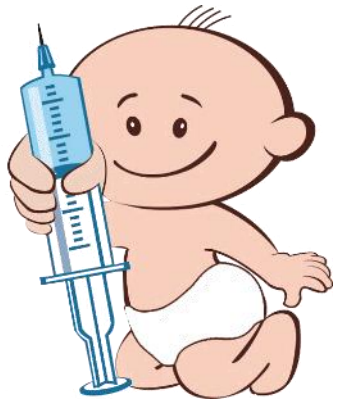


TECHNET WEBINAR SERIES ON TEMPERATURE MONITORING:
KEEPING A COLD CHAIN COLD

RTMDs: How to get the most out of your real-time temperature monitoring data

15:00 CET, November 25th, 2021

WELCOME!

TechNet-21

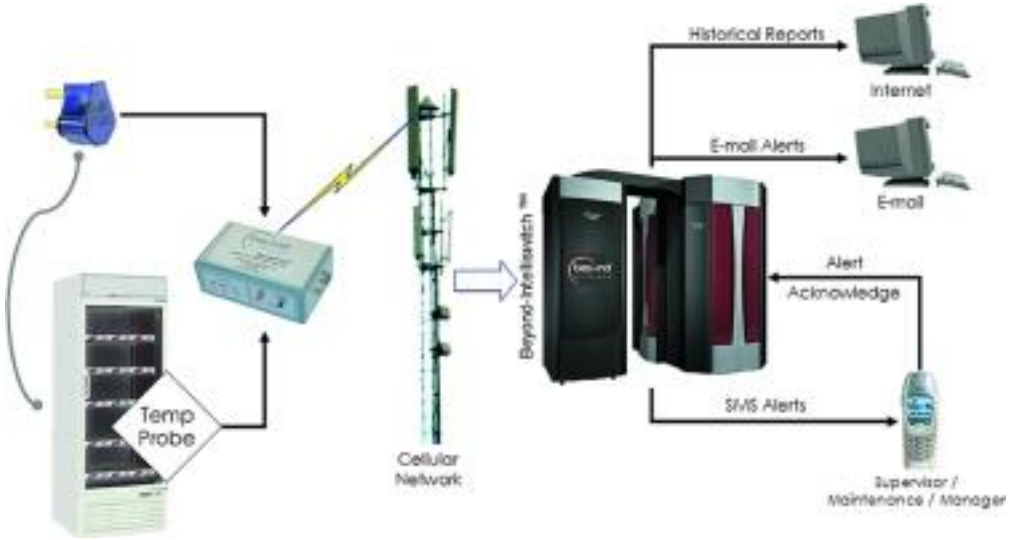
What to expect

15mins	Overview of remote temperature monitoring
10mins	Country experience on standalone RTMDs in refrigerators: Tanzania
15mins	Country experience on standalone (WICRs) & integrated RTMDs (refrigerators): Afghanistan
20mins	Q&A

What is a Remote Temperature Monitoring (RTM) system?

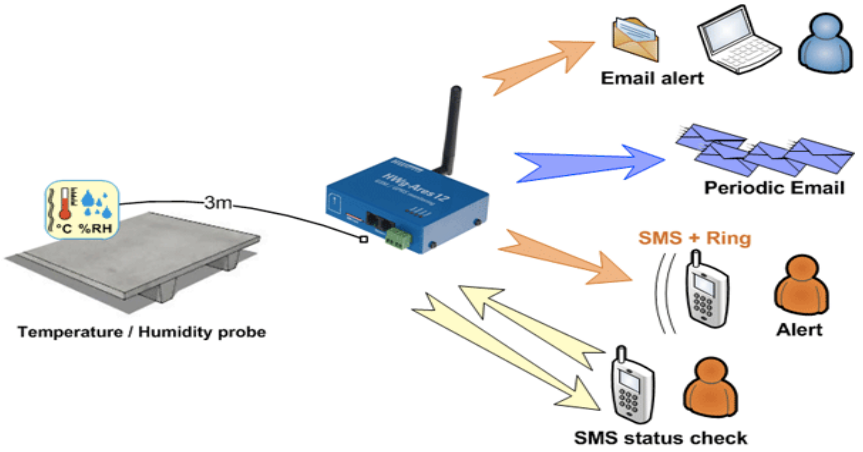
How it works:

A Remote Temperature Monitoring (RTM) system is installed on a vaccine Walk-in Cold Room (WIC) or Refrigerator, and sensors placed inside the vaccine storage compartment take temperature readings every few minutes, transmitted to cloud data storage via cellular networks.



When an unsafe temperature is detected, the RTM system will transmit an alert via SMS or email to the appropriate personnel. This enables:

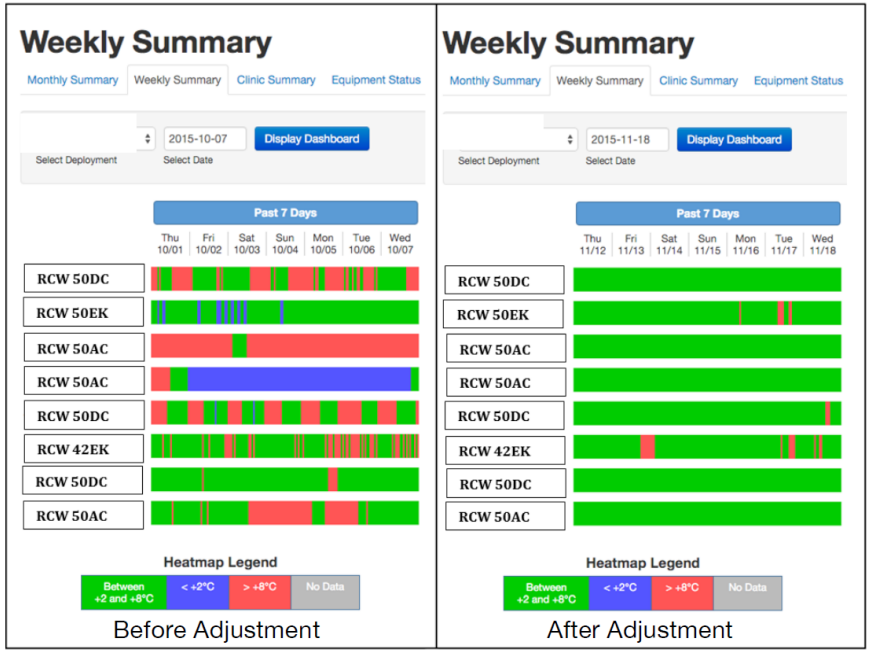
1. Proactive action to prevent vaccine damage due to freezing and heating
2. Awareness of cold chain system in order to better direct maintenance and repair efforts
3. Evidence-based decision-making in future procurement of cold chain equipment

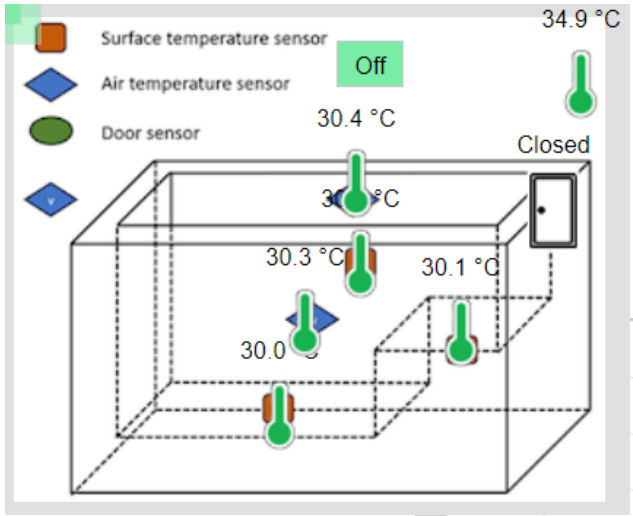


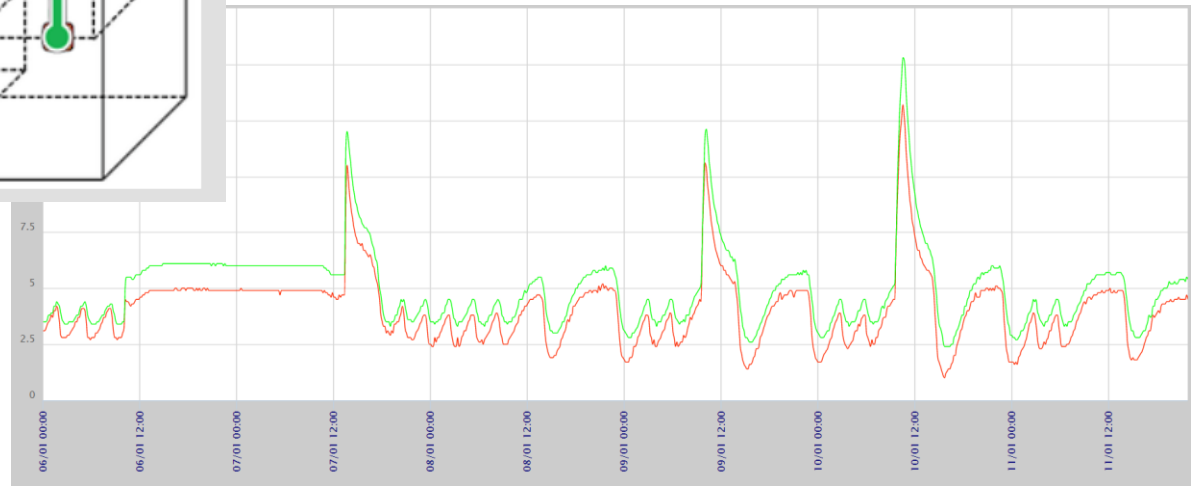
What is a Remote Temperature Monitoring (RTM) system?

How it works:

Users can access a web portal via any internet connected computer, tablet or cell phone. Web portal provides access to summary data, detailed historical temperature data, system setup and reports.







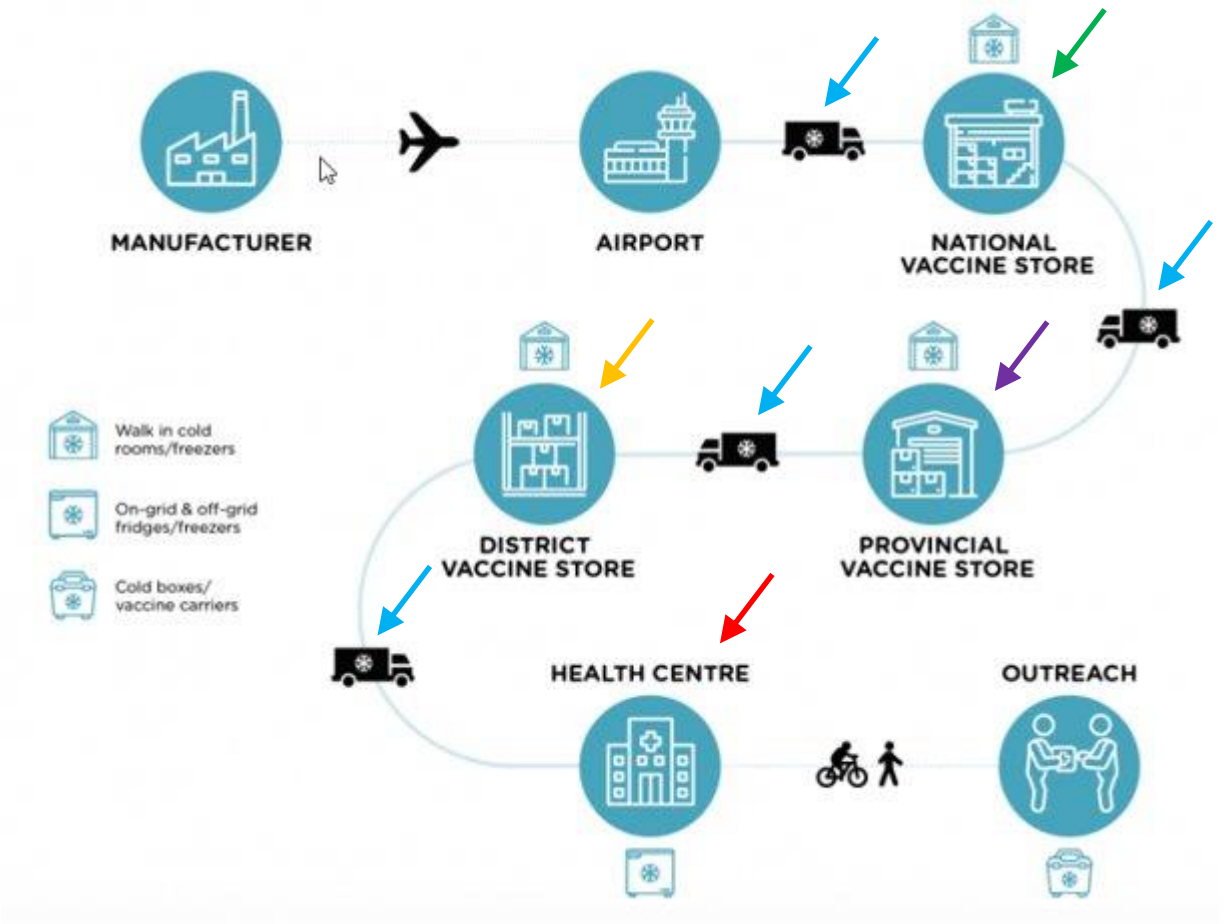
Where are RTM systems normally deployed?

Due to relatively high cost and complexity, RTM systems are typically considered most appropriate for vaccine storage sites where a high volume (and therefore value) of vaccines are stored for extended periods of time:

- National vaccine stores (WICs)
- Provincial vaccine stores (WICs)
- District vaccine stores (WICs)
- Refrigerated vehicles

However, due to increased global interest in monitoring equipment performance remotely, insufficient reporting with local temperature monitoring and falling costs, RTM systems are increasingly also being rolled out at large scale to:

- Health centers (Refrigerators / Freezers)



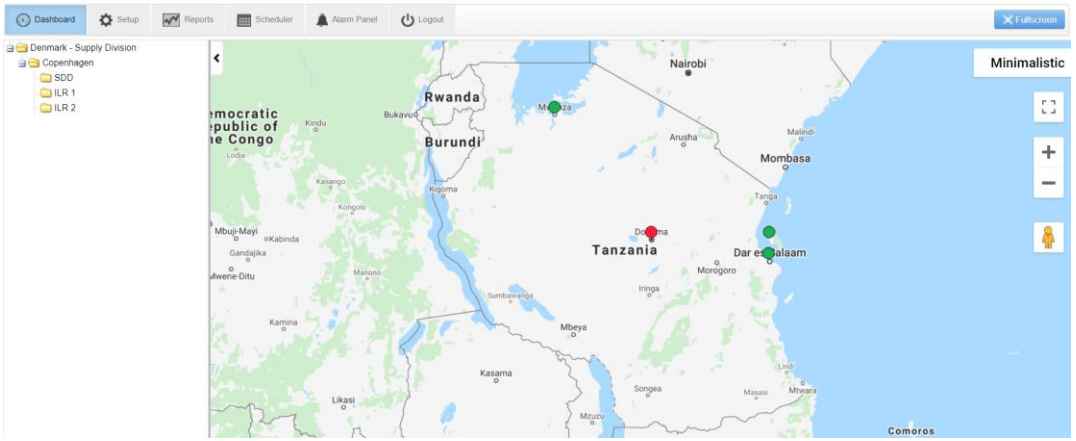
What is normally provided as part of an RTM system?

Hardware

- Base unit
- Sensors (temperature, door & mains power status)
- Power supply

Subscription (3 or 5 years)

- Licensing
- Communication
- Cloud data storage
- Subscription services



Services

- Installation
- Training

Some factors to consider when ordering an RTM system

Application	Refrigerator (single sensor) Walk-in Cold Room / Refrigerated Vehicle (multiple sensors)
Sensors	Wired (no battery to replace, difficult to run between multiple cold chain assets) Wireless (no need to run sensor wires into cold chain asset, needs regular replacement due to battery life)
Power	Mains electricity powered (can support frequent data transfer, susceptible to power damage and needs external power source) Battery powered (no need for external power source, immune to power damage, cannot support frequent data transfer)
SIM	Local SIM card (cheap, needs to be managed by customer, less reliable than global SIM) Global SIM card (fully managed by supplier, more reliable than local SIM, more costly)

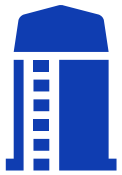
PQS prequalified RTMDs available (wired)

							
	Beyond Wireless ICE3 BC141	***Beyond Wireless ICE3 Extra BC440***	***Nexleaf ColdTrace 5***	***Berlinger Fridge-tag 3***	***Zero Stat-Send***	***Haier U-Cool***	***Ikhaya VM1000***
PQS Code	E006/036	E006/037	E006/039	E006/041	E006/055	E006/060	E006/061
Sensor Type	Wired	Wired	Wired	Wired	Wired	Wired	Wired
Measurement Range	-40 °C to +100 °C	-40 °C to +100 °C (NTC sensor) -200 °C to +150 °C (PT100 sensor)	-30°C to +55°C	-40°C to +55°C	-30°C to +50°C	-40 °C to +120 °C (NTC sensor) -200 °C to +150 °C (PT100 sensor)	-30°C to +55°C
# of Sensors Supported	4	16	5	1	5	1	4
Power Source	Battery only	Mains	Mains	Mains	Mains	Mains	Mains
Backup Battery Life	7 years	3 years	3-5 years	3-5 years	3-5 years	5 years	5 years

PQS prequalified RTMDs available (wireless)

	 ***Berlinger SmartLine***	 ***Blulog***	 ***Haier U-Cool LoRa***
PQS Code	E006/019	E006/048	E006/075
Sensor Type	Wireless	Wireless	Wireless
Measurement Range	-40 °C to +85 °C	-40 °C to +60 °C	-40°C to +80°C (Digital sensor) -200°C to +150°C (PT100 sensor)
# of Sensors Supported	50+	50+	50+
Power Source	Mains	Mains	Mains
Backup Battery Life	3-5 years	3 years	7 years
Sensor Battery Life	3 years	3 years	3 years

Challenges observed with RTMDs 1/2



- Separate RTM data platforms exist in countries limiting ability to comprehensively assess performance of CCE, integration of data in existing systems (eLMIS, IMPT) would be required

- RTM systems developing at a fast pace (with increased investments), but its use is very limited due to lack of access to data in some countries or limited HCW capabilities to use data
  - More than 4,500 RTMDs procured via UNICEF SD under CCEOP/HSS for WICRs and refrigerators between 2017 and 2021
  - COVAX CCE support is expected to deploy 750 additional RTMDs to support the covid response

- High costs for data and portal subscriptions create barriers for widespread uptake

Challenges observed with RTMDs 2/2

- Limited training of end users which has impacted HCW capabilities to understand and use available data

- Network connectivity also prevents countries for transmitting data in areas where cellular connectivity is low

- Limited use of analytics by decision makers to support maintenance efforts within countries

Gavi updated CCEOP eligibility in 2020 to articulate country ownership of data

1. Gavi's position has always been that **ownership of data lies with the country**, and updated CCEOP platform eligibility in 2020 to ensure the following:

   - This **ownership includes data (raw and processed)** originating from CCE products or accessories (e.g. RTMDs) procured for the benefit of a given country
   - Governments should have full control of data, **including definition of terms of access and use of data by third parties, storage, data protection requirements, transmission and internal processing** throughout the full lifespan of data
   - **No intent to prevent supplier access to data** for purposes of honoring warranties, but ownership lies with the country

2. Data ownership **principles apply across all Gavi supported funding streams** including CCEOP and HSS support

Programmatic considerations for RTMD implementation

Parameters*	Essential in order to...
Financing	Cover the (incremental) **costs of purchasing and deploying devices**, as well as **annually maintaining the devices and data fees** (after initial 3-5 years) and replacing standalone devices (30DTR + RTMD) once they have exceeded their shelf life
Data use and systems	Ensure data generated by the monitoring device is **used consistently and effectively for CCE monitoring and maintenance,** gaining a return on investment
Human resources / training	Ensure that each person involved in installing, using, maintaining and managing the monitoring device / system can carry out their role
Country Leadership	Mobilize resources, people and political will to adopt and maintain the system, especially if it is a new/sophisticated system

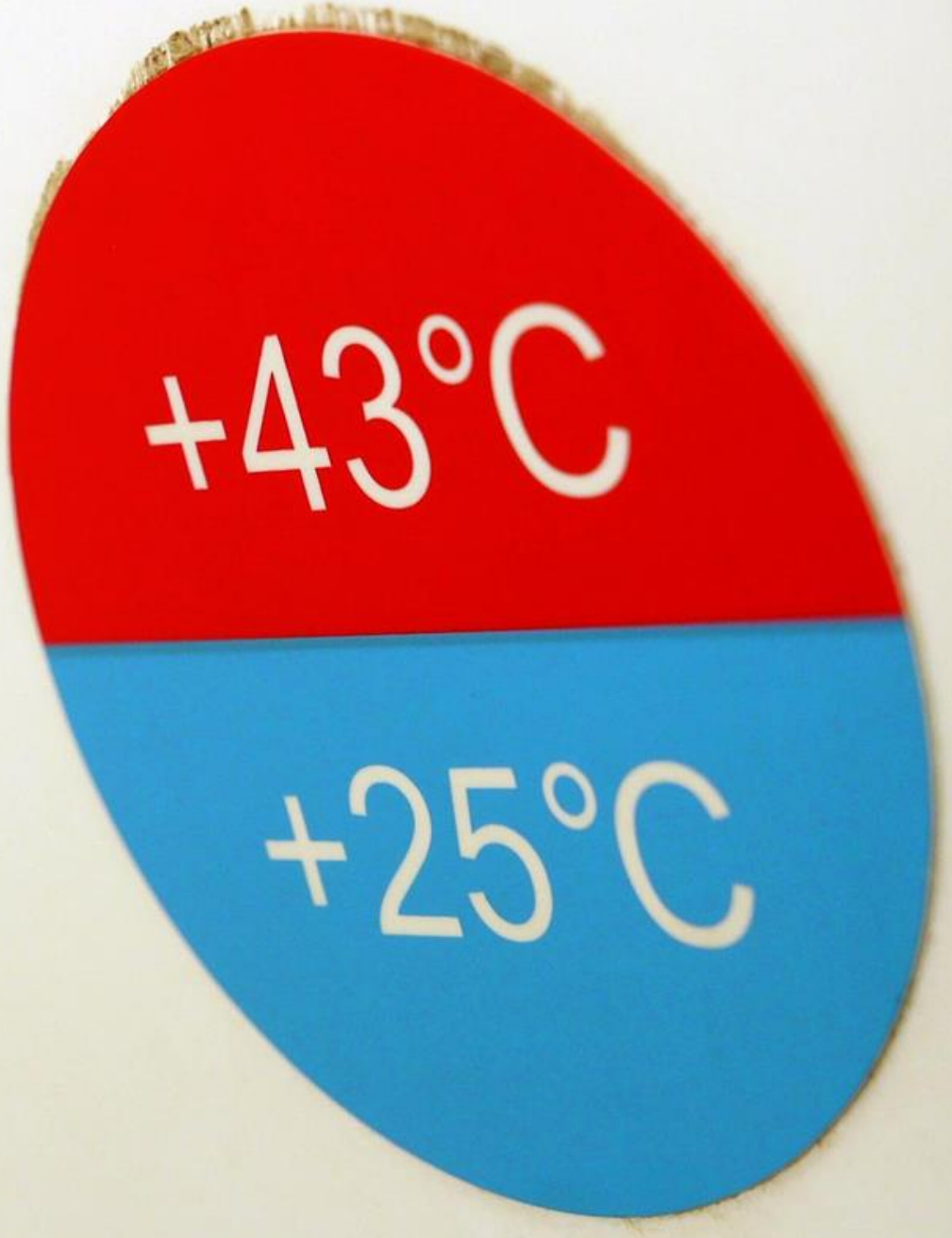
Note: System strengthening is required to enhance use of data for decision making for maintenance and procurement planning

**Reference: RTM guide to decision making by JSI, Village Reach & CHAI*

10mins

Case Study

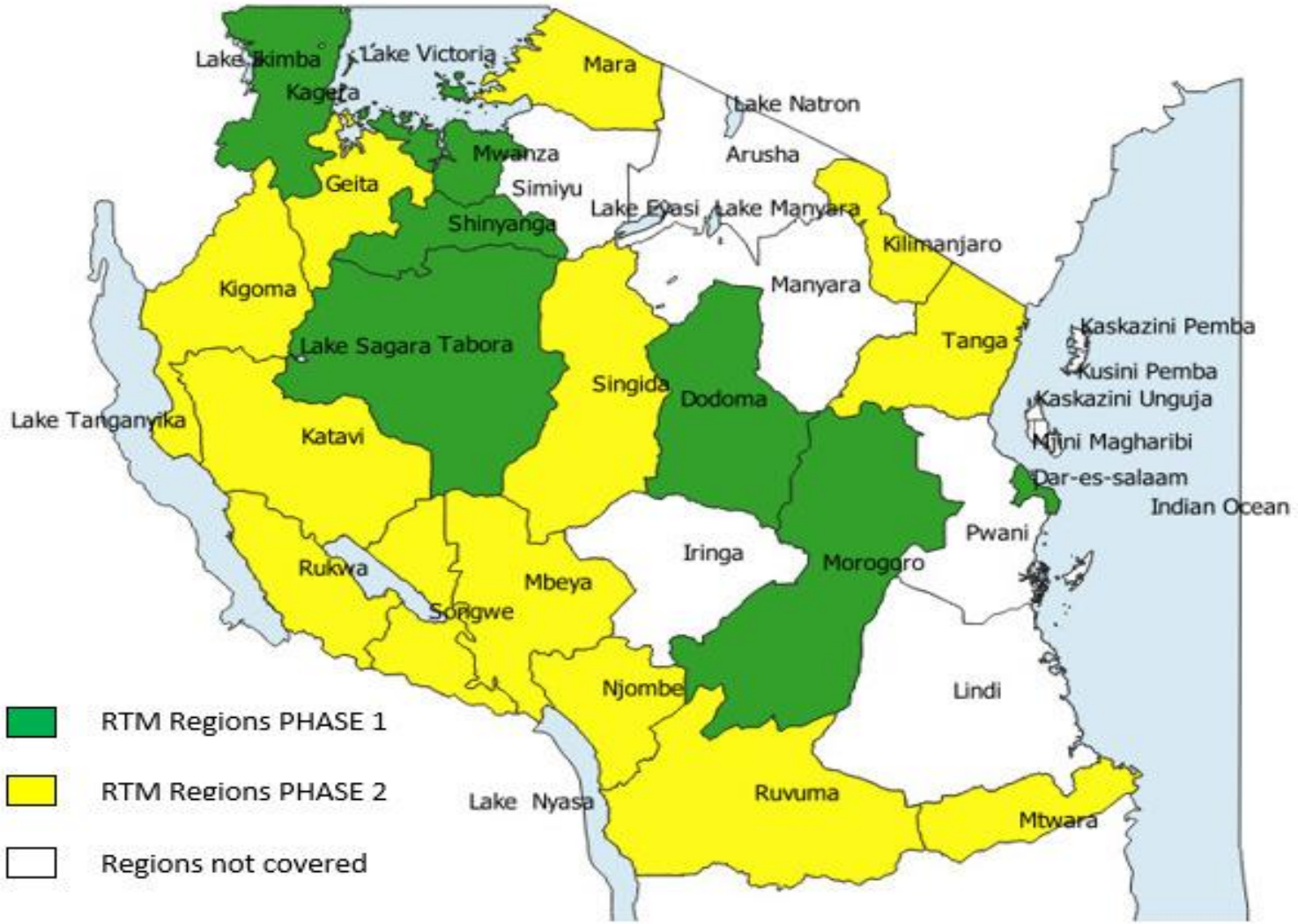
RTMD IN TANZANIA



Overview of Activities

- Up to 5,000 RTMD (ColdTrace5) installed in CCE at regional, district and facility levels, 2017 – present
- The MOH/PORALG in collaboration with JSI and Nexleaf trained Regional and District Immunization and Vaccine Officers (RIVOs, DIVOs) to lead installations and follow ups

Overview of Activities



Highlights of Implementation

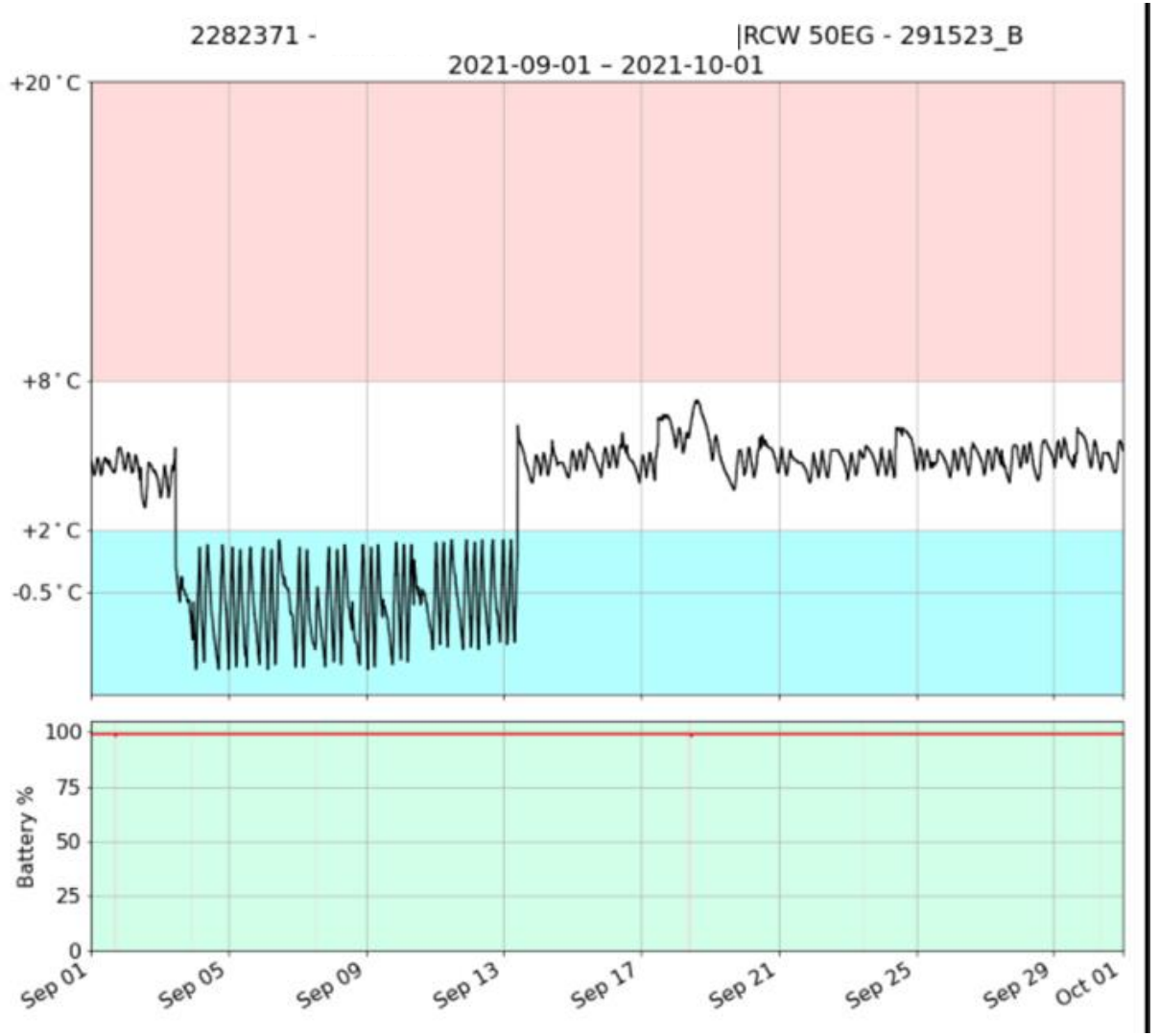
- DIVOs and RIVOs were responsible for installation and responding to any initial issues
- RTMD data integrated into the VIMS with a single sign-in
- Data costs are included in Health Facility budgets
- Adjustments along the way:
  - Shifted to installing in regional WICR, based on need
  - Smaller training sizes to adjust to the COVID-19 pandemic
  - Health facilities were responsible for the site readiness for the RMTD Installation (i.e., additional sockets or extension cables if necessary)
- DIVOs were reimbursed for expenses once the RTMD proved to be working and sending data.
- Districts and facilities took over responsibility of payment for data and SMS costs mid-2021 with some serious hiccups
- Changes in telecommunications requirements have delayed full functionality

Benefits of RTMD

- Drives immediate action at the facility level or CCE location to resolve temperature excursions
- Aids in planning for longer term maintenance needs at the country level
- Globally, contributes to global data sets to evaluate performance and guide procurement and maintenance decisions

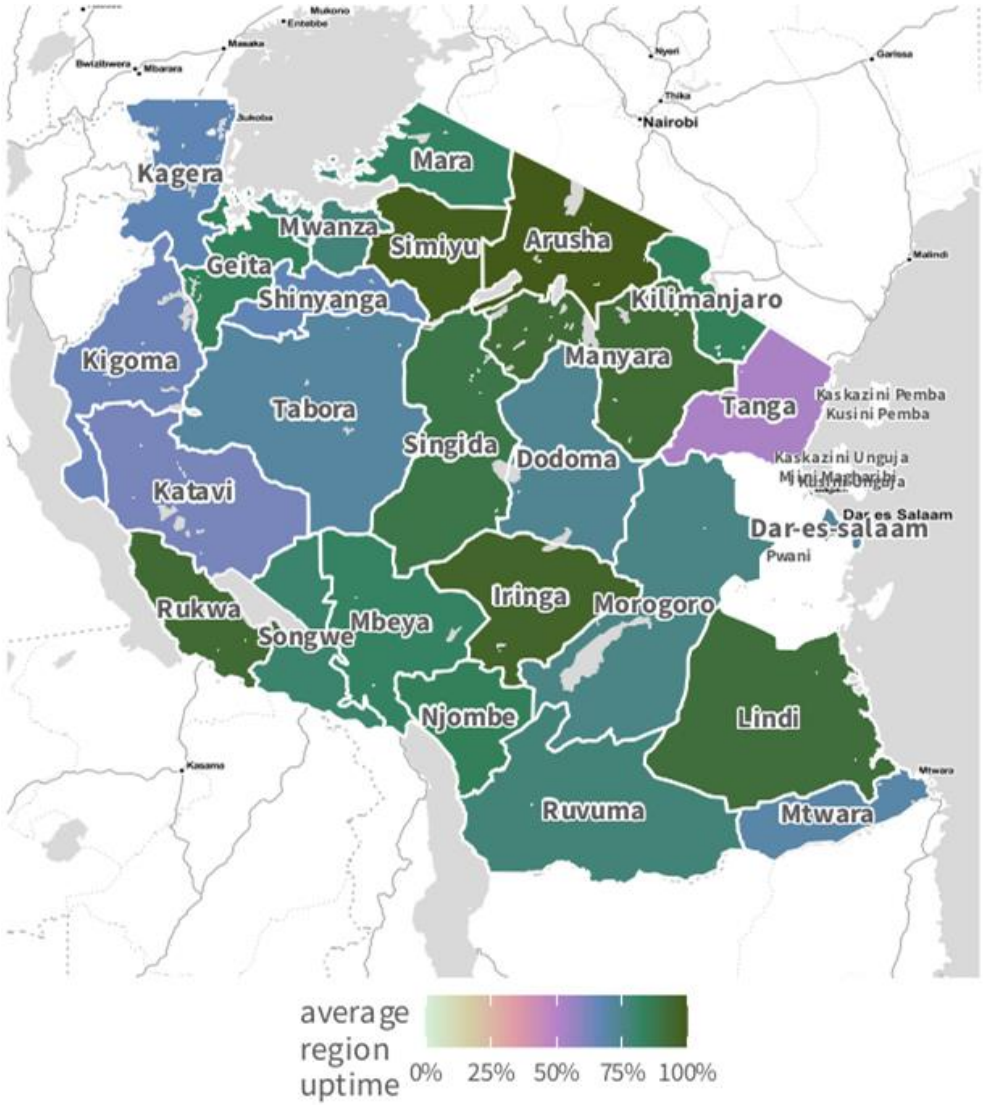
Data to Action: Facility Example

- DIVO noticed this temperature excursion lasting about 7 days
- Notified the facility
- Health worker adjusted the thermostat
- Remote supervision and data visibility reduces the need to travel yet still maintain the CCE



Cold Chain Visibility: National Overview

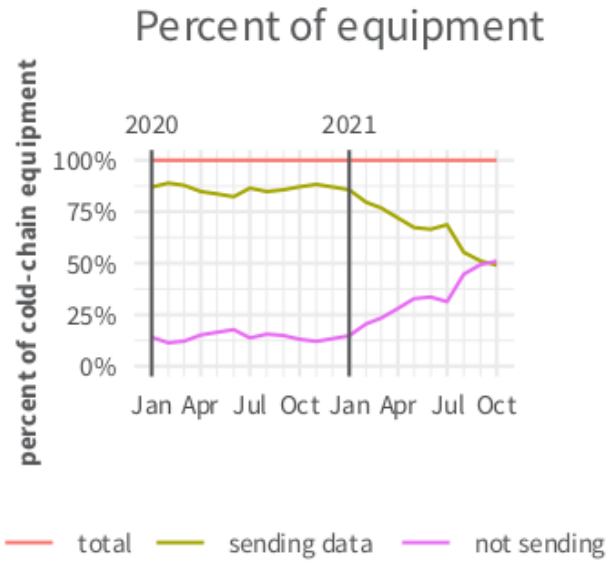
- All regions have over 50% average uptime (lowest is Tanga with 53%)
- 13 regions have over 80% average uptime
- High-level summaries enable rapid identification of possible improvements



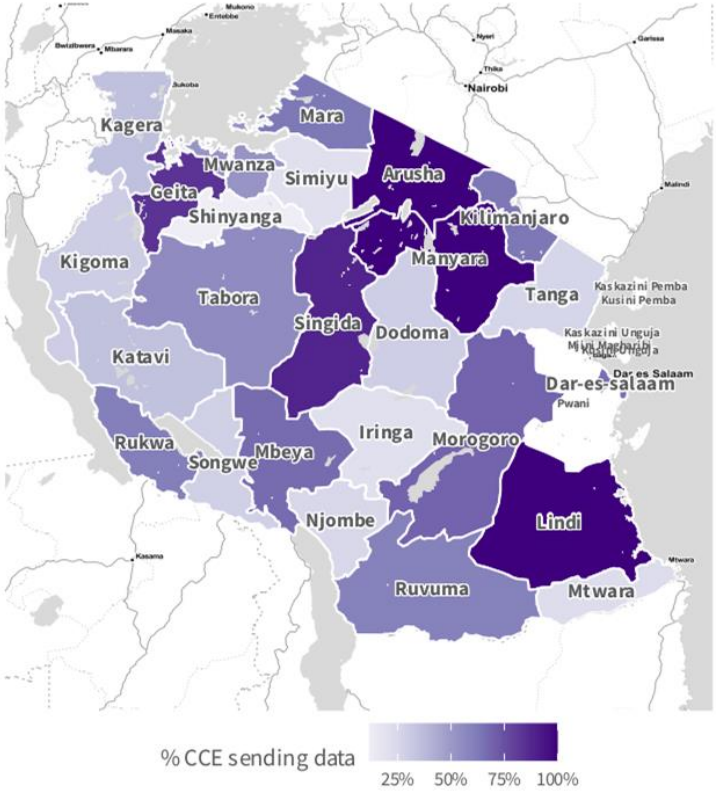
Challenges to Implementation

Devices not sending data continues to be a challenge:

- Transition to facilities paying monthly data fees: in March, facilities took responsibility for paying for data, which is a process to become regular
- Telecom challenges: ongoing changes to telecoms requirements for SIM cards, including SIM PIN CODE
- Installation of CCEOP Equipment phase 2: new CCEOP installation Removed the CT5 RTMDs



20 regions have less than 75% of their CCE sending data, impacting about 50% of the CCE nationwide



Lessons Learned

- Engage telecoms: SIM Cards for Machine to Machine (no pins) and yearly payments result in less barriers to ongoing payment
- Visibility at facility level: Ensure those tasked with payment are benefiting from the data, and realize when it is not flowing
- Institutionalize ongoing costs: ensure budgets for data are accounted for from start of installation

Global value of RTM Data

- RTM data allows countries to objectively evaluate CCE performance
- Combined with global data sets, it provides countries the opportunity to compare local performance to global and to PQS specs across manufacturers
- Collectively, this puts countries in the driver seat of the management, maintenance, and procurement of their CCE

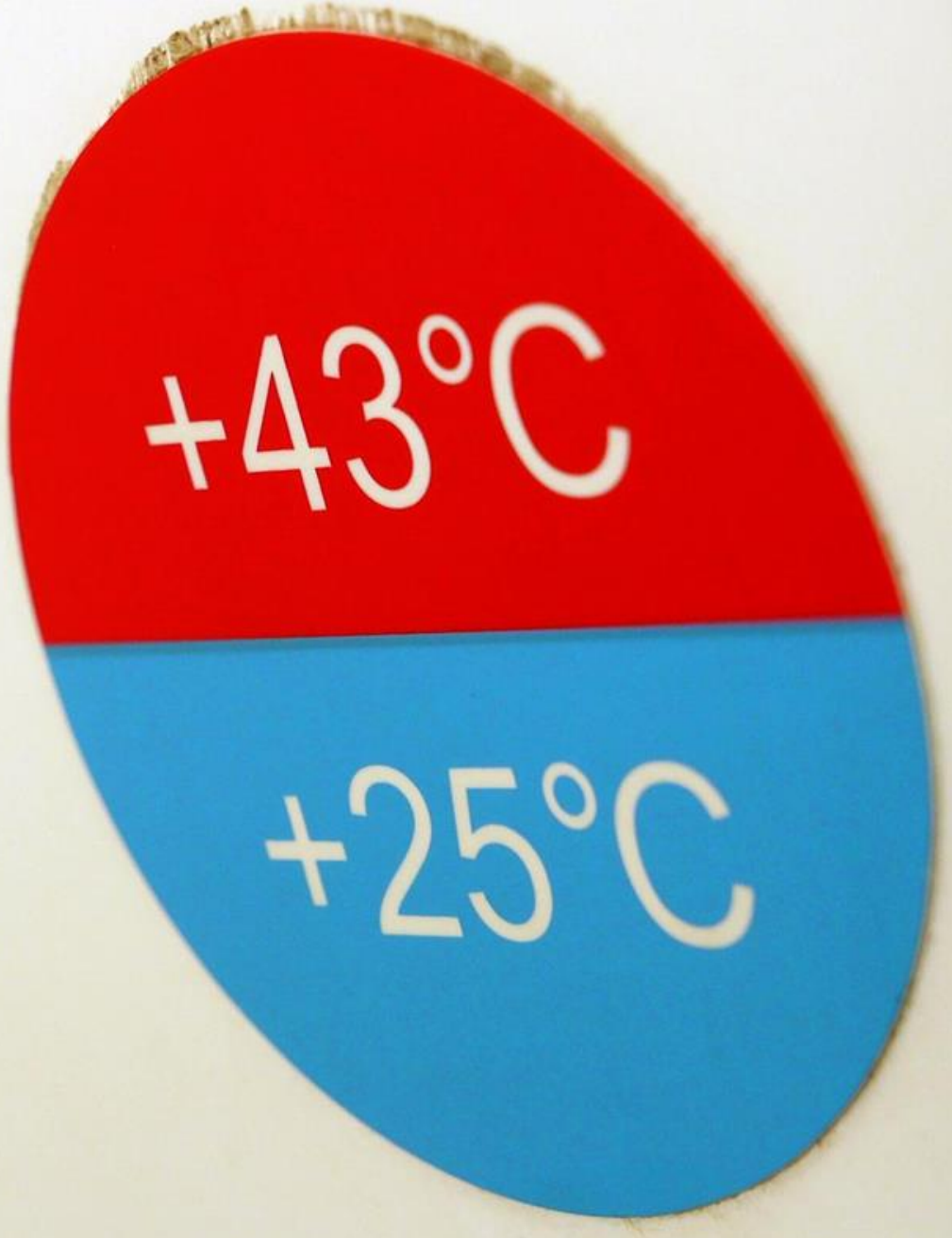
Conclusion

- RTMD has shown value in increased attention to CCE performance at national, regional, and district level
- Installations continue to be a challenge, but through combined efforts and increased understanding of how to use the data, the potential future impact is large
- Globally, RTMD are a great opportunity to ensure countries have data to manage CCE

15mins

Case Study

RTMD IN AFGHANISTAN



Immunization supply chain levels in Afghanistan

National

1 national vaccine store (9WICR/2WIF)
6 RTMD-Beyond wireless)

Regional

7 regional vaccine stores (doubles as provincial store)

(14WIC/9WIF)
13 RTMD-Beyond wireless

Provincial

27 provincial vaccine Stores (Ice lined refrigerators)
30 DTR

Health facility

2618 HFs offering RI (both public and private)

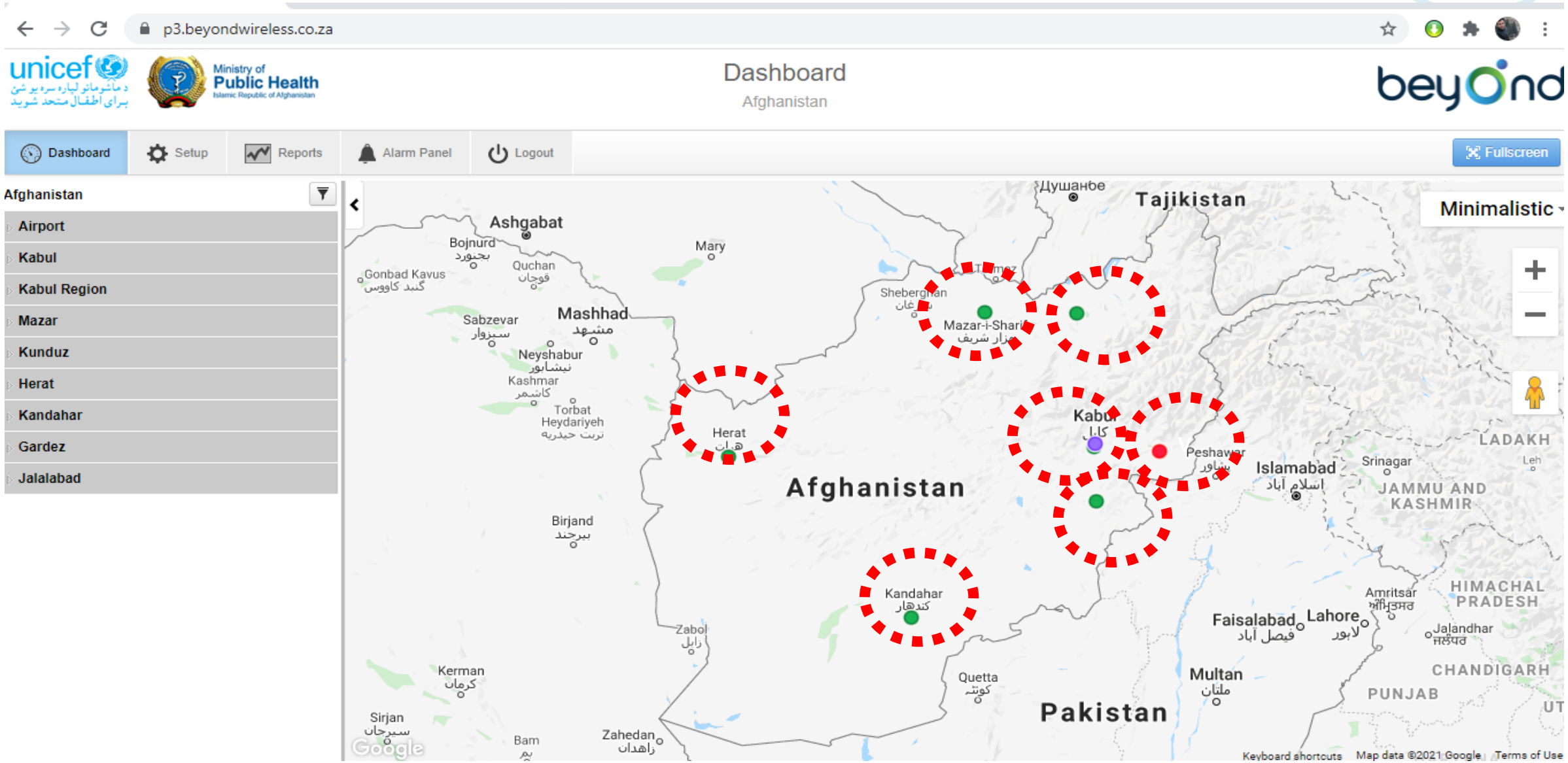
Approx. 1086 SDDs with RTMD (HSS=645, CCEOP=406, Polio=35)

RTMD for monitoring of cold rooms

Beyond wireless ice3 Devices

Name of Vaccine store	# of WIC	# of WIF
National (Kabul)	9	2
Airport	3	0
Central region (Kabul region)	1	1
North-East region (Kunduz)	2	1
North-region (Mazar)	2	1
West region (Herat)	2	1
South Region (Kandahar)	3	2
South-east region (Gardez)	2	1
East region (Ningarhar)	2	2
Total	**26**	**11**

Afghanistan: Dashboard of RTMD for cold rooms using Beyond Wireless devices



Mechanism of monitoring and control using RTMDS

- Dedicated CC staffs were trained on the use of BW by Ice 3 extra company
- At the regional and national stores, these trained CC staff monitor the WICR and WIF on daily basis

The focal national CC staff centrally coordinates, monitors and analyzes all the BW data in the country regularly

- In case of alarms, the BW system directly sends alarms notifications to the mobile phones and emails of the designated CC staff at both regional and national levels
- Immediate corrective actions are initiated by trained CC technicians situated at both national and regional vaccine stores to resolve the problem.

Usual reports produced by RTMD system

p3.beyondwireless.co.za/index.php?feature=report&function=graph&ta

unicef | Ministry of Public Health Islamic Republic of Afghanistan | beyond

Data Table

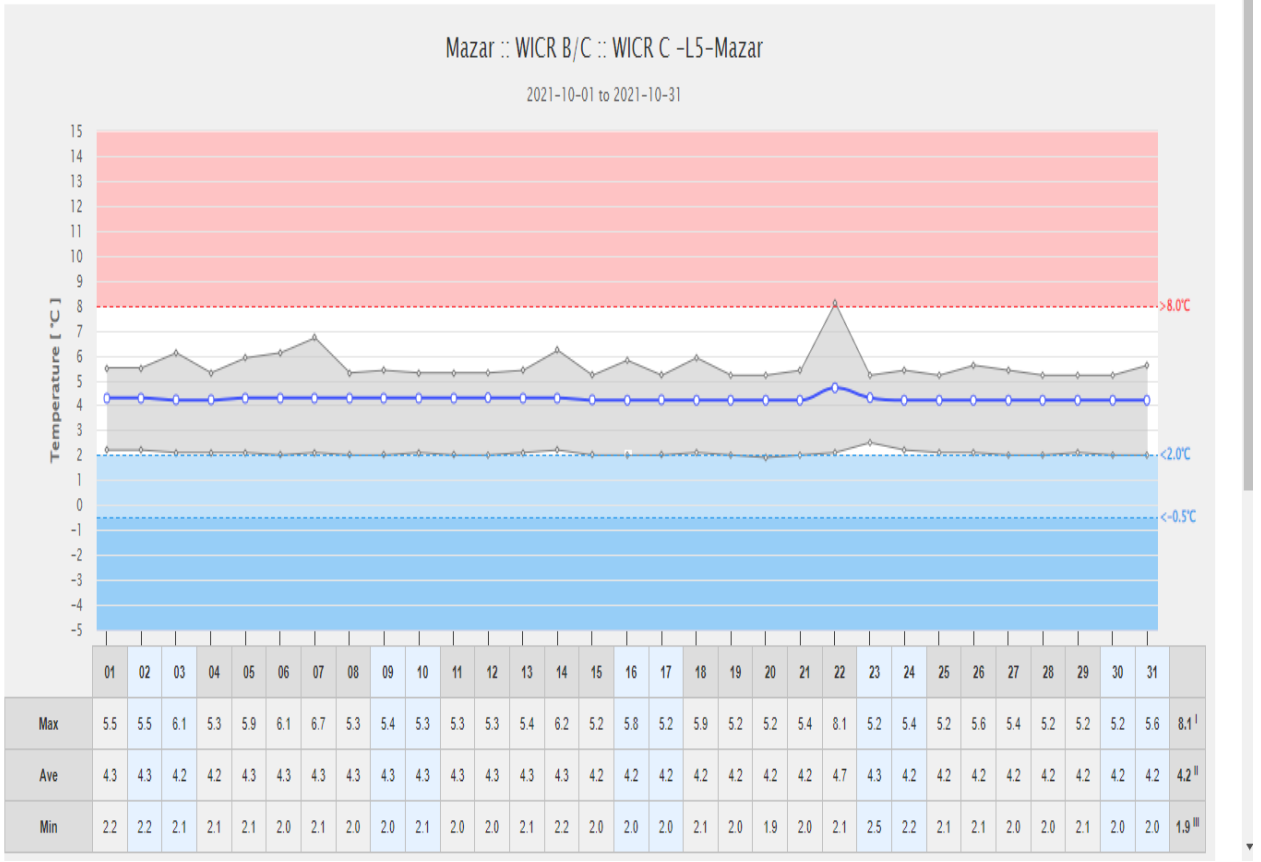
2021-11-10 11:00 to 2021-11-17 11:00

Date / Time	Kabul - WICR C/D				
	WICR C - Kabul - L1				
	1 Top Right Temperature [°C]	2 Top Left Temperature [°C]	3 Rear Right Temperature [°C]	4 Rear Left Temperature [°C]	Door - Not Connected [Open/Closed]
2021-11-10 11:00	6.0	4.8	5.2	5.2	Closed
2021-11-10 12:00	6.1	4.8	5.3	5.3	Closed
2021-11-10 13:00	6.2	5.2	5.4	5.3	Closed
2021-11-10 14:00	6.4	5.4	5.5	5.5	Closed
2021-11-10 15:00	4.2	1.5	4.6	4.9	Closed
2021-11-10 16:00	6.0	4.7	5.1	5.2	Closed
2021-11-10 17:00	6.2	5.1	5.3	5.3	Closed
2021-11-10 18:00	6.2	5.2	5.4	5.3	Closed
2021-11-10 19:00	6.3	5.4	5.5	5.4	Closed
2021-11-10 20:00	5.4	3.8	5.0	4.9	Closed
2021-11-10 21:00	5.4	3.8	5.0	4.8	Closed
2021-11-10 22:00	5.2	3.5	4.9	4.7	Closed
2021-11-10 23:00	4.4	2.5	4.2	4.5	Closed
2021-11-11 00:00	5.5	4.0	5.0	4.9	Closed
2021-11-11 01:00	4.8	3.0	4.6	4.6	Closed
2021-11-11 02:00	6.1	5.5	5.5	5.3	Closed
2021-11-11 03:00	5.9	5.1	5.3	5.1	Closed
2021-11-11 04:00	4.4	2.8	4.4	4.3	Closed
2021-11-11 05:00	5.9	5.2	5.3	5.1	Closed
2021-11-11 06:00	5.7	4.8	5.2	5.0	Closed
2021-11-11 07:00	5.3	3.7	4.9	4.8	Closed
2021-11-11 08:00	4.9	3.5	4.7	4.6	Closed
2021-11-11 09:00	5.8	5.2	5.3	5.0	Closed
2021-11-11 10:00	5.5	4.3	5.1	4.9	Closed

Public Health Islamic Republic of Afghanistan | beyond

Temperature Monitoring Chart

Afghanistan

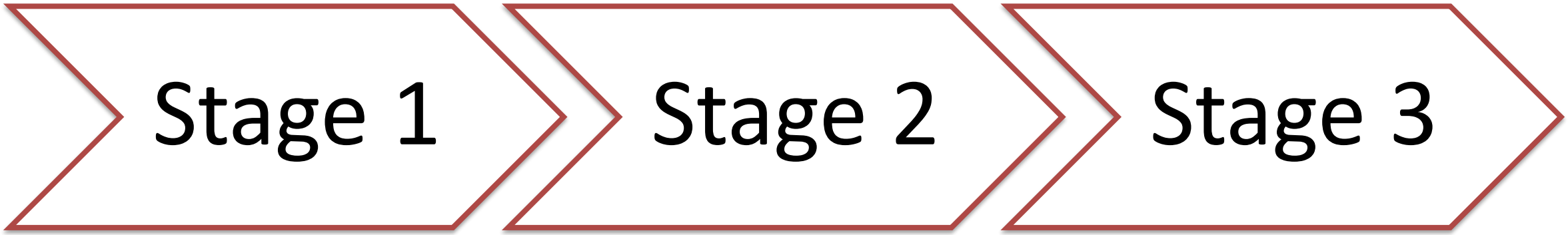


	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
Max	5.5	5.5	6.1	5.3	5.9	6.1	6.7	5.3	5.4	5.3	5.3	5.3	5.4	6.2	5.2	5.8	5.2	5.9	5.2	5.2	5.4	8.1	5.2	5.4	5.2	5.6	5.4	5.2	5.2	5.2	5.6	8.1 I
Ave	4.3	4.3	4.2	4.2	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.7	4.3	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2 II
Min	2.2	2.2	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.1	2.0	2.0	2.1	2.2	2.0	2.0	2.0	2.1	2.0	1.9	2.0	2.1	2.5	2.2	2.1	2.1	2.0	2.0	2.1	2.0	2.0	1.9 III

These reports are printed, signed and filed monthly by CC staff as part of EVM compliance

Alarm stages:

After 15mins if unresolved, notification goes to the regional CC technician and EPI manager



notification goes to provincial CC technician

After 15mins if unresolved, notification goes to the national CC manager and EPI director

Example of alarm episode:1

ALARM NUMBER: FT600H

Alarm status: Resolved

Alarm details

Company:	Afghanistan	Alarm condition:	8 Rear Left Temperature > -10°C
Region:	Kabul	Delay:	02:00:00
Site:	SN: 4145 WICR D/E L2 - National	Start:	2021-11-17 05:29:24 (+04:30)
Asset:	WICR/FR E - L2 - National	End:	2021-11-17 09:11:37 (+04:30)
Sensor:	8 Rear Left Temperature	Duration:	03:42:13
Unit SN:	4145	Alarm acknowledged:	No

Recipients

Stage 1

Stage notification sent at 2021-11-17 07:30:44

Sent via SMS to:	Mohammad Nader(93788000148)
Sent via Email to:	Mohammad Nader(eng_nader60@yahoo.com)
Sent via APP to:	No recipients
Acknowledgement required:	☐
Delay from Stage 1 to 2:	00:15:00

Stage 2

Stage notification sent at 2021-11-17 07:45:02

Stage 3

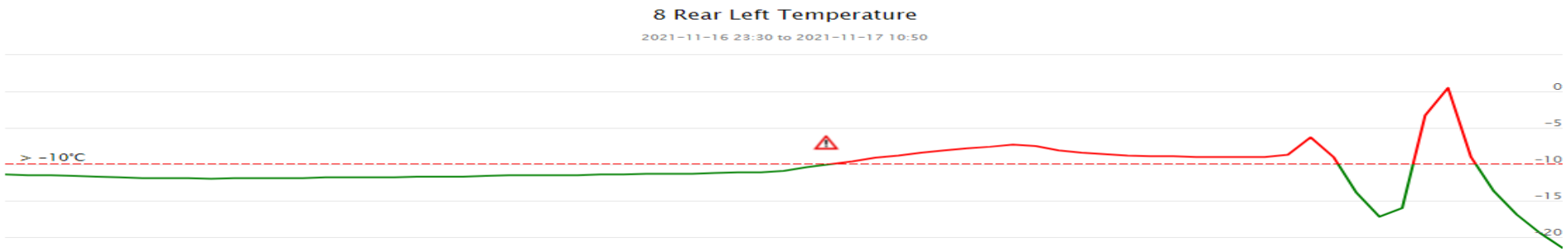
Stage notification sent at 2021-11-17 08:00:01

Sent via SMS to:	Dr Nazary EPI Managr (93797223009)
Sent via Email to:	Dr Nazary EPI Managr (nationalepi@gmail.com)
Sent via APP to:	No recipients
Acknowledgement required:	☐

Acknowledgements

No acknowledgements received

Graph



Example of alarm episode:2

Units Offline:

1

Afghanistan

Serial Number	Region	Site	Latest Reading	Last Upload	Missed Uploads
4197	Gardez	WICR B/C	2021-05-13 23:20:00 53 hours ago	2021-05-13 23:22:31 3 day(s) ago	> 50 (uploads every hour)

NOTE:
The above units are considered offline as they *(a) have missed at least 2 consecutive uploads; (b) have not uploaded any data within the last 25 hours; or (c) has recorded no new readings within the last 25 hours* as at **2021-05-16 05:00:01 (GMT +00:00)**.

WHAT YOU CAN TRY: *(on ICE3 devices only)*

- **Force upload:** Press and hold the blue (spanner / wrench) button for 5 seconds.
- **Reboot the device:**
  Follow the below steps to reboot the device:
  1. **Power off:** Press and hold both the red (mute) and blue (spanner / wrench) buttons at the same time for 5 seconds. The device should turn off.
  2. **Wait 10 minutes:** Leave the device powered off for 10 minutes.
  3. **Power on:** Power the device back on by again pressing and holding both the red (mute) and blue (spanner / wrench) buttons at the same time for 5 seconds. The device should turn on and display two arrows on the screen.
  4. **Check if issue is resolved:** Log onto https://p3.beyondwireless.co.za and check if the unit has started to upload data again by running a *Data Table* report.

Regards,
Cold-Cloud Team

Action taken by the national team to resolve the alarm

beyond

Email: support@beyondwireless.co.za

Tel: +27 (0)11 243-2960

You are receiving this mail because you were loaded as a recipient on the Cold-Cloud system.
*If you are not affiliated with **Beyond Wireless Technology**, kindly **delete this email** and inform Cold-Cloud Support.*

The readings reflected in this report includes all readings that had been uploaded successfully
to the Cold-Cloud system at 2021-05-16 05:00:01 (GMT +00:00) when the report was generated.

Ershad Faizi <e506f900@gmail.com> Sun, May 16, 2021 at 9:19 PM
To: mateen husainkhil <vsfmateen@yahoo.com>
Cc: Haji Habib Mohammad Mohmand <mohmand0786@gmail.com>, Remt Paktia <remtpaktia@gmail.com>, Dastagger Nazary <dastagger_nazary@yahoo.com>, eng_nader60 <eng_nader60@yahoo.com>, Mohammad Wazir Sadiqi <mwsadiqi@unicef.org>

Dear haji Sb.
The mentioned WIC ICE3 device don't upload the data to the site.
We will follow the issues with paktai REMT colleagues to solve the problem.
Regards
[Quoted text hidden]

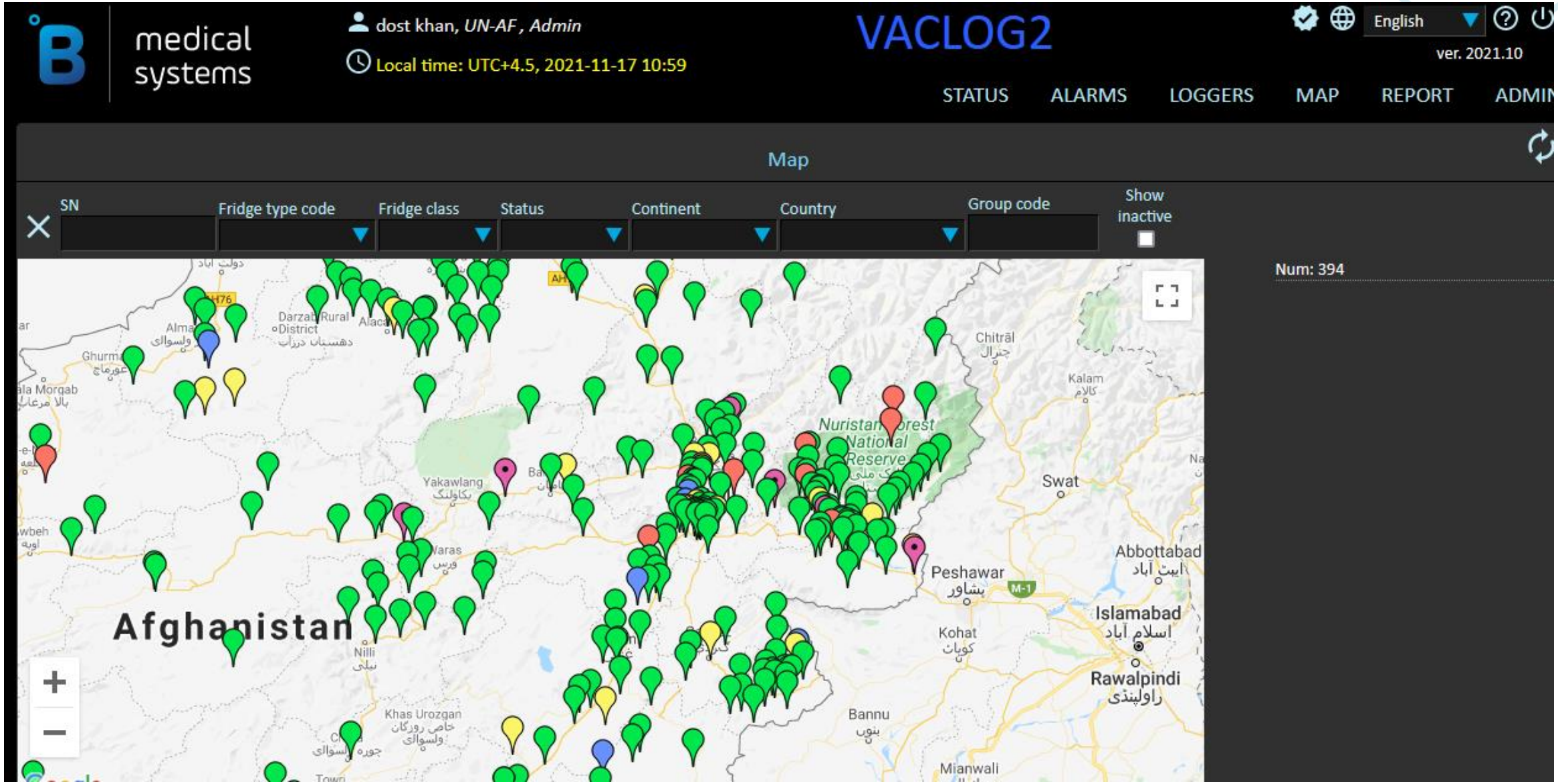
Ershad Faizi <e506f900@gmail.com> Mon, May 17, 2021 at 9:58 AM
To: mateen husainkhil <vsfmateen@yahoo.com>, Mohammad Wazir Sadiqi <mwsadiqi@unicef.org>
Cc: Haji Habib Mohammad Mohmand <mohmand0786@gmail.com>, Remt Paktia <remtpaktia@gmail.com>, Dastagger Nazary <dastagger_nazary@yahoo.com>, eng_nader60 <eng_nader60@yahoo.com>, Ranjit Dhiman <rdhiman@unicef.org>

Dear Haji sb and Dr Sb Wazir.
As discussed with the Paktai technician, the mentioned WIC faced leakage of the gas and they are trying to solve the problem with the support of local technicians, and we are waiting for them. If they can not be repaired, we need to send national technicians to solve the problems.
Regards.

Eng.Ershad Faizi
Cold Chain Consultant,National EPI, Ministry of Public Health.
Mobil:+93 (0) 789630082
Email:e506f900@gmail.com

Integrated RTM system with B-Medical SDDs

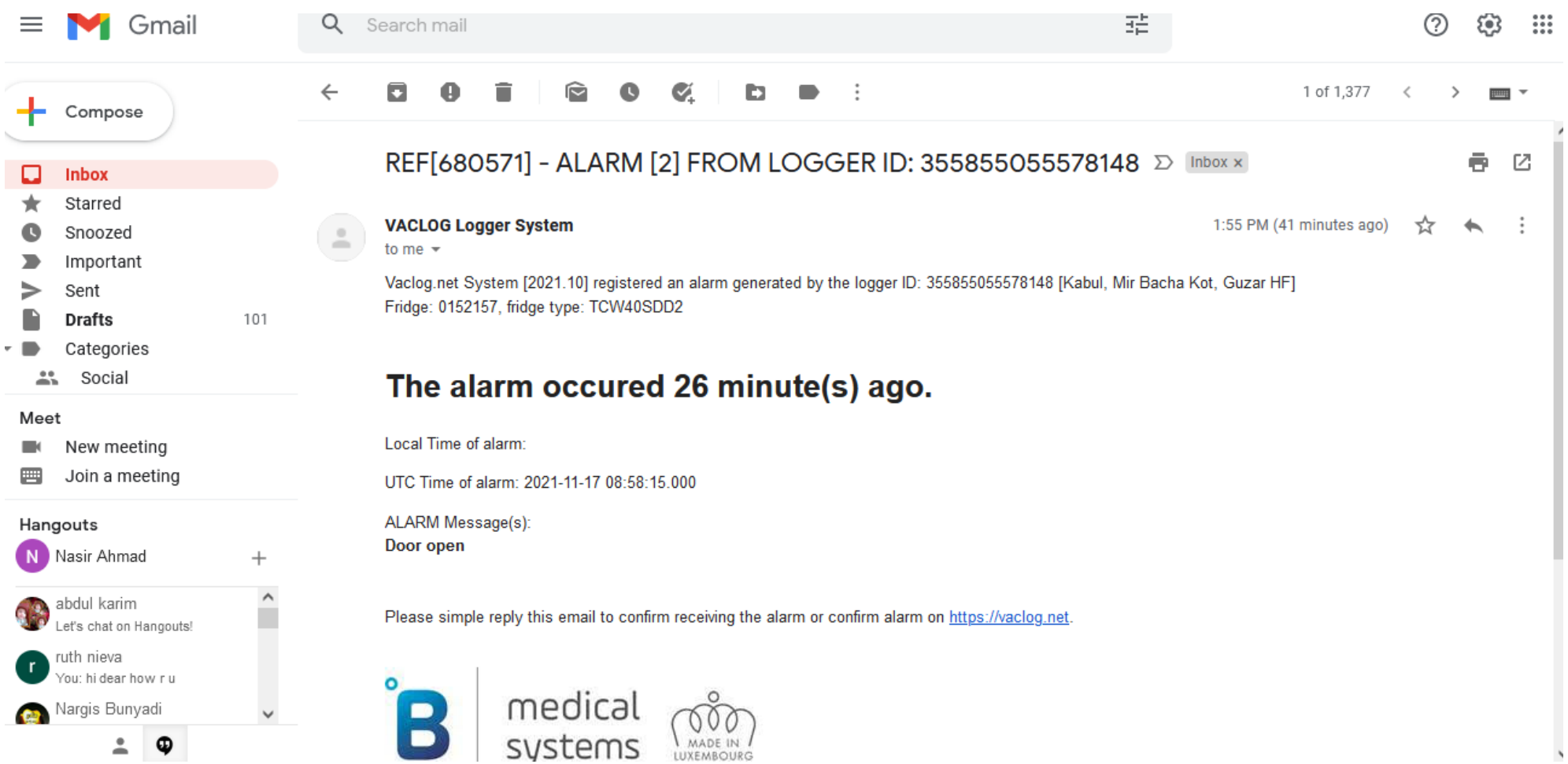
Remote monitoring of SDDs using the integrated RTMDs with B Medical



Using RTM to track commissioning of SDDs under delinking methodology

- When the installation of SDD is completed, Requisite data of the installed SDD is entered to B Medical system portal instantly.
- The temperature records of the newly installed SDD is monitored during the cooling down period.
- The B. Medical TM system accepts up to 3 email ID to communicate the alerts
  - lower level (as most HF staff do not have email ID so provincial email is added
  - Regional level
  - National level
- In cases of temperature excursion, alarms are send to all 3 integrated emails and all levels are mobilized to take action immediately

Example 1 of an alarm sent by B. Medical TMS



Example 2 of an alarm and associated actions

From: Nasir Ahmad Zaland <njan085@gmail.com>
Sent: Sunday, November 7, 2021 11:01 AM
To: Mujeeb Qurishi <mujeeb@qurishigroup.com>; mateen husainkhil (vsfmateen@yahoo.com) <vsfmateen@yahoo.com>; Mohammad Wazir Sadiqi <mwsadiqi@unicef.org>
Subject: Fwd: REF[667130] - ALARM [3] FROM LOGGER ID: 355855054529688

---------- Forwarded message ---------
From: **VACLOG Logger System** <alarm@vaclog2.net>
Date: Sat, 6 Nov 2021, 7:20 pm
Subject: REF[667130] - ALARM [3] FROM LOGGER ID: 355855054529688
To: <njan085@gmail.com>

Vaclog.net System [2021.08] registered an alarm generated by the logger ID: 355855054529688 [Maidan wardak Karimdad SHC]
Fridge: 9432602, fridge type: TCW40SDD2

The alarm occured 1 hour(s), 16 minute(s) ago.

Local Time of alarm:

UTC Time of alarm: 2021-11-06 13:33:12.000

ALARM Message(s):
Internal temperature low

From: Nasir Ahmad Zaland <njan085@gmail.com>
Sent: Tuesday, September 14, 2021 4:15 PM
To: bamyanepicct@gmail.com
Cc: Farishta Amaj <fariamaj@gmail.com>; Mohammad Wazir Sadiqi <mwsadiqi@unicef.org>
Subject: Fwd: REF[605190] - ALARM [3] FROM LOGGER ID: 355855055193856

Dear Bamyan Team:
Please find the below temperature alarm from Sahag HF, the Vaclog reports low temperature, we need to confirm through 30DTR, please enquire the Health facility vaccinators about the 30DTR status and alarms.

Many thanks and kind regards

NASIR AHMAD ZALAND
Field and deployment Coordinator, CCEOP ——— National Cold Chain NEPI, MoPH, Afghanistan
Phone: +93 773550501
Mobile: +93744 037121
Email: njan085@gmail.com
Website: www.moph.gov.af

---------- Forwarded message ---------
From: **VACLOG Logger System** <alarm@vaclog2.net>
Date: Tue, Sep 14, 2021 at 4:10 PM
Subject: REF[605190] - ALARM [3] FROM LOGGER ID: 355855055193856
To: <njan085@gmail.com>

Vaclog.net System [2021.08] registered an alarm generated by the logger ID: 355855055193856 [Bamyan, Yakawlang, Sachag HF]
Fridge: 0152181, fridge type: TCW40SDD2

The alarm occured 1 hour(s), 21 minute(s) ago.

Challenges of the B. Medical RTM system

- The system is supported by a sim-card in the SDD data logger
- To communicate with the server, the GMS network availability is required so in areas with no mobile network services, the data loggers can not communicate to the portal.
- The B medical RTM system does not support text messaging for alarm episodes, so, alarms are communicated only through emails to designated CC staff in areas where there is GMS network
- No comprehensive practical training of cold chain technicians on SDD maintenance organized, and the B medical agent in Afghanistan are very slow in responding to reported temperature excursions of SDDs.

Conclusion

- Using RTM devices helps us in following:
  - Evidence based commissioning of ODP
  - Documented recording of temperature for EVM compliance
  - Targeted intervention to save vaccine and fridge by timely monitoring and curative actions
  - Feedback to manufacturers and PQS secretariat on performance of fridges and models

Q+A !

Jacobus Schoevers, UNICEF
Jalia Nanfuka, GAVI
Ranjit Dhiman, UNICEF
Bonaventura Nestory, IVD/Tanzania
Abdul Mateen Husainkhil, National EPI/MoPH Afghanistan
Dr Mohammed Wazir Sadiqi, UNICEF Afghanistan
Nwajide Chidiebele Ifeoma, UNICEF Afghanistan