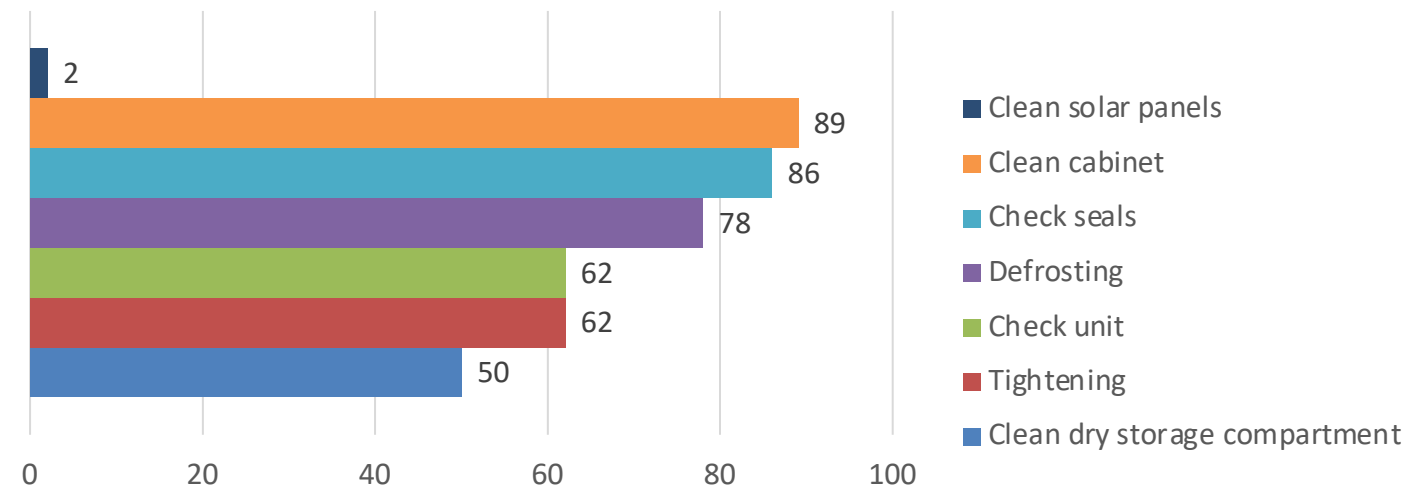
## Reporting maintenance and repair

Type of maintenance	Frequency reported
Preventive	133
Repair	3
Other	5
Blank	12
<b>TOTAL</b>	<b>153</b>

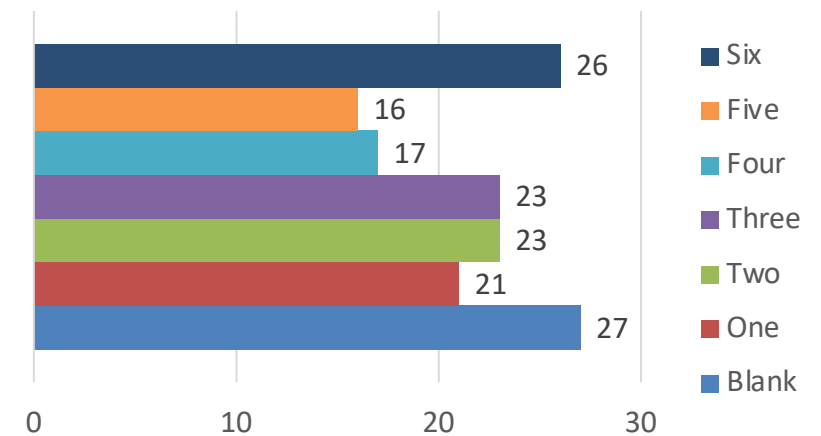
## Analysis: Spare parts

Spare part	No.
Thermostat controller	2
Voltage stabilizer	12
Solar related part (unknown)	1

## Analysis: Preventative maintenance activities



## Analysis: No. maintenance activities performed at each visit



## Results: Acceptability



- Majority of users and central supervisors stated the ODK-X application significantly improved their CCE inventory data collection responsibilities
- There was high level of satisfaction by all with ODK-X
- Users and central supervisor viewed ODK-X as easy to use
- Majority of users and central supervisors said there was a Positive impact on CCEI analysis

*“It gives timely data, so it eases the maintenance of the CCE.”*  
- Central supervisor

*“The ODK-X application is very easy to use and to understand its features. The features cover all the relevant information concerning cold chain equipment.”*  
– DCCT/A

# Challenges



## Functionality of ODK-X application

- The major challenge faced: issues with cellular network while syncing data
- Minor app & system challenges reported with the ODK-X app by users:
  - Delay in picking geographical coordinate and accuracy
  - Application freezing on phone and requiring reentry of data
  - Repeated facilities and refrigerators observed which requires supervisors with admin rights to make necessary edits.
  - Facilities may be closed and not knowing the location of the CCE led to challenges completing the form accurately.
- Critical errors reported with the ODK-X app by users: **NONE**



## Lessons learnt

- ODK-X efficiently organizes CCEI data for effective data driven asset and resource management
- High level of acceptability of the app from all users
- Clear and tangible improvements to workflow and workloads by using app vs paper/email systems
- Adjustments for additional integration with other preferred systems beyond DHIS2 such as ERP at NMS
- Additional adjustments to enable download FT2 data
- Additional improvements needed, including dashboard and analysis tools

# Next steps



## Funding

- **Targeted country Asst;-** UNEPI through the one TCA grant applied for funding to support the scale of ODKX for cold chain management and national CCE inventory update.

## Capacity building/Sustainability

- **Hand over and transition plan;** Prior to the start of the deployment, there is plan to have a detailed handover and transition plan agreed upon with all the key stakeholders.
- **In country management of the ODKX App;** From the start of the deployment, MOH is expected to run and manage the servers, granting the UW team necessary credentials for access.
- **ODKX managers training;-**MOH-ICT to identify a technical team to be involved in supporting the project.
- **SOPs for technical components** e.g. App installation; to be collaboratively developed by UW and in country ODKX managers team
- **ODKX users training;-** 135 DCCT/As, 15 central CCTs (UNEPI/NMS), representatives from IT, DHI and EPI implementing partners to be trained on use of the ODKX CCE App.



*THANK YOU!*

