TANZANIA
EVM assessment
25 MAY – 12 JUNE 2015

Findings and recommendations of
The assessment team

12 June 2015

Note: Double click on the footer strip. Delete all logos except the one that applies to the organization supporting the assessment – e.g. WHO
Abstract

This report presents the findings of an Effective Vaccine Management (EVM) assessment of Tanzania which was carried out in May/June 2015. One hundred and seventeen (117) storage and health facilities were visited and their records were assessed for the 12 month period 01 June 2014 to 31 May 2015.

An EVM assessment provides a systematic analysis of strengths and weaknesses across the supply chain; it is part of the EVM process which is designed to embed good vaccine storage and distribution practices.

Include a short paragraph summarizing the most important strengths and weaknesses identified, the recommendations made to address those weaknesses, and any strategic recommendations.
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Executive summary

With the rising cost of vaccines and the greater storage capacity now required at every level of the cold chain, countries must maintain lower stock levels, reduce wastage, accurately forecast vaccine requirements, and prevent equipment break-downs. This requires a consistently high standard of supply chain management, which can only be achieved if all of the links in the supply chain comply with current good storage and distribution practices. The EVM initiative provides the materials needed to monitor and assess vaccine supply chains and to help countries to improve their supply chain performance.

An EVM assessment identifies the key strengths and weaknesses in nine different areas of vaccine management at each of four levels of the vaccine supply chain, and makes recommendations to address any weaknesses. The four supply chain levels are:

- **PR** Primary level
- **SN** Sub-national level
- **LD** Lowest distribution level
- **SP** Service point level

The nine areas (criteria) of vaccine management are:

- **E1** Vaccine & commodity arrival procedures
- **E2** Vaccine storage temperatures
- **E3** Cold & dry storage capacity
- **E4** Buildings, CC equipment & transport
- **E5** Maintenance
- **E6** Stock management
- **E7** Effective distribution
- **E8** Good vaccine management practices
- **E9** Information systems and supportive management functions

A systematic sample of vaccine storage facilities was surveyed and the data is collated and assessed by supply chain level. Random site selection was done using the standard WHO EVM Site selection tool. Twenty-eight (28) districts representing 16% of one hundred and sixty eight (168) districts in the country were selected randomly to give the result of 90% confidence level and +/- 15% precision. Subsequently, the 28 districts fell into all 22 regions. A standard questionnaire generated from the WHO/EVM web-site (the full assessment EVM Version 2) was used. Enumerators where trained for 3 days with field practical work in between to ensure their capability during field work. The team then reconvened for 2 days for data cleaning, analysis and draft report writing.

Findings of the effective vaccine management assessment reveal that the immunisation programme in Tanzania is viable. The country managed to meet the EVM standard of 80% for 8 of the 9 indicators except for E1 that deals with vaccine arrival procedures at Central level. There is an overall 2% improvement from a similar assessment conducted 2012. This increase very commendable considering that the country in view the fact that once in the 80% range, it becomes very difficult to improve performance a degree let alone sustaining the previous level. However, there are some indicators that declined from the 2012 performance, notable of which is E1 dealing vaccine arrival processes.

The two tables below summarize the country performance when data for all levels is put together. Details of individual level performance are contained in the main report.
Comparison between 2012 and 2015 EVMA performance

2015 EVMA Performance

<table>
<thead>
<tr>
<th>Criteria scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
</tr>
<tr>
<td>43%</td>
</tr>
</tbody>
</table>

Strengths

The programme is anchored on a well-defined operational health system with four levels; the Central, the Regional, the District and the Service Point. One other notable plus is that Government is funding the procurement of all traditional vaccines from own resources and also co-financing the GAVI funded new and underused vaccines. The country has all weather partners that are readily available to offer technical, material and financial support in the immunisation programme including vaccine management. Some of them are fund procurement of cold chain equipment and day to management and development of the vaccine supply chain.

There is generally adequate and well maintained cold chain infrastructure at all levels and this includes buildings and cold chain equipment. While available transport capacity to carry vaccine consignments to lower level facilities was found to be adequate, this finding should not be regarded as conclusive because the assessment only looked at available volume versus required without necessarily going into other details which are a subject transport study. On the majority of cases, planned preventive maintenance schedules are available and being followed. The country has introduced a web-based vaccine management system that facilitates ordering of vaccines between national and sub-national levels. The national level can access sub-national level stores data at any given time to monitor stock movement and to take any corrective action where needed.
country has a standard data collection tools such as the vaccine and supplies ledger book for use at service point and the temperature record chart for use at all level.

The country has adopted use of new technologies in vaccine management. They are using the fridge tag, the freeze tag and the VVM throughout the country. The country has introduced the remote temperature monitoring of all cold rooms except in Zanzibar where installation is still in progress. The Multi dose vial policy has been adopted. Health workers are proficient on all these new technologies.

The noted success in effective vaccine management could only be achieved with a dedicated workforce. The assessment noted that health workers are committed and well knowledgeable to their on duty especially the immunisation programme.

**Weaknesses**

However, there are some noted weaknesses in the system.

At national level, vaccine lot release certificates are not available for most vaccine batch numbers. Product arrival forms (PAR) for injection safety materials are not being completed and submitted to UNICEF as confirmation that supplies have been received in good condition. There is no written contingency plan to deal with unexpected vaccine arrivals. A temperature mapping study has not been conducted for all cold rooms. Data generated by data loggers on refrigerated truck is not being downloaded and archived. There is no evidence that supportive supervision is being provided to Primary stores.

Zanzibar is classified as Central Store yet it is not receiving supplies direct from international suppliers. This affected their performance during the assessment. While cold chain capacity at the Zanzibar Central Vaccine Stores is adequate for the current vaccine schedule, it is inadequate for the impending new vaccines, IPV let alone the HPV vaccine.

Weaknesses noted at the other levels include unavailability of written planned preventive maintenance schedules for buildings and equipment at some facilities; mismatching of physical quantities of freeze dried vaccines and their diluents as well as records; unavailability of acceptable standard operating procedures (SOPs) at all level except the Mainland Central Medical Stores Department; inadequate vaccine storage capacity at some regional and district vaccine stores and some service points.

**Key Recommendations**

- Lot release certificates should accompany all vaccine batches and copies filed together VARs
- Products Arrival Forms should be completed for each consignment injection safety materials and copies submitted to UNICEF
- A formal contingency plan should be developed to deal with unexpected vaccine arrivals
- Zanzibar status as Central Store should be reclassified if they no longer receive vaccines direct from manufactures.
- A temperature mapping study should be conducted for each cold room, a reports produced and archived.
- Data generated by temperature loggers on refrigerated vehicles should be downloaded periodically and filed for future reference.
- Standard operating procedures for key vaccine management areas should be developed and issued to all vaccine stores. These should be based on generic WHO EVM SOPs.
- Zanzibar CVS cold chain capacity to be increased to meet demand for new vaccines – IPV and HPV
**Acronyms**

*Note:* Adapt as necessary and add country-specific vaccine acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>°C</td>
<td>degrees centigrade</td>
</tr>
<tr>
<td>AD</td>
<td>Auto-disable (syringe)</td>
</tr>
<tr>
<td>BCG</td>
<td>bacille Calmette-Guérin (tuberculosis vaccine)</td>
</tr>
<tr>
<td>CC</td>
<td>Cold Chain</td>
</tr>
<tr>
<td>DTP</td>
<td>Diphtheria, Tetanus and Pertussis vaccine</td>
</tr>
<tr>
<td>EEFO</td>
<td>Earliest-Expiry-First-Out</td>
</tr>
<tr>
<td>EPI</td>
<td>Expanded Programme on Immunisation</td>
</tr>
<tr>
<td>EVM</td>
<td>Effective Vaccine Management</td>
</tr>
<tr>
<td>FIC</td>
<td>Fully Immunized Child</td>
</tr>
<tr>
<td>GAVI</td>
<td>Global Alliance for Vaccines and Immunisation</td>
</tr>
<tr>
<td>HepB</td>
<td>Hepatitis B vaccine</td>
</tr>
<tr>
<td>Hib</td>
<td><em>Haemophilus influenzae</em> b</td>
</tr>
<tr>
<td>ILR</td>
<td>Ice-lined refrigerator</td>
</tr>
<tr>
<td>JE</td>
<td>Japanese encephalitis vaccine</td>
</tr>
<tr>
<td>LD</td>
<td>Lowest delivery level store</td>
</tr>
<tr>
<td>MoH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>OPV</td>
<td>Oral Polio Vaccine</td>
</tr>
<tr>
<td>PR</td>
<td>Primary store</td>
</tr>
<tr>
<td>SN</td>
<td>Sub-national store</td>
</tr>
<tr>
<td>SOP</td>
<td>Standard Operating Procedure</td>
</tr>
<tr>
<td>SP</td>
<td>Service point (health facility)</td>
</tr>
<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
</tr>
<tr>
<td>VAR</td>
<td>Vaccine Arrival Report</td>
</tr>
<tr>
<td>VVM</td>
<td>Vaccine Vial Monitor</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
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</table>
Acknowledgements

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The team also extends its deep appreciation for the active involvement of Dr. Dafrossa Lyimo – IVD Programme Manager and her whole IVD team throughout the assessment mission, and their valuable support.
Terms of reference

The assessment was set to identify strengths and weaknesses in the vaccine supply chain and to receive and implement recommendations to improve the vaccine supply chain, the Ministry of Health of Tanzania requested WHO to conduct an EVM assessment of the country’s entire vaccine supply chain.

The assessment team’s terms of reference were to:

- support the preparation of the EVM assessment, including site selection and training of national and sub-national EPI/IVD staff for field visits and data collection;
- conduct the assessment of the Central Vaccine Stores, sub-national stores and health facilities at each level of the supply chain, as required;
- facilitate and supervise the collection, review, cleaning and analysis of the data from the field visits;
- present the results to the MOH, partners and the ICC;
- submit a final report including the EVM assessment findings and recommendations for each level;
- support the development of an improvement plan in collaboration with MOH and partners

Related documents

The following spreadsheets and documents were used in the preparation of this report:

Excel workbooks:
- EVM Site Selection Tool
- EVM Assistant tool
- Stock Management tool
- EVM Analysis tool.

Documents:
- The 2012 EVMA report
- 2012 EVMA improvement plan
- Comprehensive Multi-Year Plan
- Cold Chain Inventory
- National immunization schedule
- SOPs at Medical Stores Department
- SOP for remote temperature monitoring devices
- The 2014 Temperature Monitoring study of the Vaccine Cold Chain System in Tanzania
- Immunisation Training Manual
- All EVM Assessment Excel files filled by team members
## Assessment team

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<th>Name</th>
<th>Organisation</th>
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</thead>
<tbody>
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</tr>
</tbody>
</table>
1. Introduction

1.1 Introduction to EVM

The EVM process is first and foremost about embedding **good storage and distribution practices**. The package has been designed so that it can be used both as an **assessment tool** for the systematic analysis of strengths and weaknesses across the supply chain but also as a **supervisory aid** to monitor and support the long-term progress of individual facilities.

Good storage and good distribution practices for temperature-controlled pharmaceuticals and other products are increasingly the focus of national and international legislative and regulatory control in both developed and developing countries. EVM follows the well-established principles of **quality management** used throughout the industrialised world – for example the ISO 9000 series of quality standards.

EVM is designed to help countries to develop strength-in-depth by building a culture of quality based on a structured approach to supply chain management, monitoring and record-keeping. Figure 1 illustrates the hierarchy of documentation needed to support this approach. EVM covers the yellow shaded area of the diagram.

**Figure 1 – Quality Management documentation**

The EVM tool is used to assess the quality and sufficiency of the seven component elements of an effective supply chain: buildings; storage and transport capacity; cold chain equipment; vehicles; repairs and maintenance; training, and the management systems needed for the effective operation and control of the system.

An EVM assessment uses a structured questionnaire; this questionnaire is designed to allow evaluation of four distinctly different levels in the supply chain, as follows:

1. The Central Vaccine Stores (Primary Level) where vaccine is received directly from the vaccine manufacturer.
2. The Regional Vaccines Stores (sub-national) level where vaccine is received from the Central Vaccine Stores, stored, and then distributed to lower levels stores or to health facilities. These stores have cold rooms and a number of vaccine refrigerators and freezers.
3. The District Level (lowest delivery) stores where vaccine is received, either from the Central Vaccine Stores or Regional Vaccine Stores. From this point it is distributed directly to service delivery points.
4. **Service delivery points** (SD) such as hospitals, health centres and dispensaries, where vaccine is stored for a short time before vaccination to the target population – usually in a single refrigerator, but also, on a very short-term basis, in vaccine cold boxes or vaccine carriers.

The EVM tool is based on nine basic *criteria*, each of which is divided into a number of *requirements* and *sub-requirements*; together these characterize the fundamental qualities of a good vaccine supply chain. Compliance with each of these sub-requirements is tested using a series of tightly focussed questions, which are numerically scored.

A single common list of requirements, sub-requirements and questions is used for the entire supply chain. The EVM tool automatically filters this common list to create questionnaires that are specifically directed at each of the four levels described above. These level-specific questionnaires can be further filtered to pick out only the critical indicators. In this way an assessor can choose to carry out a *full* EVM assessment or a rapid *review* assessment which is based on the critical indicators alone.

In addition to the overall filtering process, the tool dynamically adjusts the questions offered in response to the assessor’s answers to certain country- or level-specific conditions. For example, if refrigerated trucks are used to distribute vaccines, a set of questions is offered covering this type of equipment.

In its current form, the tool summarises assessment results in two ways:

- The score achieved against each of the criteria that is relevant to the level being assessed\(^1\).
- The score achieved against indicators classified in accordance with seven categories of question – those relating principally to: buildings; storage capacity; cold chain equipment; vehicles; repairs and maintenance; training, and management.

Note that *management* and *training* categories play an important role in many of the criteria scores.

### 1.2 Site selection

Assessment sites were randomly selected using the EVM Site Selection tool according to the sampling methodology of Effective Vaccine Management (EVM) Assessment. Lowest distribution (LD) level facilities (Districts) were the first to be selected as sampling units. These were then followed by the random selection of two service points (SP) in each selected district. Regional vaccine stores whose districts were selected were automatically included in the assessment as per EVMA requirement. There was no deviation from the selected facilities.

Twenty-eight (28) districts representing 16% of one hundred and sixty eight (168) districts in the country were selected randomly to give the result of 90% confidence level and +/- 15% precision. Subsequently, the 28 districts fell into all 22 regions.

A total of 117 sites were finally visited and assessed as follows:

### 1.3 Assessment types used

All the four levels were assessed using the full version of the tool.

### 1.4 Tool version used

The 2.1 English version of EVM tool was used for this assessment.

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\(^1\) For example, the first criterion – vaccine arrivals – is only relevant at the primary level. Other criteria are also filtered out at lower levels.
1.5 **Places visited**

The assessment was carried out all the 4 level of service delivery in the country the names of all facilities of which are on Annex……

- 2 Central Vaccine Stores
- 22 Regional stores
- 28 District stores and
- 56 Health facilities (service delivery sites)

2. **Country background**

Tanzania is a country in East Africa within the African Great Lakes region. The country has a total land area of 947,303 square kilometres making it the 13th largest country in Africa. It is bordered by Kenya and Uganda to the north; Rwanda, Burundi and Democratic Republic of Congo to the west; and Zambia, Malawi and Mozambique to the south. Tanzania is located on the eastern coast of Africa and has an Indian Ocean coastline stretching approximately 800 kilometres long. It also incorporates several off shore islands including Unguja (Zanzibar), Pemba and Mafia. The country is the site of Africa's highest and lowest points: Mt Kilimanjaro, at 5,895 metres above sea level and the floor of Lake Tanganyika, at 352 below sea level.

According to the 2012 census, the total population of Tanzania for 2015 is estimated to be 48.7 million. The under 15 age group represent about 45.1% of the population while the under 5 is 19.7% and the under one 3.7%. The population distribution is extremely uneven. Most people live in the northern border or the eastern coast with much of the remainder of the country sparsely populated. Density varies from 12 per square kilometre in the Katavi region to 3,133 per square kilometre in the Dar es Salaam region.

Most of the areas are accessible by road. However, there are some few communities that are hard to reach especially in river lying areas and nomadic settlements.

2.1 **Organization of immunization services**

The Government of Tanzania has adopted the Primary Health Care (PHC) approach as pillar for offering health services including immunisation in the country. The health system consists of four levels of service provision; the Central, the Regional, the District and the service delivery levels with the first three being mainly administrative. The district directly supervises implementation of activities at service delivery level hence they considered as implementers. The service delivery level is the contact between the community and the health sector and this is where both preventive and curative services including vaccinations are offered. The country has a total of 6,991 fixed facilities out of which 5,516 offer immunisation services. There about 19,913 outreach points also offering immunisation services. It is estimated about 80% of vaccinations are offered through fixed facilities with the rest being offered through outreach.

The Immunisation and Vaccines Development programme is the responsible authority for the immunisation programme in Tanzania. IVD/EPI is one of the four arms of the Child and Reproductive Health Department that falls under the Preventive Services Directorate of the Ministry of Health and Social Welfare. The programme is headed by the EPI Manager at central level and it has a structure with five sections comprising Administration, Monitoring and Evaluation, Cold Chain and Logistics, Advocacy, Communication and Social Mobilisation (ACSM) and Surveillance. At regional level, the programme is headed by Regional Immunization and Vaccines Officer (RIVO) in collaboration with Regional Reproductive and Child Health Coordinator (RRCHCO). These personnel are answerable to the Regional Medical Officer (RMO) and are responsible for management and coordination of all immunization activities. A duplicate structure exists at district level where the District Immunization and Vaccines Officer (DIVO) and District Reproductive and Child Health Coordinators have similar responsibilities at district level with their counterparts at regional level. The District Medical Officer is the overall manager of all health services including immunisation at district level.
The service delivery level is the lowest level were all health services are delivered to communities. This is the level where vaccines are administered to target population.

The Government is funding procurement of traditional vaccines and co-financing new and underused vaccines funded by GAVI but all procured through UNICEF.

There are various partners that are supporting the immunisation programme at National level both technically and financially. These include WHO, UNICEF, Clinton Health Access Initiative and GAVI under the HSS grant. Their support extends to funding the procurement and maintenance of cold chain equipment and supporting the local management of vaccine supply chain.

Ministry of Health and Social Welfare Organogram
### Current immunisation schedule

<table>
<thead>
<tr>
<th>Name of Vaccine</th>
<th>Number of doses</th>
<th>Age given</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCG</td>
<td>1</td>
<td>At birth or first contact</td>
</tr>
<tr>
<td>OPV</td>
<td>4</td>
<td>At birth, 6, 10 and 14 weeks</td>
</tr>
<tr>
<td>DTP-HepB-Hib</td>
<td>3</td>
<td>6, 10 and 14 weeks</td>
</tr>
<tr>
<td>PCV13</td>
<td>3</td>
<td>6, 10 and 14 weeks</td>
</tr>
<tr>
<td>Rotavirus</td>
<td>2</td>
<td>6 and 10 weeks</td>
</tr>
<tr>
<td>Measles-Rubella</td>
<td>2</td>
<td>9 and 18 months</td>
</tr>
<tr>
<td>TT</td>
<td>5</td>
<td>WOCA</td>
</tr>
</tbody>
</table>

### Current EPI Vaccines, Presentation and Manufacturers

<table>
<thead>
<tr>
<th>Vaccines</th>
<th>Presentation</th>
<th>Formulation</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCG</td>
<td>20 dose vial</td>
<td>Lyophilised</td>
<td>Intervax; SII</td>
</tr>
<tr>
<td>OPV</td>
<td>20 dose vial</td>
<td>Oral, liquid</td>
<td>SII; GSK; Hoffkine Biopharma</td>
</tr>
<tr>
<td>DTP-HepB-Hib</td>
<td>10 dose vial</td>
<td>Liquid</td>
<td>SII; Biological E limited; Panacea Biotech</td>
</tr>
<tr>
<td>PCV13</td>
<td>1 dose vial</td>
<td>Liquid</td>
<td>Wyeth;</td>
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<tr>
<td>Rotavirus</td>
<td>1 dose vial</td>
<td>Oral, liquid</td>
<td>GSK</td>
</tr>
<tr>
<td>MR</td>
<td>10 dose vial</td>
<td>Lyophilised</td>
<td>SII</td>
</tr>
<tr>
<td>TT</td>
<td>20 dose vial</td>
<td>Liquid</td>
<td>SII; Intervax; BB-NCIPD Ltd; MEDECO; BB-NCIPD Ltd;</td>
</tr>
<tr>
<td>0.05 ml syringe</td>
<td></td>
<td>Liquid</td>
<td>SII; Intervax; BB-NCIPD Ltd; MEDECO; BB-NCIPD Ltd;</td>
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<td>0.5 ml syringe</td>
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<td>Liquid</td>
<td>MEDECO; BD Spain</td>
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<tr>
<td>5 ml</td>
<td></td>
<td></td>
<td>Hindustan Syringes</td>
</tr>
<tr>
<td>Safety box</td>
<td></td>
<td></td>
<td>Hindustan Syringes</td>
</tr>
</tbody>
</table>

#### 2.2 Planned vaccine introductions

The country is planning to introduce new vaccines – Inactivated Polio Vaccine in October 2015 and HPV vaccine in 2018.

#### 2.3 Vaccine volume data

The current schedule for the immunisation programme in Tanzania requires 130.8 cm³ per fully immunised child at service delivery point as depicted in graph below. The country is planning to introduce IPV by October 2015 and HPV vaccine in 2018 and this increases the volume per fully immunised child to 165 cm³.

![Vaccine volume graph](image-url)
3. **Supply chain overview**

3.1 **Logistics structure**

The diagram below illustrates the Tanzania vaccine supply chain.

![Tanzania Cold Chain logistics system](image)

3.2 **Fixed infrastructure**

The Central Vaccine Stores are housed at the Medical Stores Department in Dar es Salaam. The store is equipped with 9 X 40 m³ walk in cold rooms, 3 X 20 M³ walk in cold rooms and 2 X 20 m³ freezer rooms. Zanzibar Central Vaccine Store has 1 x 10m³ walk in cold room and 8 ILR.

The regional level consists of 27 regional stores with each having one cold room size 30m³ or 40 m³ depending on the size of population served. Regions are also equipped with conventional EPI refrigerators/freezers for vaccine storage or cooling packs.

All the 167 districts have ice lined refrigerators and freezers for vaccine storage. The common types of refrigerators at this level are Dometic TCW3000, Vestfrost MK304 and MK404, and Electrolux TCW1152.

All the above levels are each equipped with a standby generator.

Health facilities have each a refrigerator the common type being the Dometic RCW50 EG. A cold chain assessment was conducted in in 2012 and this served to inform the programme on which equipment was to be procured. The bulk of the equipment was procured between 2012 and 2014 and as such is fairly new.

3.3 **Transport infrastructure**

The National level has two refrigerated trucks that are used for transportation of vaccines to regions and some districts. All regional stores have vehicles for vaccine and supplies distribution to districts. Most districts have vehicles for vaccine and supplies distribution. The vehicles are pooled at regional and district level.

3.4 **Recording and reporting systems**

The policy of the Ministry of Health, Tanzania, is to record vaccine temperatures twice daily at all levels. There is a standard manual temperature record form used at all levels. The country has introduced a remote temperature monitoring system at Nation, regional and some district and the roll out is continuing to the remaining district. The remote system is designed in such a way that when temperatures go out of range, an alert short message is sent to responsible persons for action.
The country is using the web-based stock management tool based on WHO developed SMT at national and sub-national level. The tool is still being further refined to include some essential reports. The computerised stock control system is still running parallel with the manual record.

Vaccines and supplies distribution is done by the higher level providing transport. Each distribution level is required to come up with a distribution plan which is shared with lower level facilities. The national and regional levels distribute vaccines on quarterly basis and the district on monthly. The distribution system is pull for national and sub-nation levels while it is push for health facilities. There is a standard web based vaccine order form that is used to order vaccines by sub-national level stores. There is also a standard issue voucher for vaccines and supplies at sub-national level.

4. **Previous assessments**

The last EVM assessment was conducted in May 2012 and key findings, recommendations and the level of implementation of recommendations are as indicated below.

4.1 **Key assessment findings**

All levels

- The country had a series of guidelines and training materials supporting immunization programme officers at different levels,
- Tanzania has defined standardised formats for maintaining manual records of temperature, vaccines and injection material stocks, wastage, requisition and supplies,
- All vaccines, from international shipment, have been received in good condition,
- Most staff have good knowledge and practice safe vaccine storage and manual temperature monitoring is well maintained,
- The storage capacity is in general good, especially for OPV, and ice pack freezing, and dry storage at most levels,
- The buildings housing the vaccines stores are mostly suitable and well maintained,
- Cold chain equipment is suitable at present at the regional and health facilities,
- Stock management is done using the WHO’s Stock Management tool at the central and regional level and using District vaccine data – management tool (DVD-MT) and ledger books below that. Use of this tool helps adherence to required standards,
- Maximum and minimum stocks are defined in the SMT, and used for ordering,
- At the CVS, ZVS and DVS, there is an issue voucher for every requisition. At CVS and
- RVS the entries are done in the SMT while at DVS they are done in the ledger book,
- The store managers following the EEFO with attention to the stats of VVM.
- Freeze tags are used along with freeze sensitive vaccines during storage.
- Distribution at all levels except the central level is well organized,
- Safe vaccine distribution is assured through proper planning and the Vaccine store staff accompanying the vehicles at the regional and district level during distribution. No vaccines have been lost due to problems of transport at any level.

4.2 **Key recommendations**

- Several RVS / DVS vaccines or dry stores need improvement, or proper allocation of building space,
• Additional ice-lined refrigerators (ILRs) to be installed at all location that have shortage of space in the current situation, and at those that will face shortage with the introduction of new vaccines,
• Ensure provision of generators and voltage stabilizers where required,
• Each district MUST have a specific adequate vehicle available for vaccine supply within its pool of vehicles. Priority should be given for all vaccine and associated distribution.
• Every district should ensure that one trained technical staff is appointed for maintenance of cold chain equipment through the CHMT/ DHMT.
• All unwanted / non-usable items should be kept out of the vaccine and dry stores. A space should be dedicated for such items while awaiting disposal.

4.3 Progress on recommendations
All the recommendations from the 2012 EVM assessment have been implemented except for the improvement of transport at district level. Despite the country effort to procure new vehicles for the distribution of vaccines these have not been enough to replace the aging fleet. As such, some districts are still struggling to get adequate transport for vaccines and supplies.

5. Supply chain development
A cold chain assessment was conducted in 2012 culminating to the development of cold chain equipment replacement plan covering period 2015 – 2020.

6. Assessment findings and recommendations
The country performed very well in eight of the nine indicators/criteria when average data for all levels is considered as depicted by the graph below. However, further analysis of the graph will indicate that there are facilities that did not reach the 80% mark in each criterion and these are the facilities where most of the recommendations are based. It should also be noted that while available transport capacity to carry vaccine consignments to lower level facilities was found to be adequate, this finding should not be regarded as conclusive because the assessment only looked at available volume versus required without necessarily going into other details which are the subject of a transport study not covered by this assessment. The country has a total of 6,991 fixed facilities out of which 5,516 offer immunisation services. It is reported the majority of health facilities not offering immunisation are doing so because they do not have cold chain equipment.

National performance

6.1 Primary level
Medical Stores Department – Central Vaccine Stores (Mainland) Performance
Central Vaccine Stores – Zanzibar Performance

**E1: Vaccine arrival procedures**
Achieved Score – Mainland = 47%, Zanzibar = 39%, Average 43%

**Strengths**
Vaccines and supplies are all procured through UNICEF and shipped by air to the country. Vaccine arrival reports used contain all the relevant sections of a VAR as they are supplied by UNICEF. All VARs are well completed in all sections and copies are submitted timely to UNICEF. There is a good working relationship with Airport Authorities such that when vaccines arrive they do not take more that 24 hours before they placed in the Ministry’s vaccine cold storage facilities. There is a Standard Operating Procedure (SOP) that deals with clearance of vaccines and medical products at the Department of Medical Stores. In fact the Department is ISO9001 certified for all their products including EPI vaccines.
The same working relations with Customs apply for injection safety materials. There no problems that have encountered in clearing dry materials.

**Weaknesses**
Lot release certificates are not always available and attached to shipping documents kept by the Storekeeper. Out a sample of about thirty vaccine batch numbers received in the Mainland, only five batches have lot release certificates attached. Product arrival forms for dry materials are not completed for all items received during period under review. There is no formal contingency plan in place in case vaccines arrive in the country unexpectedly.
Zanzibar is classified as having a Central Vaccine Stores receiving supplies direct from vaccine suppliers. However, for period under review, the country has not received any consignment direct from manufacturers and as such some of the documentation required for a Central Store were not available thereby denting their performance. The do not have any lot release certificates or shipping documents attached to vaccine arrival reports. For the period under review (01 June 2015 – 31 May 2015) all their consignments have come through Medical Stores Department in the Mainland.

Recommendations

- The country should consider procuring cold chain equipment for those facilities not offering immunization because of unavailability of cold chain equipment.
- Lot release certificates should accompany all vaccine batches that come into the country and these should be archived together with all other shipping documents in the Storekeeper’s office.
- Products Arrival Forms should be completed for all injection safety materials and copies submitted to UNICEF as confirmation that goods were received intact.
- A formal contingency plan should be developed to deal with unexpected vaccine arrivals into the country.
- The country needs to decide on whether or not Zanzibar should be considered a Central store receiving vaccines direct from manufacturers or a Central store receiving vaccines form an inter-country store to minimize loss of points.

E2: Temperature monitoring

Achieved Score – Mainland = 72%, Zanzibar = 74%, Average 73%

Strengths

Vaccines storekeepers and healthcare workers know very well the correct storage temperature for every vaccine or diluent. The personnel also know all the freeze sensitive vaccines in the current immunization schedule. All vaccines stores have continuous temperature monitoring devices, the personnel know how to operate and interpret thus enable a commendable practice to record the manual temperature readings twice in a day. The temperature records are routinely reviewed, countersigned by the supervisors and archived for in each of the facility. There is documentary evidence that remedial action has been taken in case of any cold chain breach.

Weakness

None of the cold rooms used for storing vaccines have a systematic temperature mapping conducted for both Mainland and Zanzibar. Tanzania Mainland has a total of 2 Refrigerated vehicles used for transporting vaccines from Central vaccine stores to Regional vaccines stores none of which has a complete set of temperature traces or printout.

Recommendation

- Systematic Temperature mapping study should be conducted and documented for all vaccine cold rooms in both Tanzania mainland and Zanzibar.
- The refrigerated vehicles in the Mainland should have temperature loggers’ data downloaded and printed or stored electronically for future reference.

E3: Storage and transport capacity

Achieved Score – Mainland = 93%, Zanzibar = 87%, Average 90%

Strengths
There is adequate storage capacity for both positive and negative vaccine storage temperature at the primary levels. The Central Vaccine Stores has thirteen walk in cold rooms with a net storage capacity of 130 m$^3$ against required capacity of 105m$^3$; and two freezer rooms with net storage capacity of 7m$^3$ against the required 3m$^3$ assuming 7 months’ supply. There are also 4 x 40m$^3$ and 2x30m$^3$ additional new walk in cold rooms awaiting installation in mainland. Zanzibar has one cold room and six ILR all with net capacity of 4m$^3$ against the required 3.4m$^3$. There is sufficient dry storage capacity at both mainland and Zanzibar.

Currently, the transportation capacity is adequate at the Medical Stores Department (MSD). Vaccine transportation in Zanzibar is done by districts which come to collect from the Central Vaccines Store and distribute to lower level facilities in their catchment areas.

**E4: Buildings, equipment and transport**
Achieved Score – Mainland = 100%, Zanzibar = 82%, Average 91%

**Strengths**
The store buildings are conveniently sited and are in a satisfactory standard that meet minimum requirements. Storage and packing spaces within the vaccine store building are satisfactory. All cold chain equipment seen comply with WHO minimum standards. Cold rooms and refrigerators are connected to voltage stabilizers and are fitted with continuous alarm systems and telecommunication links i.e. beyond wireless. There is a well maintained adequate transport fleet for distribution of both vaccines and supplies. Equipment maintenance and servicing is contracted out and there exists contracts for these services. There is evidence that the maintenance contracts are being implemented and followed as agreed.

Transport and transport containers used to distribute vaccines down to the next level in the cold chain are satisfactory. For Mainland refrigerated vehicles are in use.

**Weaknesses**
The cold room for Zanzibar is not connected to a voltage stabilizer. Some cold rooms and freezers rooms for both mainland and Zanzibar are not connected to auto-diallers.

**Recommendations**
Zanzibar cold room should be connected to auto-diallers
A suitable voltage regulator should be procured and connected to the Zanzibar cold room to prevent damages that might be caused by power fluctuation.

**E5: Maintenance**
Achieved Score – Mainland = 100%, Zanzibar = 87%, Average = 93%

**Strength:**
Tanzania mainland Medical Store Department has written PPM for buildings and this is being followed. There is visual evidence that maintenance is taking place. All the two Medical Stores have PPM for refrigeration equipment and there is evidence that the plan is being followed. Vehicles for transportation of vaccines in Tanzania mainland are well maintained and there is documentary evidence of timely maintenance and servicing. However, the Zanzibar Central Vaccine Store does not deliver vaccines rather the districts come to collect hence they have no responsibility for transport.

**Weakness:**
- Zanzibar Medical Store Department has no written PPM for building maintenance though maintenance is being done.
Recommendations:
- Zanzibar Medical Store should establish a PPM for the buildings

**E6: Stock management**
Achieved Score – Mainland = 95%, Zanzibar = 90%, Average 93%

**Strengths**

There is web based Stock Management Tool (SMT) which is used for the stock management at national and sub-national levels. The stock recording system has all key parameters indicating type of vaccine, vaccine presentation, quantity received and issued, vaccine manufacturer, batch/lot number, expiry date of each vaccine batch and for vaccines and diluents and the VVM status. A standard requisition form is used by the lower stores to request vaccines and supplies. There is a formal advanced notification process to advise receiving store of the time of vaccines delivery/collections. Stock records and or stock in hand demonstrate that vaccines are issued according to EEFO principle and VVM status is indicated. Issuing vouchers are used to deliver vaccines and other related supplies and vaccines quantities records on the issue voucher match the relevant entries in the SMT. Vaccine quantities recorded on the issue voucher match with the entry arrival stock. There are completed records of arrival vouchers from receiving store for every delivery which is taking place and the completed vouchers indicate that arrival checks are carried out correctly by the receiving store. The stock control system is designed to record vaccines and diluent wastage in un-opened vial due to expiry, freezing of heat exposure and there is evidence that the system is in use. There is adequate knowledge of what to with expired and damaged vaccines. Maximum and Minimum stock and Reorder level are set for each vaccine and commodity and the responsible can clearly explain these concepts. The vaccine and dry goods stock are secure. The content labels are fixed to all cold chain equipment indicating vaccine type, Lot number and expire date. Vaccines and dry goods are correctly stored.

**WEAKNESS**

There are no routine reports prepared to summarize details transactions on internal vaccine distributions. Physical stock of freeze dried vaccines does not match their respective diluents while on the other hand not matching stock records. There are observed mismatching of physically counted number of consumables and stock records in Zanzibar.

**RECOMMENDATIONS**

- IVD should stress on the need to conduct regular physical stock takes for vaccines and supplies to keep physical quantities matching stock record or freeze dried vaccines matching diluents.

**E7: Distribution**
Achieved Score – Mainland = 85%, Zanzibar = 93%, Average 89%
Strengths
A vaccine distribution plan is prepared and shared with recipient vaccine stores. Vaccine distribution programme follows this clearly defined plan. Communication of a pre-notification supply is always done prior to delivery to all receiving stores.

Weakness
There is no written contingency plan that describes how to deal with emergencies during distribution. There is no SOP for packing vaccines into the refrigerated vehicles.

Recommendation
- A contingency plan for emergencies during vaccine distribution should be developed and copied given to drivers as a reminder of what action to take during emergencies.
- A Standard Operating Procedure (SOP) on loading vaccines into refrigerated vehicles should be developed along the lines of other available SOPs.

E8: Vaccine management
Achieved Score – Mainland = 85%, Zanzibar = 76%, Average 80%
Findings
The performance score is good at the primary store and very good for the other levels

National level
Strength
Written instructions (posters and stickers) on the use of VVMs are available, well known and used for vaccine management purposes. Vaccine wastage data are collected and well monitored in monthly basis. Store keepers have knowledge of unopened vial wastage (88%).

Weakness
Both store keepers in Tanzania mainland and Zanzibar store do not have knowledge of shake test.

Recommendation
- Capacitate store keepers in Tanzania mainland and Zanzibar on the general knowledge of the shake test.

E9: MIS and supportive functions
Achieved Score – Mainland = 83%, Zanzibar = 43%, Average = 63
Strengths
The Medicals Stores Department in the mainland is the only vaccine store in the country with appropriate Standard Operating Procedures (SOPs) for all key operations of vaccine management. Field data are collected and used to support management decision making. Stock Management Tool (SMT) is used to forecast annual needs based on target population and coverage objective. This is buttressed by also using the UNICEF forecasting tool that is done annually. Detailed annual work plans derived from the cMYP are in place. Key management posts are filled and staffs are adequately trained both in Mainland and Zanzibar.

Weaknesses
Standard Operating Procedures (SOP) manuals and cold chain inventory are not available in Zanzibar. There is inadequate supporting staff at Zanzibar Central vaccine Store where there is only one issuer. There is no evidence that supportive supervision is being done at the two Central stores.
**Recommendations**

- Inventories for cold chain equipment should be developed for Zanzibar CVS, kept and updated regularly.
- Zanzibar should advocate for an additional Stores Assistant to assist with issuing of vaccines and supplies at the CVS.

### 6.2 Sub-national level

#### E2: Temperature monitoring

**Achieved Score – 90%**

**Strengths**

Vaccines storekeepers and healthcare workers know very well the correct storage temperature for every vaccine or diluent. The personnel also know all the freeze sensitive vaccines in the current immunization schedule. All vaccines stores have continuous temperature monitoring devices, which enable a commendable practice to record the manual temperature twice a day. The temperature records are routinely reviewed, countersigned by the supervisors and archived for in each of the facility.

**Weakness**

The facilities in Zanzibar have temperature-monitoring forms without a space for entering alarm events. There is no a documentary evidence that remedial action has been taken when any event of temperature excursion has happened.

**Recommendation**

- National level should update the temperature record chart to include space for recording temperature alarms in vaccine refrigerators.

#### E3: Storage and transport capacity

**Achieved Score – 96%**

**Strengths**

Each of the regional stores (Sub-National) has a Walk in Cold Room (WICR) with gross capacity of 40m³ for highly and 30m³ for lowly populated regions. The capacity is adequate even for new vaccines to be introduced in the near future. There is also enough storage capacity for negative temperature vaccines. Storage space for dry materials is adequate at most RVS. All regions have adequate transport and coolant packs facilities for vaccine distribution. Generally, all health care workers know what actions to take in case of any emergency events like prolonged power cut-offs, fires outbreaks etc. Also vaccine stores at all levels and service delivery points have displayed names and phone numbers of persons to contact during emergencies.
Weaknesses
Dry storage capacity is a challenge in some regional vaccine stores like Morogoro, Geita, Ruvuma, and Tabora. In some cases, dry materials are stacked within the WICRs hence minimizing good access to the store and reducing air circulation. Transportation of vaccines and related supplies is still a challenge in some sub-National stores. Mbeya and Shinyanga have inadequate transport capacity. The reported inadequacy in Mbeya sub-national level is about 20% whereas in Shinyanga is about 60%. Some regions e.g., Arusha, Shinyanga and Mwanza sub-National vaccine stores have inadequate passive containers capacity for transportation of vaccines. Manyara sub-regional store has no passive containers for vaccine storage and transportation. There is no standard operating procedure for emergency events. These stores have written guidelines which do not meet standard requirement of an SOP.

Recommendations
• Regions with no or inadequate dry storage to ensure they allocate favourable and adequate storage space for the immunization related dry materials.
• Regions with inadequate transport capacity in collaboration with National level to ensure increased capacity for transportation of immunization related supplies.
• National level should ensure that all RVSs have adequate passive containers for use during transportation of vaccines from the regional store to DVSs.
• Standard operating procedures for emergency contingency plan preparation to be adapted to all levels, and ensure personnel responsible for vaccine management are trained in its preparation and implementation.

E4: Buildings, equipment and transport
Achieved Score – 92%

Strengths
Buildings that accommodate cold chain equipment and supplies are suitable for purpose with all walls and floors in good condition. Packing areas have adequate spaces for all facilities assessed. Loading/offloading zones are very near the vaccine and supplies stores. Cold chain equipment in use complies with minimum WHO standards. All cold rooms and refrigerators are connected to main power supply through a voltage stabilizer. The Storekeepers’ offices are within vaccine stores buildings and have adequate space. There is enough space for storage of both dry materials and passive containers.

Weaknesses
Some of the staff working in cold rooms are not provided with warm clothing
Some refrigerators and freezers are not having working thermometers

Recommendations
• Staff working in cold rooms should be provided with appropriate warm clothing
• All refrigerators and freezers storing vaccines should be provided with working thermometers as a back up to fridge tags.

E5: Maintenance
Achieved Score – 91%

Strength:
Generally, all RVS have planned preventive maintenance (PPM) for building with evidence that the plan is being followed with exception of Tabora, Pemba, Morogoro, Pwani, Shinyanga and Singida. They all have PPM for equipment except for Manyara. They also have documentary evidence that the PPM for equipment is being followed except for Dodoma and Kilimanjaro. All RVS have focal persons assigned to carry out routine maintenance for equipment except for Geita. There is evidence that the cold rooms/refrigerators/freezers have recently been maintained. Vehicles are being serviced according to manufacturer’s service manual with documentary evidence and the program is being followed except for Mtwara and Singida. A total of 60 (92%) refrigeration units are available in the RVS countrywide; only 5 units are not functional. A total of 71 (87%) refrigerator/vaccine freezers are available in the RVS countrywide and functional; only 8 units are not functional. 86% of the planned vaccine distributions were implemented as planned.

**Weakness:**
Tabora and Pemba have no PPM for building maintenance. Some of the RVS have no fully established PPM for equipment in terms of not having focal person being assigned or documentary evidence: these are Manyara, Dodoma, Kilimanjaro and Geita. 5 refrigeration units are not functioning in Manyara, Tabora and Ruvuma. 8 refrigerators in Kilimanjaro, Mtwara, Ruvuma, Singida and Tabora are not functioning.

**Recommendations:**
- Tabora and Pemba should ensure that PPM for building is established and followed
- Regions without focal persons and documentary evidence for PPM for equipment should ensure these are established.
- The non-functional refrigeration units in the 8 regions above should be repaired.

**E6: Stock management**
Achieved Score – 92%

There is web based Stock Management Tool (SMT) which is used for the stock management at national and sub-national levels. The stock recording system has all key parameters indicating type of vaccine, vaccine presentation, quantity received and issued, vaccine manufacturer, batch/lot number, expiry date of each vaccine batch and for vaccines and diluents and the VVM status. A standard requisition form is used by the lower stores to request vaccines and supplies. There is a formal advanced notification process to advise receiving store of the time of vaccines delivery/collections. Stock records and or stock in hand demonstrate that vaccines are issued according to EEFO principle and VVM status is indicated. Issuing vouchers are used to deliver vaccines and other related supplies and vaccines quantities records on the issue voucher match the relevant entries in the SMT. Vaccine quantities recorded on the issue voucher match with the entry arrival stock. There are completed records of arrival vouchers from receiving store for every delivery which is taking place and the completed vouchers indicate that arrival checks are carried out correctly by the receiving store. The stock control system is designed to record vaccines and diluent wastage in un-opened vial due to expiry, freezing of heat exposure and there is evidence that the system is in use. There is adequate knowledge of what to with expired and damaged vaccines. Maximum and Minimum stock and Reorder level are set for each vaccine and commodity and the responsible can clearly explain these concepts. The vaccine and dry goods stock are secure. The content labels are fixed to all cold chain equipment indicating vaccine type, Lot number and expire date. Vaccines and dry goods are correctly stored.

**WEAKNESS**
There are no routine reports prepared to summarize details transactions on internal vaccine distributions. Physical stock of freeze dried vaccines does not match their respective diluents while on the other hand not matching stock records.

**RECOMMENDATIONS**

- IVD should stress on the need to conduct regular physical stock takes for vaccines and supplies; and updating of stock records whenever such counts are done.

**E7: Distribution**  
Achieved Score – 91%  
Strengths  
Vaccines are correctly packed during transport and staffs are knowledgeable of the use of cool water packs for transportation of vaccines in Tanzania mainland. For Zanzibar where the icepacks are still in use, staff is knowledgeable on how to condition icepacks for use in transportation of vaccines.  
Weakness  
There is no documentation on system that takes care of short supplies and also there is no evidence that the distribution programme of vaccine from the issuing store to the each receiving store is maintained. There is no written transport contingency plan that describes how to deal with emergencies during distribution. Therefore, transport system and contingency plan during transport emergency is not established.  
Recommendations  
- Transport system and contingency plan during transport emergency should be established. All issuing stores should have a written transport contingency plan that describes how to deal with emergencies during distribution.

**E8: Vaccine management**  
Achieved Score – 97%  
Strength  
The majority of health workers (98%) have adequate knowledge of how and when to conduct a shake test. Written instructions on the use of VVMs are available and well known; and there is evidence that the VVMs are being used for vaccine management purposes. Vaccine wastage data are collected, used and well monitored on monthly basis. There is adequate knowledge of the main causes of vaccine wastage in both opened and unopened vials (91% and 92% respectively). There are standard forms used for recording and reporting of vaccine wastage. Data is systematically received from health facility and then this is entered into the DVD-MT. This data is used for forecasting and monitoring performance.

**E9: MIS and supportive functions**  
Achieved Score – 84%  
Strengths  
All stores use a standard method of forecasting vaccine and supplies requirements based on their target population. The data is imbedded in web-based stock control system. They all have cold chain inventories of equipment that the hold at the store generally updated once every quarter. Key management posts are filled and staff are adequately trained. Supportive supervisory visits is being conducted and documented.

**Weaknesses**  
Apparently there are no standard operating procedures (SOPs) in place.

**Recommendations**
Standard Operating Procedures manuals should be developed and issued out to guide health workers on key vaccine management procedures are to be carried out.

6.3 Lowest delivery level

E2: Temperature monitoring
Achieved Score – 94%

Strengths
Vaccines storekeepers and healthcare workers know very well the correct storage temperature for every vaccine or diluent. The personnel also know all the freeze sensitive vaccines in the current immunization schedule. All vaccines stores have continuous temperature monitoring devices, which enable a commendable practice to record the manual temperature twice a day. The temperature records are routinely reviewed, countersigned by the supervisors and archived in a safe place.

Weakness
The temperature records are routinely reviewed and countersigned by the supervisors. However, the records are not archived in every facility. Some of the Health facilities lack documentary evidence that remedial action has been taken in case of the temperature excursion.

Recommendations
- The temperature records should be archived in each of the facility.
- Health facilities that lack documentary evidence that remedial action has been taken in case of the temperature excursion should be encouraged to document such evidence for future reference.

E3: Storage and transport capacity
Achieved Score – 99%

Strengths
Almost all LDL have adequate positive and negative storage capacity to store vaccines for required four months period. However, this is not observed at Kasulu DC and Kigoma DC in Kigoma region. Each of these two councils has a shortage of 150 litres of refrigeration. There are adequate refrigerators for storage of cool-packs at all LDLS.

Weaknesses
Kigoma DC and Kasulu DC vaccine stores have inadequate positive storage capacity. In addition, Mvomero DC in Morogoro region has inadequate dry storage capacity for immunization materials such as syringes, safety boxes and diluents.

**Recommendations**
- The existing ILRs at Kigoma RVS which are allocated for Kigoma DVS and Kasulu DVS should be released immediately to remove the existing shortage.

**E4: Buildings, equipment and transport**
Achieved Score – 91%

**Strengths**
The store buildings are conveniently sited and standard of construction meet minimum requirements. Storage and packing spaces within the vaccine store building are satisfactory. Cold chain equipment comply with minimum standards – WHO compliance. Some cold chain equipment are connected to voltage stabilizers and have continuous alarm systems i.e. fridge tags and telecommunication links i.e. mobile phones. Transport and transport containers used to distribute vaccines down to the next level in the cold chain are satisfactory.

**Weaknesses**
Some districts that require generators are having no standby generators. A good number of refrigerators are not connected to voltage regulators.

**Recommendations**
- Standby generators should be provided to all district vaccine stores and should meet minimum requirements
- Appropriate Voltage regulators should be provided and connected to all refrigerators that use electricity.

**E5: Maintenance**
Achieved Score – 90%

**Strengths:**
Most of the Stores have fully established PPM for building except for few districts which are Kinondoni, Ilala, Bahi and Mbeya CC. Most of them have established PPM for equipment except Ngara and Kiteto DC. Routine maintenance and overhaul programme for vehicle is established and all are being followed in most of the district except Rufiji. Most of them have functional refrigeration units and repair maintenance is being done. 92% of the vaccine refrigerators and vaccine freezers are functional in the DVS. Most of the planned distributions were conducted and few were cancelled due to mechanical failure of the vehicle.

**Weakness:**
Kinondoni, Ilala, Bahi and Mbeya CC have no fully established PPM for buildings. Some of the districts Ngara and Kiteto DC have no established PPM for equipment. Rufiji district has no routine maintenance program for vehicles.

**Recommendations:**
- Districts which have no fully established PPM for buildings and equipment should ensure that these are established and followed.
- Routine maintenance for vehicle should be established in Rufiji and make sure it is being followed.
E6: Stock management
Achieved Score – 90%

Strengths

There is web based Stock Management Tool (SMT) which is used for the stock management at national and sub-national levels. The stock recording system has all key parameters indicating type of vaccine, vaccine presentation, quantity received and issued, vaccine manufacturer, batch/lot number, expiry date of each vaccine batch and for vaccines and diluents and the VVM status. A standard requisition form is used by the lower stores to request vaccines and supplies. There is a formal advanced notification process to advise receiving store of the time of vaccines delivery/collections. Stock records and or stock in hand demonstrate that vaccines are issued according to EEFO principle and VVM status is indicated. Issuing vouchers are used to deliver vaccines and other related supplies and vaccines quantities records on the issue voucher match the relevant entries in the SMT. Vaccine quantities recorded on the issue voucher match with the entry arrival stock. There are completed records of arrival vouchers from receiving store for every delivery which is taking place and the completed vouchers indicate that arrival checks are carried out correctly by the receiving store. The stock control system is designed to record vaccines and diluent wastage in un-opened vial due to expiry, freezing of heat exposure and there is evidence that the system is in use. There is adequate knowledge of what to with expired and damaged vaccines. Maximum and Minimum stock and Reorder level are set for each vaccine and commodity and the responsible can clearly explain these concepts. The vaccine and dry goods stock are secure. The content labels are fixed to all cold chain equipment indicating vaccine type, Lot number and expire date. Vaccines and dry goods are correctly stored.

WEAKNESS

There are no routine reports prepared to summarize details transactions on internal vaccine distributions. Physical stock of freeze dried vaccines does not match their respective diluents while on the other hand not matching stock records

RECOMMENDATIONS

- IVD should stress on the need to conduct regular physical stock takes for vaccines and supplies; and updating of stock records whenever such counts are done.

E7: Distribution
Achieved Score – 92%

There is a formal communication with receiving facilities on the dates when consignments are expected and these dates are usual adhered to. Vaccines are correctly packed during transport and staffs are knowledgeable of the use of cool water packs for transportation of vaccines in Tanzania mainland. For Zanzibar where the icepacks are still in use, staff is knowledgeable on how to condition icepacks for use in transportation of vaccines. There have been no any short shipments recorded in the period under review.

Weakness

There is no documentation on system that takes care of short supplies and also there is no evidence that the distribution programme of vaccine from the issuing store to the each receiving store is maintained. There is no written transport contingency plan that describes how to deal with emergencies during distribution. Therefore, transport system and contingency plan during transport emergency is not established.

Recommendations

- Transport system and contingency plan during transport emergency should be established. All issuing stores should have a written transport contingency plan that describes how to deal with emergencies during distribution.
**E8: Vaccine management**
Achieved Score – 97%

Most health workers know when and how to conduct a shake test. Written instructions on VVMs are available and health workers know how VVWs work. There is evidence that the VVMs are used for vaccine management purposes as demonstrated in their stock records, receipt and issue vouchers. Vaccine wastage is being monitored, documented and reported on monthly basis. There is adequate knowledge of the main causes of vaccine wastage in both opened and unopened vials I all facilities. This data is used for forecasting and monitoring performance.

**E9: MIS and supportive functions**
Achieved Score – 88%

**Strengths**
Field data are collected and used to support management decision making.
Stock Management Tool (SMT) is used to forecast annual needs
Annual work plans are in place
Key management posts are filled and staffs are adequately trained especially in Mainland.

**Weaknesses**
There are no standard operating procedures manuals in place
Cold chain Inventory is either missing or not updated in some districts

**Recommendations**
Standard Operating Procedures manuals should be distributed to all workers responsible for vaccine management in their areas of jurisdiction
Inventories for cold chain equipment should be accurate and up-to-date

### 6.4 Service delivery level

![Criteria scores chart](image)

Mean data for the service delivery level indicate that the minimum EVM standard of 80% for all the applicable eight criteria was met. However, a closer look at the above data reveals that while the average performance of all facilities was above 80%, there are some facilities that did not achieve the minimum standard. The general finding for this level are as enumerated below.
E2: Temperature monitoring
Achieved Score – 91%

Strengths
The country is doing well on this indicator with all facilities scoring above 80%. Facilities are using a standard temperature record form which was up to date at the time of the assessment. Vaccine refrigerators are equipped with a working continuous temperature monitoring device, a fridge tag. Temperatures are being recorded twice daily including on weekends and public holidays. Temperature records are being well archived at least for last three years.

Weaknesses
The temperature record chart is designed to capture daily minimum and maximum temperatures as fridge tag requirement but the data is not being captured because of national instructions. The temperature record chart does not have space for recording alarms.

Recommendations
- IVD should redesign the temperature record chart to capture alarms in line with the fridge tag requirements. Meanwhile health workers should be asked to improvise on the existing form the capturing of temperature alarms.
- IVD should make full utilization of the fridge tag by recording daily minimum and maximum temperatures on temperature chart.

E3: Storage and transport capacity
Achieved Score – 94%

There is adequate storage capacity for both vaccines and dry materials at all facilities. Passive container capacity is also adequate. Contingency plans are available with emergency contact details well posted. Health care workers knowledge on what actions to take in the event of an emergency is adequate at all facilities.

Weaknesses
Segese Dispensary in Msalala DC does not have adequate vaccine storage capacity.

Recommendations
- Procure and supply Segese Dispensary a refrigerator that has adequate capacity to service their catchment area.

E4: Buildings, equipment and transport
Achieved Score – 92%

Strengths
The store buildings, walls and floors within which cold chain equipment is kept are all suitable for the purpose. Cold chain equipment complies with minimum WHO standards and is all CFC free. All vaccine refrigerators have a working continuous temperature monitoring thermometer i.e. the fridge tag. Telecommunication links exist either in the form of fixed line and/or mobile phones. Suitable passive containers are being used to protect vaccines during vaccination sessions.

Weaknesses
There are some vaccine refrigerators that are not connected to voltage regulators.

Recommendation
- Appropriate voltage regulators should be provided for all compression refrigerators.
**E5: Maintenance**
Achieved Score – 89%
Planned preventive maintenance schedules for both building and cold chain equipment are available at most of the facilities and there is evidence that maintenance is being carried out. Vaccine refrigerators and passive containers are clean.

**E6: Stock management**
Achieved Score – 85%

*Strengths*
There is a standard manual stock ledger at all facilities. The ledger al important parameters for vaccine stock management such except “Manufacturers” column. The ledger captures type of vaccine, presentation, batch number and expiry date and columns for recording quantity transactions. Transactions are recorded with the same day occurrence. Stock records and or stock in hand demonstrate that vaccines are issued according to EEFO principle and VVM status. There is a satisfactory formal system of recording and reporting vaccine wastage. Staff demonstrated a clear understanding of what to do with expired and damaged vaccines. No vaccines are reported to have been discarded in the past one year due to incorrect storage temperatures. Disposal facilities and procedures are in accordance with the national policy. Maximum and minimum stock and reorder level are set for each vaccine and commodity and the responsible person clearly demonstrated understanding these concepts. Vaccine and dry stores are secure at all facilities.

*WEAKNESS*
There is a mismatch at some facilities between physical quantities of freeze dried vaccine doses and their respective diluents on one hand and between stock records and physical quantities on the other hand. The current stock ledger does not have a provision for recording vaccine manufacturer and VVM status. Some of the health facilities stocks were at one time or the other below minimum or above maximum stock and below the set minimum stock levels during period under review.

**RECOMMENDATIONS**
- Refresher training in vaccine management may be required for some health workers

**E7: Distribution**
Achieved Score – 96%
All facilities are adhering to the national policy of using coolant packs as opposed to frozen ice packs. Health workers are well knowledgeable on how to use the coolant packs. Though not very necessary, health workers are using freeze tags in vaccine carriers and refrigerators. They are well versed with the use of the fridge tags. For those facilities conducting outreach, there are well written outreach plans which in the majority of cases a followed to the dot.
**E8: Vaccine management**

Achieved Score –

**Strength**

The majority (88%) of service point health workers know when to conduct shake test. Health workers use appropriate diluent for freeze-dried vaccine (i.e. same manufacture and same number of doses as vaccine). Opened vials of freeze-dried vaccines are discarded as per the national policy - six hours of dilution or at the end of working hour, whatever comes first. Written instructions (posters and stickers) on the use of VVMs are available, well known and used for vaccine management purposes. The Multi Dose Vial Policy (MDVP) is in use and well understood. Vaccine wastage data are collected and well monitored in monthly basis. Health workers have adequate knowledge of causes of vaccine wastage in both opened and unopened vials. There are standard forms used for recording and reporting vaccine wastage. Data is systematically collected and shared to by district level. There is an effective system of disposal of waste.

**Weakness**

- 45% of health workers do not have knowledge on how to conduct a shake test despite their knowledge of when to conduct it.
- Few service points (12%) visited have no written instructions (such as posters and stickers) on the use of VVMs.
- The practice of noting the date on an opened vial of liquid vaccines is not implemented in 37% of the facilities.

**Recommendation**

- Conduct on job training to create awareness of shake test to health workers.
- Written instructions (such as posters and stickers) on the use of VVMs should be distributed to facilities that do not have them.
- Staff MUST mark the vials of liquid vaccines with the date opened.

**E9: MIS and supportive functions**

Achieved Score – 89%

Vaccine and supplies estimates are historical based on previous consumption. The majority of staff are trained on vaccine management including forecasting of requirements. Supervisory visits are paid regularly generally on monthly basis and these are documented and records maintained at health facility.

**6.5 Global recommendations**

- Systematic Temperature mapping study should be conducted and documented for all vaccine cold rooms in both Tanzania mainland and Zanzibar.
- IVD should stress on the need to conduct regular physical stock takes for vaccines and supplies to keep physical quantities matching stock record or freeze dried vaccines matching diluents.
### Annex 1 – Detailed recommendations

>Please list all recommendations, from section 6.1 to section 6.5, in the table below (add rows as required).>  

<table>
<thead>
<tr>
<th>No.</th>
<th>Levels</th>
<th>Criterion</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PR</td>
<td>E1</td>
<td>Lot release certificates should accompany all vaccine batches that come into the country and these should be archived together with all other shipping documents in the Storekeeper’s office.</td>
</tr>
<tr>
<td>2</td>
<td>PR</td>
<td>E1</td>
<td>Products Arrival Forms should be completed for all injection safety materials and copies submitted to UNICEF as confirmation that goods were received intact.</td>
</tr>
<tr>
<td>3</td>
<td>PR</td>
<td>E1</td>
<td>A formal contingency plan should be developed to deal with unexpected vaccine arrivals into the country.</td>
</tr>
<tr>
<td>4</td>
<td>PR</td>
<td>E1</td>
<td>The country needs do decide on whether or not Zanzibar should be considered a Central store receiving vaccines direct from manufactures or a Central store recieving vaccines form an inter-country store to minimize loss of points.</td>
</tr>
<tr>
<td>5</td>
<td>PR</td>
<td>E2</td>
<td>Systematic Temperature mapping study should be conducted and documented for all vaccine cold rooms in both Tanzania mainland and Zanzibar.</td>
</tr>
<tr>
<td>6</td>
<td>PR</td>
<td>E2</td>
<td>The refrigerated vehicles in the Mainland should have temperature loggers’ data downloaded and printed or stored electronically for future reference.</td>
</tr>
<tr>
<td>7</td>
<td>PR</td>
<td>E4</td>
<td>Zanzibar cold room should be connected to auto-diallers.</td>
</tr>
<tr>
<td>8</td>
<td>PR</td>
<td>E4</td>
<td>A suitable voltage regulator should be procured and connected to the Zanzibar cold room to prevent damages that might be caused by power fluctuation.</td>
</tr>
<tr>
<td>9</td>
<td>PR</td>
<td>E5</td>
<td>Zanzibar Medical Store should establish a PPM for the buildings.</td>
</tr>
<tr>
<td>10</td>
<td>All</td>
<td>E6</td>
<td>IVD should stress on the need to conduct regular physical stock takes for vaccines and supplies to keep physical quantities matching stock record or freeze dried vaccines matching diluents.</td>
</tr>
<tr>
<td>11</td>
<td>PR</td>
<td>E8</td>
<td>Capacitate store keepers in Tanzania mainland and Zanzibar on the general knowledge of the shake test.</td>
</tr>
<tr>
<td>12</td>
<td>PR</td>
<td>E9</td>
<td>Inventories for cold chain equipment should be developed for Zanzibar CVS, kept and updated regularly.</td>
</tr>
<tr>
<td>PR</td>
<td>E9</td>
<td>Zanzibar should advocate for an additional Stores Assistant to assist with issuing of vaccines and supplies at the CVS.</td>
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<tr>
<td>---</td>
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</tr>
<tr>
<td>All</td>
<td>E2</td>
<td>IVD should consider redesigning the temperature record chart to capture temperature alarms in line with the fridge tag requirements. Meanwhile health workers should be asked to improvise on the existing form the capturing of temperature alarms.</td>
<td></td>
</tr>
<tr>
<td>RVS,DVS</td>
<td>E4</td>
<td>Staff working in cold rooms should be provided with appropriate warm clothing</td>
<td></td>
</tr>
<tr>
<td>RVS,DVS</td>
<td>E4</td>
<td>All refrigerators and freezers storing vaccines should be provided with working thermometers as a back up to fridge tags.</td>
<td></td>
</tr>
<tr>
<td>RVS,DVS</td>
<td>E4</td>
<td>Tabora and Pemba should ensure that PPM for building is established and followed</td>
<td></td>
</tr>
<tr>
<td>RVS,DVS</td>
<td>E5</td>
<td>Regions without focal persons and documentary evidence for PPM for equipment should ensure these are established.</td>
<td></td>
</tr>
<tr>
<td>RVS,DVS</td>
<td>E5</td>
<td>The non-functional refrigeration units in the 8 regions above should be repaired.</td>
<td></td>
</tr>
<tr>
<td>RVS,DVS, SP</td>
<td>E9</td>
<td>Standard Operating Procedures manuals should be developed and issued out to guide health workers on key vaccine management procedures are to be carried out.</td>
<td></td>
</tr>
<tr>
<td>DVS</td>
<td>E2</td>
<td>The temperature records should be archived in each of the facility.</td>
<td></td>
</tr>
<tr>
<td>DVS</td>
<td>E2</td>
<td>Health facilities that lack documentary evidence that remedial action has been taken in case of the temperature excursion should be encouraged to document such evidence for future reference.</td>
<td></td>
</tr>
<tr>
<td>DVS</td>
<td>E3</td>
<td>The existing ILRs at Kigoma RVS which are allocated for Kigoma DVS and Kasulu DVS should be released immediately to remove the existing shortage.</td>
<td></td>
</tr>
<tr>
<td>DVS</td>
<td>E4</td>
<td>Standby generators should be provided to all district vaccine stores and should meet minimum requirements</td>
<td></td>
</tr>
<tr>
<td>DVS</td>
<td>E4</td>
<td>Appropriate Voltage regulators should be provided and connected to all refrigerators that use electricity.</td>
<td></td>
</tr>
<tr>
<td>DVS</td>
<td>E5</td>
<td>Districts which have no fully established PPM for buildings and equipment should ensure that these are established and followed.</td>
<td></td>
</tr>
<tr>
<td>DVS</td>
<td>E5</td>
<td>Routine maintenance for vehicle should be established in Rufiji and make sure it is being followed.</td>
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<td>-----------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>DVS</td>
<td>E7</td>
<td>Transport system and contingency plan during transport emergency should be established. All issuing stores should have a written transport contingency plan that describes how to deal with emergencies during distribution.</td>
<td></td>
</tr>
<tr>
<td>SP</td>
<td>E4</td>
<td>Procure and supply Segese Dispensary a refrigerator that has adequate capacity to service their catchment area.</td>
<td></td>
</tr>
<tr>
<td>SP</td>
<td>E6, E8</td>
<td>Refresher training in vaccine management may be required for some health workers</td>
<td></td>
</tr>
<tr>
<td>SP</td>
<td>E8</td>
<td>Written instructions (such as posters and stickers) on the use of VVMs should be distributed to facilities that do not have them.</td>
<td></td>
</tr>
<tr>
<td>SP</td>
<td>E8</td>
<td>Staff MUST mark the MDVP vials with the date opened.</td>
<td></td>
</tr>
</tbody>
</table>
Annex 2 – Improvement Plan

<If the improvement plan is finalised before the completion of the main report it should be included here. Please use the standard Excel template provided.>
### Names of Facilities Assessed

<table>
<thead>
<tr>
<th>Central Store</th>
<th>Regional Store</th>
<th>District Store</th>
<th>Service Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Vaccine Stores - Mainland</td>
<td>Kinondoni MC</td>
<td>KIGOGO MORAVIAN DISP</td>
<td>ST ANTONIA Verna DISP</td>
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<tr>
<td></td>
<td>Ilala MC</td>
<td>AAR CITY CENTER DISP</td>
<td>511 KJ DISP</td>
</tr>
<tr>
<td>ARUSHA</td>
<td>Longido</td>
<td>ELANG’ATADAPASH DISP</td>
<td>KAMWANGA DISP</td>
</tr>
<tr>
<td>DODOMA</td>
<td>Kondoa</td>
<td>BUSI HC</td>
<td>ITOLOLO DISP</td>
</tr>
<tr>
<td></td>
<td>Bahi</td>
<td>KONGOGO DISP</td>
<td>MUNDEMU HC</td>
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<td>GEITA</td>
<td>Chato DC</td>
<td>BWANGA H/C</td>
<td>BUZIRAYOMBO DISP</td>
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<td>IRINGA</td>
<td>Iringa DC</td>
<td>MIBIKIMITALI</td>
<td>TOSAMAGANGA</td>
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<td>KAGERA</td>
<td>Ngara DC</td>
<td>MURUBANGA DISP</td>
<td>KASHARAZI DISP</td>
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<td>Kasulu DC</td>
<td>KINAZI</td>
<td>MUYANA</td>
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<td>MSIMBA DISP</td>
<td>NYARUBANDA DISP</td>
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<td>Hai DC</td>
<td>NARUMU DISP</td>
<td>LUKANI DISP</td>
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<td>MANYARA</td>
<td>Kiteto DC</td>
<td>NDEDO DISP</td>
<td>KIPERESA DISP</td>
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<td>Musoma DC</td>
<td>NYAKATENDE DISP</td>
<td>SEKA DISP</td>
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<td>Mbarali DC</td>
<td>NSOMANGA DISP</td>
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<td>ITENSA DISP</td>
<td>NDANYELA DISP</td>
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<td>Mvomero DC</td>
<td>MKATA &quot;A&quot; DISP</td>
<td>MANGAE DISP</td>
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<td>NGUMO HC</td>
<td>NYAMIGAMBIA DISP.</td>
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<td>MWANZA</td>
<td>Nyamagana MC</td>
<td>TAMBUKARELI DISPENSARY</td>
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<td>PWANI</td>
<td>Rufiji DC</td>
<td>CHUMBI DISP</td>
<td>NGORONGO DISP</td>
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<td>RUVUMA</td>
<td>Songea DC</td>
<td>LITOWA DISP</td>
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<td>MADABA HC</td>
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<td>Msalala/Kahama</td>
<td>Mwalugulu Dispensary</td>
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<td>BUDEKWA DISP</td>
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<td>Manyoni DC</td>
<td>SANJARANDA DISP</td>
<td>MKWESE DISP</td>
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<td>Igunga DC</td>
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<td>MWANYAGULA DISP</td>
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<td>TANGA</td>
<td>Muheza DC</td>
<td>MKANYAGENI</td>
<td>KIGONGOMAWE</td>
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Central Vaccine Stores - Zanzibar

<table>
<thead>
<tr>
<th>North B</th>
<th>Misufini</th>
<th>Mahonda</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pemba</td>
<td>Micheweni</td>
<td>Makangale</td>
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<tr>
<td></td>
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<td>Konde</td>
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### Revision history

<table>
<thead>
<tr>
<th>Date</th>
<th>Change summary</th>
<th>Reason for change</th>
<th>Approved</th>
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<tbody>
<tr>
<td>1 July 2011</td>
<td>Section 2.1, p 7 amended</td>
<td>Comments received</td>
<td></td>
</tr>
<tr>
<td>26 June 2012</td>
<td>General version 2 revision:</td>
<td>Arising from comments received during and after the NY CCL workshop in Nov-Dec 2011.</td>
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</tr>
<tr>
<td></td>
<td>• a standard abstract has been added</td>
<td></td>
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<tr>
<td></td>
<td>• the Executive summary is now the first item in the table of contents</td>
<td></td>
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<tr>
<td></td>
<td>• brief guidelines as to what the executive summary should contain have been added</td>
<td></td>
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<tr>
<td></td>
<td>• a short standard description of the rationale and process of the EVM assessment has been added to the Executive summary</td>
<td></td>
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<tr>
<td></td>
<td>• instructions have been added to the <em>Site selection</em> sub-section to include a description of any deviations from random sampling</td>
<td></td>
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<tr>
<td></td>
<td>• a new section, <em>Previous assessments</em>, has been added, with sub-sections <em>Key assessment findings</em>, <em>Key recommendations</em>, and <em>Progress on Recommendations</em></td>
<td></td>
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<tr>
<td></td>
<td>• a new section, <em>Supply chain development</em>, has been added</td>
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<tr>
<td></td>
<td>• the old sections <em>Overall Findings</em> and <em>Detailed analysis and conclusions</em> have been combined into one section <em>Assessment findings and recommendations</em>, in which the findings and recommendations are presented on a level-by-level and criterion-by-criterion basis, and,</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>• The annex <em>Detailed recommendations</em> now has a tabular format (to facilitate the development of an improvement plan).</td>
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</tbody>
</table>