INTRODUCTION

30DTR use and functionality

Use

- Continuous monitoring of temperatures in *vaccine refrigerators*
- Used to:
  - Monitor the current temperature
  - Alert users to temperature excursions that have already happened
- This makes these devices useful for responding to equipment failures and checking vaccines for damage

Functionality

- Electronic device that records and displays:
  - Current temperature and alarm status
  - Rolling history of temperatures and any temperature excursion alarms during the previous 30 days
- Data records older than 30 days are cyclically overwritten with new data (FIFO) for duration of battery life
- Supplied pre-programmed with alarm settings suitable for *vaccine refrigerator* monitoring:
  - Higher than +8°C for longer than 10 hours
 - Lower than -0.5°C for longer than 1 hour

PQS prequalified 30DTRs available
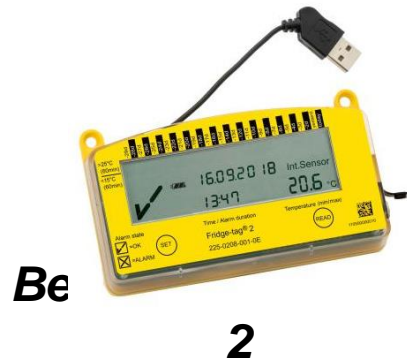
|	Berlinger Fridge-tag 2	Berlinger Fridge-tag 2E	Haier HETL-01	LogTag vaxtag
PQS Code	E006/020	E006/040	E006/042	E006/013
Sensor Type	Internal/External	Internal/External	Internal	Internal
Operating Range	-10 °C to +55 °C (internal sensor) -40 °C to +60 °C (external sensor)	-10 °C to +55 °C (internal sensor) -40 °C to +60 °C (external sensor)	-20°C to +50°C	-30°C to +60°C
Battery Life	36 months	60 months	36 months	24 months
Data Download	USB	USB	USB	USB (via cradle)

Data available on the device display

- Current date and time
- Current temperature
- Current alarm status
- Battery status

- Alarm settings
- Historical alarm date
- Historical alarm temperature
- Historical alarm duration

Berlinger Fridge-tag 2(E)
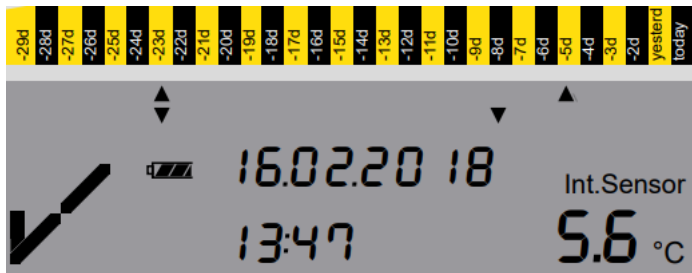
Haier HETL-01
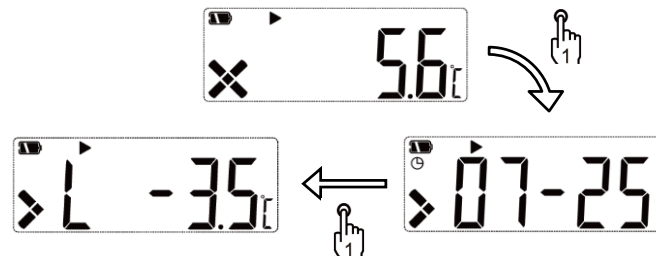
LogTag vaxtag

Data available through reports & how to share

- Reports
  - 30 to 60-day summary record of temperature & alarm data
  - PDF and/or Excel formats
  - Downloaded via USB
- Data sharing
  - Emailed reports
  - Varo application

PDF document of the Fridge-tag® 2

Identification number: BDAA01319
Date and time of report creation: 10.07.2016 18:46h
Upper alarm limit: Above +8.0°C for 10h
Lower alarm limit: Below -0.5°C for 1h

Error message: Check ASCII log file for detailed information

No.	Date (dd.MM.yyyy)	Events*	Average temp.	Lower alarm limit				Upper alarm limit				Signature / notes
				Status	Min. temp.	Duration out of range	Alarm trigger time	Status	Max. temp.	Duration out of range	Alarm trigger time	
1	Today		+5.0°C	In progress	+4.2°C	0min		In progress	+7.0°C	0min		
2	09.07.2016		+4.5°C	ok	+4.0°C	0min		ok	+5.1°C	0min		
3	08.07.2016		+6.9°C	ok	+4.2°C	0min		ok	+14.9°C	8h 45min		
4	07.07.2016		+6.1°C	ok	+3.7°C	0min		ok	+18.7°C	1h 22min		
5	06.07.2016		+5.7°C	ok	+3.1°C	0min		ok	+12.4°C	3h 49min		
6	05.07.2016		+4.0°C	ok	+2.7°C	0min		ok	+7.0°C	0min		
7	04.07.2016		+8.4°C	ok	+3.4°C	0min		ALARM!	+16.5°C	10h 10min	04:00h	
8	03.07.2016		+9.3°C	ok	+7.0°C	0min		ALARM!	+13.6°C	16h 15min	18:00h	
9	02.07.2016		+5.4°C	ok	+4.7°C	0min		ok	+7.1°C	0min		
10	01.07.2016		+3.9°C	ok	+0.9°C	0min		ok	+12.2°C	27min		
11	30.06.2016		+5.0°C	ok	+4.1°C	0min		ok	+10.8°C	23min		
12	29.06.2016		+4.9°C	ok	+3.8°C	0min		ok	+19.9°C	37min		
13	28.06.2016		+5.8°C	ok	-0.3°C	0min		ok	+17.3°C	18min		
14	27.06.2016		+2.6°C	ok	-0.8°C	18min		ok	+13.0°C	20min		
15	26.06.2016		+1.6°C	ALARM!	-2.7°C	6h 3min	13:20h	ok	+6.5°C	0min		
16	25.06.2016		+7.9°C	ok	+3.4°C	0min		ALARM!	+17.4°C	8h 22min	02:24h	
17	24.06.2016		+7.4°C	ok	-0.3°C	0min		ok	+14.0°C	7h 36min		
18	23.06.2016		+6.6°C	ok	-1.6°C	51min		ok	+16.5°C	8h 17min		
19	22.06.2016		+5.2°C	ok	+3.1°C	0min		ok	+10.0°C	2h		
20	21.06.2016		+3.5°C	ok	+2.5°C	0min		ok	+18.8°C	58min		
21	20.06.2016		+3.5°C	ok	+1.0°C	0min		ok	+17.3°C	1h 15min		
22	19.06.2016		+1.5°C	ok	+1.0°C	0min		ok	+3.9°C	0min		
23	18.06.2016		+4.5°C	ok	-0.1°C	0min		ALARM!	+17.2°C	7h 52min	00:00h	
24	17.06.2016		+11.9°C	ok	+8.8°C	0min		ALARM!	+16.7°C	1d	05:33h	
25	16.06.2016		+10.2°C	ok	+6.4°C	0min		ALARM!	+12.9°C	19h 14min	06:07h	
26	15.06.2016		+7.8°C	ok	+4.9°C	0min		ok	+10.8°C	10h 35min		
27	14.06.2016		+5.6°C	ok	+3.2°C	0min		ok	+17.5°C	53min		
28	13.06.2016		+1.8°C	ok	-0.2°C	0min		ok	+10.4°C	11min		
29	12.06.2016		+7.0°C	ok	+0.4°C	0min		ALARM!	+18.0°C	8h 17min	00:00h	
30	11.06.2016		+13.0°C	ok	+8.9°C	0min		ALARM!	+19.4°C	1d	00:00h	

Varo App: Practical Understanding

Varo unlocks CCE insights

Inadequate visibility into real-world CCE performance has been a longstanding challenge.

- Local temperature loggers are included in every CCEOP-funded fridge, implicitly creating a large but scattered dataset on CCE performance
- The lack of a systematic way to capture/aggregate data from these loggers has left most data locked inside fridges

The *Varo* Android app was developed as a simple tool to enable capture of existing CCE data
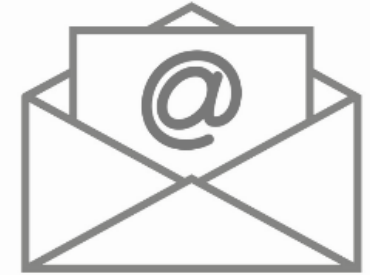
Machine-readable reports are transmitted via email and can be processed by reporting and visualization tools
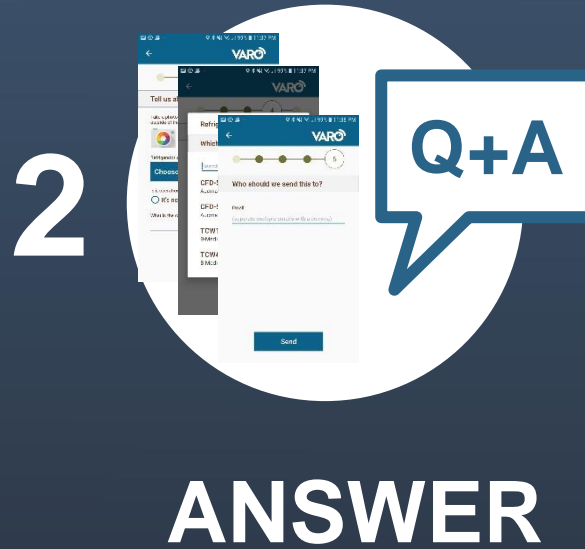
- **Emails only go to account established by EPI program**
- Equipment installation can be rapidly/consistently verified
- Users are empowered to call for help for their CCE

Varo unlocks CCE insights

The Varo mobile app enables capture and transmission of temperature reports from CCE, using only a mobile phone or tablet

- The 30DTR logger is connected to the phone or tablet using a USB OTG adapter/cable

- The app guides the entire process for report generation and e-mail transmission in < 2 minutes

- The Varo app is available as a free download from the Google Play store
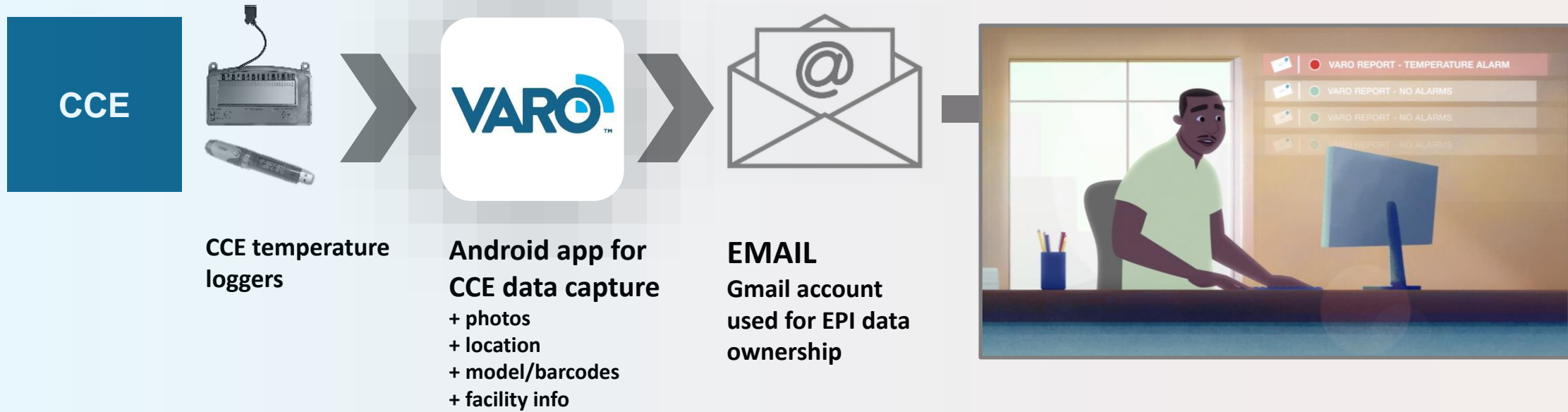
1 CONNECT

2 ANSWER

3 SEND

Typical deployment data flow

CCE

CCE temperature loggers

Android app for CCE data capture
+ photos
+ location
+ model/barcodes
+ facility info

EMAIL
Gmail account used for EPI data ownership

Typical deployment data flow

Data path from isolated CCE temperature loggers to machine-aggregated reporting and analysis

CCE

CCE temperature loggers

VARO™

Android app for CCE data capture
+ photos
+ location
+ model/barcodes
+ facility info

EMAIL
Gmail account used for EPI data ownership

VARO REPORT - TEMPERATURE ALARM
VARO REPORT - NO ALARMS
VARO REPORT - NO ALARMS
VARO REPORT - NO ALARMS

POGO LT

.pdf .xlsx

Free app for automated aggregation of Varo reports (www.pogo-lt.org)

Pogo LT converts bulk-captured Varo reports into aggregated summaries

Easily transmit cold chain temperature reports to any inbox

Varo is a simple and free smartphone app that collects and forwards useful cold chain information to the inbox of your choice.

- **Captures temperature data from 30DTR loggers**
- **Matches alarms with photos, location and other information**
- **Transmits standardized reports that can be aggregated**
  - Pogo LT tool is available for free without any infrastructure or subscriptions
  - Varo reports also can be routed to full-featured dashboards for visualization and reporting
- **Has been implemented successfully by EPI programs in multiple countries**
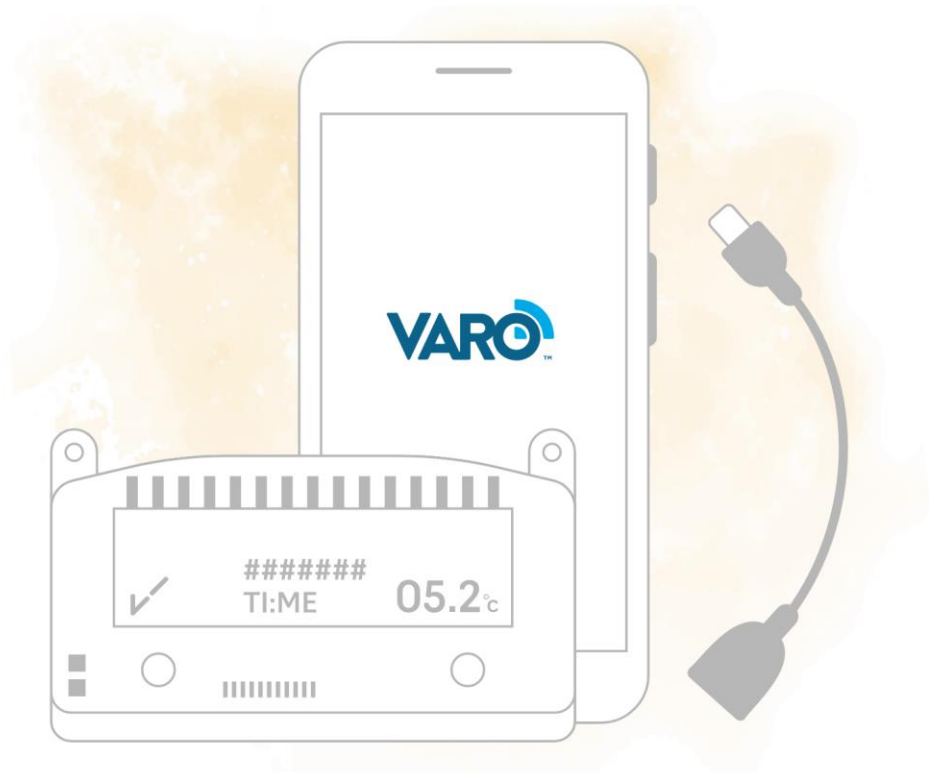
www.varo-app.org

Country Case Study: 30DTR, VARO, PogoDV, IMPACT Teams

The Kenya CCE Performance Monitoring Experience

inSupplyHealth
CO-CREATING INNOVATIONS FOR HEALTH

Overview: CCE Performance Monitoring

Objectives

Goal:

To improve and standardize vaccines cold chain temperature monitoring processes and increase data use to inform operations and management actions at all levels for vaccine management.

CCE FOR DECISION MAKING

Improve CCE monitoring and the use of data for decision making by supporting NVIP and stakeholders to implement KPIs, analytics and data use processes (IMPACT Teams) at all levels

+

CO-LEARNING

Share experiences and learning on the CCE monitoring and data use initiatives with external partners and contribute to global initiatives
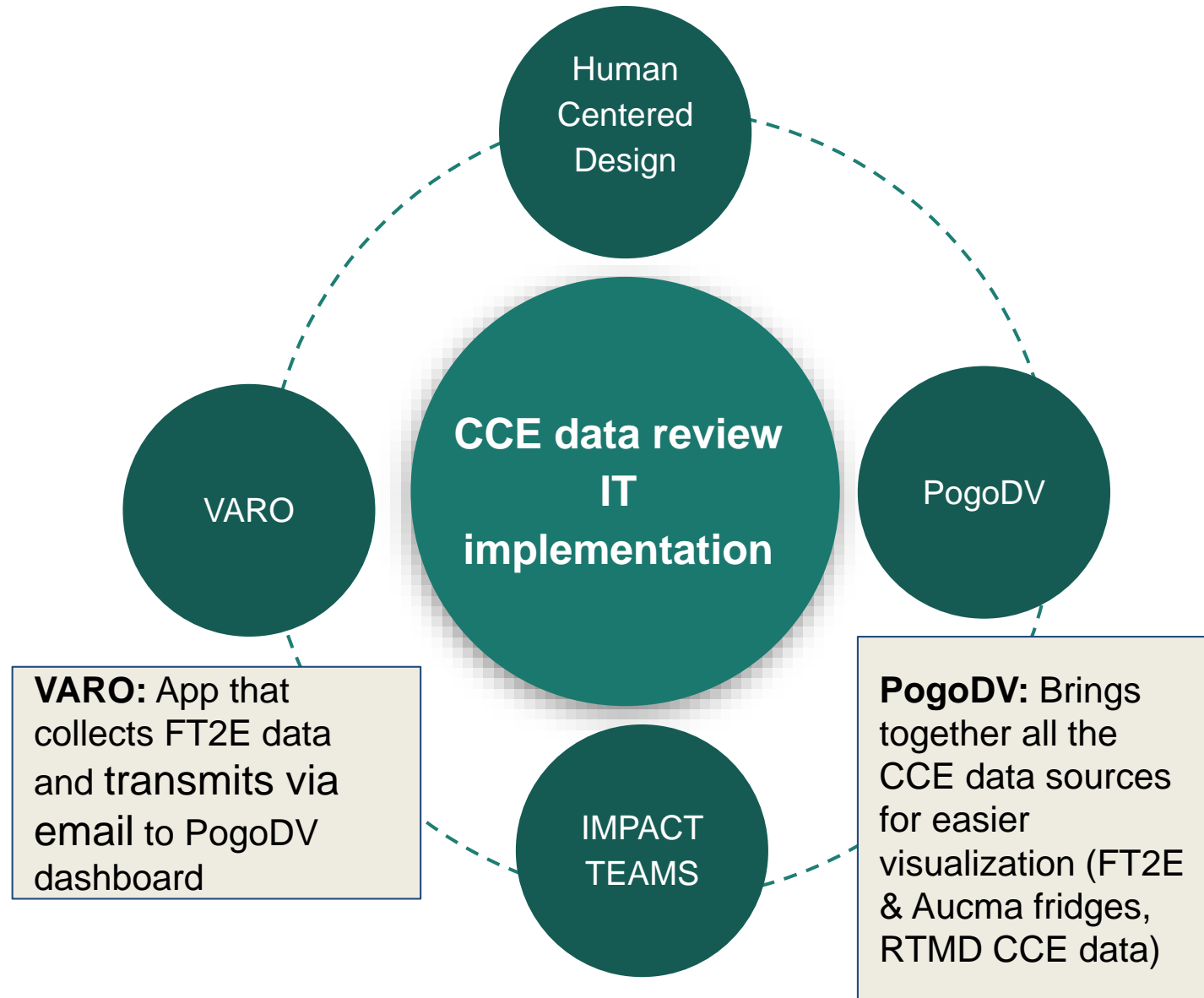
+

PARTNERSHIP FOR PROBLEM SOLVING

In partnership with NVIP and New Horizons, initiate Varo mobile application to identify CCE data opportunities for selected HF fridges with Fridge- Tag2 and ensure integration of data into KPIs and mockup dashboards

inSupplyHealth

CCE Performance Monitoring Approaches

The CCE Performance Monitoring integrated 4 approaches:

1. **VARO:** Mobile app enabling rapid capture and transmission of 30DTR logger data

2. **Human Centered design:** creative approach to problem-solving that starts with people and ends with innovative solutions that are tailor-made to suit their needs.

3. **PogoDV dashboard:** visualizes CCE data (FT2E/VARO reports, Aucma fridges)

4. **IMPACT teams:** a multidisciplinary team that utilizes data to improve performance and strengthen the supply chain

Human Centered Design

VARO

CCE data review IT implementation

PogoDV

IMPACT TEAMS

VARO: App that collects FT2E data and **transmits via email** to PogoDV dashboard

PogoDV: Brings together all the CCE data sources for easier visualization (FT2E & Aucma fridges, RTMD CCE data)

inSupplyHealth

CCE PERFORMANCE MONITORING IMPLEMENTATION PROGRESS

2020 Oct - 2021 Oct

Human-centered design & IMPACT Teams

Utilised HCD to gain insights on vaccines: CCE related decisions, CCE data needs and KPIs and practical barriers to vaccines CCE temperature monitoring data access, visibility and use for decision making

2020 July- Dec

VARO Training

206 facilities with OTG cables for FT2E data collection, 65 VARO ToTs national to subcounty levels

2020 Jan- June

Vaccines CCE KPIs reference sheet

Review recommended indicators for monitoring CCE temperature data and identify indicators required to support critical decisions for CCE temperature monitoring

2019 Dec

Vaccines CCE temperature monitoring workshop

Appreciate why cold chain equipment (CCE) temperature data monitoring and use is essential for decision making and identified CCE indicators and proposed visuals for monitoring

inSupplyHealth

VARO

Lessons Learnt

- **Cascade approach:** 65 people trained proving cost efficient and effective for scale and knowledge retention
- Presence of a VARO training **video** enhanced VARO uptake
- Minimal data bundles required for submission of data using VARO (Approx Ksh.1)
- OTG cables are easily accessible locally
- Not all facilities have reliable internet access – VARO can be used without internet.(emails go into outbox and can be sent out later
- There is interest from private facilities to improve on their CCE data monitoring

PogoDV dashboard

Lessons Learnt

- PogoDV: A dedicated platform used to visualize the CCE temperature monitoring data from FT2E and RTMDs, incorporated into IMPACT teams
- Promoting PogoDV as a report generating tool first and dashboard second enabled faster uptake from health workers
- Massive opportunity to improve access and CCE data review by making dashboards more mobile friendly that distills the most essential elements for review
- The introduction of monthly reporting accountability feature provided users a structured means to monitor CCE data and provide feedback at all levels

inSupplyHealth

IMPACT TEAMS (IT)

IMPACT teams is inSupply Health's signature approach which is a people-centered, data-driven initiative for continuous improvement to strengthen the supply chain.

The potency workstream plan integrated IMPACT teams with monthly review of CCE temperature monitoring data

IT teams leverage on already existing review of vaccine supply chain indicators on the Indicator tracking tool

IT tools: Indicator tracking tool, IT learning packages, Rapid meeting reports (RMR)

**IT learning packages:** Data, resource, organization skills, problem solving

inSupplyHealth
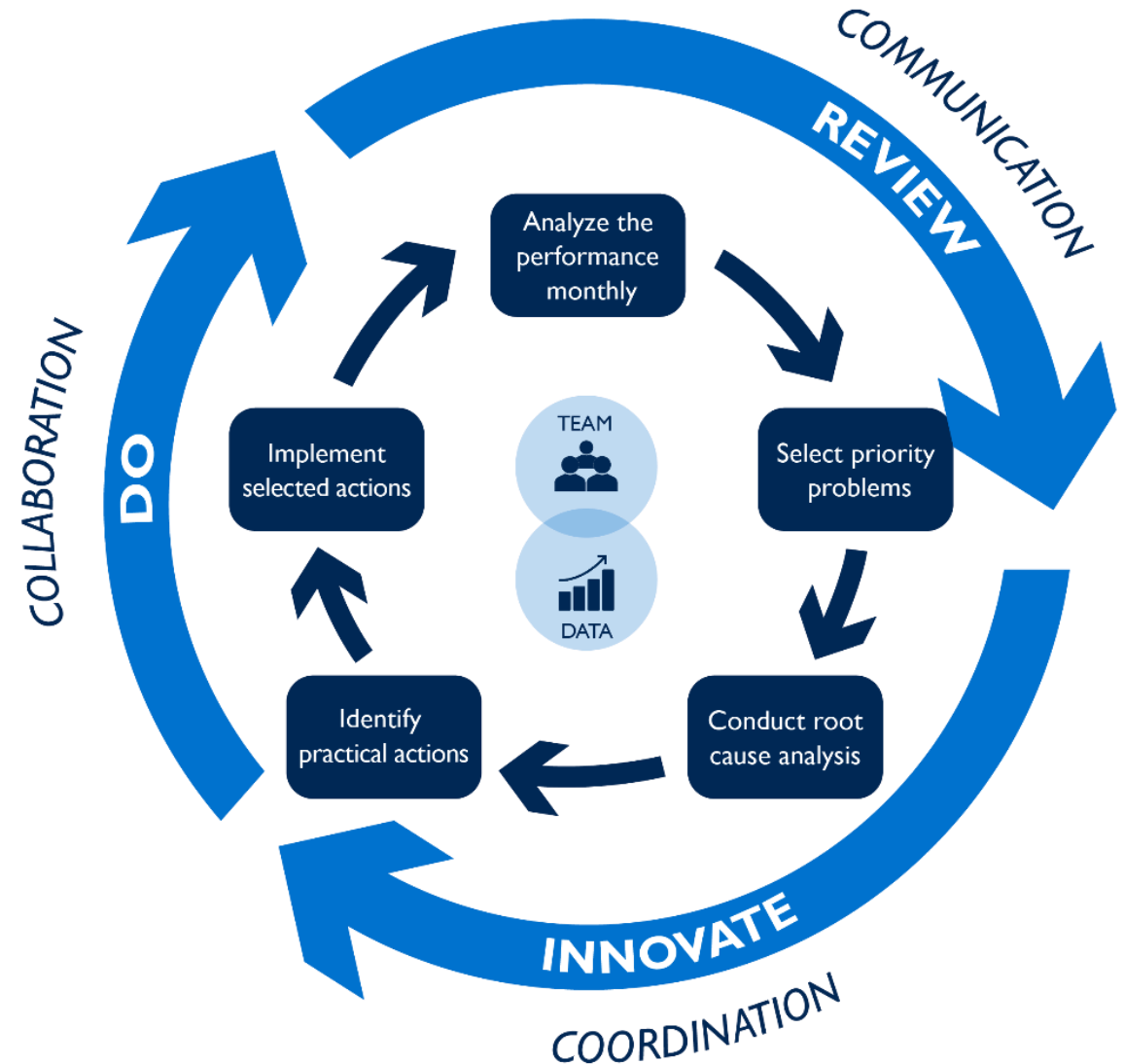
IMPACT TEAMS Lessons

CCE data review integrated within sub county health management team (SCHMT) meetings

- Trained 41 IMPACT Team members (34 Nairobi, 9 Mombasa, 7 Turkana) approach for vaccines CCE data use & decision making
- IT tools: Indicator tracking tool, IT learning packages, Rapid meeting reports (RMR)

IMPACT Teams : A structured supply chain problem solving, action planning, and data use to help health workers build a culture of data use and continuous improvement
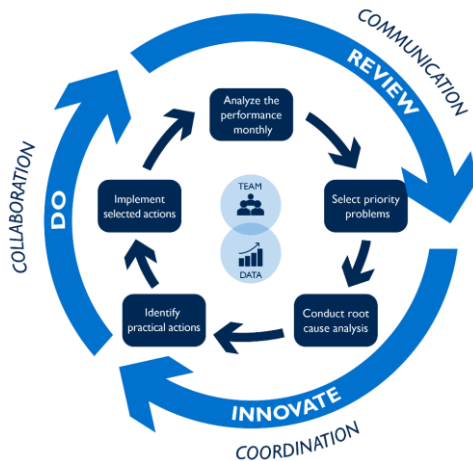
Lessons Learnt

- Provides avenue for vaccines CCE temperature monitoring data review, problem solving and action planning
- Enhances connection between immunization supply chain and service delivery (EPI and METs)
- Consistent and regular joint review of CCE temperature monitoring data enhances visibility and interest (Current interest by private health facilities to review CCE data)
- IT learning packages a motivation for CCE data review
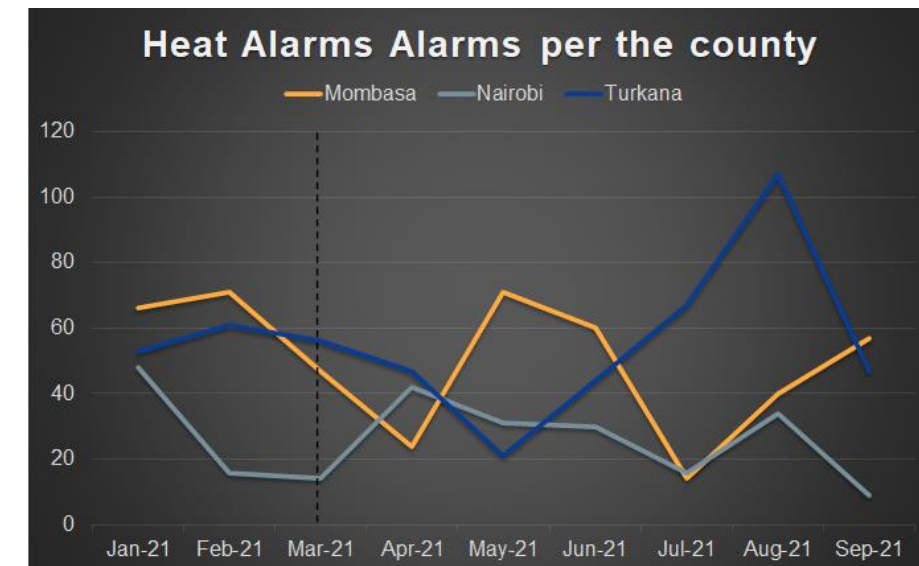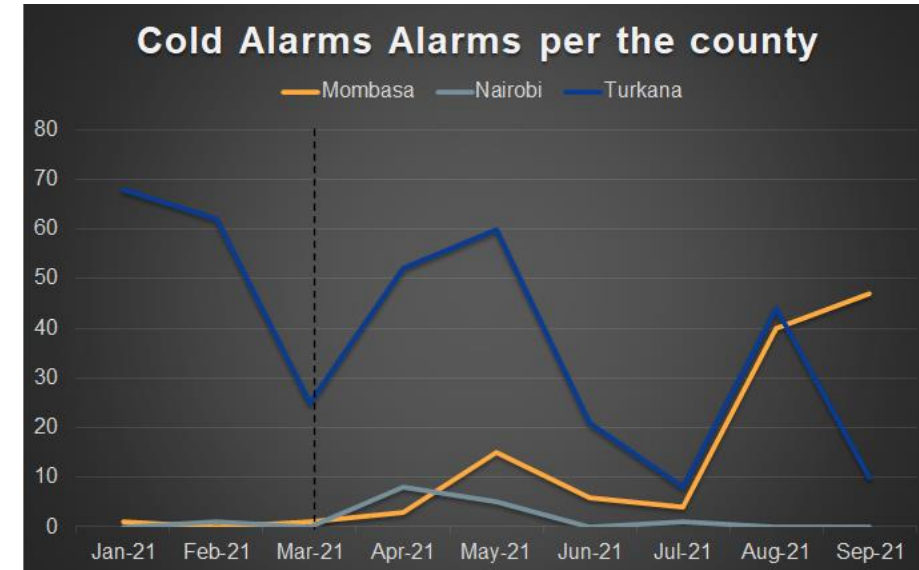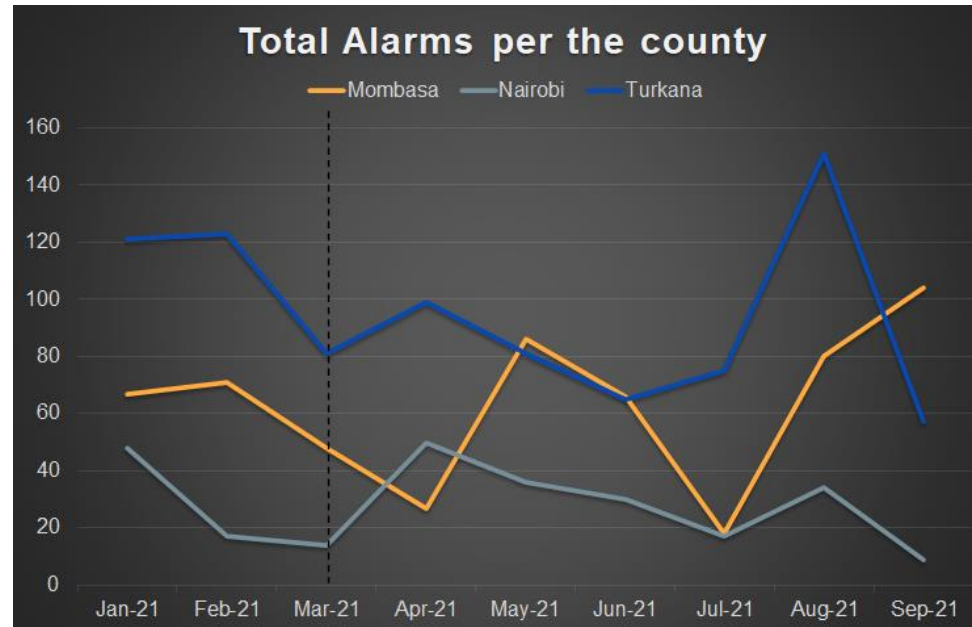
inSupplyHealth

Performance of Pilot counties

IMPACT teams provided an avenue to review CCE data at the sub county level which was not there previously. This enabled active monitoring of fridges that has reduced number of alarms since intervention started

Challenges

Break down and expired FT2Es affected VARO reporting

Competiting activities has disrupted reporting such as prioritizing COVID immunizations and HCW strikes

Q&A
THANK YOU