
GLOBAL
HEALTH
SUPPLY CHAIN SUMMIT

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Nexleaf Analytics

Practices for an Effective Cold Chain Maintenance System

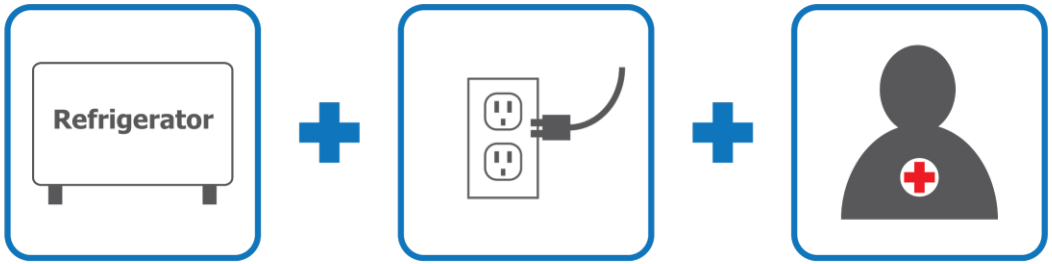
Lack of Visibility into Cold Chain Conditions

75%

OF VACCINES DAMAGED BY FREEZING

Why Do Fridges Fail?

UNDERSTANDING OF FAILURES SHOULD DRIVE MAINTENANCE STRATEGIES



Equipment & Installation | **Power** | **People & Processes**

20% OF FAILURES CAUSED BY POWER OUTAGES

14% non-functional and 41% poorly performing CCE

Common Questions and Gaps in Cold Chain Maintenance

- How many CCE to procure?
- How many sites require solar CCE?
- Is the CCE inventory up-to-date?
- How many spare parts and tools to procure?
- How many technicians/technician hours needed?
- Do the technicians have the essential training?
- How much funding needed for facility maintenance visits? (transport, per-diem)
- Where should new CCE be placed (i.e. if you have to prioritize, and you only have limited number of CCE, where do they go)
- Is the new CCE failing because of an equipment flaw or is it due to poor installation?

Working together to Improve CCE Maintenance

- Cold chain technician training and capacity building
- CCE performance assessments to make informed CCE and spare parts procurement decisions (CCEOP, HSS)
- Cold chain equipment inventory tracking
- Continuous temperature monitoring
- Effective information flow around cold chain failures and resources needed from the facilities to the national level

Dianna Lourenco
VillageReach

Temperature Monitoring and Maintenance Planning in **Mozambique**

Cold Chain Maintenance Challenges in Mozambique

- Lack of visibility into temperature monitoring practices at the facilities
- Lack of resources and funds for technicians to visit the facilities
- Cold chain equipment failure due to poor management and maintenance

Fridge Uptime Improvement: Evaluation of Different Temperature Monitoring Practices

88%
REDUCTION
IN FREEZING
among facilities with remote temperature monitoring

Figure 4: **Total monthly duration of cold and freezing alarms (facility average).**

Real-time DATA → ACTION

Nurse: “It was only when I received the SMS alert that I realized the fridge was unplugged accidently when clinic was being painted”.

Technician: “Before, there was lack of information about the fridges. Now information about any fridge problem facilitates a quicker intervention by giving us an initial diagnosis.”

Manager: “While on distribution, the EPI personnel received high temperature alerts due to power outage. They communicated with another colleague in the province to turn on the generator to prevent loss of vaccines”.

RTM

Health Facility Personnel

Technician

Provincial Manager

SMS Alerts

SMS Alerts
Monthly Reports
Dashboard

Why Fridges Fail: CCE Performance Data to Inform Maintenance

While the RTM group in the RCT evaluation achieved higher uptime, **even some fridges with SMS alerts enabled did not achieve 95% uptime**[1].

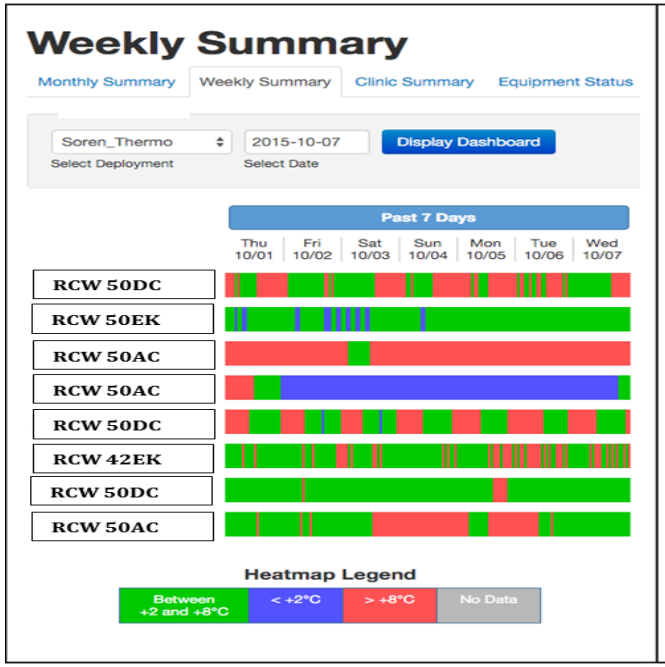
Nexleaf and VillageReach developed a follow-up assessment focused on repair and maintenance to:

1) get definitive information on specific reasons for fridge failures;
2) document the diagnoses, tools and spare parts that fix these failures;
3) define how RTM data can be used to diagnose failing fridges prior to a facility visit and/or remotely enable repairs by calling clinics on the phone to take simple actions.

[1] **fridge uptime** defined as the amount of time spent between 2˚ C to 8˚ C over a given time period

RTM Data Enables Remote Fixes

BEFORE



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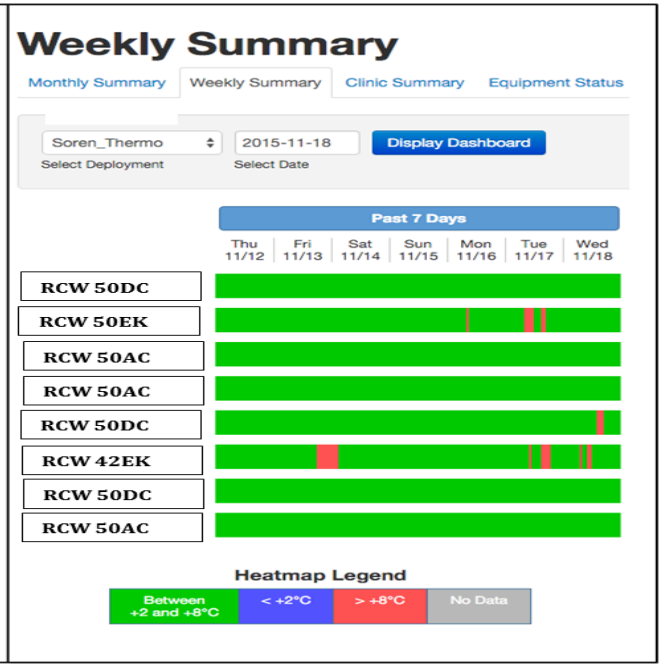


Data

Remote Diagnosis

of fridge failure via **web dashboard**

Action

Phone Call

to **on-site nurse** to adjust thermostat

Result

90%

fridge uptime after remote fix (vs. 70% before)

CCE Performance Data Strengthens Cold Chain Management

NATIONAL MOH

- National Procurement and Maintenance Strategy

DISTRICT/PROVINCIAL MOH

- Maintenance Planning and Information Flow

TECHNICIAN

- Remote Fridge Repairs and Informed Facility Visits

FACILITY STAFF

- Temperature Alarms and Preventive Care

Learnings & Recommendations

- It is important for nurses and managers to be trained with **Standard Operating Procedures (SOPs)** on how to respond to SMS alerts on temperature excursions and power outages

- Alerts and reports on CCE performance alone is not sufficient for improving cold chain maintenance. Through an effective information flow, **data availability** should identify the gaps and **inform budget** and **procurement** planning at the provincial and national level

- Data from RTM system should be integrated into the **daily practices** of nurses and maintenance technicians to ensure **sustainability**

- **Refresher trainings** are needed to ensure new nurses and managers know how to respond to alerts from an RTM system

CCE Performance Data to Inform the Maintenance Strategy

- MOH saves time, money and resources by **remotely diagnosing and fixing** some of the simple cold chain failures, **using the RTM dashboard.**
- Data on **how different CCE models perform** can enable the MOH to calculate the average annual cost per model and make evidence-based procurement decisions.
- Performance data can ensure that **new equipment** are installed and functioning properly.
- Technicians can **prioritize facility visits** to target the worst performing fridges, enabling efficient use of limited resources.

Next Steps

- Nexleaf and VillageReach have provided reports on existing CCE performance to **inform the upcoming CCE procurement, placement and maintenance strategy for the** application to the **Gavi Cold Chain Equipment Optimization Platform (CCEOP)**

- Ministry of Health would like full cold chain visibility throughout Mozambique by considering **remote temperature monitoring scale-up**

- VillageReach and UNICEF are collaborating with the MoH to conduct a nationwide **cold chain equipment inventory**

- VillageReach is putting together a **preventive maintenance guideline** for CCE in the health facilities

Nassor Mohamed
John Snow Inc.

Practices for an Effective Cold Chain Maintenance System in Tanzania

CHALLENGES FOR EFFECTIVE COLD CHAIN MAINTENANCE IN TANZANIA

- ✓ Inadequate Capacity to Repair & Maintain CCE
- ✓ Insufficient Funds allocated for LPG and
- ✓ Electricity to run Refrigerators
- ✓ Real-time CCE functional status reports

WHAT HAS BEEN DONE BY JSI/MCSP TO ADDRESS SOME OF THE CHALLENGES

- ✓ JSI in collaboration with CHAI Trained 2 technician from each Region
- ✓ JSI/MCSP built capacity of the Districts (in 13 focused Districts) to plan for immunization operational cost (including LPG and electricity)

JSI/MCSP WORK IN PROGRESS

- ✓ JSI/MCSP will continue to build capacity of other Districts in planning for immunization operational cost (including LPG and electricity bills)
- ✓ Through VIMS, JSI and other partners work to ensure availability of real-time functional status of the CCE and that will help to ensure timely repair and maintenance.

Conclusions and Lessons Learned

- ✓ Having technician who can fix the CCE at the lower level helped to reduce cost and time for repair and maintenance.
- ✓ Operational cost for maintaining cold chain need to be well planned and budget from the lower level of Health Facilities

Lilian Babyebonela

Clinton Health Access Initiative (Tanzania)
Vaccine Program

Cold Chain Maintenance and Repair in Tanzania

CHAI Key Areas for Current Support

Organization and Structure of Maintenance System

Preventive maintenance

- Planned preventative care(Facility staff at all levels, monthly
- Regular checks (technician, yearly)

Corrective maintenance (Repairs)

- Minor Repair of broken devices including replacement of spare parts(Trained DIVO/RIVO)
- Repair of broken devices including replacement of spare parts(technician)

- 4 qualified technicians at National level for supporting Regions and Councils Repairs
- Each Region has 2 technicians trained on cold chain equipment maintenance and repair and 33 District technicians in 5 regions

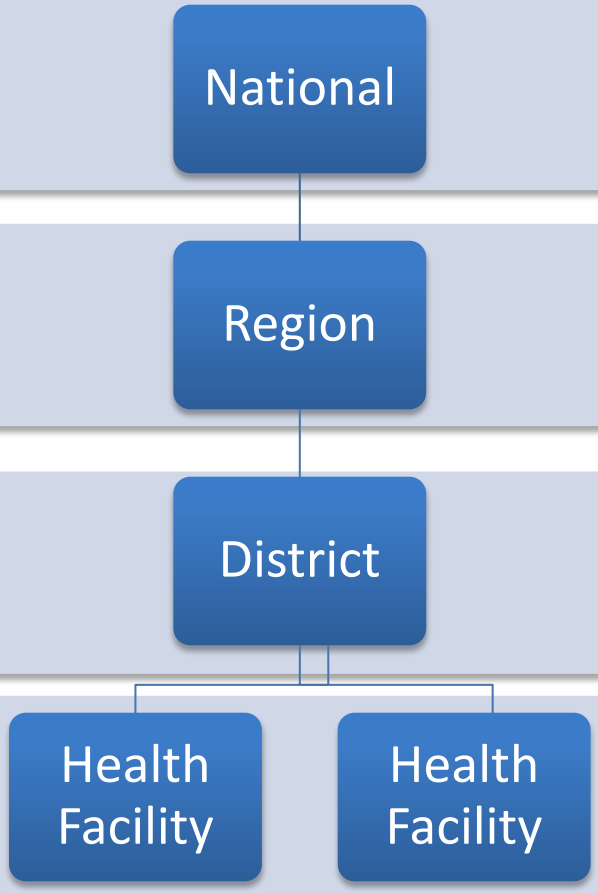
Repair and Maintenance Information Flow Process

Planning and organizing support on repairs

RIVO updates status at Regional levels and get alerts on the status of Sub Regional levels

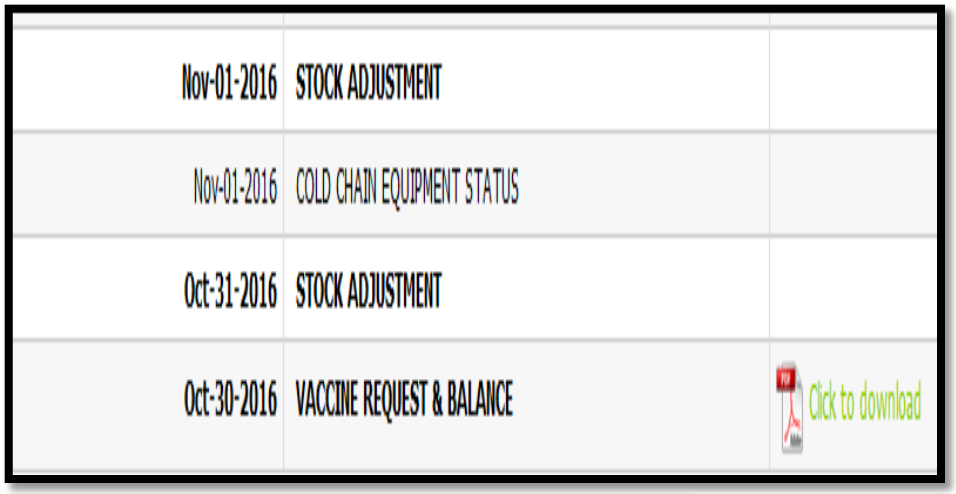
DIVO update **Web SMT/Cold Chain Inventory Tool** on functionality status of CCE at District and Facility level

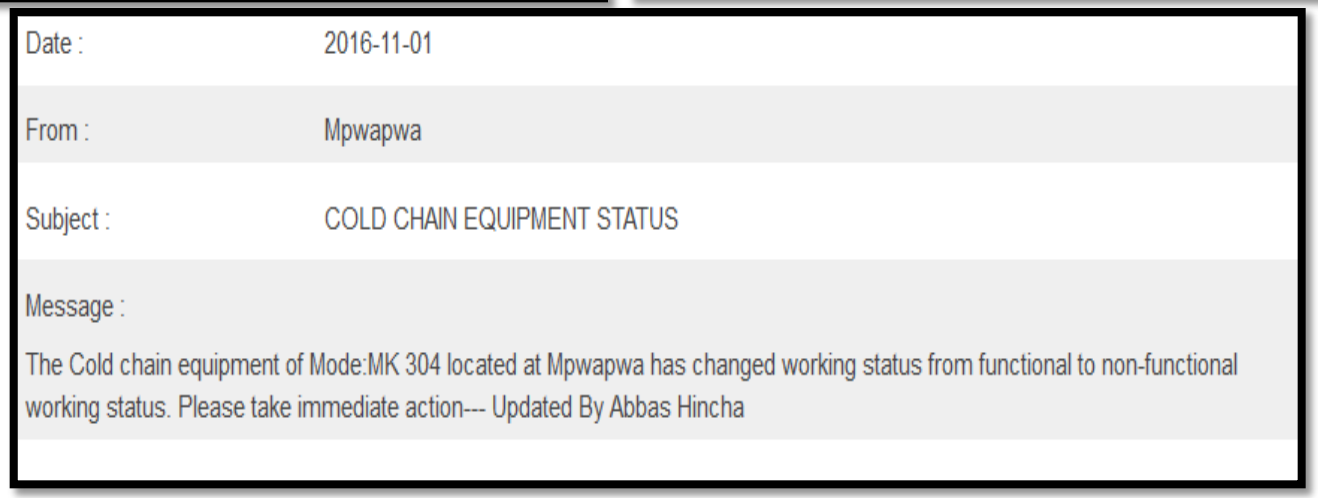
Reports status of the Equipment through monthly summary form



- Easy computation of the amount of vaccines and other related materials to be supplied.
- The tool can tell the user to know the status of all the products available.
- The system can easily generate order to the higher level

Progress on Repairs Conducted

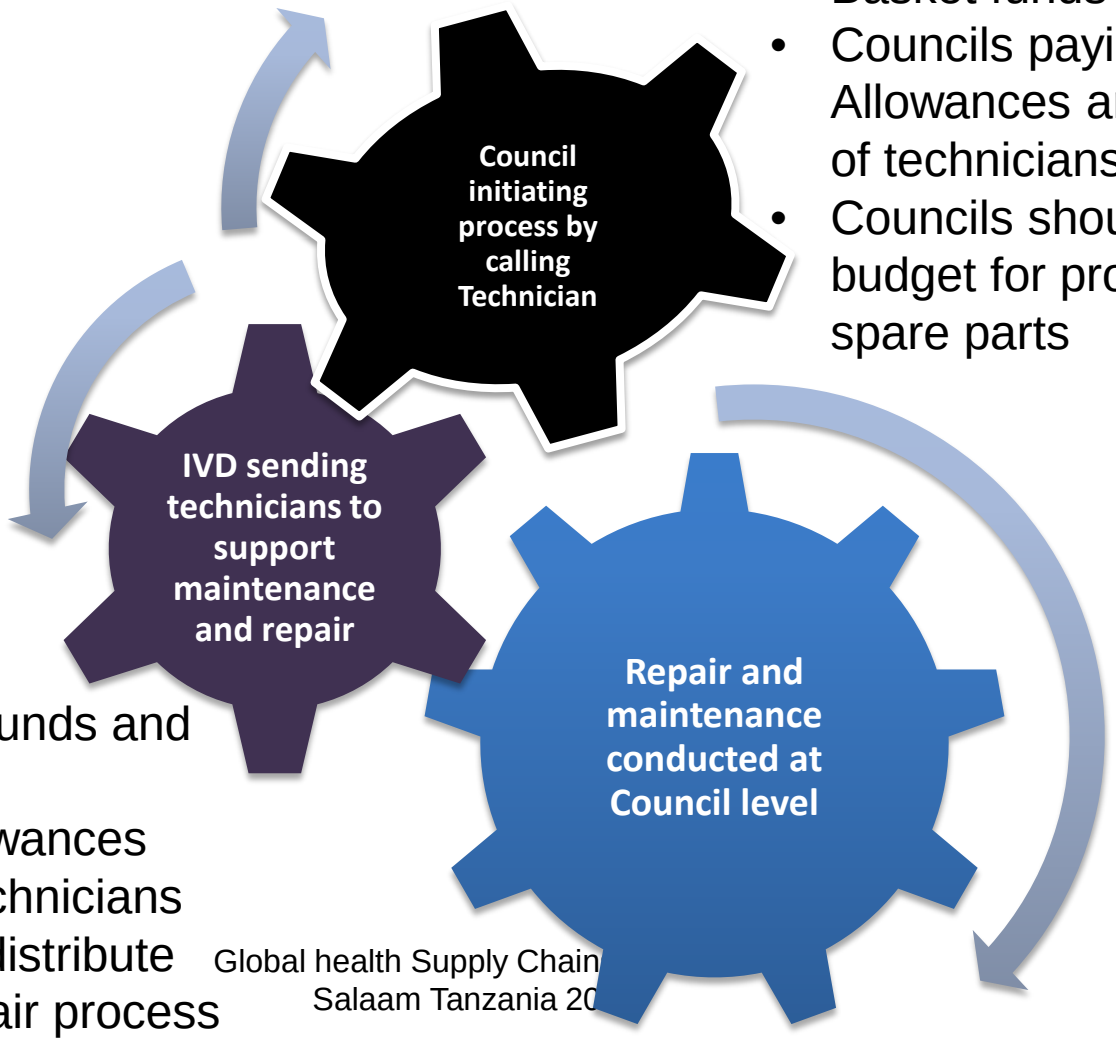




Process to Request Technicians for Repair and Maintenance

Source of funds

- Basket funds
- Councils paying for Allowances and transport of technicians
- Councils should include budget for procurement of spare parts



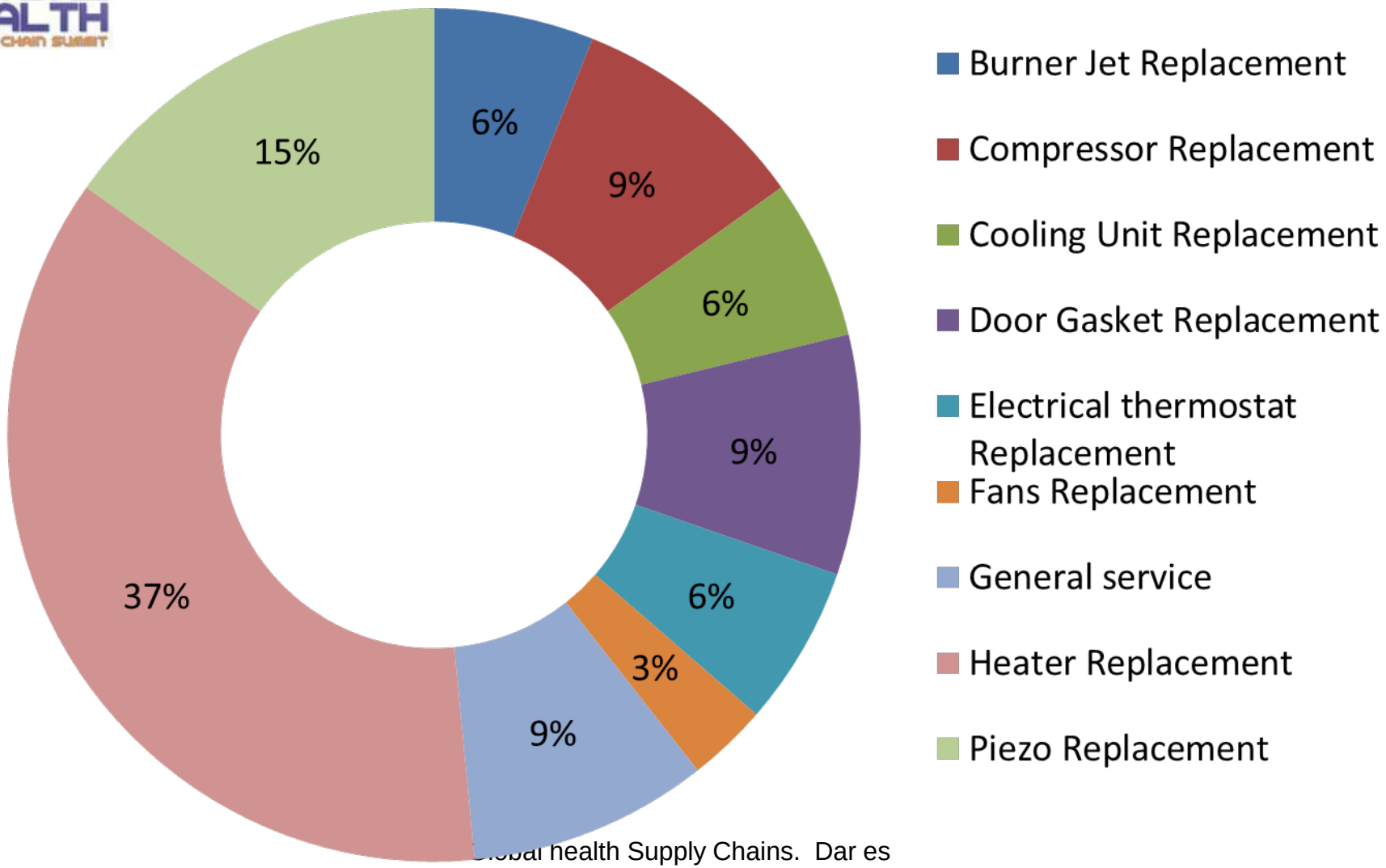
Source of funds

- Mobilized internal funds and from Partners
- IVD paying for allowances and transport of technicians
- IVD procures and distribute spare parts for repair process

Progress on Repairs Conducted

- Based on the information obtained from the web based CCIT on the equipment that needs maintenance and repair, workshop were planned in 2015
  - A total of 538 refrigerators repaired in 18 regions, this resulted into reduction of sickness rate from 35.5% in 2013 at facility level to less than 10% in 2015
  - IVD and Councils collaboratively organized and conducted maintenances and repair in Tabora, Shinyanga, Singida, Kigoma, Kagera, Mara, Mwanza, Manyara, Geita, Lindi, Tanga, Mtwara, Arusha, Njombe, Katavi, Rukwa, Iringa and Ruvuma
  - The scope of work included maintenance of WICR and repair of broken refrigerators and freezers

Type of Maintenance and Spare Parts Used



Best Practices

Effective Planning

- **Web Cold Chain Inventory Tool**

Capacity Building

- **Cold Chain Technicians trained at Regional and District level**

Ownership

- Some districts have included **Repair and Maintenance activity and spare parts procurement in their 2016/2017 CCHPs (Council Health Plans)**

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