Assessment cum Training of Vaccine and Cold Chain Management in Orissa- A VMAT Study

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ABBREVIATIONS AND GLOSSARY

ADMO	Assistant District Medical Officer
BPL	Below Poverty Line
BVS	Block Vaccine Store
°C	degree Celsius
CCC	Cold Chain Consultant
CCM	Cold Chain Monitor
CCO	Cold Chain Officer
CDMO	Chief District Medical Officer
CFC	Chlorofluorocarbon (ozone depleting substance)
CHC	Child Health Centre
CI	Critical Indicator (in EVSM and VMAT)
DIO	District Immunization Officer
DT	Down Time
UIP	Universal Immunization Programme
EVSM	(WHO-UNICEF) Effective Vaccine Store Management initiative
FEFO	First to-expiry-first-out
GTN	Global Training Network
ILR points	Both ILR+ DF available
MI	Medical Institution
MO	Medical Officer
MHU	Mobile Health Unit
MMU	Mobile Medical Unit .
MQP	Model Quality Plan (module 2 of EVSM)
NRHM	National Rural Health Mission
PHC	Primary Health Centre
OPV	Oral Polio Vaccine
PO	Project Officer
PPC	Post Partum Centre
RT	Response Time
RVS	Regional Vaccine Store
SIO	State Immunization Officer
SOP	Standard Operating Procedure
SVS	State Vaccine Store
UNICEF	United Nations Children's Fund
VAR	Vaccine Arrival Report
VM	Vaccine Management
VMAT	(WHO-UNICEF) Vaccine Management Assessment Tool
VVM	Vaccine Vial Monitor
IPPI	Intensified Pulse Polio Immunization

ACKNOWLEDGMENTS

The Orissa Vaccine Management Assessment is first VMAT study of India. This was possible only due to the generous hospitality, guidance and support of the Department of Health and Family Welfare, Govt of Orissa, NRHM Orissa, Immunization division of MOH&FW, New Delhi and an active collaboration of UNICEF.

EXECUTIVE SUMMARY

BACKGROUND

Since last five years there has been a consistent rise in the immunization coverage in Orissa. Percentage of children in the age group of 12-23 months covered with all antigens has increased from 36 to 51.8 by NFHS 3(2006)[1].CES-2006 gives coverage for full immunization at 74.0 %, Bacille Calmette Gueren (BCG) 96.2% and Measles 85.8 %[2]. There is also significant reduction in dropout rate out from 14 % to 11%. Some of the key factors of improving immunization coverage are dedicated grassroot level female health workers, adoption of fixed day - fixed site approach, better cold chain infrastructure and greater emphasis on immunization by the state government.

However, for effective implementation of the Universal Immunization Programme (UIP) certain key factors like Cold Chain and Vaccine Management needs greater focus and attention as the success of the UIP lies in delivering potent vaccines to the child.[3]

Reviews and assessment in the past like: UIP Review (2004), Performance Need Assessment (PNA) Survey for Immunisation (2005)[4] and routine monitoring of Immunization by UNICEF and officials of Department of Family Welfare (DFW), Orissa has identified management and logistic gaps in Cold Chain and Vaccine Management. There have even been stock outs of antigen at some places compromising the immunization programme, while the same antigen has been in excess at other locations.

UNICEF has been actively collaborating with the Department of Health and Family Welfare (DH&FW) of Orissa to strengthen its immunization programme through several innovative strategies. Considering the importance of vaccine management and logistics, UNICEF has initiated steps to strengthen the Cold Chain and Vaccine Management all over the state. To begin with WHO/UNICEF Vaccine Management Assessment Tool (VMAT)[5] has been adopted for a systematic assessment and capacity building of the departmental staffs.

THE TOOL

The VMAT is designed to investigate vaccine management knowledge and practices amongst health staff operating at national, sub-national (state level or regional) or intermediate (district) and service delivery (block) levels. It is based on the data and practices of the last six months. The tool helps assessors to identify and document the areas of strengths and good practices. It also helps to identify major knowledge and performance gaps in a consistent format. Targeted support and training can be provided to overcome these deficiencies.

[1] Govt. of India,Ministry of Health & FW, NFHS-3, 2005-06, New Delhi
[2] Govt. of India / UNICEF, Coverage Evaluation Survey, 2006, New Delhi
[3] Govt. of India, Ministry of Health & FW, September 2004, UIP review, National and State Report, New Delhi
[4] Govt. of India, Ministry of Health & FW, October 2005, Performance Need Assessment of Basic health care workers of Immunization in India, New Delhi
[5] WHO/IVB/05.02,2005, Vaccine Management Assesment, Geneva

The tool is based upon eleven global criteria essential for a performing vaccine and cold chain management system. These are listed below:

1. **Vaccine arrival procedures**
2. **Vaccine storage temperatures**
3. **Cold storage capacity**
4. **Buildings, cold chain equipment and transport**
5. **Maintenance of cold chain equipment and transport**
6. **Stock management**
7. **Effective vaccine delivery**
8. **Correct diluents use for freeze dried vaccines**
9. **Effective Vaccine Vial Monitor (VVM) use**
10. **Multi-Dose Vial Policy (MDVP)**
11. **Vaccine wastage control**

Grouped under each criterion there are a set of specific questions which are applied to the different levels of vaccine supply chain within the health system (State Vaccine Store (SVS) or Regional Vaccine Store (RVS), District Vaccine Store (DVS) and Block Vaccine Store (BVS) and to which one attributes a mark, i.e. (either zero (no), one (yes) or n/a (not applicable). The sum of these marks is then normalized to give an overall score for each criterion on a scale of 0 to 100 % by the software. These scores are then used to depict graphically on a spider web the strengths and weaknesses of a state's vaccine management systems.

THE METHODOLOGY AND IMPLEMENTATION

The Objective of the Vaccine Management Assessment of Orissa using the VMAT is to identify:

- **Strengths and good practices**
- **Major knowledge gaps**
- **Major performance gaps**
- **Resource and training needs**
- **Develop internal capacity of the system to conduct similar self-assessment periodically.**

To achieve this objective, as a first step, 26 health department staffs were given a three-day training (class room and field visits) on the use of the VMAT to conduct assessments at different levels so as to apply it periodically through self-assessment in future.

This was followed by formation of six teams where each team consisted of four members (one- Assistant District Medical Officer (ADMO-FW/Cold Chain Officer(CCO), one- Cold Chain Technician (CCT) , one- District Vaccine Handlers and one- RVS Coordinator) conducted the assessment of the SVS, six RVSs, 10 DVSs, 27 BVSs and five Urban Post Partum Centres (PPCs) to get a fingerprint of the current status. All the six teams were observed and supported by two facilitators through personal visit and telephonic communication. The collected information was inserted in the VMAT software tool. The resulting graphs were discussed and analysed with the team leaders collectively. The strengths and weaknesses in the cold chain and vaccine management were discussed and team leaders defined lists of recommendations to address the identified weaknesses and enhance the performance of the system.

This document reports on the entire range of activities starting from the induction training, followed by the field assessment, the collected results, the final outcome of the analysis and the recommendations.

THE FINDINGS

The table 1 below provides the respective consolidated score that resulted from the assessment of the SVS - Bhubaneswar, six RVSs, 10 DVSs 27 BVSs and five PPCs. Details of the individual findings and weaknesses given in the section on findings in the report, with summarization of the salient aspects.

☞ **The performance at most levels is just satisfactory for global criteria nos. 2 to 5. This is largely due to the following positive aspects:**

- Satisfactory manual records,
- Sufficiency of storage capacity based on the supplies received and delivered,
- Most equipment have been in running conditions and have not failed to a point of risk to vaccines
- There have not been any written records of vaccine wastage (though there has been wastage).

Table 1. Summary of consolidated scores at different levels with Colour coding of scores: 0 to 70% - Red; 70 to 90% - *Black Italics*; Greater than 90% - Green bold

Global Criteria No.	Indicator	SVS	RVS Average	DVS Average	BVS Average	Urban PPC Average
2	Vaccine storage temperature	*82*	**66**	*74*	*79*	**49**
3	Cold store capacity	*75*	*82*	*82*	*86*	*80*
4	Building, cold chain equipment and transport	*80*	*71*	**67**	*75*	*81*
5	Maintenance of cold chain equipment and transport	*77*	*78*	*77*	*79*	*83*
6	Stock management	**59**	**46**	**48**	**40**	**29**
7	Effective vaccine delivery	**32**	**40**	**41**	**52**	**49**
8	Correct diluents use for freeze dried vaccines	**100**	**45**	**33**	**48**	**38**
9	Effective VVM use	**91**	**99**	**97**	*87*	*82*
10	Multi-Dose Vial Policy (Not Applicable)	NA	NA	NA	NA	NA
11	Vaccine wastage control	**21**	**16**	**24**	**19**	**1**

☞ **The score is rather poor and a cause of concern for global criteria nos. 6, 7, 8 and 11 except for criterion 8 at SVS where the management of diluents is well done. The most serious weaknesses that are limiting the performance and which need to be addressed are:**

- All records of vaccines and especially diluents are not maintained. Unless this is done, it would be very difficult to follow up on any serious Adverse Effect Following Immunization (AEFI),
- There have been stock outs of antigens that have interrupted immunization programs. These have occurred for two antigens. In the case of BCG there has been excess stock at state store while at block levels there have been stock-outs. For DPT the stock outs have occurred all

through the system due to untimely and insufficient supply from the Government of India (GoI). The irregular supply to the SVS has also caused irregularity of deliveries to the lower stores.

- There are large mismatches of quantities of vaccines and their corresponding diluents at several vaccine stores
- Physical verification of stocks is never carried out
- Staffs are not trained in proper conditioning of Ice Packs (IP). Hard frozen IPs used for deliveries of all vaccines including the freeze sensitive T series vaccines. These increases chances for the vaccines to become impotent at the end of the journey
- Diluents are cooled just before using them for reconstitution of freeze dried vaccines.
- Wastage is neither well understood nor recorded so that the information is used properly to combat and reduce wastage.
- The score for criterion no. 9 on VVM is good as most staffs are well familiar with the use of VVM and its application in the management of vaccine logistics – thanks to the IPPI campaigns.

☞ **The global criteria no. 10 on Multi Dose vial Policy is not adopted by Govt. of India, and hence does not apply to Orissa.**

RECOMMENDATIONS

The thorough study of the weaknesses and gaps led to a set of recommendations that are given in details in the corresponding section of the report. The recommendations have been categorized into:

(a) Infrastructure, equipment and staff (b) Practices to be introduced and maintained, (c) Capacity building and (d) Sustaining the quality.

In each of these categories, a priority has been defined between 0 and 4 for each recommendation. These are defined as:

0: Most urgent, to be implemented without any delay;

1: Urgent, to be implemented within three months;

2: Important, to be implemented within six months;

3: To be implemented within a year and finally;

4: To be implemented within next two to three years.

Implementing them would ensure enhancing the performance of the total vaccine management and ensuring a greater success of the entire immunization programme.

The most urgent and vital recommendations, which need immediate implementation, are given in detail below with summary of other recommendations. The details of the latter may be referred in section 7 of the report.

Table 2. : I - Recommendation on Infrastructure, Equipment and Staff

Priority	Major Gaps	Action
0 (Most Urgent)	WIF and WICs contain large quantities of vaccines whose storage temperature need to be monitored continuously. The seven day graph chart recorders are not working in six out of seven WIC and the WIF. The required stationary is also not available. This is causing a serious gap in having continuous records of storage temperature of the vaccines to ensure their safety.	➢ Get all non functional graphic chart recorders into working order and provide the necessary stationary for them. Start taking records of the WICs and WIFs in 24/7 and 365 days in continuous manner.
0 (Most Urgent)	None of the WIC or the WIF has a working sound alarm that can alert the store keeper or any individual through an alerting signal when the temperature rises to unsafe limits. Some of them (Ganjam and Phulbani RVS) have just an alarm in the form of a light getting lit. However, this is not effective to alert anyone who is not close to its vicinity. Due to this and non-functioning of the auto-start of the back-up generators, there is no means to keep the temperature under recommended limits during power failures.	➢ Have all acoustic alarm put in to operation. ➢ Optical alarms should not be used.
0 (Most Urgent)	In many RVS and several DVS the back-up generators are not functioning. Back up generators are needed to ensure proper running of refrigeration units in case of power failures.	➢ Set the generators at each RVS and DVS into operation. ➢ DVSs that do not have generator should be provided with one. ➢ Sufficient financial support should also be provided for the procurement of diesel to run these generators. ➢ Auto-start mechanism to be repaired for all generators - especially at RVS levels so that large stocks of vaccines are always maintained at recommended temperatures.
0 (Most Urgent)	There are several equipments which are not in proper working conditions. Several ILRs particularly the old models cause heavy frost and put the vaccines at risk of freezing. Such obvious hazards to the vaccines should be addressed immediately.	➢ A special drive should be taken to rectify or replace all the non-functioning or badly functioning equipment

The above recommendations are on top priority as currently absence of these aspects are putting large volumes of vaccines at risk in case of power failures.

The other recommendations in this category are:

- Providing adequate space to several vaccine stores which are currently having very inadequate space for working and storage,
- The second cold room needs to be put into operation at the SVS,
- Replacement of CFC based ILRs which have been found to be causing freezing of vaccines at the BVS,
- Appointment of adequate staff to handle the load at each level,
- Appoint one refrigeration technician for each district,
- In the long run, the temperature monitoring at the SVS should be computerized and
- For a smooth and assured immunization programme for the next decade, the state should plan and build a dedicated vaccine store at the state level based on the WHO recommended model quality plan (EVSM Module 2).[6]

I. Recommendation on Practices

Most recommendations are categorized under 1 to 3 level of priority. These relate to:

- Proper use of vaccine stores;
- Correct management and use of diluents especially prior to reconstitution;
- Proper recording of vaccines and diluents and their physical verification, including use of batch cards;
- Regular temperature monitoring;
- IP freezing and conditioning;
- Defining and practicing contingency plans;
- Defining and implementing preventive maintenance plan for each and every equipment with appropriate log book;
- Evaluation of equipment condition;
- Self assessment of the vaccine logistics using VMAT and other software like RIMS[7] to monitor vaccine stocks;
- Implementation of safety stocks at each level and use of revised indent forms;

II. Recommendation on Capacity building

The recommendations that need top priority actions are:

Priority	Area	Action
0 (Most Urgent)	Supplies	➢ To ensure that reconstituted vaccines remain in good and recommended condition for 4 hours, the staffs need to be trained on proper management of diluents during usage.
0 (Most Urgent)	Transport	➢ To ensure that vaccines are transported without any risk of freezing, the staffs need to learn proper conditioning of ice packs.

[6] WHO/IVB/04.16-20,2005, WHO-UNICEF Effective Vaccine Store Management Initiative : Modules 1-4, Geneva
[7] Govt. of India, Ministry of Health & FW, Guidlines for Routine Immunization Monitoring System, 2006 New Delhi

The other recommendations in this category are related to training on:

- Proper storage of vaccines and their sensitivity to freezing;
- Management of diluents during storage and distribution;
- IP freezing and conditioning;
- Proper monitoring of equipment storing vaccine – its proper operation and temperature recording;
- Calculation of safety stocks to avoid situations of stock-outs;
- Use of new forms (indenting, batch card, service logs);
- Use of Freeze indicators to ensure safety of freeze sensitive vaccines;
- Monitoring /reduction of vaccine wastage for use in future;
- On the long run, vaccine use and its storage should be made an integral part of the nursing curriculum.

WAY FORWARD

To ensure that the implemented recommendations are being sustained, there is a need to put in place a monitoring system. The monitoring and reporting should be regular and effectively carried out.

- **First the VMAT tool should be used for quarterly self-assessment at every level, for this the staff now trained in VMAT should be appointed to train the vaccine handlers and store managers at different levels and the use of VMAT.**
- **The district ADMOs, the DIOs, the CCO, CCC and the RVS coordinators should be involved at different levels of monitoring and analysis of the results.**
- **For the immunization programme to be implemented in an effective manner, the Government should allot one full time dedicated State Immunization Officer (SIO) in the state level and also one District Immunization Officer (DIO) in each district. They must treat this occupation as their principal activity and not be distracted with any other priorities.**
- **The State CCO should be self-driven, dynamic, competent and committed, who can dedicate significant time to move across the state on inspection visits. He must have a logical thinking for strengthening vaccine logistics and cold chain system of the state and should assume greater ownership of the responsibility for the improvement and good performance of the cold chain and vaccine logistics.**
- **Much is needed and unless adequate rapid action being taken now, the immunization programme is bound to be compromised in the years to come and the children of Orissa would not get proper immunization services.**
- **As a very first step it is recommended that the DH&FW should define an action plan with clearly defined time frames to implement the recommendations given in the report.**

Let us care for the vaccines for the sake of our children

INTRODUCTION

Orissa is a medium sized state in the eastern part of India. Approximately 30% of the state is inaccessible due to geographical barriers. The demographic profile shows that around 22% of the population is tribal, 17 % Scheduled Caste (SC) and 48% of the population is below poverty line (BPL).[8]

There are 30 districts and 314 blocks in the state. Immunisation services are delivered through 30 District Head Quarter Hospitals (DHH), 2 Major Urban Hospital, 22 Sub Divisional Hospitals (SDH)s, 117 Area Hospitals, 120 Other Hospitals, 231 Community Health Centre (CHCs), 1162 PHCs, 14 Mobile Health Unit (MHU)s and 6688 Sub Centers.[9] Each ANM organize at least four immunisation sessions in a month in the Sub Center area. There are one SVS, six RVSs, 30 DVSs and 1088 ILRs points. The existing six RVS has been expanded to seven with one new addition at Bolangir for western Orissa districts.

Orissa's immunization coverage is consistently increasing since last five years. Every year 8,306690 infants and 9,87823 pregnant mothers receive immunization. Percentage of children who have received full immunizations by 12-23 months has increased from 36% in NFHS 1 (1998) to 51.8 % in NFHS 3 (2006). CES-2006 gives coverage for full immunization of 74.8 %, BCG 96.2% and Measles 85.8 %[2]. There is also reduction in dropout percentage from 14 % to 11%. Some of the key factors of improving immunization coverage are dedicated female health workers, adoption of fixed day - fixed site approach, better cold chain infrastructure and greater emphasis on immunization by the state government.

However, certain areas still need attention for an effective implementation of the UIP, which can provide quality immunization services. One of the key issues that need to be recognized is that the cold chain and vaccine management are the very backbone of Immunization Programs. But it has not drawn much attention of the programme managers and policy makers. Unless the vaccine delivered to the child is potent, its effectivity will be compromised, jeopardizing the entire immunization programme. All the reviews and assessment in the past like: UIP Review (2004), PNA Survey for Immunisation (2005), and Routine Monitoring of Immunisation by UNICEF and Officials from DFW-Orissa has identified repeated severe cold chain &Vaccine logistics management gaps: for eg. there have even been stock outs of antigens at some places compromising the immunization programmes, while the same antigen has been in excess at other locations.

UNICEF has been actively collaborating with the Department of Health and Family Welfare of Orissa to strengthen its immunization programme through several strategies like strengthening the capacity of the programme managers, health workers training, micro-planning, development of technical guidelines, monitoring and facilitating state immunization PIP development. To strengthen the cold chain and vaccine logistics UNICEF supported regular review of cold chain technician and district vaccine handlers, provided need based financial support for spare parts and equipments and in few places supplying back-up generators. UNICEF focus has been to improve the coverage.

However, recently it was felt from field experience that strengthening of cold chain and vaccine logistics management system is the need of the hour for a reliable, qualitative immunization programme. Hence some efforts have been made to strengthen it. Supporting implementation of Routine Immunization Monitoring Software (RIMS), deployment of immunization coordinators to 12 high priority low performing districts & deployment of RVS coordinators for each RVS for better planning and management through NRHM/DFW , external monitoring of routine immunization including cold chain monitoring through Medical Colleges are some of the initial steps adopted in 2007.

As an additional step, UNICEF has initiated an activity targeting the improvement of vaccine logistics and cold chain management throughout the state through a systematic assessment. For this purpose it has

[8] Govt. of India, Orissa Census Data 2001, New Delhi

[9] Directorate of FW Govt of Orissa, Special information on Health Infrastructure of Orissa, Year book 2006-07, Bhubaneswar

adopted the Vaccine Management Assessment Tool (VMAT) developed from the WHO-UNICEF Effective Vaccine Store Management (EVSM) initiative.

1. Objectives of Vaccine Management Assessment

The objective of such an assessment is to identify the following aspects:

- Strengths and good practices
- Major knowledge gaps
- Major performance gaps
- Resource and training needs
- Develop internal capacity of the system to conduct similar self assessment periodically.
- Strengthen future planning & prepare the system for storage space and management of future vaccines like Hepatitis B (Hep B), Measles & Rubela (MR) and 2nd Dose of Measles etc.

To achieve this objective, the first step is to train a certain number of health department technical staff in the use of the VMAT so as to apply it periodically through self-assessment and it should be followed by an assessment exercise to get the knowledge of the current status. This needs to be followed with a partial assessment to get a feel of the current status. The analysis of the result will help define the future course of action to improve and ensure good level of vaccine logistics.

Keeping the above in mind, the current assignment was organized by UNICEF from 6 to 24 December 2007. This document reports on the entire activity starting from the induction training till the final outcome of the analysis with recommendations.

2. The Tool

The VMAT is developed by the Vaccine Management Training Network (VMTN) team to help countries to improve the quality of their vaccine management down to the service delivery level. The modules complement the package of guidance, assessment and training materials developed for the initiative for Effective Vaccine Store Management (EVSM), which focuses on vaccine management at national primary stores.

For Orissa, different manufacturers and the national primary store (Government Medical Store Depot – Kolkata and occasionally Kranal store) supply vaccines to the state vaccine store (SVS), which in turn supplies to the regional vaccine stores (RVS). The latter supplies to several DVS within its region. Finally the DVSs supply to the BVS along with the ILR points which lie under its geographical zones and which conduct immunizations.

The purpose of VMAT is to assess vaccine management knowledge and practices amongst health staff operating at national or primary level (state store), sub-national or intermediary (RVS, DVS) and service delivery levels (BVS). It bases itself on the data and practices over the last six months. The tool helps assessors to identify and document the areas of strengths and good practices. It also helps to identify major knowledge and performance gaps in a consistent format. Targeted support and training can then be provided to overcome these deficiencies.

The tool is based upon eleven global criteria listed below. Of these the first seven has been derived directly from Effective Vaccine Store Management (EVSM) initiative. Criteria 8, 9 & 11 are implicitly part of EVSM but have been identified as separate indicators for assessment at periphery levels.

A criterion 10 on MDVP has been added. But the policy on MDVP not being adopted by GoI for Routine Immunisation.

The eleven global criteria for a performing vaccine and cold chain management system are

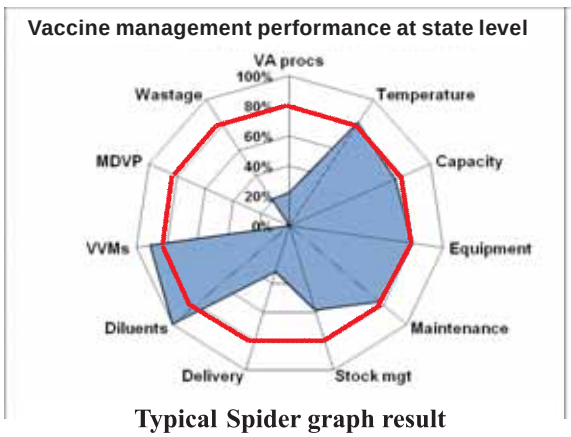
1. **Vaccine arrival procedures**
2. **Vaccine storage temperatures**
3. **Cold storage capacity**
4. **Buildings, cold chain equipment and transport .**
5. **Maintenance of cold chain equipment and Transport.**
6. **Stock management**
7. **Effective vaccine delivery**
8. **Correct diluents use for freeze dried vaccines**
9. **Effective VVM use**
10. **Multi-Dose Vial Policy (MDVP)**
11. **Vaccine wastage control**

Grouped under each criterion there are a set of specific questions which are applied to the different levels of vaccine supply chain within the health system (SVS or RVS, DVS and BVS) and to which one attributes a mark corresponding to the answer: 0 (no), 1 (yes) or n/a (not applicable). The sum of these marks is then normalized to give an overall score for each criterion on a scale of 0 to 100 %.

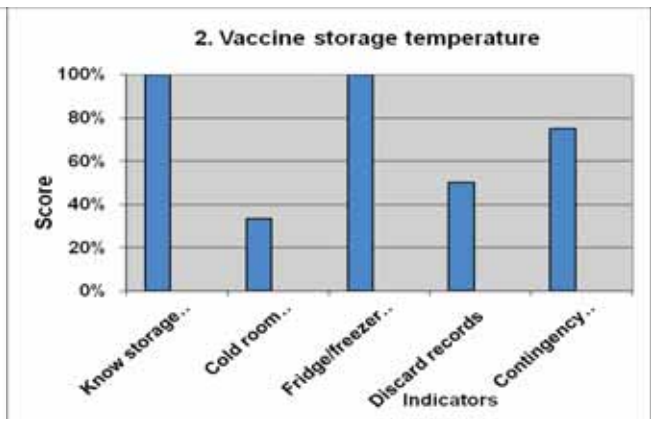
These scores are then used to depict graphically on a spider web the strengths and weaknesses of a country's vaccine management systems. The graph below shows the result of the assessment at SVS. A minimum of 80% score is recommended for each criterion as shown by the red polygon in the graph. In summary one can see that the performance of some criteria are above 80% while those that are below 80% are a cause for concern and need to be addressed.

The individual criteria are also plotted in bar graphs in terms of status of specific indicators. An example of one bar graph for the indicators of criterion 2 (vaccine storage temperature) corresponding to the spider chart is shown alongside the spider graph. This graph depicts the status of performance for the 5 core indicators verified under this criterion.

It can be seen that the score is good only for the knowledge of the store keeper and the temperature monitoring of ILR and DF. The score for the other 3 indicators is poor. Note that the weightage of the different indicator being different, the total score corresponds to about 80% as shown on the spider chart on the left.



Typical Spider graph result (state vaccine store at Orissa)



Corresponding Bar chart result for criteria no. 2

NB. Criteria 1- Vaccine arrival procedures apply only to a primary national store receiving vaccines from overseas or directly from the manufacturer. Govt. of India has not adopted MDVP (criteria 10). Hence criteria 1 and 10 are not assessed while conducting a state assessment.

3. The Methodology

The first three days were dedicated to induction of health staff in the VMAT, through a combination of debriefing presentation, group works, field visits during the afternoons, role plays and presentations by

participants, a methodology recommended by the Global Training Network (GTN). Annex-A provides the detailed agenda.

The field training was carried out by dividing the entire group into four teams and conducting visits to four vaccine stores SVS - Bhubaneswar, two DVS: Cuttack and Khurda and one BVS: Mohidarapara. The teams were constituted of one cold chain Tech/Foreman , one Statistical Assistant/ Investigator responsible for District vaccine store, RVS coordinator and one ADMO-FW and other staff from the Directorate of FW. The teams were permuted among the different facilities on the three days as given in annexure B. One senior person in rotation who facilitated the assessment accompanied each team. The aim of the fieldwork was to exercise the VMAT to assess the respective stores and bring back the answers to the questions in the tool for further discussion and analysis.

On each day only three or four out of 11 global criteria and their detailed questions were presented, discussed and used for the assessment. After the field visit the experience of the participants at different levels i.e. SVS, DVS and BVS and the results collected were discussed in detail and complemented with the observations of the consultant.

Different objectives were targeted through the 3 days induction:

- Training the health staff to use the tool to assess a specific facility (SVS, RVS, DVS and BVS)
- Collect data from the different facilities visited
- Consolidate the data and analyse the same
- Guide the participants for better data collection
- Draw major conclusions on the preliminary data.

At the end of each day the participants provided their evaluation of each activity of the day.

At the end of the third day the facilitators presented the following week's work plan for assessment six RVS, 12 DVS and at least 20-24 BVS (more if time permits) besides the SVS in the fields.

It was agreed with the UNICEF Health Officer, Dr. Dutta and DD-MCH, Dr. Nath that it was more important at this stage to ensure that the participants are fully trained in the correct manner of assessment and to get complete data as possible from the RVS and selected sampled DVS and Blocks.

While conducting the assessment and analyzing as time was available, one more elements was introduced. ie five urban PPCs of 3 big town (Cuttack, Rourkeala and Berhampur).

4. Implementation

4.0. Induction training

Classroom sessions on *VMAT*

The induction programme was successfully completed within the given time frame. A total of 26 participant attended the training. Annexure C gives list of the participants. They all worked from 9 am to 8 pm all three days. All with only 2 exceptions attended all the sessions and participated actively. The active involvement enhanced their level of confidence in the use of the tool each day.

Field exercises using *VMAT*

On reviewing and analysing the data collected each day, the consultant could guide the participants on improving the quality of data collection and safeguarding against reporting incomplete or incorrect data.

Some of the important aspects stressed were:

- To take the store managers into confidence,
- To report factual information based on what is seen. This is important to avoid misinterpretation of results,
- To provide sufficient comments to support the score given to every question - especially if it is zero,
- To verify all information as much as possible based on documented records,
- To conduct physical verification for functionality of the equipment,
- Not to disturb or correct any existing practice unless one is sure of it and it is drastically incorrect (eg. conditioning of ice packs),
- Not to tamper with any equipment (thermostats) unless one is a authorised technician.

4.1. Field assessment

The survey exercise was conducted from 10-15 December. Six teams were formed each consisting of one Cold Chain Tech/Foreman , one Statistical Assistant/ Investigator responsible for District vaccine store, one RVS coordinator and one ADMO-FW as described in Annex-D. Each team covered 1 regional store, two of their respective districts and 3-5 corresponding block stores. In addition the state vaccine store (SVS) and 5 urban health centres (PPCs) of Cuttack, Rourkela and Behrampur were also assessed. Two facilitators (UNICEF hired international consultant Dr. K. Prasad and Health Officer Dr. S. Dutta) travelled independently and switched from one team to another to ensure that correct practice was being used to collect the data. In particular, they verified that the data was genuine, backed up with photos wherever possible. It was also important part of the exercise to ensure that the defects were not being concealed and specially, that the wrong practices are captured through the assessment and corrected on the spot. Mr. S. C. Jena - CCO took care of his own team in the far southern region of Koraput which was beyond the access of the other two facilitators in the given short duration.

4.2. Data consolidation

After the completion of the field assessment, the results were collected from the team leaders on 17th December. The data were verified for their correctness and completeness with each team leader and some team members who were present during this meeting.

One of the participants Ms. Trupti Mishra, who was trained for data entry in excel VMAT software helped in consolidation of the data in the software package of VMAT. At a first level, one file was created for the SVS.

Different file was created, one for each region with its respective RVS, DVSs and BVSs. This generated for each region the consolidated spider chart at RVS, DVS and BVS levels. These are given in the Annex- F1 to F6. The results of the 5 urban PPCs were used to generate a separate spider chart for that category of service level.

Then the scores emerging for the six RVSs were averaged to generate the consolidated RVS spider chart. Likewise, the scores of the 10 DVS and 27 BVS belonging to the six regions were respectively averaged to determine the consolidated spider chart at DVS and BVS level. The consolidated graph are given in the next section. The details of the scores used for averaging is given in the Annex-G.

Meeting with the team members for analyzing results

A second meeting with the team leaders was again held on the 20th December to discuss the scores of each level. The consultant helped the team members to think through the reasons for good and poor scores and come up with recommendations to enhance the performance.

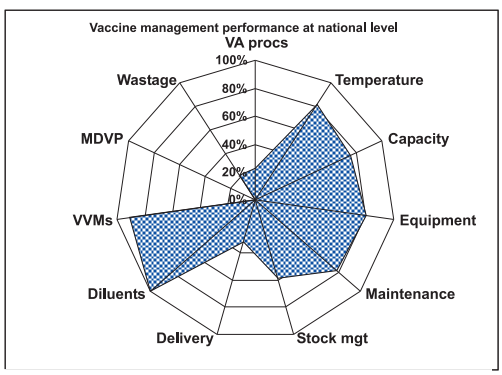
On 22nd December, a session was organised for debriefing the authorities of the Department of Health and Family Welfare and all the participants on the assessment results and emerging recommendations. Annex- E gives the list of members present at this final session.

Debriefing of the results to the authorities and the participants

The next section gives the details of the findings - the strengths and weaknesses at different levels. This is followed by the set of recommendations identified for improving the performance.

5. Findings

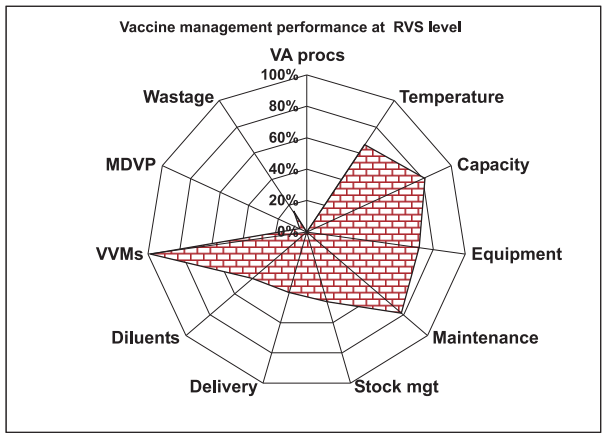
5.0. General



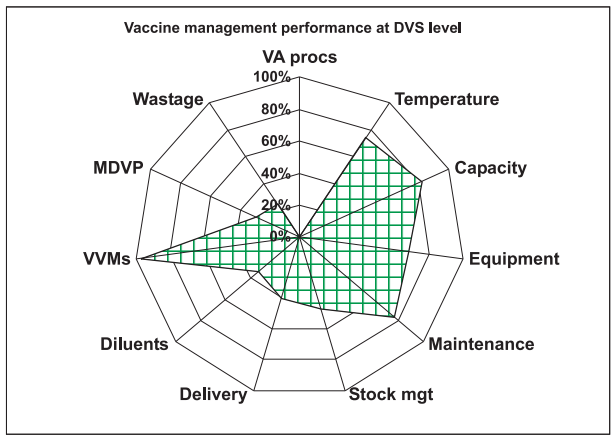
State vaccine store - SVS

The findings of the assessment in the form of spider chart are given below. The adjacent graph is that of the SVS, then below are the consolidated results of six RVSs, their corresponding DVSs, BVSs and Urban PPC.

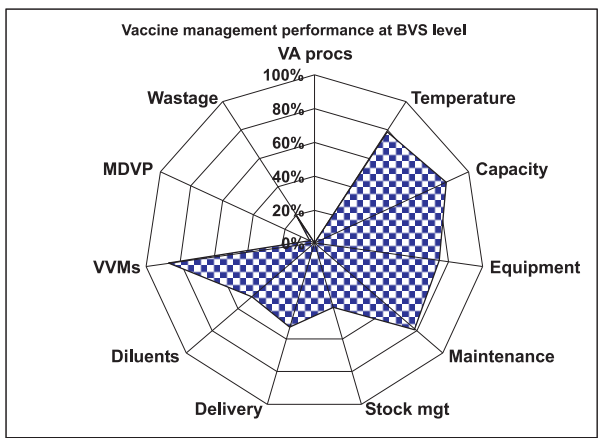
The detailed chart of each RVS, DVS and BVS corresponding to each region is given in Annex-F1-F6 along with the table with the corresponding scores in Annex-G.



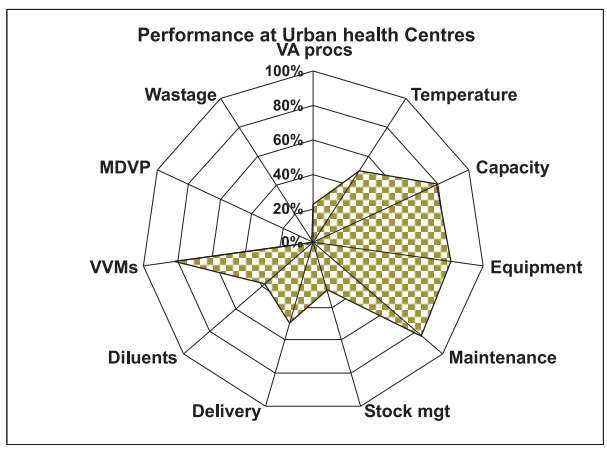
Consolidated result for 6 Regional stores



Consolidated result for 10 District stores



Consolidated result for 27 Block Vaccine stores



Consolidated result of 5 Urban health centres

These findings are discussed below on the basis of the assesment, the spider graphs and the bar graphs obtained for each of the global criteria at the different vaccine store levels. First the strengths are listed followed by the weaknesses that need redressal. The recommendations for improving the performance is given in the next section.

5.1. Pre-shipment and arrival procedures

This indicator assesses the process of vaccine arrival from the manufacturer to the primary store. It verifies the proper receipt and recording of all pre-advice and arrival documents through the Vaccine Arrival Reports; the smooth clearing at the customs and adequate functioning by a clearing agent if engaged in the process.

This criteria is applicable to national primary stores. As it is not applicable at state level primary store, it is not covered in this assessment and report.

5.2. Temperature Monitoring

All vaccines are sensitive biological substances. The higher the temperature to which the vaccine is exposed, the quicker is the loss of potency. Some vaccines are also sensitive to freezing like T-series, and this can cause irreversible damage.

The only way to ensure that vaccines have been stored at the correct temperature at all times is by having twice daily temperature recording at all stores having vaccines. In case of any danger

(temperature variation beyond prescribed limit), the vaccines can be saved using an adequate and ready contingency plan.

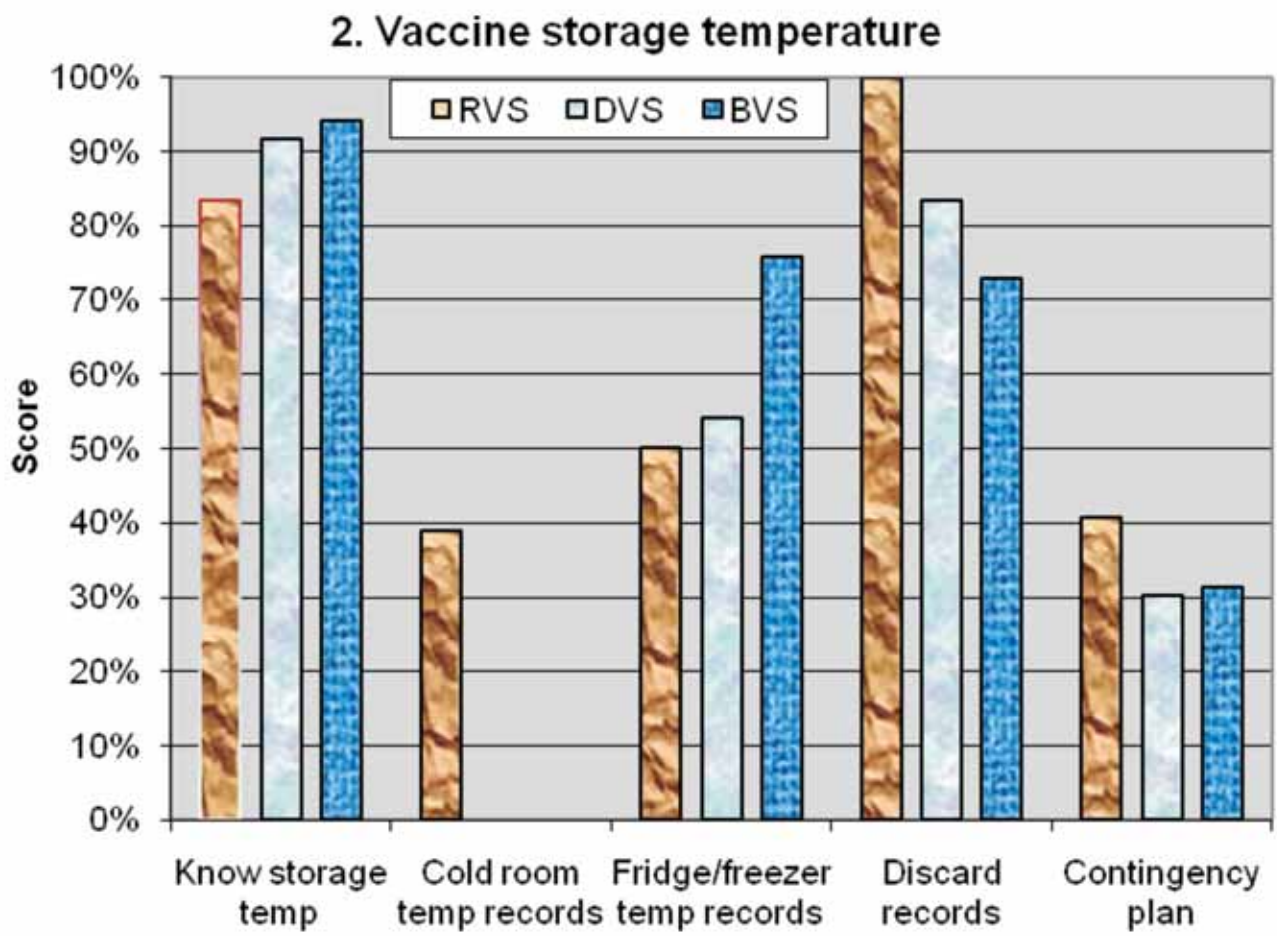
The following aspects are assessed here:

- Knowledge of the store keeper with regard to the storing temperature for the different vaccines and their sensitivity to freezing
- Continuous temperature records of the cold rooms and freezer rooms
- Twice daily manual temperature recording for all equipment storing vaccines
- Are these temperature records inspected regularly and retained for auditing purposes
- Whether the quantum of damaged vaccines due to improper storage is no more than 1%.
- Status of existence and implementation of contingency plan in case of any emergency.

Findings

Vaccine Store	State	Regional	District	Block	Urban PPC
Performance Score	82%	66%	73%	79%	49%

The consolidated bar graph of individual component of temperature monitoring of SVS, RVS, and BVS are shown below.



Taking into account the results shown above for RVS, DVS and BVS and also considering the results of SVS and PPCs the findings are as follows :

- Most of the staff know the correct storage temperature of vaccines and their freeze sensitivity. In most of the places, the vaccines are taken good care based on this knowledge. Some exceptions prevail at the Block and Urban PPC level where the staff, specially the new ones, are not familiar with the correct operation of old ILRs where risk of freezing have been observed.
- Records also do not show any wastage of vaccines, which, if correct is a strength to be sustained. However, in reality, this is not always the case since many staff avoid noting wastage as this calls for long explanations and may result in consequences feared by the staff. Damaged vaccines were observed in some blocks and at PPCs due to either freezing in sub zero temperature of old ILRs.At the Behrampur City Municipal Hospital where used vaccines were kept in the ILR (presumably for reuse).

Heavy frost in old ILRs

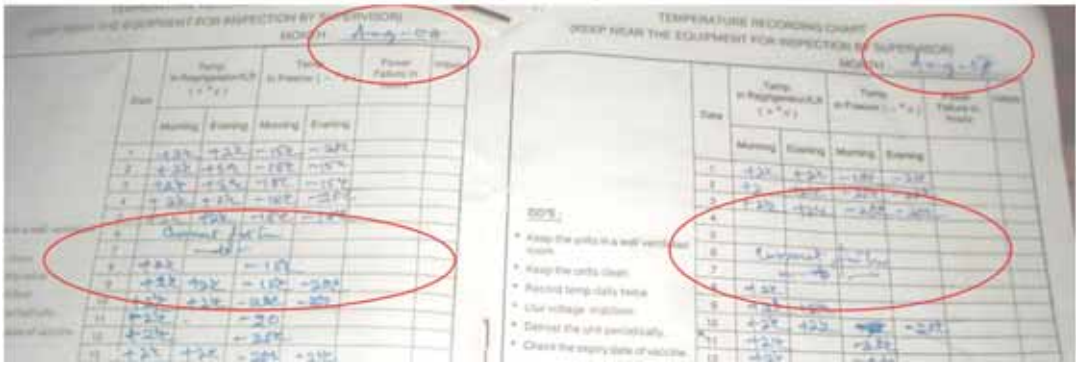
Used vaccines stored in ILR for presumably for reuse

The major weaknesses are incomplete temperature records and lack of contingency plans. More specifically:

- Most of the Walk-in-coolers (WICs) at SVS and RVSs and the walk-in-freezer (WIF) at SVS do not have a functioning continuous temperature chart recorder. The only exception is Balasore RVS. The other chart recorders are out of order since more than 5 years.
- In some of the RVS (Koraput and Ganjam), the manual records have also not been maintained. This clubbed with non-functional auto-start mechanism of the back-up generators or worse still a non-functional generator are putting the vaccines to a high level of vulnerability. There is no way to ensure that no damage has been caused to the vaccines in case of power failures.
- Most of the staff have limited idea on how to handle emergencies. Some even have a misconception that the large stocks of vaccines from a WIC could be stored in cold boxes. There is no written standard operating procedure for contingency, nor has there been any mock exercise. The emergency telephone numbers are also missing at vital positions.

7 day chart recorder of WIC

Manual records with gaps and repetition of months



5.3 Cold storage capacity

Storage capacity should be adequate for routine as well as campaign vaccines. Hence the following issues are assessed:

- Sufficient storage capacity to accommodate peak level stock requirements including safety stocks, for the routine immunization schedule.
- Satisfactory arrangements need to be made to ensure that vaccine supplied for NIDs and campaigns can be temporarily accommodated if necessary in other storage facilities that meet WHO standards.
- The store keeper is knowledgeable how to adapt vaccine supply schedule to accommodate space requirements

Findings

Vaccine Store	State	Regional	District	Block	Urban PPC
Performance Score	75%	82%	82%	86%	80%

Non functioning WIC at SVS

At the SVS there are 2 WICs: one of 32 CuM and another installed in 2003 of 16 CuM. The total usable space is thus 24,000 lts considering 50% of gross volume as net storage space. The second WIC has never worked and is still awaiting repair ever since it was installed more than 3 years ago. Hence currently only 16,000 Lts of net space is available.

However, based on the records, and the irregular supplies, there has not been any shortage of space. But overall observations lead to insufficient supplies of some antigens like DTP for which there have been stock outs at most levels.

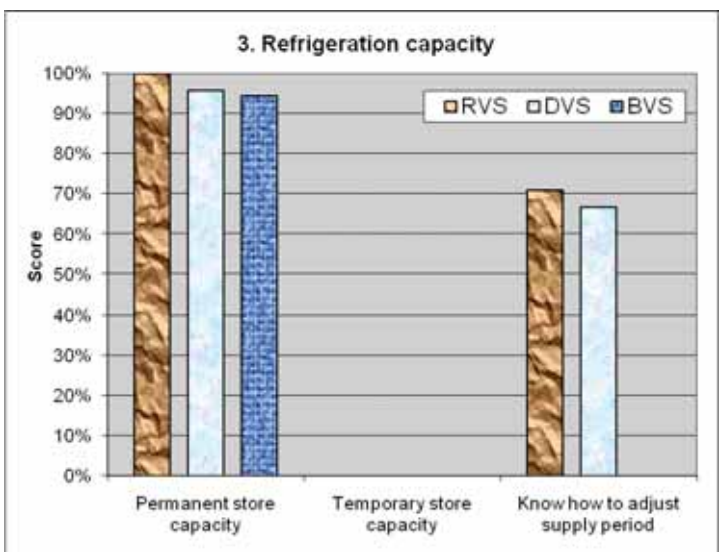
The table -3 below gives the details of annual requirements of the state for each antigen. It also gives the total quantities corresponding to 50% and 25% (as safety stock) of the requirement. The peak stock as found according to the register on 1st April 2007 is also listed. The total volume occupied by these stocks is also given for each antigen.

Table 3. : Antigen wise vaccine requirements in doses & Space available at SVS

		Vaccine requirements (doses)					Space required and available (Ltrs)			
#	Vaccine	Annual Requirement (2007-08)	50% of annual requirement	25% of annual requirement	opening stock on 1st April 07	vol /dose (Ccm)	50% of annual requirement	25% of annual requirement	As of 1st of April	Space Available (Ltrs)
1	BCG	13,80,987	6,90,494	3,45,247	6,36,000	1.2	829	414	763	
2	DPT	55,23,949	27,61,975	13,80,987	6,61,100	3	8,286	4,143	1,983	
3	DT	15,39,834	7,69,917	3,84,959	2,98,500	3	2,310	1,155	896	
4	TT	62,97,211	31,48,606	15,74,303	18,72,400	3	9,446	4,723	5,617	
	Total volumes required and available (2 to 8 °C: WIC)						20,870	10,435	9,259	24,000
5	Measles	13,80,987	6,90,494	3,45,247	2,80,000	5	3,452	1,726	1,400	
6	OPV-Routine	55,23,949	27,61,975	13,80,987	11,92,000	1	2,762	1,381	1,192	
	Total volumes required and available (-20 °C : WIF)						6,214	3,107	2,592	11,200

The single operating cold store (net capacity 16,000 Ltrs) was able to store the peak stock as of 1st April 2007. It can basically accommodate more than 25% of the annual requirement which would occupy 10,435 ltrs, as seen in the table. However, if one intends to keep 25% of annual requirement as safety stock and another 25% as working stock (total 50% of the annual requirement at any time), then one would need a storage space of 20,870 Ltrs and that would need the second cold room to become operational.

The last 3 rows of the table gives the details for OPV and Measles. With total net storage space of 11,200 ltrs in the WIF there is ample space for storing 6 months requirements of OPV and Measles for keeping 6 months stock.



The staff knows how to adjust supplies and has been implementing it specially when large supplies of OPV arrive for NIDs. They have been shipping part of the consignment immediately downstream to reduce the storage load.

The resulting consolidated bar graph for the RVS, DVS and BVS is shown herewith.

All the RVS have one WIC with a capacity of 16 CuM of gross volume. Taking into account the RVS that supplies vaccines for the most highly populated region (RVS-Balasore), a comparison between the storage requirement and storage capacity of the WIC was carried out. The table-4 below shows the result.

Table 4. : Estimate of vaccine storage capacity for Balasore Regional Vaccine store

		Vaccine requirements (doses)			Space required and available (Ltrs)	
#	Vaccine	Annual Requirement (2007-08)	50% of annual requirement	Vol/dose cm^3	For 50 % of annual need	Space Available
1	BCG	2,67,912	1,33,956	1.2	161	
2	DPT	10,71,646	5,35,823	3	1,607	
3	DT	2,98,726	1,49,363	3	448	
4	TT	12,21,660	6,10,830	3	1,832	
5	Measles	2,67,912	1,33,956	5	670	
		Total (2-8C: WIC)			4,719	8,250
6	OPV-Routine	10,71,646	5,35,823	1	536	
		Total (-20C : Deep Freezer)			536	5 x MF 300

The WICs, with a net storage capacity of 8,250 ltrs has ample space to store the total vaccine requirements for 6 months for the most populated region. Since the demand on the other RVS is less, they have sufficient space to keep more than 6 months requirement.

Tipped unpacked Vaccine cartons in WIC with holes for air circulation

In fact the sufficiency of space is being misused, by not unpacking the vaccines from the large carton and only making holes in order to enable flow of cold air. Besides, often it was observed that the large cartons are placed in the WIC without respecting the direction of the top position. Both these practices are incorrect.

For the storage of 6 months of OPV in DF, the RVS would need to operate 5 large DFs (MF 300). Currently they have fewer quanta of supplies which suffice in maximum of 2 DFs while others are used for IP freezing.

Most DVS and BVS have sufficient space to store routine vaccines. However, this does not take into account any safety stock management.

Except for the staff at SVS and a few RVS, most staff are not very familiar with how to handle excess stock and adjust supplies to avoid shortfall of space.

At no level, any temporary external facilities are used for campaign vaccines. Campaign vaccines arrive at the last moment, is stored and shipped largely in cold boxes and distributed immediately across the different levels and used up rapidly. Hence the storage has not been a serious issue.

Unpacked cartons of Vaccines placed directly in the WIC

5.4. Status of Building, Equipment and Transport

The good operating conditions of the building housing the vaccine store, the equipment storing the vaccines and the vehicles are important aspects to ensure safety of the vaccines.

The elements that are assessed here are :

- The quality of building with Cold Chain appliances and equipment,
- The space available for working,
- Correct operation of all equipment (WIF, WIC, DF and ILRs) for maintaining correct temperature
- Working acoustic alarm and 7 day graphic chart recorder
- Proper working condition of the stand-by generator and sufficiency of fuel,
- Good operation of all transport vehicles.

Findings

Vaccine Store	State	Regional	District	Block	Urban PPC
Performance Score	80%	71%	67%	75%	80%

The relatively high score at all levels result from the following aspects:

1. All WICs and the WIF have twin working refrigeration units,
2. The units are maintaining correct temperatures,
3. All units have their servo-stabilizer in working condition,
4. Half of the units have operating back-up generators,
5. All installed ILRs and DFs are operating,
6. There are sufficient numbers of CBs, VC, and IPs,
7. Most of the transport vehicles have been in good condition,
8. Transports of vaccines have taken place without problems.

The table-5 below summarizes the status of the equipment and staff at the SVS and different RVS.

As can be seen in the table 5, starting with the building, 5 out of 7 facilities are inadequate in terms of space and condition of the building. In particular, the SVS, RVS at Phulbani , DVS at Cuttack and some of the BVS are too small. All dry space materials are cluttered along the corridors and every nook and corner. Working space is limited. The staff are working with the inappropriate (even unacceptable) conditions.

Overloaded SVS, undersized RVS at Phulbani and cluttered PPC (Behrampur)

Table 5. : Status of Equipments and staffs at various vaccine stores

		BBSR	Balasore	Ganjam	Koraput	Phulbani	Sambalpur	Sundargarh
1	Estimated Target Infant	17,73,035	1,67,849	87,873	1,09,085	72,598	1,27,099	56,546
2	Estimated Target PW	19,50,338	1,84,633	96,660	1,19,993	79,857	1,39,809	62,201
3	Store keeper	1	1	1	1	1	1	1
4	100% Duty	Yes	Yes	Yes	NO	Yes	Yes	NO
5	Additional Duty				DVS			DVS
6	No, of Helpers	NIL	NIL	1	NIL	NIL	NIL	NIL
7	No. of Technicians	2	1	1	1	1	1	1
8	Is facility suitable	NO	Good	YES	NO	NO	NO	NO
9	Dry space	Small	Good	OK	Small	Small	Small	Small
10	WIC / WIF	1 WIF WIC-1 WIC-2	1 WIC	1 WIC	1 WIC	1 WIC	1 WIC	1 WIC
11	Servo-stabilizer working	Y	Y	Y	Y	Y	Y	Y
12	Chart recorder working	X	Y	X	X	X	X	X
13	Manual temp records ok	Y	Y	X	X	X	Y	X
14	Acoustic alarm working	X	X	X	X	X	X	X
15	Generator working	Y	Y	X	X	Y	X	X
16	Generator Auto-start functioning	X	X	X	X	X	X	X
16	Fuel for generator available	Y	Y	Y	Y	Y	Y	Y
	Green font : Existing or Operation							
	Red font : non-Existing or non-functional							

On the equipment front there are serious issues which are putting the vaccines at risk in case of equipment or power failure at an inopportune moment:

- All except one graphic chart recorders are non-functional,
- The sound (and even the visual) alarms and generator auto-start mechanisms are not functioning.
- At several BVS, one still finds the old CFC based ILRS having a plywood lining. Either due to incorrect setting, age or conversion as a deep freezer, many of them are over cooling and having thick layers of frost. At many BVS the staff is not trained and tend to keep the T series vaccine at vulnerable levels in the ILR. This has resulted in freezing of vaccines to the point of discard.

Old CFC ILR with frost and ice and froze in DPT vaccine

- In several ILRs the thermometers have been missing, though stock of thermometers are available at upper level.

On the staffing front too there are aspects that are worrying:

- The large SVS or RVS are manned by a single staff with limited support from the local technician, even if the quantum of vaccine is small (Sundergarh) or large (SVS). Adequate support staff is necessary for effective vaccine logistics.

Staff do not know proper IP conditioning. In most places, especially at block level hard frozen IPs are sent along with T series vaccines, practically causing freeze damage to the vaccine by the time it arrives its destination.

This and poor quality or the old ILRs are compromising at the very final stage the entire effort put in place to plan and implement a successful immunization programme.

5.5. Maintenance of Building, Equipment

For ensuring a sustainable safety of the vaccines, the building, equipment and transport vehicles need to be maintained and upgraded periodically. Hence it is important to ensure that:

- A replacement plan is in place for all outdated equipment and vehicles, and the same is being implemented,
- A periodic preventive maintenance plan for equipment and vehicles is also in place and being implemented,
- All equipment or vehicle failure is attended rapidly and that such failures have not caused damage to any vaccine,
- None of the equipment or vehicles have been out of service for more than 7 days due to lack of spares.

Findings

Vaccine Store	State	Regional	District	Block	Urban PPC
Performance Score	77%	78%	77%	79	83%

The performance indicators are a result of the following strengths:

- Most of the equipment and vehicles being in working order,
- The MoH & FW has a general plan to replace old equipment in a staggered manner,
- Repairs are being carried out in time by the technicians. The 30 districts are covered by about 18 refrigeration technicians and foremen,
- At no point of time the equipment has been out of service due to lack of spare parts or adequate attention for more than 7 days.
- All emergency repairs have been attended to immediately.

On the other hand, there are still 873 ILRs and 730 DFs working on CFC (see table-6 below). These need rapid replacement, due to the phase out programme of CFC by 2009, and also due to the issue of improper working which is putting a risk of freezing the T series, as mentioned earlier.

Table 6. : Status of ILRS ad DFs

Details as received from GOI	No of ILRs	No of DFs
Year 89-91	382	382
Year 91-92	100	100
Year 92-93	386	389
Year 93-94	382	194
Total - CFC	1,250	1,065
CFC equipment in working condition	873	730
Total non-CFC in working condition	646	732
Total	**1,519**	**1,462**

There is no plan for any preventive maintenance, nor is there any system to keep a log of the services and repairs to any equipment.

5.6. Stock Management

In order to maintain the quality of vaccines throughout the cold chain, it is essential to keep complete and accurate records of all stock transactions. A stock control system comprises of three steps, each of which must be performed regularly, accurately and completely. The three steps are checking and recording details of vaccine consignments or stocks when: 1. they arrive, 2. during their storage and 3. they leave the storage point.

Here the following issues are assessed:

- All lots of vaccines and diluents have been recorded along with all their salient parameters,
- Proper requisition and receipt forms are in place,
- Stocks are maintained between safety and maximum stock levels,
- Stocks are well laid out with contents list
- Deliveries are made following Early Expiry First Out (EEFO),
- Store keepers know when to over ride EEFO based on VVM status,
- Periodic physical verification are carried out and
- Stocks and records are safe.

Findings

Vaccine Store	State	Regional	District	Block	Urban PPC
Performance Score	59%	46%	48%	40%	29%

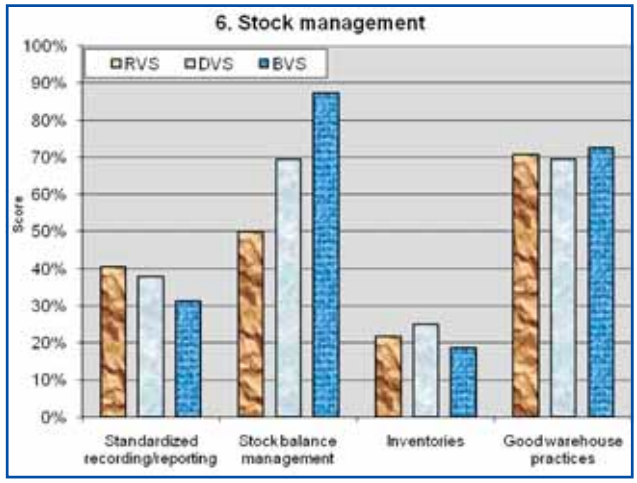
From this criteria onwards the performance drops significantly at many levels .

The two strengths are that the vaccines stocks and their records are in safe custody, almost at all levels. At some block levels the access was not possible or the documents were taken home by the in- charge for completion, and hence could not be verified.

Considering the score and the adjacent related bar graph the following weaknesses are identified:

- There is no system to record the temperature status. First as VVM is currently only avialable with OPV, and no other form of temperature monitoring is carried out while transporting the vaccines, there is no

means to know the temperature status of the vaccines on arrival.



- The standard ledger does not provide sufficient flexibility and possibility to enter all salient details.
- At none of the levels the notion and practice of safety stock is introduced. As a result there have been instances of very low stocks or stock outs - particularly of DTP and Measles.
- Vaccine stocks have rarely, if ever, been physically verified except at the SVS, and hence discrepancies were observed between physical stock and that marked in the register. The mismatch was rather significant in two regions (Sundergarh and Sambalpur) where the diluents quantities were rather small as compared to that of corresponding vaccines.

Significant improvements are needed in this sector in order to improve the performance. The related recommendations are listed in section 7.

5.7. Effective Vaccine delivery

For an effective immunization programme timely deliveries and sufficiency of stocks are necessary. The parameters assessed to ensure the effectiveness of delivery are:

- The vaccine distribution system is planned and implemented in timely fashion,
- Sufficient stocks of vaccines and diluents are available for supplies to the lower level stores,
- There is sufficient stock until next delivery,
- Staff is knowledgeable on how to estimate the vaccine requirements,
- A system is in place for managing the short supplies if it occurs, and
- Freeze indicators are correctly used in all deliveries.
- In case of vaccine damage during transport the same is reported ad the quantities replaced.

Findings

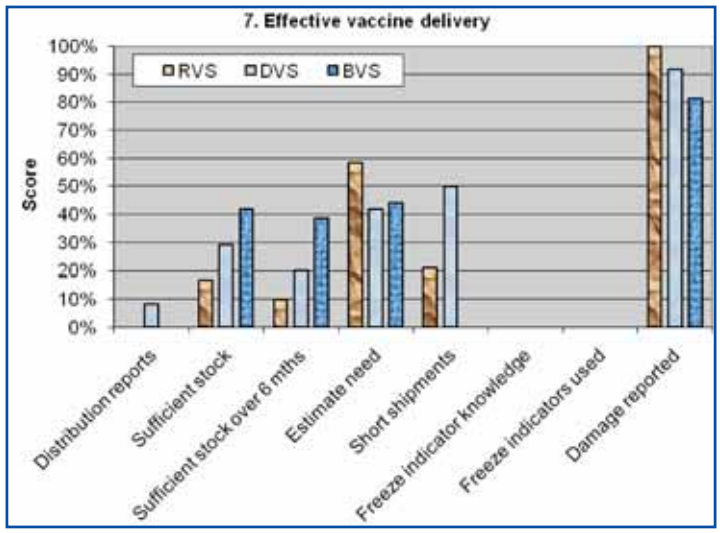
Vaccine Store	State	Regional	District	Block	Urban PPC
Performance Score	32%	40%	41%	52%	49%

The limited score results from zero wastage recorded during the transport from one level to another.

Once again, looking at the spider graph and the related adjacent bar graph the following weaknesses can be mentioned:

- The summary of vaccines arrivals and deliveries at the SVS shows that supply of vaccine has been very irregular. Since 1st January 2007, there have been 37 arrivals consisting of 69 different lots of vaccines, only of the routine vaccines.
- As a result of this irregular supplies, limitation of available stocks and the absence of delivery plans, the state store has had to make 467 deliveries to the lower levels. The deliveries have been based on incoming indent and available stocks. This is rather high and unacceptable load on the state

store which is already under staffed. The entire process is unsystematic due to lack of sufficient stocks.



- Since there is no concept of safety stock, there have been several instances of stock outs, jeopardizing the immunization programme. The critical ones that have come to the notice are :
  - Stock outs of DPT at all levels right from the SVS down to the point of immunization
  - Stock outs of BCG at block levels while large stocks have been available at the SVS.
- There is no system to take care of short supplies or situation of stock outs,
- Finally, at most of the block levels frozen IP are used with poor (or even without conditioning) and sent along with T series vaccines, putting the vaccines to serious risk of freezing,
- The system is not using any freezer indicator to monitor temperature / status of freeze sensitive vaccines during transport, especially considering that frozen IP are used during transport of T series vaccines.

During the assessment, at several block levels the team carried out simulated loading exercise. The staff was requested to prepare the VC or CB as they usually do. A thermometer was kept inside for monitoring the temperature. The VC or CB was reopened after more than an hour to read the temperature which was usually around -10C as the original IP used were at -20C. Based on the duration of the travel that would be undertaken, the staff was explained the risk of getting the vaccines frozen at the end of the journey. Then the staff was given instruction through demonstration and practice on proper conditioning of IP.

At one urban PPC, used vaccines were stored in the ILR to be presumably to be reused a week later, a practice that is not advised by the GoI.

Thus, with such incorrect practices, vaccines are being damaged at the very last point of delivery, i.e. from the block level to the field. None of the damage is ever noted, as in many cases it is not even recognised. Worse still, the vaccines are being used as if "Potent" with a very serious risk of jeopardizing the very purpose of immunization programme.Vaccine preventable diseases may occurs in any of these areas.

There is a need to address the above issues in urgency. The suggestions for its redressal as given under urgent training requirements.

5.8. Correct diluents use for freeze dried vaccine

For the freeze dried vaccines the following parameters are assessed:

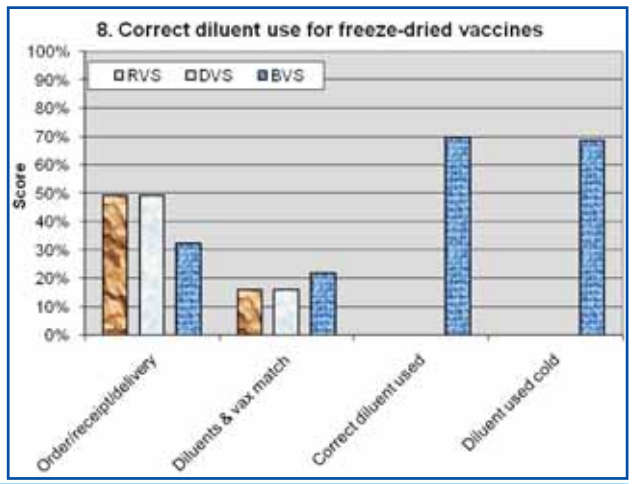
- The freeze dried vaccines and their corresponding diluents are correctly ordered, received, stored and distributed,
- The vaccines are always used with their corresponding diluents,
- Diluents are maintained at 2-8C, same as the vaccine before reconstitution.

Findings

Vaccine Store	State	Regional	District	Block	Urban PPC
Performance Score	100%	45%	33%	48%	38%

At the state vaccine store, there is a good management of the diluents. Receipts and supplies are done in matching numbers.

At lower levels, however, as seen from the graph below, several issues that need attention are :



- First the discrepancy between the quantity of vaccine and diluents starts to develop. This particularly large in Balasore and Sundergarh regions at most levels. This is seen by the strong drop in this score in their respective spider graphs. (Eg. At Lakhanpur: there are 228 vials of BCG and 134 vials of measles, but the corresponding diluents are 8 & nil, respectively).
- At the block level, besides the discrepancy in numbers there are two issues of major concern:
  - **Saline or distilled water is used in some places in place of diluents.**
  - **Diluent is not always cooled down to the same temperature as the vaccine before reconstitution. Often the diluents are received in ambient temp and kept close to the IP for 15 minutes and then used for reconstitution.**

Both these practices are detrimental to the immunization goals and must be stopped immediately.

5.9. Effective VVM use

Findings

VVM are correctly interpreted and used in vaccine management of the EPI programme.

Vaccine Store	State	Regional	District	Block	Urban PPC
Performance Score	91%	99%	97%	87%	82%

This criteria has the maximum, and commendable score at all levels. This is essentially due to the training obtained for the polio NIDs. All staff are familiar with the VVM, its interpretation and its use.

The only small shortfall is the absence of poster or stickers anywhere.

5.10. Multi Dose Vial Policy

Whether the MDVP is implemented correctly

As the Govt. of India has not adopted this policy, this criterion is not assessed.

5.11. Vaccine wastage control

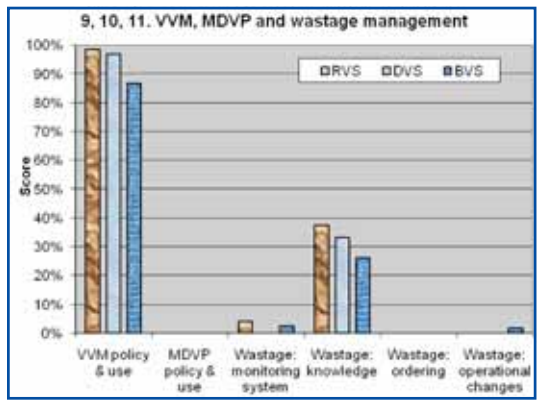
A vaccine wastage monitoring system should be in place so that the store manager can use it to assess wastage and also make necessary corrections when re-ordering vaccines. The information should be used to incorporate improvements in the system to reduce wastage in future.

Findings

Vaccine Store	State	Regional	District	Block	Urban PPC
Performance Score	21 %	16%	24%	19%	1%

This criterion has been least perfomed at every level.

Only limited number of staff understand wastage properly, especially at levels above the block level. However, there is no system to monitor, record and eventually use it to reduce wastage and adapt future indents.



In the opinion of the consultant, wastage issue should be undertaken when aptitude and mastery has developed over the other criteria of vaccine management. It is preferable to accept a certain level of wastage and ensure that the vaccines arrives in correct temp till the child is vaccinated than to compromise on basic care needed for the vaccine throughout the cold chain, in trying to save a few percentage of doses.

With this all the strengths and weaknesses under each criteria have been covered at the different levels.

6. Recommendations

In order to address the weaknesses identified during the assessment and noted in the sections overhead and to improve the performance a list of recommendations have been proposed. Implementing them will ensure enhancing the performance of the total vaccine management and ensuring a greater success of the entire immunization programme.

The recommendations have been categorized into the following four areas:

I: Infrastructure, building, equipment, and staff,

II: Practices to be introduced and maintained,

III: Capacity building and

IV: Sustaining the Quality

In each of these categories, for each recommendation a priority has been given between 0 and 4. These priorities are defined as:

0: Most urgent to be implemented without any delay.

1: Urgent to be implemented within 3 months,

2: Important to be implemented within 6 months and

3: To be implemented within a year and finally

4: To be implemented within next 2-3 years.

I - INFRASTRUCTURE, EQUIPMENT and STAFF

Building

Priority	Gaps Identified	Action to be taken
1 (Urgent)	The state vaccine store is the principle store which supplies the entire state with the required vaccines and ancillary items for the immunization programs. It is important that it is well planned and adequately organised for receiving, storing and supplying the state. ***Currently it is heavily loaded with cartons of ancillary items and immediately needs more dry storage space***.	➢ Organize additional space in close vicinity of the SVS for all ancillary items such as droppers, AD syringes immunization cards and others so as to make more adequate space for working, packing and unpacking of vaccines.
1 (Urgent)	The regional vaccine stores come next in priority as these have the responsibility to supply vaccines to a significant portion of the state (21 districts) . Four out of six regional stores are working with insufficient working and storing space. This needs to be remedied:	➢ Define expansion or alternate location and shift these four Regional VSs that immediately need expansion for working and dry storage space. ➢ The WHO "Guidelines for establishing or improving primary or intermediate vaccine store[10]" should be referred to for improving the stores. Plan for expansion of RVS at Phulbani was discussed with the DIO during the assessment and the proposed extension plan is given in annexure H.
1 (Urgent)	Situation in some of the DVSs and BVSs also need to be improved: some need additional space, while some need additional material stored in the rooms to be relocated. Some BVSs have equipment in a different room from the one where immunization is conducted.	➢ Specific locations should be shortlisted by reviewing the VAMT assessment sheets and collecting further details from respective DVSs and BVSs for defining the exact nature of support required. The defined support needs to be provided. ➢ The DVSs and BVSs which were not visited need to be investigated by CCO/ CCC/ RVS coordinators to define actions. ➢ All improvements should take into account the recommendations given in document.[10]

[10] WHO-VB/02.34, 2002, Guideline for establishing for improving primary and intermediate vaccine store, Geneva

Priority	Gaps Identified	Action to be taken
3	Orissa has an estimated target infant population of 9.3 lacs and an estimated target pregnant women population of 10.3 lacs. Both these numbers are likely to increase in the next coming years. The immunization programme is also going to expand further with the introduction of tetravalent or penta-valent vaccines. The latter particularly will occupy a five fold volume as compared to the volume occupied by DPT at present. Unless adequate plans are made now to have a dedicated building as state vaccine store with the necessary WIFs and WICs to cope up with the growing demand, the immunization programme will suffer, and so also the children. The same applies to some of the regional vaccine stores that are operating with minimum space.	➢ Required new adequate building should be planned for SVS and some RVSs as per standard WHO guidline.[10]

WIF / WIC

0 (Most Urgent)	Six out of seven WIC and the WIF do not have their seven day graph chart recorders in working order. The required stationary is also not available. This is causing a serious gap in having continuous records of storage temperature of the vaccines to ensure their safety.	➢ Get all non functional graphic chart recorders into working order and provide the necessary stationary for them. Start taking records of the WICs and WIF in 24/7 and 365 days in continuous manner.
0 (Most Urgent)	None of the WICs or the WIFs has a working acoustic alarm that can alert the store keeper or any individual through an alerting signal when the temperature rises to unsafe limits. Some of them have just an optical alert through an internal bulb getting lit. However, this is not effective to alert anyone who is not close to its vicinity. Due to this and non-functioning of the auto-start of the back-up generators, there is no means to keep the temperature under recommended limits during power failures.	➢ Have all acoustic alarm put in to operation. ➢ Optical alarms should not be used.
0 (Most Urgent)	In many RVSs and several DVSs the back-up generators are not functioning.	➢ Set the generators at each RVS and DVS into operation.

Priority	Gaps Identified	Action to be taken
		➢ DVS that do not have a genset should be provided with one. ➢ Sufficient financial support should also be provided for the diesel to run these generators. ➢ Auto-start mechanism to be repaired for all generators - esp. at RVS levels so that large stocks of vaccines are always maintained at recommended temperatures.
0 (Most Urgent)	The two WIC (capacity 16 CuM)which was installed at the SVS at Bhubaneswar in 2003 is still not operating. The total storage space cannot accommodate three months of safety stock and three months of working stock of vaccines in the first WIC alone.	➢ It is imperative to get this 2nd WIC repaired immediately or failing which to decide on procuring another WIC to replace it.
0 (Most Urgent)	The state vaccine store is meant to keep large stocks of vaccines including at least three months safety stock and three months of working stock. It is important that continuous monitoring of the storage temperature is carried out at different points of the WIF and WIC. This can be achieved through an eight or 16 channel data logger connected to a computer.	➢ Install computerised temperature monitoring at SVS.

DF / ILRs

0 (Most Urgent)	There are several equipments which are not in proper working conditions. Several ILRs particularly the old models that cause heavy frost and put the vaccines at risk of freezing. Such obvious hazards to the vaccines should be addressed immediately.	➢ A special drive should be taken to rectify all the non functioning equipment.
1 (Urgent)	There are approximately 837 ILRs and 730 DFs still running on CFC refrigerant which will no longer be available after 2009. Many of the ILRs are poorly calibrated and causing high level of frost, thereby putting the T series vaccines to risk of freezing.	➢ The existing equipment replacement plan should be reviewed in order to rapidly replace the CFC equipment especially the old ILRs which are putting the vaccines at risk of freezing.

Priority	Gaps Identified	Action to be taken
1 (Urgent)	At several vaccine stores thermometers were either broken or found missing in the equipment. This caused interruptions in manual temperature records.	➢ Provide manual thermometers at all levels. ➢ Define mechanism for lower levels to indent spares from upper store.
2	Vaccines are transported using improperly conditioned IP and in several BVSs, the ILRs have been having frost inside. Both situations are putting the Freeze sensitive vaccines to risk of getting damaged. There is need to monitor this.	➢ Provide freeze indicators at all levels for storage and transport. ➢ Train Staff in their use.
1 (Urgent)	Many BVSs have both the ILR and DF connected through the single stabilizer. If the stabilizer fails both units will need to be connected directly to the mains and be vulnerable to damage due to low voltage for its fluctuations.	➢ Provide one stabilizer for each of the ILRs and DFs at all blocks and ILR points.

Staff

2	The large SVSs or many RVSs are manned by a single staff with limited support from the local technician irrespective of the quantum of vaccines to be handled. This puts avoidable pressure on the staff and results in de-motivating the staff.	➢ Appoint key staffs considering the total load of vaccines and number of arrivals and despatches to be handled by the store.
2	The 30 districts are currently manned by only 18 refrigeration technicians and foremen. There should be one technician for each district who can take care of periodic maintenance and emergency repairs.	➢ Ensure appointment of one technician in each district. ➢ Ensure adequate funding for his movements across his district for periodic visits and requirement of spares.

II - PRACTICES

Building

Priority	Major Gaps	Action to be taken
1 (Urgent)	Currently vaccine stores are used for several purposes. Some have been used as store room for non-immunization items while some are filled with cartons of AD syringes and other miscellaneous material including stationary.	➢ Vaccine store space should not be used for any purpose other than keeping the equipments needed to store vaccines and the free space should be used for items and activities related to the receipt and despatch of vaccines.

Diluents

1 (Urgent)	In several BVSs, the current practice is to keep the diluents in the ILR just a few minutes before supplying them on the day of immunization, or worse still keeping the diluents close to the Ice Packs for cooling for 15 minutes before reconstitution. Both practices will lead to rise in the final temperature of the reconstituted vaccine, jeopardizing its quality over the four hours it can be used.	➢ Diluents to be kept at 2-8 °C minimum one day prior to immunization day at ILR levels.
1 (Urgent)	Large mismatch between the stocks of vaccine and their corresponding diluents exist at all levels.	➢ Need imporved Diluent management. Diluents should be requested, received and supplied in matching numbers for every freeze dried vaccine - corresponding to the respective batch numbers.

Periodic verification

1 (Urgent)	Serious mismatch exist between the actual physical stock of vaccines and that recorded in the register at many levels.	➢ Conduct periodic physical verification of stocks and adjust records if required . ➢ Same should be done with corresponding diluents for freeze dried vaccines ➢ The physical verification should be conducted periodically by any of the following: ADMO-FW/ RI Coordinators of district / RVS Coordinators / CCC / CCO/ SEPIO.
2	All equipments need to be kept in good operating condition. Apart from the obvious need to have a competent technician who can intervene in case of any break down, there	➢ Each district should have a cold chain technician with adequate mobility support

Priority	Major Gaps	Action to be taken
	needs to be a system of periodic preventive maintenance. These services and repair need to be adequately recorded for future references.	➢ Develop preventive maintenance plan for all cold chain equipments as per the guidelines ➢ Use log sheets / book to record all services and repair of equipments and it should be available at the site. ➢ A suggestion of the service log is given in annexure I for WIF and WIC. A similar log sheet should be prepared for ILR ad DF, and generators.
2	In order to establish the need for timely replacement of the systems, as well as timely intervention by the technician, it is helpful to monitor periodically (monthly) DT, RT and sickness rate of the equipments.	➢ Down time of the equipment ➢ Response time for repairs ➢ Sickness rate of Cold chain equipment. Should be monitored by the SEPIO, CCO, CCC, RI Coordinator, RVS Coordinators and Cold chain Technician using standard monitoring format.
1 (Urgent)	The health of the cold chain and vaccine logistics depend on the implementation of a well defined logistics, timely and appropriate interventions by the cold chain technicians and the appropriate supervision and intervention of the newly appointed RVS coordinators. Hence it is important to conduct the following performance evaluation periodically.	➢ Review monthly the cold chain and vaccine logistics (by DFW and UNICEF at the state level), ➢ Conduct quarterly a performance evaluation of the cold chain technician based on the cold chain status, the down time, response time and mean time between failure of equipment and other objective indicators, ➢ Every quarter conduct performance evaluation of the RVS coordinators based on the inputs brought in by them, the manned the issues were addressed and other objective indicators. ➢ The last two evaluations should be conducted by the CCO in collaboration with the State and/or district Immunization officer with the help of UNICEF if required.

Records

Priority	Major Gaps	Action to be taken
1 (Urgent)	In many places the manual records are not maintained, either due to incomplete record keeping, or due to absence of thermometer.	➢ Temperature recording : seven days/week & two times daily for all units having vaccines
2		➢ Introduce use of batch cards and record all salient elements of vaccines (including diluents). An example of batch card is given in annexure J. ➢ Preparing and displaying summary of stock position on each equipment.

Storage

1 (Urgent)	Staff have a tendency to keep OPV in the same DF where IPs are prepared for deliveries. This causes wide fluctuations in the storage temperature when warm packs are added.	➢ Separate units should be used for storing OPV and for freezing IPs.

Emergency

2	The SVS and RVS keep large volumes of vaccines which are at risk when the equipment including generators fail. Such instances are not only hypothetical. Hence there is a need to have written contingency plan which the staff is familiar with in practice as well.	➢ Define contingency plan and practice it once a year at SVS and RVS as mock drill, ➢ Define contingency plan for DVS and BVS and practice it whenever staff is changed.

Stocks and supply

2	The only manner to ensure a continuous non-interrupted immunization programme is by having always sufficient stocks of vaccines irrespective of the irregularity in supplies. This can be achieved by keeping a certain safety stock at all levels.	The safety stocks recommended at respective levels are : **SVS & RVS : three months ; DVS : two months; BVS : one month** ➢ Define safety stocks required each level and indent requisition based on safety stock and working stock.

Priority	Major Gaps	Action to be taken
2	The indent form should provide information on total stock available and the quantum used so that the new quantum can be rationally defined.	➢ Use revised indent form - with information on usage, balance and safety stock requirements - see example in Annex-H. ➢ The real benefit of defining safety stock and working stock can be obtained if this is accompanied with a proper plan for supply and delivery of vaccines at all levels, stating the supply coming into the state, ➢ Define receipt and distribution plan for each level, ➢ Make annual indent of vaccines to GoI with a suggested plan for deliveries on a quarterly basis, considering the safety stocks.

VVM

2	To maintain the effort to identify the weaknesses and address them there should be a periodic self assessment. This can be done through the use of VMAT, RIMs and other specific software.	➢ Introduce computerized vaccine and logistics management using a software at SVS/RVS/DVS /BVS which will supplement RIMS. ➢ Provide and display VVM posters at vaccine stores - especially block levels

III - CAPACITY BUILDING

Priority	Area	Action
0 (Most Urgent)	Supplies	➢ To ensure that reconstituted vaccines remain in good and recommended condition for 4 hours, the staff needs to be trained on proper management of diluents during use.
0 (Most Urgent)	Transport	➢ To ensure that vaccines are transported without any risk of freezing, the staff needs to learn proper conditioning of ice packs.
1 (Urgent)	Storage	➢ Proper storage of vaccines and their sensitivity to freezing.
1 (Urgent)	Storage	➢ Management of diluents during storage and distribution.
1 (Urgent)	Storage	➢ Proper freezing of ice packs without affecting the OPV stocks.
2	Storage	➢ Proper monitoring of equipment storing vaccine - its proper operation and temperature recording.
2	Storage	➢ Calculation of safety stocks to avoid situations of stock-outs.
2	Supplies	➢ Use of new forms (indenting, batch card, service logs).
2	Supplies	➢ Indenting for next month using recommended form.
2	Transport	➢ Use of Freeze indicators to ensure safety of freeze sensitive vaccines.
3	General	For future health workers who will be part of the heath system, proper training should be planned and imparted so that the weaknesses identified at present do not recur.
		➢ Vaccine and diluent storage and use should be made an integral part of the health worker training curriculum.
3	Wastage	➢ Monitoring for reduction of vaccine wastage for use in future.

IV- SUSTAINING THE QUALITY

First these results should be disseminated to all the ADMO-FW, district vaccine handles and the cold chain technicians. These should be the baseline status for all future actions and comparisons.

To ensure that the implemented recommendations are being followed, there is a need to put in place a monitoring system. The observation, monitoring and reporting should be regular and effective. All required implementation should be carried out rapidly. Some of the suggestions for such a system are given below :

➢ ADMOs at storage points should periodically do the following:

- Verification of storage temperature
- Verification of equipment service logs
- Maintenance of vaccine safety stock
- Review of RIMS reports

➢ CCO and CCC should make regular inspections to RVS, DVS , BVS

➢ RVS coordinators should follow up on all major improvements that are decided upon and bring back field information regarding the implementations. They should make regular field visit to DVS& BVS and immunisation sessions sites.

- Conduct a self-assessment (VMAT) every 4 months at all levels by the 26 trained persons pool available with the state.
- For the immunization programme to be implemented in an effective manner, the Govt. should allot one full time dedicated State Immunization Officer and also one District immunization officers in each district. They should have this occupation as the principle activity and not be distracted with any other priorities.
- The state cold chain officer need to be a self driven, dynamic and competent. He should dedicate significant time to move across the state on inspection visits He must have a logical thinking for strengthening vaccine logistics and cold chain system of the state and should assume greater ownership of the responsibility for the improvement and good performance of the cold chain and vaccine logistics.To strengthen the vaccine logistics state must provide support to the cold chain officer through recruitment of a cold chain consultant and a vaccine logistics manager at state level and RVS coordinators for each RVS .

Much is wanting and unless adequate and rapid action is taken now, the immunization programs are bound to be compromised in the years to come and the children of Orissa shall suffer.

As a very first step it is recommended that the Department of Health & FW of Orissa should define an action plan with clearly defined time frames to implement the recommendations given above.

Let us care for the vaccines for the sake of our children

ANNEX

Annex- A - Schedule of the induction programme

Thursday - 6 December 2007

Starting time	Topic	Facilitator
9.00	Registration	SCJ
9.30	Welcome and introduction to the workshop	SD
9.45	Programme of the day + House rules	MU
10.00	Introduction	KP
10.45	Address by NRHM-MD/ DFW/UNICEF	
11.00	Tea Break	
11.15	Origin of assessments	KP
11.45	Introduction to VMAT	KP
12.15	Questionnaires 1 to 3	KP
1.00	Details of field work	MU
1.15	Lunch	
2.00	Field work - Collection of data at respectivestores	ALL
5.00	Return to Venue Submission of data& discussion ofthe results	MU+KP
6.30	Evaluation of the day	Part. Repr.
7.00	Closing	

Friday - 7 December 2007

Starting time	Topic	Facilitator
9.30	Programme of the day	MU
9.35	Discussion on theexperience ofthe previous day- Q 1-3	MU+KP
10.15	Questionnaires 4-6 -	KP
11.00	Tea break	
11.30	Questionnaires Continued	KP
12.30	Lunch break	
1.30	Field work	ALL
5.30	Return to Venue Submission of data& discussion of field work	MU+KP
6.45	Evaluation of the day	Part. Repr.

Annex B - Plan and groups for field exercise

Day 1

	Team 1	Team 2	Team 3	Team 4
Type of VS	***RVS***	***DVS1***	***DVS 2***	***BVS***
Name of VS	BBSR	Cuttack	Khurda	Baranga
Form to be used	National	Sub-national	Sub-national	Service
Facilitator	*KP**	*SD**	*SJ**	*MU**

Day 2

Type of VS	***BVS***	***RVS***	***DS1***	***DVS 2***
Name of VS	Baranga	BBSR	Cuttack	Khurda
Form to be used	Service	National	Sub-national	Sub-national
Facilitator	*SJ*	*MU*	*KP*	*SD*

Day 3

Type of VS	***DVS 2***	***BVS***	***RVS***	***DS1***
Name of VS	Khurda	Baranga	BBSR	Cuttack
Form to be used	Sub-national	Service	National	Sub-national
Facilitator	*MU*	*KP*	*SD*	*SJ*

Team formations for field training

Category	Team 1	Team 2	Team 3	Team 4
Dy. Dir. MCH				Dr. R. K. Nath
ADMOs or DIO	Kandamal Dr. J.K. Patnaik	Sambalpur Dr. U.K. Sahu	Puri Dr. B. Senapati	Khurda
Dy. Dir. Demogr.			Mr. Ravi Mishra	
State Officers	Sanjeev Mohan Palo	R. K. Mahapatra	Ms. Monalisa Mahapatra	Sanjay Satpathi

*KP : Kshem Prasad, SD : Srihari Dutta, SJ : Suresh Ch Jena, MU : Meghna Udgire

Annex B - Plan and groups for field exercise with category of staff

Team formations for field training

Category	Team 1	Team 2	Team 3	Team 4
Dy. Dir. MCH				Dr. R. K. Nath
ADMOs or DIO	Kandamal Dr. J.K. Patnaik	Sambalpur Dr. U.K. Sahu	Puri Dr. B. Senapati	
Dy. Dir. Demogr.			Mr. R.K Mishra	
State Officers	Sanjeev Mohan Palo	R. K. Mahapatra	Ms. Monalisa Mahapatra	Sanjay K. Satpathi
RVS Co-ordinator	Kripasindu Patra	Ravi Shankar Patnaik	Jayanta Kumar Pradhan	S.K.Das
CC Technicians Foreman	P K Khandei	R C Mohanty	U. K. Maiti	A.K. Nanda
	T K Adhikari			
Statistical assistant CCO – S. C. Jena	Ms. Trupti Mishra	N. K. Swain	L N. Das Rayagada	Anand Kumar Bolangiri
		B. Bedbak Sonepur		D. Pujari Kalahandi

Annex C - List of Participants and Facilitators for VMAT Training from 6-8 December 2007

	Participant	Designation	Posting at	Contact no.
1	Dr. R. K. Nath	Dy. Dir. MCH	State HQ	
2	Dr. J. K. Pattanaik	DIO	Kandhamal	94371 00684
3	Dr. Bhagban Dikshit.	ADMO-FW	Bhadrak	94371 31401
4	Dr. Banambar Senapati	DIO	Puri	94373 05906
5	Dr. Upendra K. Sahoo	DIO	Sambalpur	9437348631
6	R. K. Mishra	Dy. Dir. Demogr.	State HQ	94371 07253
7	Sanjeeb Mohan Palo	CC consultant	State HQ	94372 61264
8	R. K. Mahapatra	EPI - Techn. Asst.	State HQ	
9	Ms. Monalisa Mahapatra	State Data officer.	State HQ	94371 13771
10	Sanjay K. Satpathy	St. Comp. Asst.	State HQ	92370 73666
11	Naba K. Swain	Statistical Investigator	State HQ	
12	Devsingh Pujari	Statistical Investigator	Kalahandi	94372 94158
13	Ms. Trupti Mishra	Statistical Assistant	State HQ	94372 68012
14	Laxmi Narayan Dash	Statistical Assistant	Raygada	94374 48574
15	Anand Kumar	Statistical Assistant	Bolangir	94372 42159
16	Balabhadra Bedbak	Statistical Assistant	Sonepur	94373 30208
17	Kripasindu Patra	RVS coord.	Sambalpur (New)	98534 12559
18	Rabi Shankar Patnaik	RVS coord.	Ganjam (New)	00384 27279
19	Jayanta K. Pradhan	RVS coord.	Sambalpur (New)	94375 22396
20	Surech chandra Jena	CCO	State HQ	94378 73004
21	P K Khandai	Foreman	State HQ	98536 06738
22	R C Mohanty	Foreman	State HQ	99371 48608
23	Utpal K. Maiti	CC technician	Ganjam Dist.	94371 60674
24	Anil K. Nanda	CC technician	Anugul	94372 13665
25	T. K. Adhikari	CC technician	Mayurbhanj	99379 51211
26	S.K.Das	RVS coord.	New	
	Facilitators			
1	Dr. Kshem Prasad	Facilitator	Consultant	094432 62241
2	Dr. Srihari Dutta	Facilitator	Unicef Health Officer	94375 75838
3	Ms. Meghna Udgire	Facilitator	Consultant	093208 71669

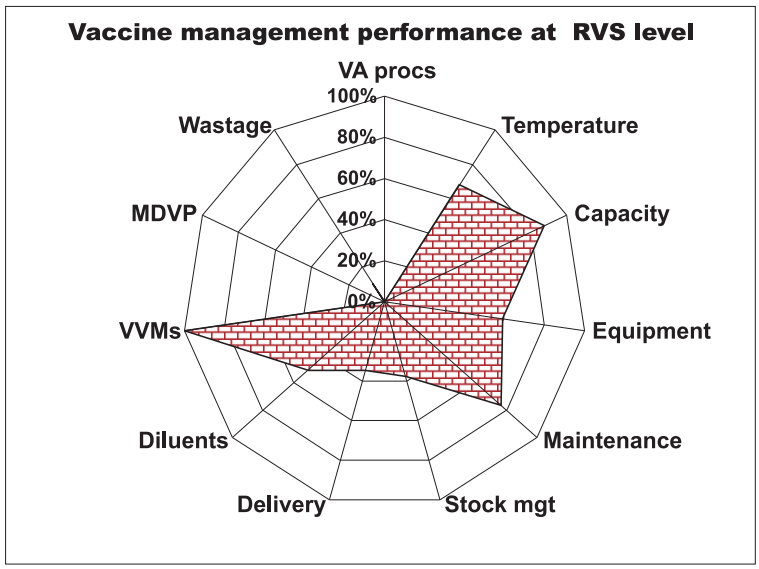
Annex D - VMAT Assessment teams and Target Locations

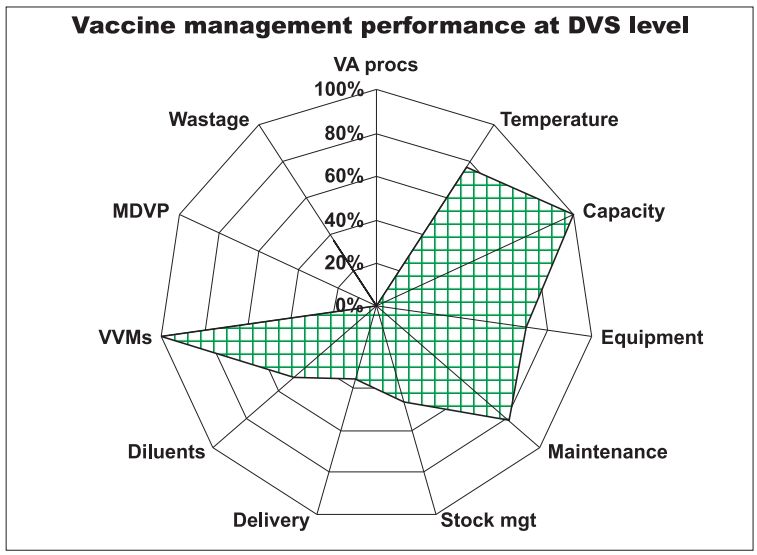
	Team Leader	Team members	RVS	DVS	BVS	Urban health Centres	Facilitator
1			BBSR State store			Cuttack municipal H.	
2	S.C. Jena 9437873004	Jayanta K. Pradhan	Koraput		Baipariguda		Mr.S.C. Jena
3		Naba K. Swain			Dasmantpur		
4		Sanjay K. Satpathi		Rayagada	Kolnara		
5					Kasipur		
	R.K. Mohapatra 9938371661	Dr. Banamdar Senapati	Ganjam		Balisira	BRM city H.	Dr. Kshemm Prasad
6		Santosh K. Das			Kabisuryanagar	BRM Municipal H.	
7		T. K. Adhikari			Bomkai		
8				Gajapati	Kasinagar		
9					Mohana		
10	Rabi Shankr Pattnaik 9938427279	Dr. J. K. Pattanaik	Phulbani / Kandhamal	Phulbani	Raikia		
11		Anand Kumar			Phiringia		
12		Anil K. Nanda			Tikabali		
13		R C Mohanty			G.Udayagari		
14				Boudh	Adenigarh		
15					Baunsuni		
16					Manmunda		
17	Trupti Mishra 9437268012	Kripasindu Patra	Sambalpur	Sonepur	Ulunda	PPC Sambalpur	Dr. Srihari Dutta
18		Utpal K. Maiti			Tarva		
19				Bolangir	Loisingha		
20					Deogaon		
21					Khaprakhol		
22	R.C.	Dr. U. K. Sahoo	Sundargarh	Sundargarh	Kuwnarmunda		
23	R.C. Mohanty 9937148608	Balabhadra Bedbak	Sundargarh	Sundargarh	Raourkela Panposh	Rourkela PPC	
24				Jharsuguda	Lakhanpur		
25					Mundrajora		
26	S.M.Palo 9437261264	Devsingh Pujari	Balasore	Bhadrak	Barapada		
27		Paresh K Khandai			Tihidi		
28				Keonjhar	Bansapal		
29					Harichandanpur		
30					Ghatagaon		
	Total		6	9 + (3)	30	5	

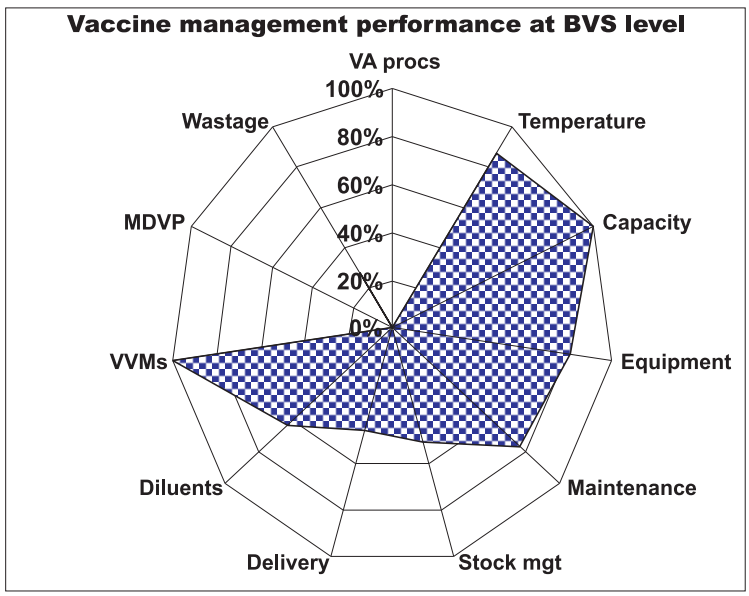
Annex E - List of Participants at the Debriefing of VMAT held on 22 Dec. 07

Sl No	Participant	Designation	Contact no.
1	Mr Chinmaya Basu	Principal Secretary, H & FW Dept, Orissa	
2	Dr B.S.Tripathy	Director Family Welfare, Orissa	
3	Mr S.K.Lohani	Mission Director NRHM, Orissa	
4	Dr Krishna Ch. Sinha	Jt Dir, Medical, DHS(O)	99372 03530
5	Ms. Gayatri Singh	P.O,Nutrition, OIC, UNICEF	94370 76004
6	Dr A.K.Sen	P.O,Health, UNICEF	94371 02141
7	S.K.Saxena	National Cold Chain Consultant MOH&FW, New Delhi	92509 03467
8	Dr Usha Patnaik	Sr. Programme Officer, UNOPS-NIP	99379 45250
9	R. K. Mishra	Dy. Dir. Demography	94371 07253
10	Surech chandra Jena	Cold Chain Officer, Orissa	94378 73004
11	Sanjeeb Mohan Palo	Cold Chain consultant, Orissa	94372 61264
12	Dr. Banambar Senapati	ADMO-FW, Puri	94373 05906
13	Dr. P.K Pattnaik	Specialist, Grade-I, Regional Director Office, Govt. of India	2341708
14	Dr Harihar Dora	CDMO,Kanhdhamal	9438001727
15	Dr B.C. Roy	CDMO, Koraput	94370 84209
16	Dr. Upendra K. Sahoo	ADMO-FW, Sambalpur	94373 48631
17	Ms. Monalisa Mahapatra	State Data Officer.	94371 13771
18	Sanjay K. Satpathi	St. Immun. Asst.	92370 73666
19	Naba K. Swain	Statistical Investigator, Office of DFW	
20	Ms. Trupti Mishra	Statistical Assistant, Office of DFW	94372 68012
21	Rabi Shankar Patnaik	RVS coordinator, Ganjam	00384 27279
22	P K Khandai	Foreman, Office of DFW	98536 06738
23	Rabindra K. Mohapatra	Technical Assistant, Office of DFW	
24	Raghunath Omkar	Dy MEIO, Ganjam	94375 13385
25	Mr S.Das	Asst Dir, Statistics, Office of DFW	94373 03334
26	Nrusingha Charan Sahu	MEIO, Balasore	94381 67570
Speakers			
1	Dr. R. K. Nath	Dy. Dir. MCH, Office of DFW	94373-55717
2	Dr. Srihari Dutta	Health Officer, Unicef, Orissa	94375-75838
3	Dr. Kshem Prasad	International Consultant, Unicef	094432-62241

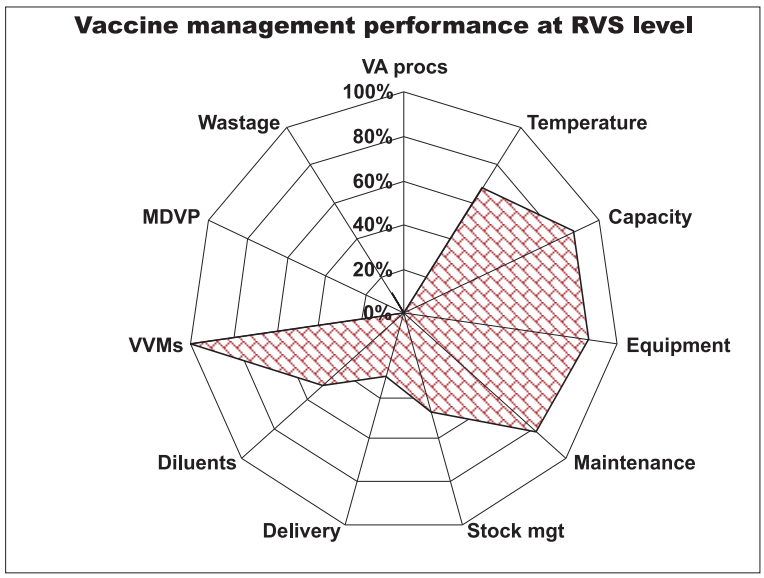
Annex F1 - KORAPUT Region

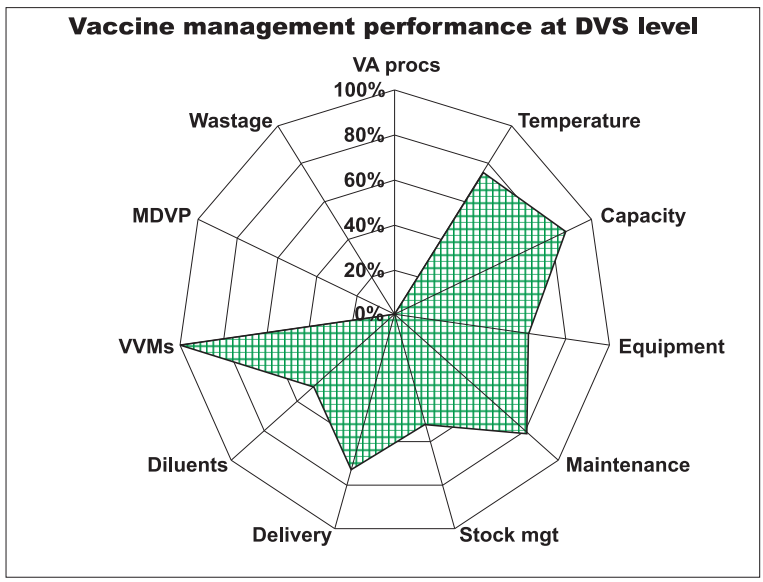


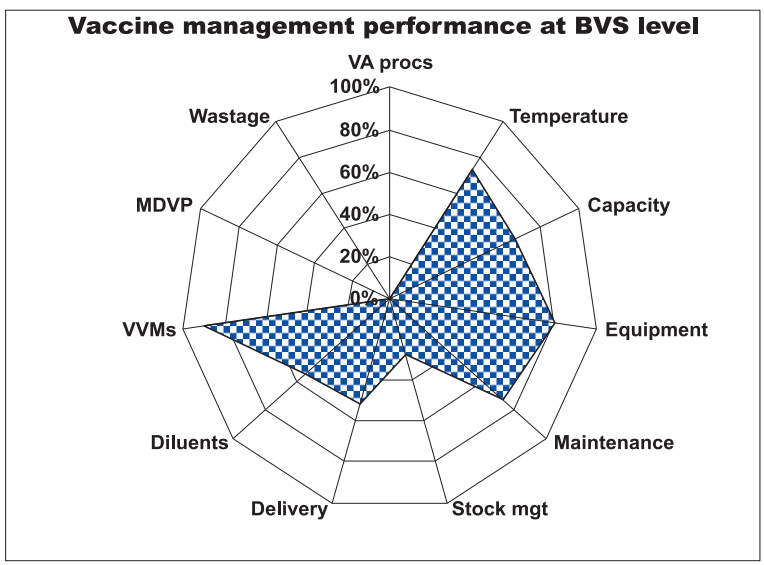




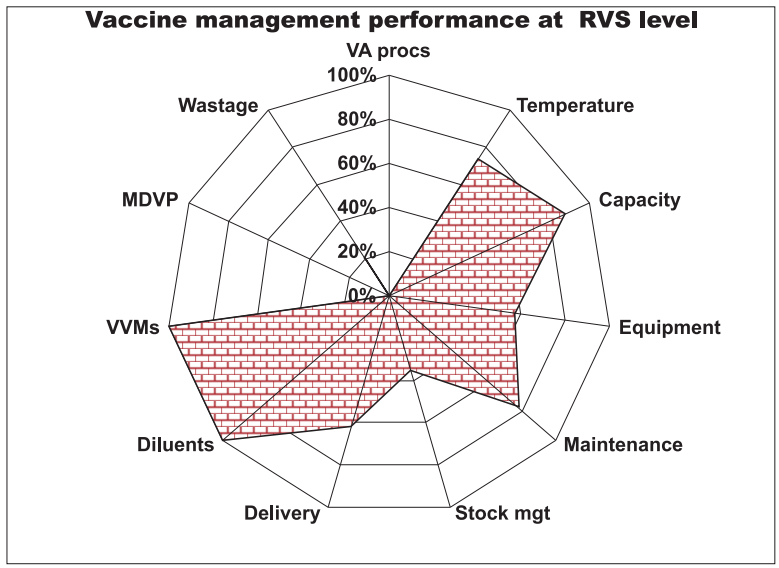
Annex F2 - GANJAM Region

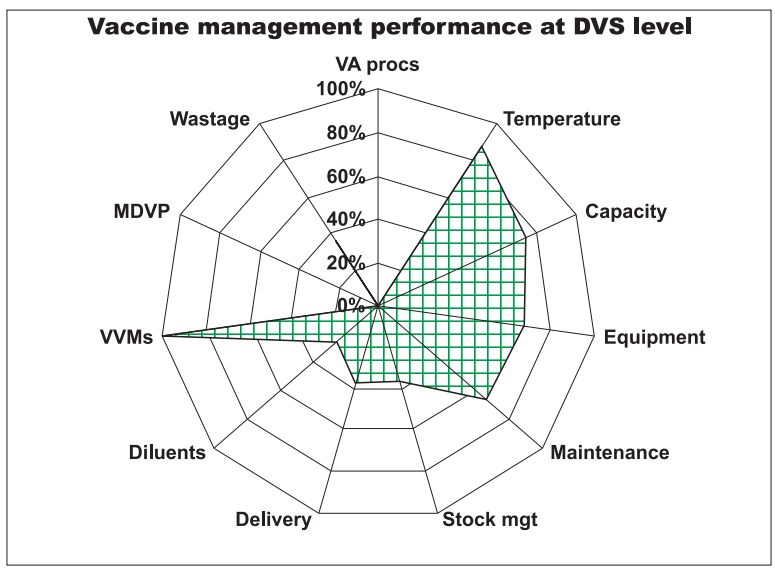


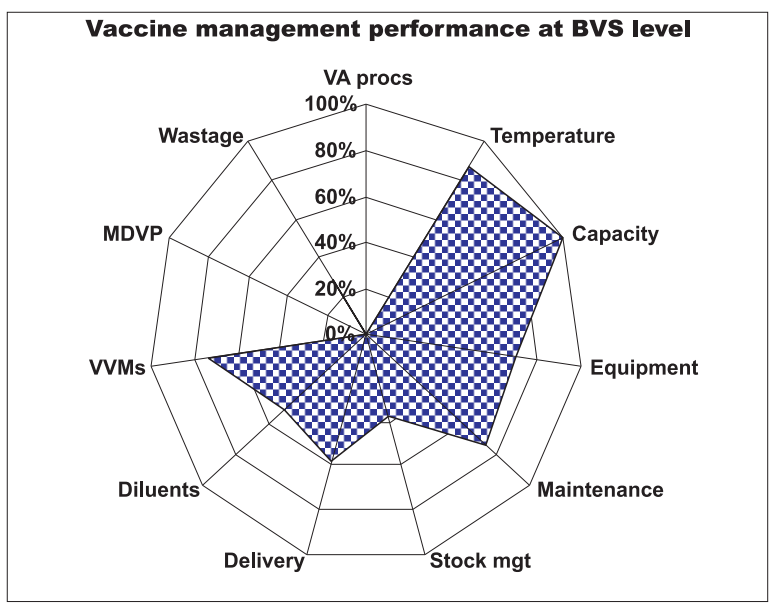




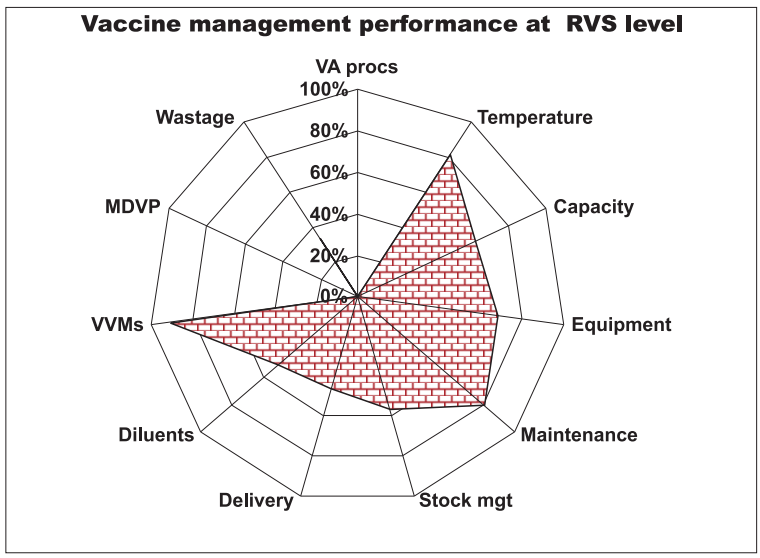
F3 - PHULBANI Region

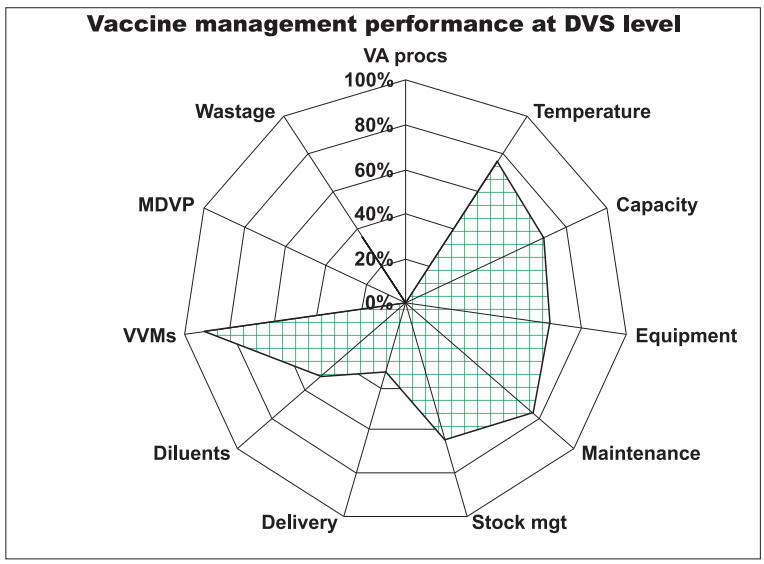


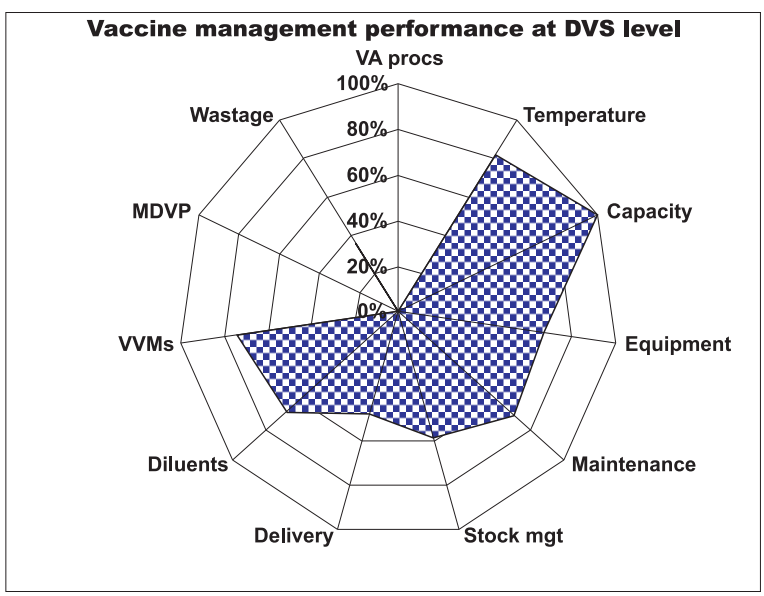




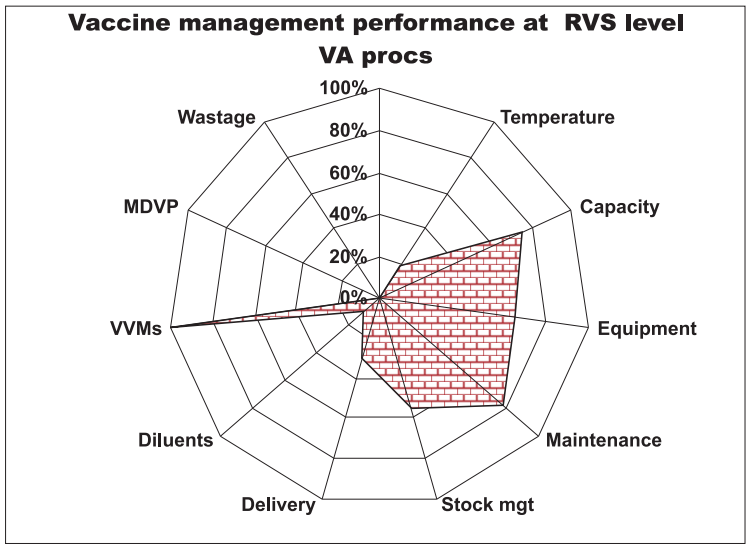
F4 - SAMBALPUR Region

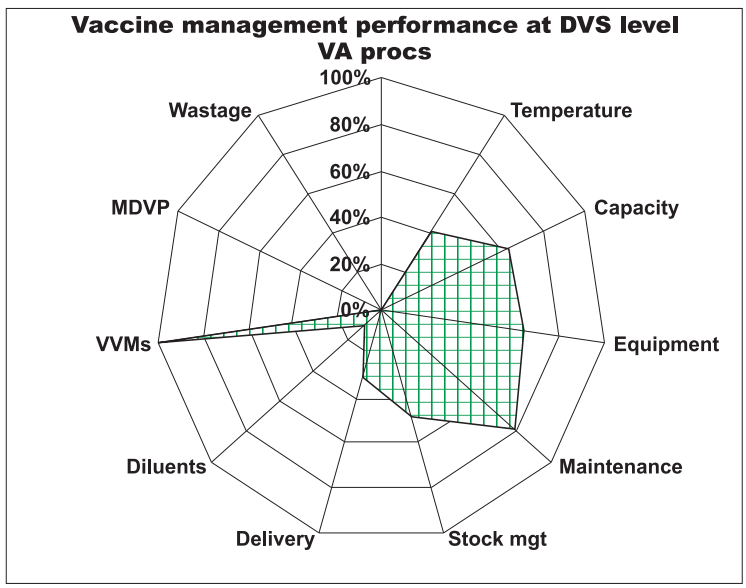


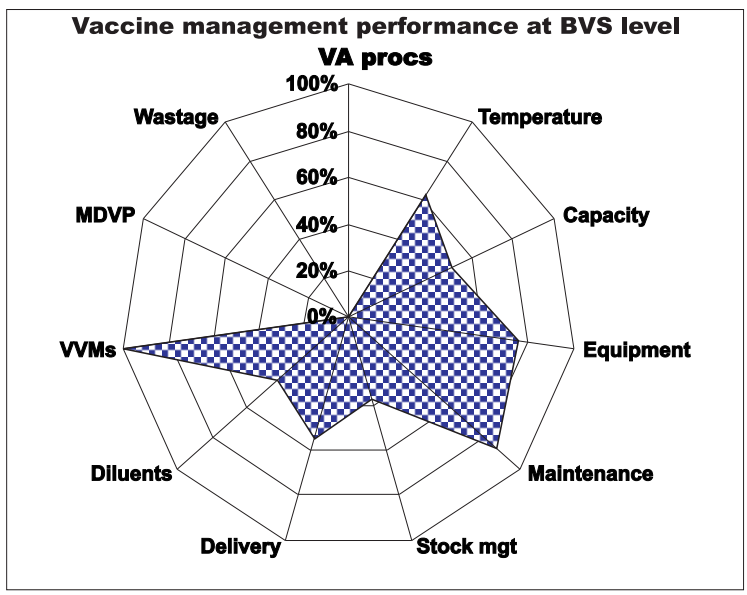




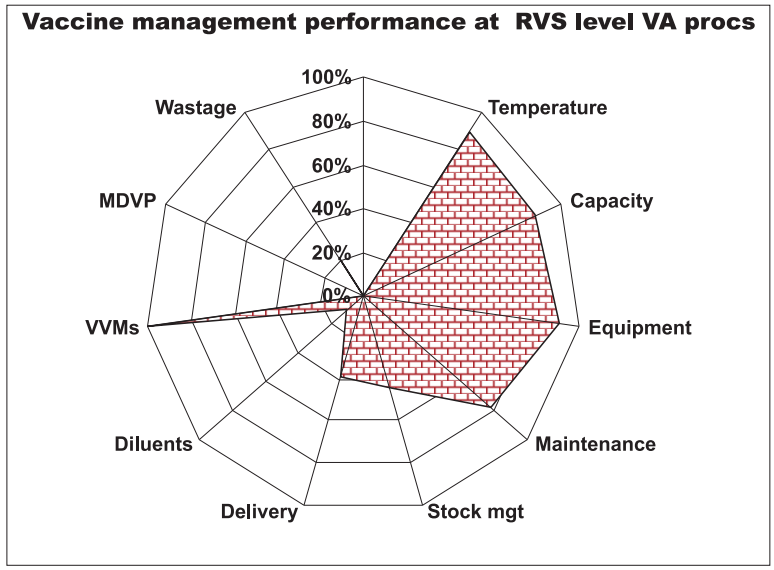
Annex F5 - SUNDERGARH Region

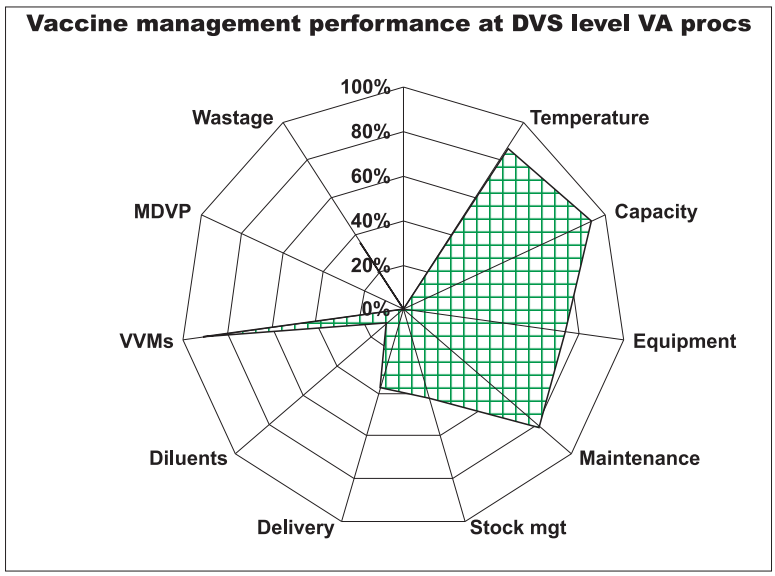


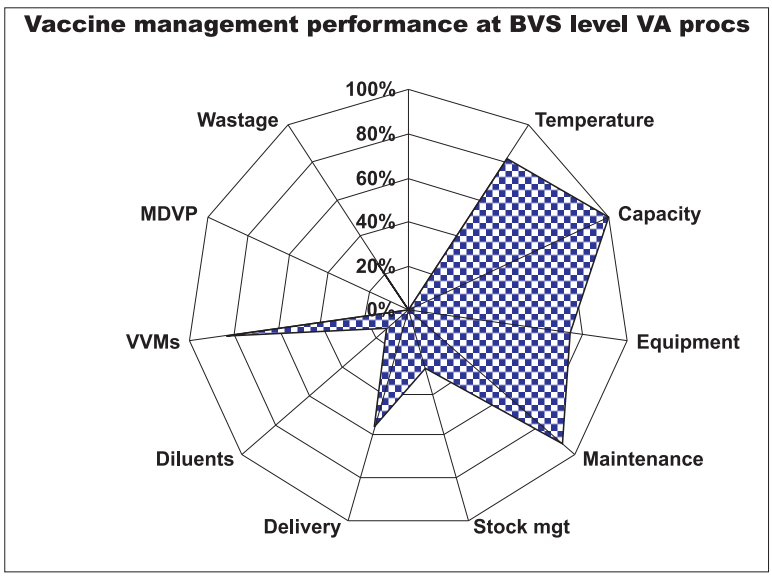




Annex F6 - BALASORE Region







Annex G - Indicator scores for all regions and their respective district and block level vaccine stores

No.	Indicator	SVS	RVS							DVS							Block- Service Delivery level							Urban PPC
			Koraput	Ganjam	Phulbani	Sambalpore	Sundergarh	Balasore	Average	Koraput	Ganjam	Phulbani	Sambalpore	Sundergarh	Balasore	Average	Koraput	Ganjam	Phulbani	Sambalpore	Sundergarh	Balasore	Average	
2	Vaccine storage temperature	82	68	67	74	82	18	89	66	76	75	88	76	41	86	74	87	73	86	82	63	82	79	49
3	Cold store capacity	75	88	88	88	63	75	88	82	100	88	75	69	63	94	82	100	67	100	100	50	100	86	80
4	Building, cold chain equipment and transport	80	59	87	57	68	65	91	71	69	63	68	66	64	74	67	81	80	70	67	75	74	75	81
5	Maintenance of cold chain equipment and transport	77	77	82	77	80	77	77	78	81	81	65	75	79	81	77	76	73	73	70	87	93	79	83
6	Stock management	59	38	47	35	57	55	43	46	47	51	36	64	48	41	48	50	28	37	58	37	28	40	29
7	Effective vaccine delivery	32	35	30	61	46	30	39	40	35	72	37	32	30	37	41	45	52	57	47	55	55	52	49
8	Correct diluents use for freeze dried vaccines	100	50	50	100	50	10	10	45	50	50	25	50	10	10	33	63	54	50	68	42	13	48	38
9	Effective VVM use	91	100	100	100	91	100	100	99	100	100	100	91	100	91	97	100	90	73	74	100	83	87	82
11	Vaccine wastage control	21	10	10	21	33	0	21	16	36	0	36	36	0	36	24	27	0	28	36	0	25	19	1

Annex H - Vaccine Batch Card (New for each batch of Vaccine)

Name of Vaccine:		**Diluent:**
Date received:	**Number of cartons:**	**Number of cartons:**
Temp. Rec. Status:	**Vial size:**	**Ampoule size:**
	Batch No:	**Batch No:**
VVM Status:	**Expiry date:**	**Expiry date:**
CCM Status:	**Quantity Received (vials):**	**(opening balance)**
Manufacturer:		

Vaccine issued / received (including diluents if applicable)

Date	Issued to / Received from	Invoice / Voucher	Quantity Issued	Balance (Doses)	Entry Reference	signature

Annex I - Walk-In-Freezer / Walk-In-Cooler

Ref.	Items of maintenance/Check list	Frequency	Date attended								
1	Cleaning of external surface of condensor units.	1 / month									
2	Cheaking function of electrical switch & circuit breaker.	1 / month									
3	Cleaning and checking condensate & drain line.	1 / month									
4	Cheaking of electrical conection of motor/ compressor terminal wires.	1 / 3 month									
5	Cleaning the condensor coil by brush with blower.	1 / 3 month									
6	Cheak & note voltage, ampere of motor/compressor.	1 / 3 month									
7	Check vibration and noise source.	1 / 3 month									
8	Checking and tighting the screws of contactors.	1 / 6 month									
9	Cleaning and lubricating the fan motor.	1 / 6 month									
10	Cleaning the evaporator coil by brush with blower.	1 / 6 month									
11	Checking refrigerant pressure and level.	1 / 6 month									
12	Checking tube insulation.	1 / year									
13	Checking & noting the winding insulation resistance of motor/compressor.	1 / year									
14	Calibration of thermometer and thermostat.	1 / year									

Please indicatewhen attended

Cl-Cleaned, Ch-Checked, S-Serviced, Specify other details on front page

Note: This log sheet should be stored safely for at least 3 years

Annex J

Department of Health & Family Welfare Services

Cold Chain Section (Maintenance Log Sheet)

WIF / WIC

Vaccine Store name	MONTH:	Unit Type	Net Capacity (Ltrs)
Unit Make	Model no.	Unit no.	Date Installed

Date	Detail of the Work	Time for work		Verified S ignature	
		Started date	Ended date	Technician	Section In-charge

Note: This log sheet should be stored safely for at least 3 years

Annex K - Example of Service log sheet for WIF and WIC

Department of Health Services

Cold Chain Section (Maintenance Log Sheet)

WIF / WIC

Make: …… Model No: ……

Capacity: …… Date installed: …….. Unit No: ……

Date	Detail of the Work	Time for work		Verified Signature	
		Started date	Ended date	Technician	Section In-charge

Annex L - VMAT format used for assessment

Vaccine Management

Module 1: Assessment tool

<Enter country name here>

September 2004 Version v2.0

VMAT: Introductory notes

1 The **Vaccine Management Assessment Tool (VMAT)** is one of a number of component tools and documents that have been developed for the Vaccine Management Training Network, with the aim of helping countries to improve their vaccine management systems and procedures. It should be read in conjunction with the *VMAT User Guide*. Other key documents are as follows:

1. Global Training Network, *Vaccine Management Training Cluster: Conceptual framework*.
2. *Ensuring Quality of Vaccines at Country Level - A Guideline for Health Staff.* (WHO/V&B/02.16).
3. Monitoring *vaccine wastage at country level: Guidelines for programme managers.* (WHO/V&B/03.18).
4. WHO-UNICEF Effective Vaccine Store Management Initiative (EVSM) documents comprising: Module 1 - Ten Global Criteria for Effective Vaccine Store Management. (WHO/IVB/04.17 and UNICEF/Immunization 04.01); Module 2: Model Quality Plan. (WHO/IVB/04.18 and UNICEF/Immunization 04.02); Module 3 - Assessment Questionnaire. (WHO/IVB/04.19 and UNICEF/Immunization 04.03), and Module 4 - Guidelines for Self-assessment. (WHO/IVB/03.20 and UNICEF/Immunization 04.04).

2 **Design of the questionnaire:** The questionnaire consists of a set of linked Excel worksheets. All cells, other than the ***commentary*** and the ***data entry*** cells are protected and should not be altered. Commentary and data entry cells are white. Cells containing formulae are generally shaded grey. Critical indicators are highlighted in turqoise.

3 **Using the questionnaire:** As much data as possible should be collected before the assessment takes place. The 'Background' and 'Human resources' worksheets provide checklists of information that, in many cases can be collected before the assessment visit. The worksheets tagged 'national', subnational' and 'service' set out the indicators that relate specifically to each of these levels. The results obtained contribute to the scores on the spider web graphs ('graph1' and 'graph2'). Note that a number of the critical indicators relating to vaccine storage and distribution are identical to critical indicators set out in the EVSM Assessment Questionnaire. However, the VMAT tool serves a different, albeit complimentary, purpose to the EVSM tool.

4 **Scoring:** All of the questions require a numerical score. With the exception of a few ***critical indicators***, which are weighted, the answers all carry the same value. However the design of the questionnaire allows weightings to be adjusted in future, in the light of experience in the use of the tool. The **Indicators** worksheet displays a column headed **wf** (weighting factor) which contains a factor for every indicator. Normal indicators currently have wf values set = 1; critical indicators have higher values. Any one of these values can be altered by a user with password privileges. In almost all cases, the wf value is obtained from the value set on the 'indicators' worksheet. Where a wf value is highlighted in yellow, it has been specifically set to this value.

5 **Commentaries:** The individual questions, with their numerical answers, cannot hope to capture many of the subtler observations of a skilled assessor. Consequently each sub-criterion has a commentary box after each question or group of questions. ***These commentaries are an essential part of the assessment.*** They also provide a place to record the assessors' recommendations for improvements to observed practices.

6 **Setting up and completing a blank spreadsheet:** Start each assessment with a copy of the spreadsheet in which all commentary and data entry cells are blank. The simplest way to do this is to save a copy of the original spreadsheet with a new fiule name. Alternatively cells containing data can be made blank by pressing the 'Delete' key. DO NOT use zeros or other characters to indicate unused cells as this will cause calculation errors. For each facility that is inspected DO enter an answer to every question.

7 **Error indicator:** The data entry cells of the worksheets tagged 'national', 'subnational' and 'service' contain error checking routines. These are designed to ensure that the user does not enter answers that are obviously incorrect. When such an error occurs, the cell is highlighted in **magenta.** Before continuing, the user should review and change the value just entered.

8 **Feedback:** Both national and international assessors are strongly encouraged to provide feedback on the use of the tool and to provide suggestions for improvements.

Revision history

D1 19.03.03: Partially complete draft issued for comment.
D2a 26.03.03: Partially completed draft issued for comment.
D3 01.04.03: Completed draft for discussion in Geneva, 03-04 April 2003.
D4 11.04.03: Draft incorporating amendments agreed with Dr Kartoglu, 03-04 April 2003. Sections 7 and 8 merged as 'Effective vaccine delivery'. Sections 9 and 10 removed. 13 other indicators deleted. Numbering updated. Visible changes in blue. Missing references (this sheet) in red.
D5 02.05.03: Bar chart y axes set to 100%
v1.0 11.03.04: Revisions requested by Dr Kartoglu. Background A2, A3, A4 - warning note added. 4E - wording changed; 4H - n/a option added; 5A, 5B, 5C, 5D - n/a options added. 5A - weighting factor now different at each level.
13.07.04: Final revision done by Dr Kartoglu (version 2). Changes introduced in references and document numbers.

VMAT: Section A - background data

Note to assesors: Obtain as much of this information as possible before the inspection commences, including copies of any previous self-assessments and previous external assessments.

A1 General details

A1.1	Country:	
A1.2	Department/ministry:	
A1.3	Address:	
A1.4	Primary contact(s):	
A1.5	Telephone:	
A1.6	Fax:	
A1.7	Email:	
A1.8	Type of assessment:	Self-assessment: ____ External assessment: ____
A1.9	Dates of assessment:	From: ____ To: ____
A1.10	Assessment team:	

A2 National/primary level store details (NOTE: You MUST enter a name for every facility you visit, otherwise the results will not be summed to the spider web graphs and bar charts)

A2.1 No. of primary stores ____ Include every primary store, whether at national or at regional level, which receives vaccine direct from the manufacturer/supplier.

A2.2 Primary stores chosen for inspection

	Facility name (enter at least one)	Temperature zone	Contact details	List sub-national stores supplied
ps01				
ps02				
ps03				

A2.3 Commentary on choice of store(s) for inspection

A3 Sub-national/intermediate level store details (NOTE: You MUST enter a name for every facility you visit, otherwise the results will not be summed to the spider web graphs and bar charts)

A3.1 Total no. of all sub-national stores (note 1, 2) ____ No. of these which supply lower level sub-national stores ____ No. of sub-national stores that supply service points direct ____

A3.2 Sub-national stores chosen for inspection

	Facility name (enter at least one)	Temperature zone	Contact details	List sn and/or no. of sd supplied
sn01				
sn02				
sn03				
sn04				
sn05				

Note to assesors: Obtain as much of this information as possible before the inspection commences, including copies of any previous self-assessments and previous external assessments.

A3.3 Commentary on choice of sub-national stores for inspection

A4 Service delivery level details (NOTE: You MUST enter a name for every facility you visit, otherwise the results will not be summed to the spider web graphs and bar charts)

A4.1 Total number of fixed service delivery points ____

A4.2 Service delivery points chosen for inspection

	Facility name (enter at least one)	Temperature zone	Contact details	Name of supplying sub-national store
sd01				
sd02				
sd03				
sd04				
sd05				
sd06				
sd07				
sd08				
sd09				
sd10				

A4.3 Commentary on choice of service delivery points for inspection

VMAT: Section A - background data

Note to assesors: Obtain as much of this information as possible before the inspection commences, including copies of any previous self-assessments and previous external assessments.

A5 Checklist of materials requested and obtained before or during inspection (enter dates or yes/no)

		Requested	Obtained	Notes
A5.1	Immunization schedule:			
A5.2	Details of vaccine supplier(s):			
A5.3	Standard Operating Procedures manual:			
A5.4	Standard reporting forms:			
A5.5	EVSM national quality plan:			
A5.6	Details of stock control system used:			
A5.7	Inventory of cold chain equipment at all levels:			
A5.8	Inventory of transport fleet at all levels:			
A5.9	General commentary on documentation:			

A6 Details of previous self-assessments and previous external assessments

A6.1	Previous assessments:	Type of assessment:		Date:	Outcome:	
		Type of assessment:		Date:	Outcome:	
		Type of assessment:		Date:	Outcome:	
		Type of assessment:		Date:	Outcome:	

Notes:

1) Some countries have a four level distribution system thus: national/primary store > high level sub-national store > low level sub-national store > service point.

2) If the country has a four level distribution system, make sure that the sample of sub-national stores includes stores which supply lower level stores as well as stores which directly supply service points.

VMAT: Section B - service providers

Note to assesors: Obtain as much of this information as possible before the inspection commences.

B1 Logistics and maintenance service providers

List organizations and companies that provide a logistics service to the programme. If the service is provided by the government, specify the relevant agency/department

	Service	Organization	Is there a formal contract agreement? YES/NO	If YES, record contract start & end dates	If NO, record how service is procured (note 1)
B1.1	Building maintenance				
B1.2	Vehicle maintenance				
B1.3	Refrigeration maintenance				
B1.4	Generator maintenance				
B1.5	Clearing agent				
B1.6	Storage service				
B1.7	Transport service				
B1.8	Insurance agency				
B1.9					
B1.10					

Add further fields as required

Notes:

1) For example, there could be a memorandum of agreement (MoU) with another government department or an informal arrangement.

VMAT: Indicators

Wherever a 0 or 1 score is indicated, NO = 0 or YES = 1. | **Indicators apply only to those levels which are**

0	EVSM inspection	Indicator	wf	National	Subnational	Service
0.A	The national store has passed an EVSM external inspection and/or carried out a self-assessment.	Review EVSM inspection report and/or results of self-assessment. Identify any areas of weakness so that these can be followed up using the national-level questions which follow. (Score Cert = certified, Self = self-assessed, None = no assessment).				

1	Vaccine arrival procedures	Indicator	wf	National	Subnational	Service
1.A	The requirements set out in the vaccine arrival report have been complied with for all shipments.	**CI**: Does the VAR form includes all key procedures from UNICEF VAR Parts I to VII? [Score 0 or 1. If no VAR of any kind, score 0].	2.00			
		CI: Record the number of vaccine **arrivals** over the past six months.				
		CI: There should be a VAR to accompany each individual vaccine; how many where there?				
		CI: How many of these received VARs were completed substantially correctly by the 'Inspection Supervisor'?	5.00			
		Review VARs for the past six months. Were any shipments received in unsatisfactory condition? If so, were these shipments followed-up satisfactorily with the supplier, within 14 days? [Score 0-4]	1.00			
1.B	Reliable arrangements have been agreed with the relevant authorities to clear vaccines through customs.	Review the working arrangements with customs (and the Memoranda of Understanding (MoU) if it exists). Are they satisfactory? [Score 0-4].	1.00			
1.C	Where a clearing agent is used, the facilities and performance of the agent have been adequately monitored.	Inspect the contract with the clearing agent and assess the adequacy of their facilities. Are they satisfactory? [Score 0-4. Score n/a if no clearing agent is used].	1.00			

2	Vaccine storage temperatures	Indicator	wf	National	Subnational	Service
2.A	Storekeepers must know the correct storage temperature for every vaccine	**CI:** Can the storekeeper give the correct storage temperature range for each of the vaccines on the schedule? [Score 0 or 1].	5.00			
		CI: Can the storekeeper give the freezing temperature of each of the freeze-sensitive vaccines on the schedule (see note 2)? [Score 0 or 1].	5.00			
2.B	**For all cold rooms and freezer rooms:** Continuous temperature records are available, and these records demonstrate that vaccine has been stored correctly in both permanent and temporary cold stores.	For the past six months, is there a complete set of twice-daily manual temperature records for each and every cold room and freezer room? [Score 0 or 1. Score n/a if no cold/freezer room].	1.00			
		For the past six months, is there a complete set of temperature recorder traces for each and every cold room and freezer room? [Score 0 or 1. Score n/a if no cold/freezer room].	1.00			
		Does a random 7 day sample of temperature recorder traces for each appliance agree with the matching temperature records? [Score 0 or 1. Score n/a if no cold/freezer room].	1.00			
2.C	**For vaccine refrigerators and freezers:** Inspect temperature records at least twice every 24 hours, 7 days per week.	For the past six months, is there a complete set of twice-daily manual temperature records for each and every vaccine refrigerator and freezer? [Score 0 or 1 or n/a].	1.00			
2.D	Record all vaccine discarded due to incorrect storage temperatures.	Inspect stock records and disposal reports and question staff. IF (no. of doses discarded/(vax balance at start of 6 month period + vax received during period))*100 shows no more than 1% loss, then system is acceptable. [Score 0 or 1].	1.00			
2.E	Maintain a contingency plan.	**CI:** Is there a satisfactory contingency plan in the event of equipment failure? [Score 0-4].	1.00			
		CI: Are emergency contact details posted in the vaccine store? [Score 0 or 1].	1.00			
		CI: Interview staff. Do they know what to do in the event of an emergency? [Score 0-4].	2.00			

3	Cold storage capacity	Indicator	wf	National	Subnational	Service
3.A	The store can accommodate peak stock levels for all the vaccines specified in the national immunization schedule, including campaign vaccines where these are normally kept in the store.	**Step 1** (see note 3)**:** Using data from stock records, calculate the peak volume (in litres) for +4 deg C and -20 deg C vaccines. At service level, allow for +4 deg C storage of diluent. **Step 2** (see note 4)**:** Establish the net storage capacity (in litres) of the store (for both +4 deg C and -20 degC equipment). **Step 3:** From analysis of these data, establish whether storage capacity is adequate. [Score 0 or 1].	1.00			
3.B	Where vaccine supplied for campaign use is stored in **temporary facilities**, these facilities can accommodate peak stock levels.	**Step 1** (see note 3)**:** Using data from stock records, calculate the peak volume (in litres) for +4 deg C and -20 deg C vaccines. At service level, allow for +4 deg C storage of diluent. **Step 2** (see note 4)**:** Establish the net storage capacity (in litres) of the store (for both +4 deg C and -20 degC equipment). **Step 3:** From analysis of these data, establish whether storage capacity is adequate. [Score 0 or 1 or n/a].	1.00			
3.C	Vaccine managers know how to adjust the supply period to the storage capacity.	Ask the vaccine manager what s/he would do when the capacity is not sufficient - for example introduction of new vaccines. [Score 0-4].	1.00			

4	Buildings, cold chain equipment and transport	Indicator	wf	National	Subnational	Service
4.A	**National store:** Accommodation within the store building is satisfactory.	Check that the room where the refrigeration equipment is accommodated large enough., located close to the packing area and adequately ventilated. [Score 0-4].	1.00			
		Check that there is an adequate packing area, maintained at 15-25 deg C. [Score 0-4].	1.00			
		Check that the storekeeper has an adequate office located close to the storage area. [Score 0-4].	1.00			
		Check that there is adequate space for storing diluents, packaging materials, cold boxes, icepack freezers and icepacks. [Score 0-4].	1.00			
4.B	**Subnational store: Accommodation within the store building is satisfactory.**	Check that that the room where the refrigeration equipment is accommodated is large enough. The room should be adequately ventilated. [Score 0-4].	1.00			
		Check that there is adequate space for storing diluents, packaging materials, cold boxes, icepack freezers and icepacks. [Score 0-4].	1.00			
4.C	**Cold rooms and freezer rooms:** The standard of equipment is satisfactory in	Are refrigeration units fully operational (note 5)? [Score 0 or 1. Score n/a if no cold/freezer room].	1.00			

VMAT: Indicators

				Indicators apply only to those levels which are		
Wherever a 0 or 1 score is indicated, NO = 0 or YES = 1.						
	both permanent and temporary cold stores.	Do all rooms have continuous temperature recorders? [Score 0 or 1. Score n/a if no cold/freezer room].	1.00			
		Do all cold rooms maintain a temperature of +2°C to +8°C? [Score 0 or 1. Score n/a if no cold/freezer room].	1.00			
		Do all freezer rooms maintain a temperature of -15°C to -25°C? [Score 0 or 1. Score n/a if no cold/freezer room].	1.00			
		Are all rooms fitted with dual refrigeration units? [Score 0 or 1. Score n/a if no cold/freezer room].	1.00			
		Are all rooms fitted with adequate shelving? [Score 0 or 1. Score n/a if no cold/freezer room].	1.00			
		Are all rooms fitted with temperature alarms?[Score 0 or 1. Score n/a if no cold/freezer room].	1.00			
		Unreliable electricity supply only: Are all rooms fitted with voltage regulators? [Score 0 or 1. Score n/a if no cold/freezer room].	1.00			
		Cold climates only: Do cold rooms EITHER have low temperature protection OR are they located in a permanently heated room? [Score 0 or 1. Score n/a if no cold/freezer room].	1.00			
4.D	**Vaccine refrigerators and freezers:** The standard of equipment is satisfactory in both permanent and temporary cold stores.	Does every unit comply with the WHO specifications that were in force at date of purchase? (Including correct climate zone). [Score 0 or 1. Score n/a if no refrigerators/freezers].	1.00			
		Are all units fully operational at time of inspection (note 5)? [Score 0 or 1. Score n/a if no refrigerators/freezers].	1.00			
		Do all units have a working thermometer stored with the vaccine? [Score 0 or 1. Score n/a if no refrigerators/freezers].	1.00			
		Do all vaccine refrigerators maintain a temperature of +2°C to +8°C? [Score 0 or 1. Score n/a if no refrigerators].	1.00			
		Do all vaccine freezers maintain a temperature of -15°C to -25°C? [Score 0 or 1. Score n/a if no freezers].	1.00			
		Where applicable, are there adequate reserve supplies of kerosene and/or gas? [Score 0 or 1 or n/a].	1.00			
		Unreliable electricity supply only: Are all units fitted with voltage regulators? [Score 0 or 1 or n/a].	1.00			
		Cold climates only: Are vaccine refrigerators located in a permanently heated room? [Score 0 or 1 or n/a].	1.00			
4.E	**Icepack freezering capacity:** There should be sufficient freezing capacity to meet the maximum daily demand for icepacks.	Is there sufficient icepack **freezing** capacity to meet peak demand? [Score 0 or 1].	1.00			
		Is there sufficient icepack **storage** capacity to meet peak demand? [Score 0 or 1].	1.00			
4.F	**Cold boxes and vaccine carriers** should be sufficient to meet peak demand.	Are there are sufficient cold boxes and vaccine carriers? [Score 0 or 1].	1.00			
		Do staff know how to condition icepacks and how to pack transport boxes? [Score 0 or 1].	1.00			
		Cold climates only. Do staff know how to prevent vaccine freezing during transport? [Score 0 or 1 or n/a].	1.00			
4.G	**Standby power supply:** There should be a standby power supply for the vaccine store, with automatic start-up. Preferably the generator should serve the vaccine store alone.	Is the generator in working order? [Score 0 or 1].	1.00			
		Can the generator start all the connected equipment in the vaccine store (see note 6)? [Score 0 or 1].	1.00			
		Is the fuel tank large enough (ideally 72 hrs running time)? [Score 0 or 1].	1.00			
		Are there adequate reserve supplies of fuel? [Score 0 or 1].	1.00			
4.H	**Transport:** Satisfactory transport arrangements are in place for transporting vaccine, including arrangements for the maintenance of correct temperatures during transport.	Are all vehicle(s) fully operational (note 4)? [Score 0 or 1 or n/a].	1.00			
		During the past six months, was sufficient fuel available to allow all deliveries to be completed on time? [Score 0 or 1 or n/a].	1.00			
4.J	**Transport:** Refrigerated vehicles are used correctly.	**Only where used.** Do drivers know how to operate refrigerated vehicles? [Score 0 or 1 or n/a].	1.00			

5	Maintenance of cold chain equipment & transport	Indicator	wf	National	Subnational	Service
5.A	Planned replacement of cold chain equipment is carried out.	**CI: Equipment:** Is there an itemised equipment replacement plan, and is this plan being followed? [Score 0-4].				
		Transport: Is there an itemised vehicle replacement plan, and is this plan being followed? [Score 0-4 or n/a if no transport].				
5.B	Planned preventive maintenance to cold chain equipment and transport is carried out.	**CI: Equipment:** Is there a planned preventive maintenance, overhaul and replacement plan, and is this plan is being followed? [Score 0-4].	2.00			
		Transport: Is there a planned preventive maintenance, overhaul and replacement plan, and is this plan is being followed (note 7)? (Score 0-4 or n/a if no transport)	1.00			
5.C	Emergency repairs to equipment and transport are conducted in a timely manner and are reported.	**CI: Equipment:** During the past six months did any cold room, vaccine refrigerator or freezer fail to the extent that vaccine was damaged? [Score 0 if damage occured or 1 if no damage].	5.00			
		CI: Transport: During the past six months did any vehicle fail to the extent that vaccine was damaged (note 8)? [Score 0 if damage occurred, 1 if no damage or n/a if no transport].	5.00			
5.D	Adequate supplies of spare parts and consumables are available to ensure that equipment and vehicles operate effectively.	**Equipment:** During the past six months, did a shortage of spare parts or consumables cause any cold room, refrigerator or freezer to be removed from service for longer than 7 days? [Score 0 or 1].	1.00			
		Transport: During the past six months, did a shortage of spare parts or consumables cause any vehicle to be removed from service for longer than 7 days? [Score 0 or 1 or n/a if no transport].	1.00			

6	Stock management	Indicator	wf	National	Subnational	Service
6.A	Standardized recording and reporting of all stock transactions is carried out. Preferably this is computerized at the national (primary) level.	Are all receipts and despatches recorded and balances updated? [Score 0 or 1].	1.00			
		CI: Are vaccine & diluent quantities (in doses) recorded? [Score 0 or 1].	0.63			
		CI: Are vaccine & diluent type recorded? [Score 0 or 1].	0.63			
		CI: Are vaccine & diluent manufacturer recorded? [Score 0 or 1].	0.63			
		CI: Are vaccine & diluent vial size recorded? [Score 0 or 1].	0.63			

VMAT: Indicators

Wherever a 0 or 1 score is indicated, NO = 0 or YES = 1.				Indicators apply only to those levels which are		
		CI: Are vaccine & diluent batch/lot numbers recorded (note 8)? [Score 0 or 1].	0.63			
		CI: Are vaccine & diluent expiry dates recorded (note 8)? [Score 0 or 1].	0.63			
		CI: Is VVM status recorded (where applicable)? [Score 0 or 1].	0.63			
		CI: Is freeze indicator status recorded? [Score 0 or 1].	0.63			
		Is a vaccine distribution report regularly made and circulated? [Score 0 or 1].	1.00			
		Are vaccine requisition forms used for ordering and receiving vaccine? [Score 0 or 1].	1.00			
6.B	Stocks have been maintained between the safety stock level and the maximum stock level for each vaccine and for other consumables.	Is vaccine distribution generally made according to the 'earliest expiry – first out' (EEFO) principle? [Score 0 or 1].	1.00			
		Are maximum and minimum stock levels established for each store? [Score 0 or 1].	1.00			
		Can the vaccine managers make exceptions to this rule (e.g. because of VVM status)? [Score 0 or 1].	1.00			
6.C	Periodic physical inventories have been conducted.	Have physical counts have been carried out and recorded during the past six months? (Ignore counts that are reported, but not properly recorded). [Score 0 or 1].	1.00			
		CI: Carry out a sample physical count of the vaccine stock to establish whether stock records are accurate. Choose a freeze-dried vaccine, preferably one with a separately packed diluent. [Score 0-4].	4.00			
6.D	Good warehousing practices are in place.	**Cleanliness:** Is the vaccine store clean and pest-free? [Score 0 or 1].	1.00			
		Stock security: Is the stock secure? [Score 0 or 1].	1.00			
		Data security: Are the records secure? [Score 0 or 1].	1.00			
		Storage: Is stock laid out in an orderly fashion? [Score 0 or 1].	1.00			
		Storage: Does all cold chain equipment have a contents list fixed to the cabinet indicating type of vaccine, lot no., expiry date, etc. [Score 0 or 1].	1.00			
		Storage: Are vaccines correctly stored (e.g. no freeze-sensitive vaccine stored close to cold room evaporators, stored close to ice lining in ILRs or stored close to the evaporator plate of service point refrigerators)? [Score 0 or 1].	1.00			
7	**Effective vaccine delivery**	**Indicator**	**wf**	**National**	**Subnational**	**Service**
7.A	Distribution reports indicate compliance with the planned delivery schedule.	Is a plan for vaccine receipt/distribution established and followed? [Score 0 or 1].	1.00			
7.B	The stock of vaccine is sufficient until the next delivery arrives.	Check stock levels for each vaccine in the stock record/book. Are stocks sufficient for the period remaining until the next delivery is due? (This could be as much as six months at national level, three months at Subnational level and one month at service level). [Score 0 or 1].	1.00			
7.C	A sufficient stock of each vaccine and diluent has been available throughout the past six months.	**CI:** No stockouts? [Score 0 or 1].	2.00			
		CI: No instances where low stock levels affected deliveries to lower level stores? [Score 0 or 1].	1.00			
		CI: No instances where safety stock levels were breached? [Score 0 or 1].	2.00			
7.D	The person responsible for ordering vaccine knows how to estimate the vaccine needs for one supply period.	Is the correct method used to calculate vaccine needs? [Score 0 or 1].	1.00			
7.E	A system for managing short shipments is in place.	If there were short shipments during the past six months, were they followed up and corrected? [Score 4 if there were no short shipments. Otherwise evaluate the effectiveness with which short shipments were managed and score on a scale of 0-4].	0.25			
7.F	Freeze indicators are correctly used.	Check the status of freeze indicators. Do the health workers know how to read them? [Score 0 or 1].	1.00			
7.G	Freeze indicators are used in all deliveries.	Over a selected one month period, were freeze indicators used on all deliveries of freeze-sensitive vaccines (note: if chilled water packs are used and ambient temperature is above zero, then freeze indicators are not required)? [Score 0 or 1 or n/a].	1.00			
7.H	In case of failure, damage has been reported and vaccine has been replaced on time.	**CI:** During the past six months period, was less than 1% of vaccine lost due to incorrect transport conditions from the supplying store? [Score 0 or 1].	4.00			
8	**Correct diluent use for freeze dried vaccines**	**Indicator**	**wf**	**National**	**Subnational**	**Service**
8.A	Freeze-dried vaccines are always ordered, received and distributed with their original diluent (see note 8).	**CI:** Inspect vaccine and diluent stocks and check stock records. Are the correct diluents, in the correct quantities and correct lots, being distributed with each batch of vaccine? [Score 0 or 1].	5.00			
8.B	The stock of diluent corresponds with the stock of freeze-dried vaccine.	**CI:** Does the diluent stock for each freeze-dried vaccine correspond with the stock of each vaccine? [Score 0 or 1].	5.00			
8.C	Health workers use the correct diluent with each freeze-dried vaccine (i.e. same manufacturer and same number of doses as the vaccine)	**CI:** Do health workers always use matching diluent and vaccine? [Score 0 or 1].	5.00			
8.D	Diluents for immunization sessions are stored and used at the correct temperature (cooled to 2-8°C before and during use).	**CI:** Are diluents always kept in the cold chain before and during every immunization session? [Score 0 or 1].	5.00			
9	**Effective VVM use**	**Indicator**	**wf**	**National**	**Subnational**	**Service**
9.A	The VVM policy is correctly implemented by national EPI.	Are written instructions on the use of VVMs, such as posters and stickers, available to health workers? [Score 0 or 1].	1.00			
		CI: Do storekeepers/health workers know how to read VVMs? (Use dummy VVMs and/or sticker samples to check knowledge). [Score 0 or 1 or n/a].	5.00			
		CI: Where VVM vaccines are used outside the cold chain, during routine, outreach or campaign sessions, are they are used correctly? [Score 0-4].	5.00			
		CI: Do vaccine managers/health workers use VVM status for vaccine management purposes (e.g. do they use Stage 2 vaccines first)? [Score 0 or 1].	5.00			

VMAT: Indicators

Wherever a 0 or 1 score is indicated, NO = 0 or YES = 1. | **Indicators apply only to those levels which are**

10	Multi-Dose Vial Policy	Indicator	wf	National	Subnational	Service
10.A	The MDVP is correctly implemented by national EPI.	**CI:** Has the MDVP been adopted? [Score 0 or 1].	5.00			
		CI: Are opened vials of freeze-dried vaccines discarded within six hours of reconstitution, or at the end of each immunization session? [Score 0 or 1].	5.00			
		CI: Are opened vials of liquid vaccines kept for the next immunization sessions? (ask health workers to show which opened vials they will use for the next session and verify this information through immunization records) [Score 0 or 1].	5.00			
		CI: Can vaccine managers/health workers explain how to use the MDVP? [Score 0 or 1].	5.00			

11	Vaccine wastage control	Indicator	wf	National	Subnational	Service
11.A	There is a vaccine wastage monitoring system.	Review the periodic immunization reports and/or any other reporting forms that are used to monitor vaccine wastage. [Score 0-4].	1.00			
11.B	Vaccine managers/health workers know how to calculate the wastage rate.	**CI:** Assess whether staff understand the principles involved in calculating vaccine wastage. [Score 0-4].	5.00			
11.C	When vaccines are ordered, wastage rate information is used to establish the quantities required.	**CI:** Establish whether wastage rate data have been used to estimate vaccine needs before ordering vaccine. [Score 0-4].	5.00			
11.D	Available vaccine wastage data is used to make other operational changes. (e.g. training, supervision, selection of vial size, session size, adoption of MDVP, etc.)	Review documents where the current wastage rates have been used. [Score 0-4].	1.00			

Notes:

1) Note that vaccines may be stored 'in bond' in the national store until they are formally cleared by customs. In this case answer the question as for the national cold room/freezer room.

2) It is particularly important that respondents know that freeze-sensitive vaccines must not be exposed to temperatures below 0 deg C.

3) Assessors should use the WHO vaccine volume calculator to help with carrying out the capacity checks. The tool may be downloaded from http://www.who.int/vaccines-documents/DocsPDF01/www586.pdf

4) For refrigerators and freezers use capacity data listed in the *Product Information Sheets* wherever possible.

5) Ignore any equipment which is out-of-service for a legitimate reason - for example because it is being serviced or repaired. Check that any vaccine that was stored in the out-of-service equipment is being kept under safe conditions.

6) The starting load for a refrigeration compressor is much higher than the running load. If there is a power failure, the generator must be able to cope with the combined starting load of all connected refrigeration units.

7) In this context, 'planned preventive maintenance' (PPM) is as defined in the manufacturer's service manual. Both the need for and the timing of PPM can be foreseen. 'Overhaul' means the dismantling or replacement of major components, such as clutch linings, engines, transmissions, etc. The timing may vary between similar vehicles, but the need can be foreseen. 'Replacement policy' means the disposal of the vehicle at a rationally established point in its life.

8) Ignore losses arising from traffic accidents for which the driver was not directly responsible.

9) All diluents must have lot numbers and expiry dates. If this information is missing, the team should notify Dr Nora Dellepiane at WHO Geneva (dellepianen@who.int).

VMAT: National/primary level assessment

Wherever a 0 or 1 score is indicated, NO = 0 or YES = 1.

0	EVSM inspection	Indicator											National
0.A	The national store has passed an EVSM external inspection and/or carried out a self-assessment.	Review EVSM inspection report and/or results of self-assessment. Identify any areas of weakness so that these can be followed up using the national-level questions which follow. (Score Cert = certified, Self = self-assessed, None = no assessment).											

Commentary:

1	Vaccine arrival procedures	Indicator											National
1.A	The requirements set out in the vaccine arrival report have been complied with for all shipments.	**CI:** Does the VAR form include all key procedures from UNICEF VAR Parts I to VII? [Score 0 or 1. If no VAR of any kind, score 0].		0.0		0.0		0.0					
		CI: Record the number of vaccine **arrivals** over the past six months.											
		CI: There should be a VAR to accompany each individual vaccine; how many where there?											
		CI: How many of these received VARs were completed substantially correctly by the 'Inspection Supervisor'?		0.0		0.0		0.0					
		Review VARs for the past six months. Were any shipments received in unsatisfactory condition? If so, were these shipments followed-up satisfactorily with the supplier, within 14 days? [Score 0-4]		0.0		0.0		0.0					
1.B	Reliable arrangements have been agreed with the relevant authorities to clear vaccines through customs.	Review the working arrangements with customs (and the Memoranda of Understanding (MoU) if it exists). Are they satisfactory? [Score 0-4].		0.0		0.0		0.0					
1.C	Where a clearing agent is used, the facilities and performance of the agent have been adequately monitored.	Inspect the contract with the clearing agent and assess the adequacy of their facilities. Are they satisfactory? [Score 0-4. Score n/a if no clearing agent is used].		0.0		0.0		0.0					
			Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0				
			Percentage score:	0%	10.0	0%	10.0	0%	10.0				

Commentary:

2	Vaccine storage temperatures	Indicator											National
2.A	Storekeepers must know the correct storage temperature for every vaccine	**CI:** Can the storekeeper give the correct storage temperature range for each of the vaccines on the schedule? [Score 0 or 1].		0.0		0.0		0.0					
		CI: Can the storekeeper give the freezing temperature of each of the freeze-sensitive vaccines on the schedule (see note 2)? [Score 0 or 1].		0.0		0.0		0.0					
2.B	**For all cold rooms and freezer rooms:** Continuous temperature records are available, and these records demonstrate that vaccine has been stored correctly in both permanent and temporary cold stores.	For the past six months, is there a complete set of twice-daily manual temperature records for each and every cold room and freezer room? [Score 0 or 1. Score n/a if no cold/freezer room].		0.0		0.0		0.0					
		For the past six months, is there a complete set of temperature recorder traces for each and every cold room and freezer room? [Score 0 or 1. Score n/a if no cold/freezer room].		0.0		0.0		0.0					
		Does a random 7 day sample of temperature recorder traces for each appliance agree with the matching temperature records? [Score 0 or 1. Score n/a if no cold/freezer room].		0.0		0.0		0.0					
2.C	**For vaccine refrigerators and freezers:** Inspect temperature records at least twice every 24 hours, 7 days per week.	For the past six months, is there a complete set of twice-daily manual temperature records for each and every vaccine refrigerator and freezer? [Score 0 or 1 or n/a].		0.0		0.0		0.0					
2.D	Record all vaccine discarded due to incorrect storage temperatures.	Inspect stock records and disposal reports and question staff. IF (no. of doses discarded/(vax balance at start of 6 month period + vax received during period))*100 shows no more than 1% loss, then system is acceptable. [Score 0 or 1].		0.0		0.0		0.0					
2.E	Maintain a contingency plan.	**CI:** Is there a satisfactory contingency plan in the event of equipment failure? [Score 0-4].		0.0		0.0		0.0					
		CI: Are emergency contact details posted in the vaccine store? [Score 0 or 1].		0.0		0.0		0.0					
		CI: Interview staff. Do they know what to do in the event of an emergency? [Score 0-4].		0.0		0.0		0.0					
			Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0				
			Percentage score:	0%	19.0	0%	19.0	0%	19.0				

Commentary:

3	Cold storage capacity	Indicator											National
3.A	The store can accommodate peak stock levels for all the vaccines specified in the national immunization schedule, including campaign vaccines where these are normally kept in the store.	**Step 1** (see note 3)**:** Using data from stock records, calculate the peak volume (in litres) for +4 deg C and -20 deg C vaccines. At service level, allow for +4 deg C storage of diluent. **Step 2** (see note 4)**:** Establish the net storage capacity (in litres) of the store (for both +4 deg C and -20 degC equipment). **Step 3:** From analysis of these data, establish whether storage capacity is adequate. [Score 0 or 1].		0.0		0.0		0.0					
3.B	Where vaccine supplied for campaign use is stored in **temporary facilities**, these facilities can accommodate peak stock levels.	**Step 1** (see note 3)**:** Using data from stock records, calculate the peak volume (in litres) for +4 deg C and -20 deg C vaccines. At service level, allow for +4 deg C storage of diluent. **Step 2** (see note 4)**:** Establish the net storage capacity (in litres) of the store (for both +4 deg C and -20 degC equipment). **Step 3:** From analysis of these data, establish whether storage capacity is adequate. [Score 0 or 1 or n/a].		0.0		0.0		0.0					
3.C	Vaccine managers know how to adjust the supply period to the storage capacity.	Ask the vaccine manager what s/he would do when the capacity is not sufficient - for example introduction of new vaccines. [Score 0-4].		0.0		0.0		0.0					

VMAT: National/primary level assessment

Wherever a 0 or 1 score is indicated, NO = 0 or YES = 1.

Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0	
Percentage score:	0%	3.0	0%	3.0	0%	3.0	

Commentary:

4	Buildings, cold chain equipment and transport	Indicator							National
4.A	**National store:** Accommodation within the store building is satisfactory.	Check that the room where the refrigeration equipment is accommodated large enough., located close to the packing area and adequately ventilated. [Score 0-4].		0.0		0.0		0.0	
		Check that there is an adequate packing area, maintained at 15-25 deg C. [Score 0-4].		0.0		0.0		0.0	
		Check that the storekeeper has an adequate office located close to the storage area. [Score 0-4].		0.0		0.0		0.0	
		Check that there is adequate space for storing diluents, packaging materials, cold boxes, icepack freezers and icepacks. [Score 0-4].		0.0		0.0		0.0	
4.C	**Cold rooms and freezer rooms:** The standard of equipment is satisfactory in both permanent and temporary cold stores.	Are refrigeration units fully operational (note 5)? [Score 0 or 1. Score n/a if no cold/freezer room].		0.0		0.0		0.0	
		Do all rooms have continuous temperature recorders? [Score 0 or 1. Score n/a if no cold/freezer room].		0.0		0.0		0.0	
		Do all cold rooms maintain a temperature of +2°C to +8°C? [Score 0 or 1. Score n/a if no cold/freezer room].		0.0		0.0		0.0	
		Do all freezer rooms maintain a temperature of -15°C to -25°C? [Score 0 or 1. Score n/a if no cold/freezer room].		0.0		0.0		0.0	
		Are all rooms fitted with dual refrigeration units? [Score 0 or 1. Score n/a if no cold/freezer room].		0.0		0.0		0.0	
		Are all rooms fitted with adequate shelving? [Score 0 or 1. Score n/a if no cold/freezer room].		0.0		0.0		0.0	
		Are all rooms fitted with temperature alarms?[Score 0 or 1. Score n/a if no cold/freezer room].		0.0		0.0		0.0	
		Unreliable electricity supply only: Are all rooms fitted with voltage regulators? [Score 0 or 1. Score n/a if no cold/freezer room].		0.0		0.0		0.0	
		Cold climates only: Do cold rooms EITHER have low temperature protection OR are they located in a permanently heated room? [Score 0 or 1. Score n/a if no cold/freezer room].		0.0		0.0		0.0	
4.D	**Vaccine refrigerators and freezers:** The standard of equipment is satisfactory in both permanent and temporary cold stores.	Does every unit comply with the WHO specifications that were in force at date of purchase? (Including correct climate zone). [Score 0 or 1. Score n/a if no refrigerators/freezers].		0.0		0.0		0.0	
		Are all units fully operational at time of inspection (note 5)? [Score 0 or 1. Score n/a if no refrigerators/freezers].		0.0		0.0		0.0	
		Do all units have a working thermometer stored with the vaccine? [Score 0 or 1. Score n/a if no refrigerators/freezers].		0.0		0.0		0.0	
		Do all vaccine refrigerators maintain a temperature of +2°C to +8°C? [Score 0 or 1. Score n/a if no refrigerators].		0.0		0.0		0.0	
		Do all vaccine freezers maintain a temperature of -15°C to -25°C? [Score 0 or 1. Score n/a if no freezers].		0.0		0.0		0.0	
		Unreliable electricity supply only: Are all units fitted with voltage regulators? [Score 0 or 1 or n/a].		0.0		0.0		0.0	
		Cold climates only: Are vaccine refrigerators located in a permanently heated room? [Score 0 or 1 or n/a].		0.0		0.0		0.0	
4.E	**Icepack freezering capacity:** There should be sufficient freezing capacity to meet the maximum daily demand for icepacks.	Is there sufficient icepack **freezing** capacity to meet peak demand? [Score 0 or 1].		0.0		0.0		0.0	
		Is there sufficient icepack **storage** capacity to meet peak demand? [Score 0 or 1].		0.0		0.0		0.0	
4.F	**Cold boxes and vaccine carriers** should be sufficient to meet peak demand.	Are there are sufficient cold boxes and vaccine carriers? [Score 0 or 1].		0.0		0.0		0.0	
		Do staff know how to condition icepacks and how to pack transport boxes? [Score 0 or 1].		0.0		0.0		0.0	
		Cold climates only. Do staff know how to prevent vaccine freezing during transport? [Score 0 or 1 or n/a].		0.0		0.0		0.0	
4.G	**Standby power supply:** There should be a standby power supply for the vaccine store, with automatic start-up. Preferably the generator should serve the vaccine store alone.	Is the generator in working order? [Score 0 or 1].		0.0		0.0		0.0	
		Can the generator start all the connected equipment in the vaccine store (see note 6)? [Score 0 or 1].		0.0		0.0		0.0	
		Is the fuel tank large enough (ideally 72 hrs running time)? [Score 0 or 1].		0.0		0.0		0.0	
		Are there adequate reserve supplies of fuel? [Score 0 or 1].		0.0		0.0		0.0	
4.H	**Transport:** Satisfactory transport arrangements are in place for transporting vaccine, including arrangements for the maintenance of correct temperatures during transport.	Are all vehicle(s) fully operational (note 4)? [Score 0 or 1 or n/a].		0.0		0.0		0.0	
		During the past six months, was sufficient fuel available to allow all deliveries to be completed on time? [Score 0 or 1 or n/a].		0.0		0.0		0.0	
4.J	**Transport:** Refrigerated vehicles are used correctly.	**Only where used.** Do drivers know how to operate refrigerated vehicles? [Score 0 or 1 or n/a].		0.0		0.0		0.0	
		Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0	
		Percentage score:	0%	32.0	0%	32.0	0%	32.0	

Commentary:

5	Maintenance of cold chain equipment & transport	Indicator							National
5.A	Planned replacement of cold chain equipment is carried out.	**CI: Equipment:** Is there an itemised equipment replacement plan, and is this plan being followed? [Score 0-4].		0.0		0.0		0.0	
		Transport: Is there an itemised vehicle replacement plan, and is this plan being followed? [Score 0-4 or n/a if no transport].		0.0		0.0		0.0	

VMAT: National/primary level assessment

Wherever a 0 or 1 score is indicated, NO = 0 or YES = 1.

5.B	Planned preventive maintenance to cold chain equipment and transport is carried out.	**CI: Equipment:** Is there a planned preventive maintenance, overhaul and replacement plan, and is this plan is being followed? [Score 0-4].		0.0		0.0		0.0				
		Transport: Is there a planned preventive maintenance, overhaul and replacement plan, and is this plan is being followed (note 7)? (Score 0-4 or n/a if no transport)		0.0		0.0		0.0				
5.C	Emergency repairs to equipment and transport are conducted in a timely manner and are reported.	**CI: Equipment:** During the past six months did any cold room, vaccine refrigerator or freezer fail to the extent that vaccine was damaged? [Score 0 if damage occured or 1 if no damage].		0.0		0.0		0.0				
		CI: Transport: During the past six months did any vehicle fail to the extent that vaccine was damaged (note 8)? [Score 0 if damage occurred, 1 if no damage or n/a if no transport].		0.0		0.0		0.0				
5.D	Adequate supplies of spare parts and consumables are available to ensure that equipment and vehicles operate effectively.	**Equipment:** During the past six months, did a shortage of spare parts or consumables cause any cold room, refrigerator or freezer to be removed from service for longer than 7 days? [Score 0 or 1].		0.0		0.0		0.0				
		Transport: During the past six months, did a shortage of spare parts or consumables cause any vehicle to be removed from service for longer than 7 days? [Score 0 or 1 or n/a if no transport].		0.0		0.0		0.0				
			Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0			
	Commentary:		**Percentage score:**	0%	16.5	0%	16.5	0%	16.5			

6	Stock management	Indicator								National
6.A	Standardized recording and reporting of all stock transactions is carried out. Preferably this is computerized at the national (primary) level.	Are all receipts and despatches recorded and balances updated? [Score 0 or 1].		0.0		0.0		0.0		
		CI: Are vaccine & diluent quantities (in doses) recorded? [Score 0 or 1].		0.0		0.0		0.0		
		CI: Are vaccine & diluent type recorded? [Score 0 or 1].		0.0		0.0		0.0		
		CI: Are vaccine & diluent manufacturer recorded? [Score 0 or 1].		0.0		0.0		0.0		
		CI: Are vaccine & diluent vial size recorded? [Score 0 or 1].		0.0		0.0		0.0		
		CI: Are vaccine & diluent batch/lot numbers recorded (note 8)? [Score 0 or 1].		0.0		0.0		0.0		
		CI: Are vaccine & diluent expiry dates recorded (note 8)? [Score 0 or 1].		0.0		0.0		0.0		
		CI: Is VVM status recorded (where applicable)? [Score 0 or 1].		0.0		0.0		0.0		
		CI: Is freeze indicator status recorded? [Score 0 or 1].		0.0		0.0		0.0		
		Is a vaccine distribution report regularly made and circulated? [Score 0 or 1].		0.0		0.0		0.0		
		Are vaccine requisition forms used for ordering and receiving vaccine? [Score 0 or 1].		0.0		0.0		0.0		
6.B	Stocks have been maintained between the safety stock level and the maximum stock level for each vaccine and for other consumables.	Is vaccine distribution generally made according to the 'earliest expiry – first out' (EEFO) principle? [Score 0 or 1].		0.0		0.0		0.0		
		Are maximum and minimum stock levels established for each store? [Score 0 or 1].		0.0		0.0		0.0		
		Can the vaccine managers make exceptions to this rule (e.g. because of VVM status)? [Score 0 or 1].		0.0		0.0		0.0		
6.C	Periodic physical inventories have been conducted.	Have physical counts have been carried out and recorded during the past six months? (Ignore counts that are reported, but not properly recorded). [Score 0 or 1].		0.0		0.0		0.0		
		CI: Carry out a sample physical count of the vaccine stock to establish whether stock records are accurate. Choose a freeze-dried vaccine, preferably one with a separately packed diluent. [Score 0-4].		0.0		0.0		0.0		
6.D	Good warehousing practices are in place.	**Cleanliness:** Is the vaccine store clean and pest-free? [Score 0 or 1].		0.0		0.0		0.0		
		Stock security: Is the stock secure? [Score 0 or 1].		0.0		0.0		0.0		
		Data security: Are the records secure? [Score 0 or 1].		0.0		0.0		0.0		
		Storage: Is stock laid out in an orderly fashion? [Score 0 or 1].		0.0		0.0		0.0		
		Storage: Does all cold chain equipment have a contents list fixed to the cabinet indicating type of vaccine, lot no., expiry date, etc. [Score 0 or 1].		0.0		0.0		0.0		
		Storage: Are vaccines correctly stored (e.g. no freeze-sensitive vaccine stored close to cold room evaporators, stored close to ice lining in ILRs or stored close to the evaporator plate of service point refrigerators)? [Score 0 or 1].		0.0		0.0		0.0		
			Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0	
	Commentary:		**Percentage score:**	0%	22.0	0%	22.0	0%	22.0	

7	Effective vaccine delivery	Indicator								National
7.A	Distribution reports indicate compliance with the planned delivery schedule.	Is a plan for vaccine receipt/distribution established and followed? [Score 0 or 1].		0.0		0.0		0.0		
7.B	The stock of vaccine is sufficient until the next delivery arrives.	Check stock levels for each vaccine in the stock record/book. Are stocks sufficient for the period remaining until the next delivery is due? (This could be as much as six months at national level, three months at sub-national level and one month at service level). [Score 0 or 1].		0.0		0.0		0.0		
7.C	A sufficient stock of each vaccine and diluent has been available throughout the past six months.	**CI:** No stockouts? [Score 0 or 1].		0.0		0.0		0.0		
		CI: No instances where low stock levels affected deliveries to lower level stores? [Score 0 or 1].		0.0		0.0		0.0		
		CI: No instances where safety stock levels were breached? [Score 0 or 1].		0.0		0.0		0.0		

VMAT: National/primary level assessment

Wherever a 0 or 1 score is indicated, NO = 0 or YES = 1.

7.D	The person responsible for ordering vaccine knows how to estimate the vaccine needs for one supply period.	Is the correct method used to calculate vaccine needs? [Score 0 or 1].		0.0		0.0		0.0				
7.E	A system for managing short shipments is in place.	If there were short shipments during the past six months, were they followed up and corrected? [Score 4 if there were no short shipments. Otherwise evaluate the effectiveness with which short shipments were managed and score on a scale of 0-4].		0.0		0.0		0.0				
7.F	Freeze indicators are correctly used.	Check the status of freeze indicators. Do the health workers know how to read them? [Score 0 or 1].		0.0		0.0		0.0				
7.G	Freeze indicators are used in all deliveries.	Over a selected one month period, were freeze indicators used on all deliveries of freeze-sensitive vaccines (note: if chilled water packs are used and ambient temperature is above zero, then freeze indicators are not required)? [Score 0 or 1 or n/a].		0.0		0.0		0.0				
7.H	In case of failure, damage has been reported and vaccine has been replaced on time.	**CI:** During the past six months period, was less than 1% of vaccine lost due to incorrect transport conditions from the supplying store? [Score 0 or 1].		0.0		0.0		0.0				
			Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0			
	Commentary:		**Percentage score:**	0%	14.3	0%	14.3	0%	14.3			

8	**Correct diluent use for freeze dried vaccines**	**Indicator**										**National**
8.A	Freeze-dried vaccines are always ordered, received and distributed with their original diluent (see note 8).	**CI:** Inspect vaccine and diluent stocks and check stock records. Are the correct diluents, in the correct quantities and correct lots, being distributed with each batch of vaccine? [Score 0 or 1].		0.0		0.0		0.0				
8.B	The stock of diluent corresponds with the stock of freeze-dried vaccine.	**CI:** Does the diluent stock for each freeze-dried vaccine correspond with the stock of each vaccine? [Score 0 or 1].		0.0		0.0		0.0				
			Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0			
	Commentary:		**Percentage score:**	0%	10.0	0%	10.0	0%	10.0			

9	**Effective VVM use**	**Indicator**										**National**
9.A	The VVM policy is correctly implemented by national EPI.	Are written instructions on the use of VVMs, such as posters and stickers, available to health workers? [Score 0 or 1].		0.0		0.0		0.0				
		CI: Do storekeepers/health workers know how to read VVMs? (Use dummy VVMs and/or sticker samples to check knowledge). [Score 0 or 1 or n/a].		0.0		0.0		0.0				
		CI: Do vaccine managers/health workers use VVM status for vaccine management purposes (e.g. do they use Stage 2 vaccines first)? [Score 0 or 1].		0.0		0.0		0.0				
			Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0			
	Commentary:		**Percentage score:**	0%	11.0	0%	11.0	0%	11.0			

10	**Multi-Dose Vial Policy**	**Indicator**										**National**
10.A	The MDVP is correctly implemented by national EPI.	**CI:** Has the MDVP been adopted? [Score 0 or 1].		0.0		0.0		0.0				
		CI: Can vaccine managers/health workers explain how to use the MDVP? [Score 0 or 1].		0.0		0.0		0.0				
			Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0			
	Commentary:		**Percentage score:**	0%	10.0	0%	10.0	0%	10.0			

11	**Vaccine wastage control**	**Indicator**										**National**
11.A	There is a vaccine wastage monitoring system.	Review the periodic immunization reports and/or any other reporting forms that are used to monitor vaccine wastage. [Score 0-4].		0.0		0.0		0.0				
11.B	Vaccine managers/health workers know how to calculate the wastage rate.	**CI:** Assess whether staff understand the principles involved in calculating vaccine wastage. [Score 0-4].		0.0		0.0		0.0				
11.C	When vaccines are ordered, wastage rate information is used to establish the quantities required.	**CI:** Establish whether wastage rate data have been used to estimate vaccine needs before ordering vaccine. [Score 0-4].		0.0		0.0		0.0				
11.D	Available vaccine wastage data is used to make other operational changes.	Review documents where the current wastage rates have been used. [Score 0-4].		0.0		0.0		0.0				
			Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0			
	Commentary:		**Percentage score:**	0%	12.0	0%	12.0	0%	12.0			

Notes:

1) Note that vaccines may be stored 'in bond' in the national store until they are formally cleared by customs. In this case answer the question as for the national cold room/freezer room.

2) It is particularly important that respondents know that freeze-sensitive vaccines must not be exposed to temperatures below 0 deg C.

VMAT: National/primary level assessment

Wherever a 0 or 1 score is indicated, NO = 0 or YES = 1.

3) Assessors should use the WHO vaccine volume calculator to help with carrying out the capacity checks. The tool may be downloaded from http://www.who.int/vaccines-documents/DocsPDF01/www586.pdf

4) For refrigerators and freezers use capacity data listed in the *Product Information Sheets* wherever possible.

5) Ignore any equipment which is out-of-service for a legitimate reason - for example because it is being serviced or repaired. Check that any vaccine that was stored in the out-of-service equipment is being kept under safe conditions.

6) The starting load for a refrigeration compressor is much higher than the running load. If there is a power failure, the generator must be able to cope with the combined starting load of all connected refrigeration units.

7) In this context, 'planned preventive maintenance' (PPM) is as defined in the manufacturer's service manual. Both the need for and the timing of PPM can be foreseen. 'Overhaul' means the dismantling or replacement of major components, such as clutch linings, engines, transmissions, etc. The timing may vary between similar vehicles, but the need can be foreseen. 'Replacement policy' means the disposal of the vehicle at a rationally established point in its life.

8) Ignore losses arising from traffic accidents for which the driver was not directly responsible.

9) All diluents must have lot numbers and expiry dates. If this information is missing, the team should notify Dr Nora Dellepiane at WHO Geneva (dellepianen@who.int).

VMAT: Subnational assessment

Wherever a 0 or 1 score is indicated, NO = 0 or YES = 1.

0	EVSM inspection	Indicator																			Sub-national
Not applicable at this level																					
1	**Vaccine arrival procedures**	**Indicator**																			**Sub-national**
Not applicable at this level																					
2	**Vaccine storage temperatures**	**Indicator**																			**Sub-national**
2.A	Storekeepers must know the correct storage temperature for every vaccine	**CI:** Can the storekeeper give the correct storage temperature range for each of the vaccines on the schedule? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0									
		CI: Can the storekeeper give the freezing temperature of each of the freeze-sensitive vaccines on the schedule (see note 2)? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0									
2.B	**For all cold rooms and freezer rooms:** Continuous temperature records are available, and these records demonstrate that vaccine has been stored correctly in both permanent and temporary cold stores.	For the past six months, is there a complete set of twice-daily manual temperature records for each and every cold room and freezer room? [Score 0 or 1. Score n/a if no cold/freezer room].		0.0		0.0		0.0		0.0		0.0									
		For the past six months, is there a complete set of temperature recorder traces for each and every cold room and freezer room? [Score 0 or 1. Score n/a if no cold/freezer room].		0.0		0.0		0.0		0.0		0.0									
		Does a random 7 day sample of temperature recorder traces for each appliance agree with the matching temperature records? [Score 0 or 1. Score n/a if no cold/freezer room].		0.0		0.0		0.0		0.0		0.0									
2.C	**For vaccine refrigerators and freezers:** Inspect temperature records at least twice every 24 hours, 7 days per week.	For the past six months, is there a complete set of twice-daily manual temperature records for each and every vaccine refrigerator and freezer? [Score 0 or 1 or n/a].		0.0		0.0		0.0		0.0		0.0									
2.D	Record all vaccine discarded due to incorrect storage temperatures.	Inspect stock records and disposal reports and question staff. IF (no. of doses discarded/(vax balance at start of 6 month period + vax received during period))*100 shows no more than 1% loss, then system is acceptable. [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0									
2.E	Maintain a contingency plan.	**CI:** Is there a satisfactory contingency plan in the event of equipment failure? [Score 0-4].		0.0		0.0		0.0		0.0		0.0									
		CI: Are emergency contact details posted in the vaccine store? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0									
		CI: Interview staff. Do they know what to do in the event of an emergency? [Score 0-4].		0.0		0.0		0.0		0.0		0.0									
			Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0								
	Commentary:		**Percentage score:**	0%	19.0	0%	19.0	0%	19.0	0%	19.0	0%	19.0								
3	**Cold storage capacity**	**Indicator**																			**Sub-national**
3.A	The store can accommodate peak stock levels for all the vaccines specified in the national immunization schedule, including campaign vaccines where these are normally kept in the store.	**Step 1** (see note 3)**:** Using data from stock records, calculate the peak volume (in litres) for +4 deg C and -20 deg C vaccines. At service level, allow for +4 deg C storage of diluent. **Step 2** (see note 4)**:** Establish the net storage capacity (in litres) of the store (for both +4 deg C and -20 degC equipment). **Step 3:** From analysis of these data, establish whether storage capacity is adequate. [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0									
3.B	Where vaccine supplied for campaign use is stored in **temporary facilities**, these facilities can accommodate peak stock levels.	**Step 1** (see note 3)**:** Using data from stock records, calculate the peak volume (in litres) for +4 deg C and -20 deg C vaccines. At service level, allow for +4 deg C storage of diluent. **Step 2** (see note 4)**:** Establish the net storage capacity (in litres) of the store (for both +4 deg C and -20 degC equipment). **Step 3:** From analysis of these data, establish whether storage capacity is adequate. [Score 0 or 1 or n/a].		0.0		0.0		0.0		0.0		0.0									
3.C	Vaccine managers know how to adjust the supply period to the storage capacity.	Ask the vaccine manager what s/he would do when the capacity is not sufficient - for example introduction of new vaccines. [Score 0-4].		0.0		0.0		0.0		0.0		0.0									
			Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0								
	Commentary:		**Percentage score:**	0%	3.0	0%	3.0	0%	3.0	0%	3.0	0%	3.0								
4	**Buildings, cold chain equipment and transport**	**Indicator**																			**Sub-national**
4.B	**Sub-national store:** Accommodation within the store building is satisfactory.	Check that that the room where the refrigeration equipment is accommodated is large enough. The room should be adequately ventilated. [Score 0-4].		0.0		0.0		0.0		0.0		0.0									
		Check that there is adequate space for storing diluents, packaging materials, cold boxes, icepack freezers and icepacks. [Score 0-4].		0.0		0.0		0.0		0.0		0.0									
4.C	**Cold rooms and freezer rooms:** The standard of equipment is satisfactory in both permanent and temporary cold stores.	Are refrigeration units fully operational (note 5)? [Score 0 or 1. Score n/a if no cold/freezer room].		0.0		0.0		0.0		0.0		0.0									
		Do all rooms have continuous temperature recorders? [Score 0 or 1. Score n/a if no cold/freezer room].		0.0		0.0		0.0		0.0		0.0									
		Do all cold rooms maintain a temperature of +2°C to +8°C? [Score 0 or 1. Score n/a if no cold/freezer room].		0.0		0.0		0.0		0.0		0.0									
		Do all freezer rooms maintain a temperature of -15°C to -25°C? [Score 0 or 1. Score n/a if no cold/freezer room].		0.0		0.0		0.0		0.0		0.0									
		Are all rooms fitted with dual refrigeration units? [Score 0 or 1. Score n/a if no cold/freezer room].		0.0		0.0		0.0		0.0		0.0									
		Are all rooms fitted with adequate shelving? [Score 0 or 1. Score n/a if no cold/freezer room].		0.0		0.0		0.0		0.0		0.0									
		Are all rooms fitted with temperature alarms?[Score 0 or 1. Score n/a if no cold/freezer room].		0.0		0.0		0.0		0.0		0.0									
		Unreliable electricity supply only: Are all rooms fitted with voltage regulators? [Score 0 or 1. Score n/a if no cold/freezer room].		0.0		0.0		0.0		0.0		0.0									

VMAT: Subnational assessment

Wherever a 0 or 1 score is indicated, NO = 0 or YES = 1.

		Cold climates only: Do cold rooms EITHER have low temperature protection OR are they located in a permanently heated room? [Score 0 or 1. Score n/a if no cold/freezer room].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
4.D	**Vaccine refrigerators and freezers:** The standard of equipment is satisfactory in both permanent and temporary cold stores.	Does every unit comply with the WHO specifications that were in force at date of purchase? (Including correct climate zone). [Score 0 or 1. Score n/a if no refrigerators/freezers].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Are all units fully operational at time of inspection (note 5)? [Score 0 or 1. Score n/a if no refrigerators/freezers].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Do all units have a working thermometer stored with the vaccine? [Score 0 or 1. Score n/a if no refrigerators/freezers].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Do all vaccine refrigerators maintain a temperature of +2°C to +8°C? [Score 0 or 1. Score n/a if no refrigerators].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Do all vaccine freezers maintain a temperature of -15°C to -25°C? [Score 0 or 1. Score n/a if no freezers].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Where applicable, are there adequate reserve supplies of kerosene and/or gas? [Score 0 or 1 or n/a].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Unreliable electricity supply only: Are all units fitted with voltage regulators? [Score 0 or 1 or n/a].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Cold climates only: Are vaccine refrigerators located in a permanently heated room? [Score 0 or 1 or n/a].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
4.E	**Icepack freezering capacity:** There should be sufficient freezing capacity to meet the maximum daily demand for icepacks.	Is there sufficient icepack **freezing** capacity to meet peak demand? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Is there sufficient icepack **storage** capacity to meet peak demand? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
4.F	**Cold boxes and vaccine carriers** should be sufficient to meet peak demand.	Are there are sufficient cold boxes and vaccine carriers? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Do staff know how to condition icepacks and how to pack transport boxes? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Cold climates only. Do staff know how to prevent vaccine freezing during transport? [Score 0 or 1 or n/a].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
4.G	**Standby power supply:** There should be a standby power supply for the vaccine store, with automatic start-up. Preferably the generator should serve the vaccine store alone.	Is the generator in working order? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Can the generator start all the connected equipment in the vaccine store (see note 6)? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Is the fuel tank large enough (ideally 72 hrs running time)? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Are there adequate reserve supplies of fuel? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
4.H	**Transport:** Satisfactory transport arrangements are in place for transporting vaccine, including arrangements for the maintenance of correct temperatures during transport.	Are all vehicle(s) fully operational (note 4)? [Score 0 or 1 or n/a].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		During the past six months, was sufficient fuel available to allow all deliveries to be completed on time? [Score 0 or 1 or n/a].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
4.J	**Transport:** Refrigerated vehicles are used correctly.	**Only where used.** Do drivers know how to operate refrigerated vehicles? [Score 0 or 1 or n/a].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
			Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Commentary:		**Percentage score:**	0%	31.0	0%	31.0	0%	31.0	0%	31.0	0%	31.0	0%	31.0	0%	31.0	0%	31.0	0%	31.0

5	**Maintenance of cold chain equipment & transport**	**Indicator**																		**Sub-national**
5.A	Planned replacement of cold chain equipment is carried out.	**CI: Equipment:** Is there an itemised equipment replacement plan, and is this plan being followed? [Score 0-4].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Transport: Is there an itemised vehicle replacement plan, and is this plan being followed? [Score 0-4 or n/a if no transport].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
5.B	Planned preventive maintenance to cold chain equipment and transport is carried out.	**CI: Equipment:** Is there a planned preventive maintenance, overhaul and replacement plan, and is this plan is being followed? [Score 0-4].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Transport: Is there a planned preventive maintenance, overhaul and replacement plan, and is this plan is being followed (note 7)? (Score 0-4 or n/a if no transport)		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
5.C	Emergency repairs to equipment and transport are conducted in a timely manner and are reported.	**CI: Equipment:** During the past six months did any cold room, vaccine refrigerator or freezer fail to the extent that vaccine was damaged? [Score 0 if damage occured or 1 if no damage].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		CI: Transport: During the past six months did any vehicle fail to the extent that vaccine was damaged (note 8)? [Score 0 if damage occurred, 1 if no damage or n/a if no transport].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
5.D	Adequate supplies of spare parts and consumables are available to ensure that equipment and vehicles operate effectively.	**Equipment:** During the past six months, did a shortage of spare parts or consumables cause any cold room, refrigerator or freezer to be removed from service for longer than 7 days? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Transport: During the past six months, did a shortage of spare parts or consumables cause any vehicle to be removed from service for longer than 7 days? [Score 0 or 1 or n/a if no transport].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
			Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Commentary:		**Percentage score:**	0%	15.8	0%	15.8	0%	15.8	0%	15.8	0%	15.8	0%	15.8	0%	15.8	0%	15.8	0%	15.8

6	**Stock management**	**Indicator**																		**Sub-national**
6.A	Standardized recording and reporting of all stock transactions is carried out. Preferably this is computerized at the national (primary) level.	Are all receipts and despatches recorded and balances updated? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		CI: Are vaccine & diluent quantities (in doses) recorded? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		CI: Are vaccine & diluent type recorded? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		CI: Are vaccine & diluent manufacturer recorded? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		CI: Are vaccine & diluent vial size recorded? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		CI: Are vaccine & diluent batch/lot numbers recorded (note 8)? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		CI: Are vaccine & diluent expiry dates recorded (note 8)? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		CI: Is VVM status recorded (where applicable)? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	

VMAT: Subnational assessment

Wherever a 0 or 1 score is indicated, NO = 0 or YES = 1.

		CI: Is freeze indicator status recorded? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0	
		Is a vaccine distribution report regularly made and circulated? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0	
		Are vaccine requisition forms used for ordering and receiving vaccine? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0	
6.B	Stocks have been maintained between the safety stock level and the maximum stock level for each vaccine and for other consumables.	Is vaccine distribution generally made according to the 'earliest expiry – first out' (EEFO) principle? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0	
		Are maximum and minimum stock levels established for each store? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0	
		Can the vaccine managers make exceptions to this rule (e.g. because of VVM status)? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0	
6.C	Periodic physical inventories have been conducted.	Have physical counts have been carried out and recorded during the past six months? (Ignore counts that are reported, but not properly recorded). [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0	
		CI: Carry out a sample physical count of the vaccine stock to establish whether stock records are accurate. Choose a freeze-dried vaccine, preferably one with a separately packed diluent. [Score 0-4].		0.0		0.0		0.0		0.0		0.0	
6.D	Good warehousing practices are in place.	**Cleanliness:** Is the vaccine store clean and pest-free? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0	
		Stock security: Is the stock secure? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0	
		Data security: Are the records secure? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0	
		Storage: Is stock laid out in an orderly fashion? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0	
		Storage: Does all cold chain equipment have a contents list fixed to the cabinet indicating type of vaccine, lot no., expiry date, etc. [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0	
		Storage: Are vaccines correctly stored (e.g. no freeze-sensitive vaccine stored close to cold room evaporators, stored close to ice lining in ILRs or stored close to the evaporator plate of service point refrigerators)? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0	
		Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Commentary:	**Percentage score:**	0%	22.0	0%	22.0	0%	22.0	0%	22.0	0%	22.0	

7	Effective vaccine delivery	Indicator											Sub-national
7.A	Distribution reports indicate compliance with the planned delivery schedule.	Is a plan for vaccine receipt/distribution established and followed? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0	
7.B	The stock of vaccine is sufficient until the next delivery arrives.	Check stock levels for each vaccine in the stock record/book. Are stocks sufficient for the period remaining until the next delivery is due? (This could be as much as six months at national level, three months at sub-national level and one month at service level). [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0	
7.C	A sufficient stock of each vaccine and diluent has been available throughout the past six months.	**CI:** No stockouts? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0	
		CI: No instances where low stock levels affected deliveries to lower level stores? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0	
		CI: No instances where safety stock levels were breached? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0	
7.D	The person responsible for ordering vaccine knows how to estimate the vaccine needs for one supply period.	Is the correct method used to calculate vaccine needs? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0	
7.E	A system for managing short shipments is in place.	If there were short shipments during the past six months, were they followed up and corrected? [Score 4 if there were no short shipments. Otherwise evaluate the effectiveness with which short shipments were managed and score on a scale of 0-4].		0.0		0.0		0.0		0.0		0.0	
7.F	Freeze indicators are correctly used.	Check the status of freeze indicators. Do the health workers know how to read them? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0	
7.G	Freeze indicators are used in all deliveries.	Over a selected one month period, were freeze indicators used on all deliveries of freeze-sensitive vaccines (note: if chilled water packs are used and ambient temperature is above zero, then freeze indicators are not required)? [Score 0 or 1 or n/a].		0.0		0.0		0.0		0.0		0.0	
7.H	In case of failure, damage has been reported and vaccine has been replaced on time.	**CI:** During the past six months period, was less than 1% of vaccine lost due to incorrect transport conditions from the supplying store? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0	
		Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Commentary:	**Percentage score:**	0%	14.3	0%	14.3	0%	14.3	0%	14.3	0%	14.3	

8	Correct diluent use for freeze dried vaccines	Indicator											Sub-national
8.A	Freeze-dried vaccines are always ordered, received and distributed with their original diluent (see note 8).	**CI:** Inspect vaccine and diluent stocks and check stock records. Are the correct diluents, in the correct quantities and correct lots, being distributed with each batch of vaccine? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0	
8.B	The stock of diluent corresponds with the stock of freeze-dried vaccine.	**CI:** Does the diluent stock for each freeze-dried vaccine correspond with the stock of each vaccine? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0	
		Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Commentary:	**Percentage score:**	0%	10.0	0%	10.0	0%	10.0	0%	10.0	0%	10.0	

9	Effective VVM use	Indicator											Sub-national
9.A	The VVM policy is correctly implemented by national EPI.	Are written instructions on the use of VVMs, such as posters and stickers, available to health workers? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0	
		CI: Do storekeepers/health workers know how to read VVMs? (Use dummy VVMs and/or sticker samples to check knowledge). [Score 0 or 1 or n/a].		0.0		0.0		0.0		0.0		0.0	
		CI: Do vaccine managers/health workers use VVM status for vaccine management purposes (e.g. do they use Stage 2 vaccines first)? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0	

VMAT: Subnational assessment

Wherever a 0 or 1 score is indicated, NO = 0 or YES = 1.

			Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Commentary:		**Percentage score:**	0%	11.0	0%	11.0	0%	11.0	0%	11.0	0%	11.0	

10	**Multi-Dose Vial Policy**	**Indicator**										**Sub-national**
10.A	The MDVP is correctly implemented by national EPI.	**CI:** Has the MDVP been adopted? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0	
10.A	The MDVP is correctly implemented by national EPI.	**CI:** Can vaccine managers/health workers explain how to use the MDVP? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0	
			Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Commentary:		**Percentage score:**	0%	10.0	0%	10.0	0%	10.0	0%	10.0	0%	10.0	

11	**Vaccine wastage control**	**Indicator**										**Sub-national**
11.A	There is a vaccine wastage monitoring system.	Review the periodic immunization reports and/or any other reporting forms that are used to monitor vaccine wastage. [Score 0-4].		0.0		0.0		0.0		0.0		0.0	
11.B	Vaccine managers/health workers know how to calculate the wastage rate.	**CI:** Assess whether staff understand the principles involved in calculating vaccine wastage. [Score 0-4].		0.0		0.0		0.0		0.0		0.0	
11.D	Available vaccine wastage data is used to make other operational changes.	Review documents where the current wastage rates have been used. [Score 0-4].		0.0		0.0		0.0		0.0		0.0	
			Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Commentary:		**Percentage score:**	0%	7.0	0%	7.0	0%	7.0	0%	7.0	0%	7.0	

Notes:

1) Note that vaccines may be stored 'in bond' in the national store until they are formally cleared by customs. In this case answer the question as for the national cold room/freezer room.

2) It is particularly important that respondents know that freeze-sensitive vaccines must not be exposed to temperatures below 0 deg C.

3) Assessors should use the WHO vaccine volume calculator to help with carrying out the capacity checks. The tool may be downloaded from http://www.who.int/vaccines-documents/DocsPDF01/www586.pdf

4) For refrigerators and freezers use capacity data listed in the *Product Information Sheets* wherever possible.

5) Ignore any equipment which is out-of-service for a legitimate reason - for example because it is being serviced or repaired. Check that any vaccine that was stored in the out-of-service equipment is being kept under safe conditions.

6) The starting load for a refrigeration compressor is much higher than the running load. If there is a power failure, the generator must be able to cope with the combined starting load of all connected refrigeration units.

7) In this context, 'planned preventive maintenance' (PPM) is as defined in the manufacturer's service manual. Both the need for and the timing of PPM can be foreseen. 'Overhaul' means the dismantling or replacement of major components, such as clutch linings, engines, transmissions, etc. The timing may vary between similar vehicles, but the need can be foreseen. 'Replacement policy' means the disposal of the vehicle at a rationally established point in its life.

8) Ignore losses arising from traffic accidents for which the driver was not directly responsible.

9) All diluents must have lot numbers and expiry dates. If this information is missing, the team should notify Dr Nora Dellepiane at WHO Geneva (dellepianen@who.int).

VMAT: Service delivery level assessment

Wherever a 0 or 1 score is indicated, NO = 0 or YES = 1.																							
0	EVSM inspection	Indicator																					Service
Not applicable at this level																							
1	Vaccine arrival procedures	Indicator																					Service
Not applicable at this level																							
2	Vaccine storage temperatures	Indicator																					Service
2.A	Storekeepers must know the correct storage temperature for every vaccine	**CI:** Can the storekeeper give the correct storage temperature range for each of the vaccines on the schedule? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		CI: Can the storekeeper give the freezing temperature of each of the freeze-sensitive vaccines on the schedule (see note 2)? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
2.C	**For vaccine refrigerators and freezers:** Inspect temperature records at least twice every 24 hours, 7 days per week.	For the past six months, is there a complete set of twice-daily manual temperature records for each and every vaccine refrigerator and freezer? [Score 0 or 1 or n/a].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
2.D	Record all vaccine discarded due to incorrect storage temperatures.	Inspect stock records and disposal reports and question staff. IF (no. of doses discarded/(vax balance at start of 6 month period + vax received during period))*100 shows no more than 1% loss, then system is acceptable. [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
2.E	Maintain a contingency plan.	**CI:** Is there a satisfactory contingency plan in the event of equipment failure? [Score 0-4].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		CI: Are emergency contact details posted in the vaccine store? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		CI: Interview staff. Do they know what to do in the event of an emergency? [Score 0-4].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Commentary:	**Percentage score:**	0%	15.0	0%	15.0	0%	15.0	0%	15.0	0%	15.0	0%	15.0	0%	15.0	0%	15.0	0%	15.0	0%	15.0	
3	Cold storage capacity	Indicator																					Service
3.A	The store can accommodate peak stock levels for all the vaccines specified in the national immunization schedule, including campaign vaccines where these are normally kept in the store.	**Step 1** (see note 3)**:** Using data from stock records, calculate the peak volume (in litres) for +4 deg C and -20 deg C vaccines. At service level, allow for +4 deg C storage of diluent. **Step 2** (see note 4)**:** Establish the net storage capacity (in litres) of the store (for both +4 deg C and -20 degC equipment). **Step 3:** From analysis of these data, establish whether storage capacity is adequate. [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
3.B	Where vaccine supplied for campaign use is stored in **temporary facilities**, these facilities can accommodate peak stock levels.	**Step 1** (see note 3)**:** Using data from stock records, calculate the peak volume (in litres) for +4 deg C and -20 deg C vaccines. At service level, allow for +4 deg C storage of diluent. **Step 2** (see note 4)**:** Establish the net storage capacity (in litres) of the store (for both +4 deg C and -20 degC equipment). **Step 3:** From analysis of these data, establish whether storage capacity is adequate. [Score 0 or 1 or n/a].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Commentary:	**Percentage score:**	0%	2.0	0%	2.0	0%	2.0	0%	2.0	0%	2.0	0%	2.0	0%	2.0	0%	2.0	0%	2.0	0%	2.0	
4	Buildings, cold chain equipment and transport	Indicator																					Service
4.D	**Vaccine refrigerators and freezers:** The standard of equipment is satisfactory in both permanent and temporary cold stores.	Does every unit comply with the WHO specifications that were in force at date of purchase? (Including correct climate zone). [Score 0 or 1. Score n/a if no refrigerators/freezers].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Are all units fully operational at time of inspection (note 5)? [Score 0 or 1. Score n/a if no refrigerators/freezers].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Do all units have a working thermometer stored with the vaccine? [Score 0 or 1. Score n/a if no refrigerators/freezers].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Do all vaccine refrigerators maintain a temperature of +2°C to +8°C? [Score 0 or 1. Score n/a if no refrigerators].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Do all vaccine freezers maintain a temperature of -15°C to -25°C? [Score 0 or 1. Score n/a if no freezers].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Where applicable, are there adequate reserve supplies of kerosene and/or gas? [Score 0 or 1 or n/a].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Unreliable electricity supply only: Are all units fitted with voltage regulators? [Score 0 or 1 or n/a].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Cold climates only: Are vaccine refrigerators located in a permanently heated room? [Score 0 or 1 or n/a].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
4.E	**Icepack freezering capacity:** There should be sufficient freezing capacity to meet the maximum daily demand for icepacks.	Is there sufficient icepack **freezing** capacity to meet peak demand? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Is there sufficient icepack **storage** capacity to meet peak demand? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
4.F	**Cold boxes and vaccine carriers** should be sufficient to meet peak demand.	Are there are sufficient cold boxes and vaccine carriers? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Do staff know how to condition icepacks and how to pack transport boxes? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Cold climates only. Do staff know how to prevent vaccine freezing during transport? [Score 0 or 1 or n/a].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
4.H	**Transport:** Satisfactory transport arrangements are in place for transporting vaccine, including arrangements for the maintenance of correct temperatures during transport.	Are all vehicle(s) fully operational (note 4)? [Score 0 or 1 or n/a].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		During the past six months, was sufficient fuel available to allow all deliveries to be completed on time? [Score 0 or 1 or n/a].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Commentary:	**Percentage score:**	0%	15.0	0%	15.0	0%	15.0	0%	15.0	0%	15.0	0%	15.0	0%	15.0	0%	15.0	0%	15.0	0%	15.0	
5	Maintenance of cold chain equipment & transport	Indicator																					Service
5.A	Planned replacement of cold chain equipment is carried out.	**CI: Equipment:** Is there an itemised equipment replacement plan, and is this plan being followed? [Score 0-4].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Transport: Is there an itemised vehicle replacement plan, and is this plan being followed? [Score 0-4 or n/a if no transport].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
5.B	Planned preventive maintenance to cold chain equipment and transport is carried out.	**CI: Equipment:** Is there a planned preventive maintenance, overhaul and replacement plan, and is this plan is being followed? [Score 0-4].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	

VMAT: Service delivery level assessment

Wherever a 0 or 1 score is indicated, NO = 0 or YES = 1.

		Transport: Is there a planned preventive maintenance, overhaul and replacement plan, and is this plan is being followed (note 7)? (Score 0-4 or n/a if no transport)		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
5.C	Emergency repairs to equipment and transport are conducted in a timely manner and are reported.	**CI: Equipment:** During the past six months did any cold room, vaccine refrigerator or freezer fail to the extent that vaccine was damaged? [Score 0 if damage occured or 1 if no damage].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		CI: Transport: During the past six months did any vehicle fail to the extent that vaccine was damaged (note 8)? [Score 0 if damage occurred, 1 if no damage or n/a if no transport].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
5.D	Adequate supplies of spare parts and consumables are available to ensure that equipment and vehicles operate effectively.	**Equipment:** During the past six months, did a shortage of spare parts or consumables cause any cold room, refrigerator or freezer to be removed from service for longer than 7 days? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Transport: During the past six months, did a shortage of spare parts or consumables cause any vehicle to be removed from service for longer than 7 days? [Score 0 or 1 or n/a if no transport].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Commentary:	**Percentage score:**	0%	15.4	0%	15.4	0%	15.4	0%	15.4	0%	15.4	0%	15.4	0%	15.4	0%	15.4	0%	15.4	0%	15.4	
6	**Stock management**	**Indicator**																					**Service**
6.A	Standardized recording and reporting of all stock transactions is carried out. Preferably this is computerized at the national (primary) level.	Are all receipts and despatches recorded and balances updated? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		CI: Are vaccine & diluent quantities (in doses) recorded? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		CI: Are vaccine & diluent type recorded? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		CI: Are vaccine & diluent manufacturer recorded? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		CI: Are vaccine & diluent vial size recorded? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		CI: Are vaccine & diluent batch/lot numbers recorded (note 8)? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		CI: Are vaccine & diluent expiry dates recorded (note 8)? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		CI: Is VVM status recorded (where applicable)? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		CI: Is freeze indicator status recorded? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Are vaccine requisition forms used for ordering and receiving vaccine? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
6.B	Stocks have been maintained between the safety stock level and the maximum stock level for each vaccine and for other consumables.	Is vaccine distribution generally made according to the 'earliest expiry – first out' (EEFO) principle? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Can the vaccine managers make exceptions to this rule (e.g. because of VVM status)? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
6.C	Periodic physical inventories have been conducted.	Have physical counts have been carried out and recorded during the past six months? (Ignore counts that are reported, but not properly recorded). [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		CI: Carry out a sample physical count of the vaccine stock to establish whether stock records are accurate. Choose a freeze-dried vaccine, preferably one with a separately packed diluent. [Score 0-4].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
6.D	Good warehousing practices are in place.	**Cleanliness:** Is the vaccine store clean and pest-free? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Storage: Are vaccines correctly stored (e.g. no freeze-sensitive vaccine stored close to cold room evaporators, stored close to ice lining in ILRs or stored close to the evaporator plate of service point refrigerators)? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Commentary:	**Percentage score:**	0%	16.0	0%	16.0	0%	16.0	0%	16.0	0%	16.0	0%	16.0	0%	16.0	0%	16.0	0%	16.0	0%	16.0	
7	**Effective vaccine delivery**	**Indicator**																					**Service**
7.B	The stock of vaccine is sufficient until the next delivery arrives.	Check stock levels for each vaccine in the stock record/book. Are stocks sufficient for the period remaining until the next delivery is due? (This could be as much as six months at national level, three months at sub-national level and one month at service level). [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
7.C	A sufficient stock of each vaccine and diluent has been available throughout the past six months.	**CI:** No stockouts? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		CI: No instances where safety stock levels were breached? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
7.D	The person responsible for ordering vaccine knows how to estimate the vaccine needs for one supply period.	Is the correct method used to calculate vaccine needs? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
7.F	Freeze indicators are correctly used.	Check the status of freeze indicators. Do the health workers know how to read them? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
7.H	In case of failure, damage has been reported and vaccine has been replaced on time.	**CI:** During the past six months period, was less than 1% of vaccine lost due to incorrect transport conditions from the supplying store? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Commentary:	**Percentage score:**	0%	11.0	0%	11.0	0%	11.0	0%	11.0	0%	11.0	0%	11.0	0%	11.0	0%	11.0	0%	11.0	0%	11.0	
8	**Correct diluent use for freeze dried vaccines**	**Indicator**																					**Service**
8.A	Freeze-dried vaccines are always ordered, received and distributed with their original diluent (see note 8).	**CI:** Inspect vaccine and diluent stocks and check stock records. Are the correct diluents, in the correct quantities and correct lots, being distributed with each batch of vaccine? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
8.B	The stock of diluent corresponds with the stock of freeze-dried vaccine.	**CI:** Does the diluent stock for each freeze-dried vaccine correspond with the stock of each vaccine? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
8.C	Health workers use the correct diluent with each freeze-dried vaccine (i.e. same	**CI:** Do health workers always use matching diluent and vaccine? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
8.D	Diluents for immunization sessions are stored and used at the correct temperature	**CI:** Are diluents always kept in the cold chain before and during every immunization session? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Commentary:	**Percentage score:**	0%	20.0	0%	20.0	0%	20.0	0%	20.0	0%	20.0	0%	20.0	0%	20.0	0%	20.0	0%	20.0	0%	20.0	
9	**Effective VVM use**	**Indicator**																					**Service**
9.A	The VVM policy is correctly implemented by national EPI.	Are written instructions on the use of VVMs, such as posters and stickers, available to health workers? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		CI: Do storekeepers/health workers know how to read VVMs? (Use dummy VVMs and/or sticker samples to check knowledge). [Score 0 or 1 or n/a].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		CI: Where VVM vaccines are used outside the cold chain, during routine, outreach or campaign sessions, are they are used correctly? [Score 0-4].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	

VMAT: Service delivery level assessment

Wherever a 0 or 1 score is indicated, NO = 0 or YES = 1.

		CI: Do vaccine managers/health workers use VVM status for vaccine management purposes (e.g. do they use Stage 2 vaccines first)? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Commentary:	**Percentage score:**	0%	16.0	0%	16.0	0%	16.0	0%	16.0	0%	16.0	0%	16.0	0%	16.0	0%	16.0	0%	16.0	0%	16.0	
10	**Multi-Dose Vial Policy**	**Indicator**																					**Service**
10.A	The MDVP is correctly implemented by national EPI.	**CI:** Has the MDVP been adopted? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		CI: Are opened vials of freeze-dried vaccines discarded within six hours of reconstitution, or at the end of each immunization session? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		CI: Are opened vials of liquid vaccines kept for the next immunization sessions? (ask health workers to show which opened vials they will use for the next session and verify this information through immunization records) [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		CI: Can vaccine managers/health workers explain how to use the MDVP? [Score 0 or 1].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Commentary:	**Percentage score:**	0%	20.0	0%	20.0	0%	20.0	0%	20.0	0%	20.0	0%	20.0	0%	20.0	0%	20.0	0%	20.0	0%	20.0	
11	**Vaccine wastage control**	**Indicator**																					**Service**
11.A	There is a vaccine wastage monitoring system.	Review the periodic immunization reports and/or any other reporting forms that are used to monitor vaccine wastage. [Score 0-4].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
11.B	Vaccine managers/health workers know how to calculate the wastage rate.	**CI:** Assess whether staff understand the principles involved in calculating vaccine wastage. [Score 0-4].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
11.D	Available vaccine wastage data is used to make other operational changes. (e.g.	Review documents where the current wastage rates have been used. [Score 0-4].		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
		Subtotals:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Commentary:	**Percentage score:**	0%	7.0	0%	7.0	0%	7.0	0%	7.0	0%	7.0	0%	7.0	0%	7.0	0%	7.0	0%	7.0	0%	7.0	

Notes:

1) Note that vaccines may be stored 'in bond' in the national store until they are formally cleared by customs. In this case answer the question as for the national cold room/freezer room.

2) It is particularly important that respondents know that freeze-sensitive vaccines must not be exposed to temperatures below 0 deg C.

3) Assessors should use the WHO vaccine volume calculator to help with carrying out the capacity checks. The tool may be downloaded from http://www.who.int/vaccines-documents/DocsPDF01/www586.pdf

4) For refrigerators and freezers use capacity data listed in the *Product Information Sheets* wherever possible.

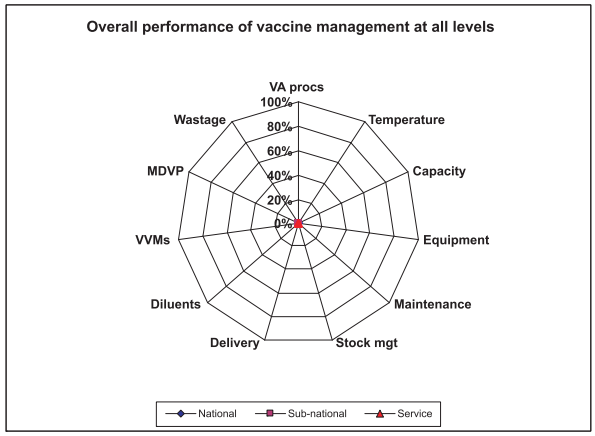
5) Ignore any equipment which is out-of-service for a legitimate reason - for example because it is being serviced or repaired. Check that any vaccine that was stored in the out-of-service equipment is being kept under safe conditions.

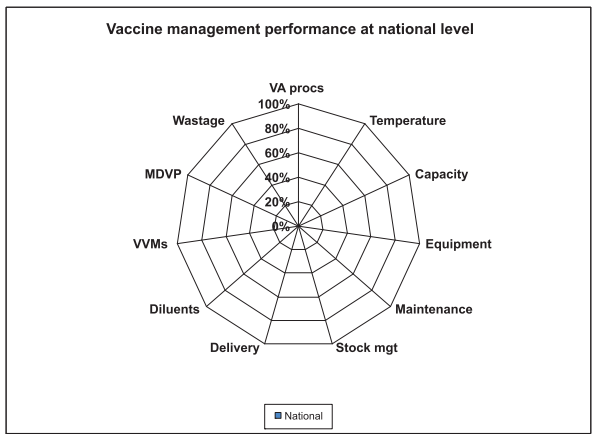
6) The starting load for a refrigeration compressor is much higher than the running load. If there is a power failure, the generator must be able to cope with the combined starting load of all connected refrigeration units.

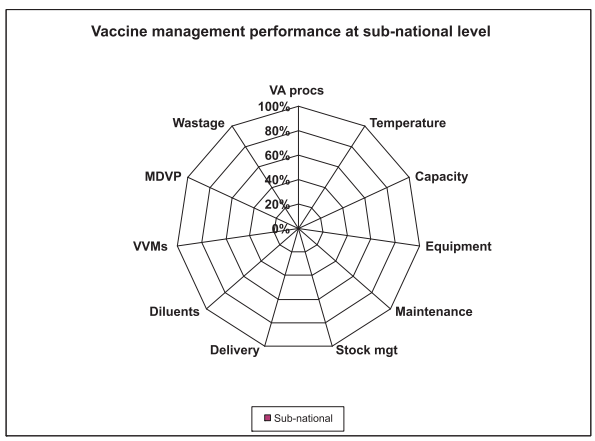
7) In this context, 'planned preventive maintenance' (PPM) is as defined in the manufacturer's service manual. Both the need for and the timing of PPM can be foreseen. 'Overhaul' means the dismantling or replacement of major components, such as clutch linings, engines, transmissions, etc. The timing may vary between similar vehicles, but the need can be foreseen. 'Replacement policy' means the disposal of the vehicle at a rationally established point in its life.

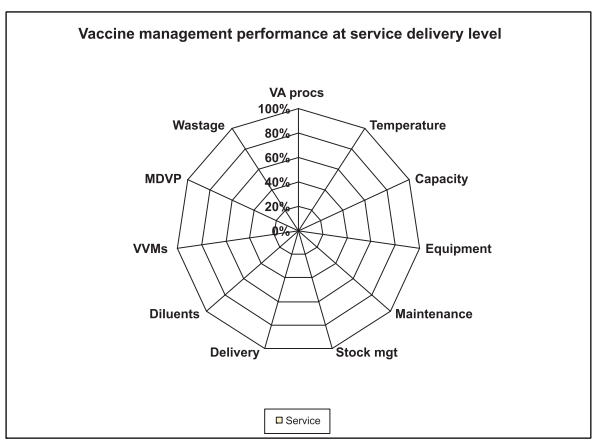
8) Ignore losses arising from traffic accidents for which the driver was not directly responsible.

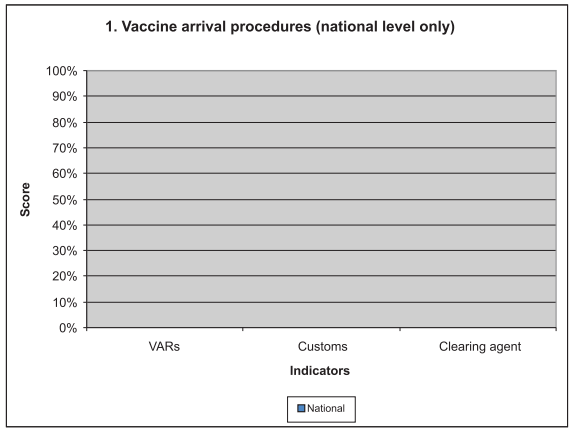
9) All diluents must have lot numbers and expiry dates. If this information is missing, the team should notify Dr Nora Dellepiane at WHO Geneva (dellepianen@who.int).

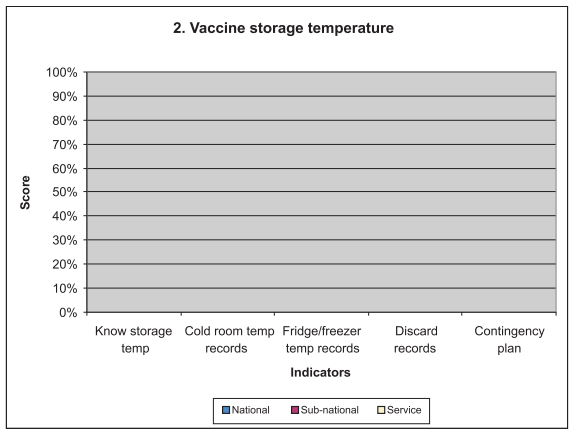

Overall performance of vaccine management at all levels
VA procs
Temperature
Capacity
Equipment
Maintenance
Stock mgt
Delivery
Diluents
VVMs
MDVP
Wastage
100%
80%
60%
40%
20%
0%
National
Sub-national
Service

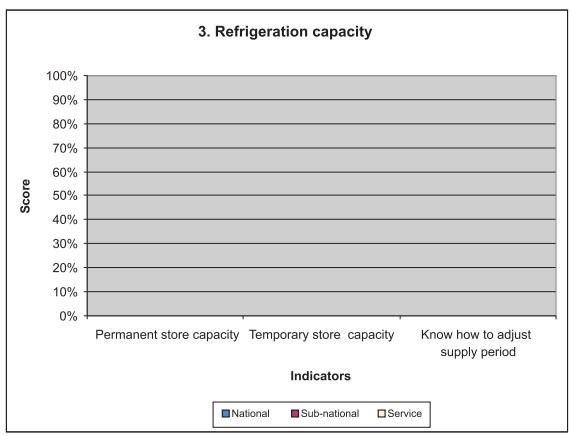

Vaccine management performance at national level
VA procs
Temperature
Capacity
Equipment
Maintenance
Stock mgt
Delivery
Diluents
VVMs
MDVP
Wastage
100%
80%
60%
40%
20%
0%
National

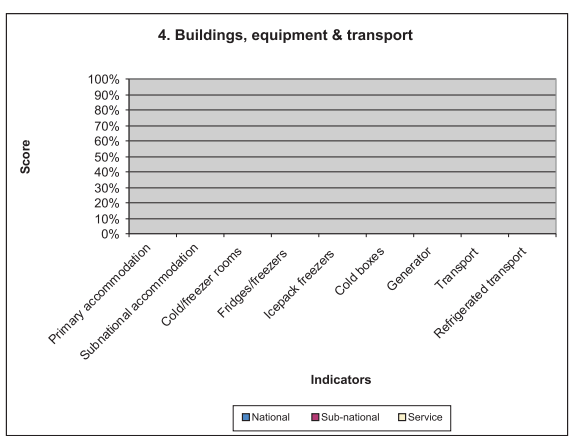

Vaccine management performance at sub-national level
VA procs
Temperature
Capacity
Equipment
Maintenance
Stock mgt
Delivery
Diluents
VVMs
MDVP
Wastage
100%
80%
60%
40%
20%
0%
Sub-national

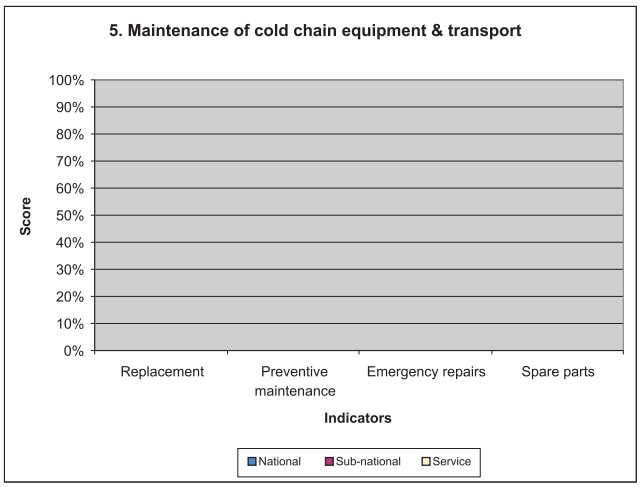

Vaccine management performance at service delivery level
VA procs
Temperature
Capacity
Equipment
Maintenance
Stock mgt
Delivery
Diluents
VVMs
MDVP
Wastage
100%
80%
60%
40%
20%
0%
Service

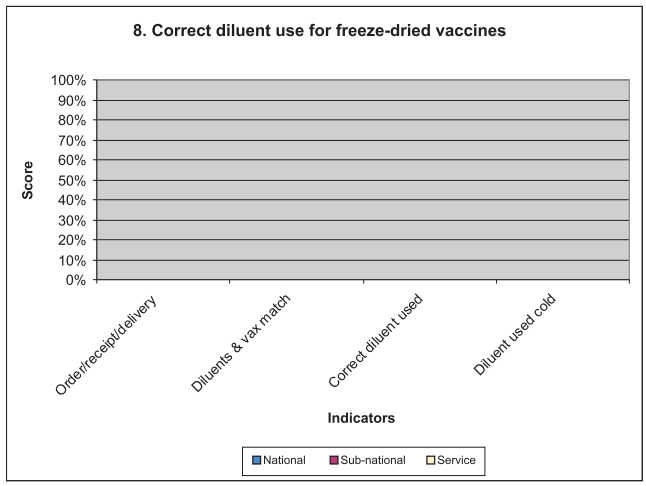

1. Vaccine arrival procedures (national level only)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Score
VARs
Customs
Clearing agent
Indicators
National

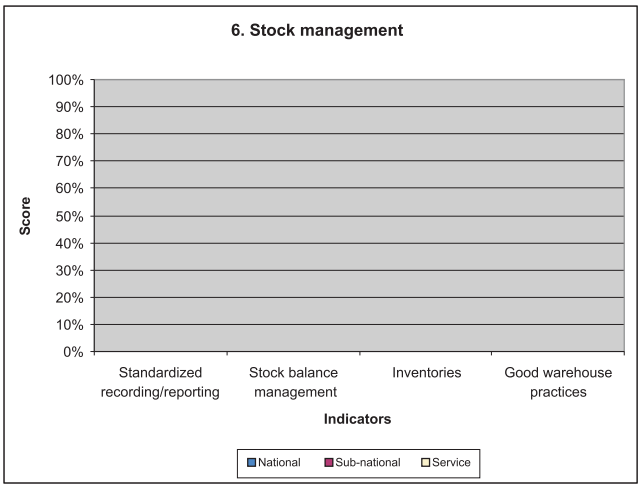

2. Vaccine storage temperature
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Score
Know storage temp
Cold room temp records
Fridge/freezer temp records
Discard records
Contingency plan
Indicators
National
Sub-national
Service

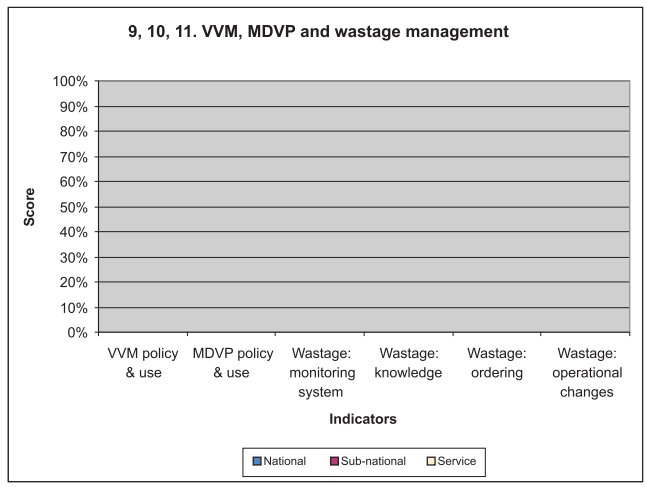

3. Refrigeration capacity
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Score
Permanent store capacity
Temporary store capacity
Know how to adjust supply period
Indicators
National
Sub-national
Service

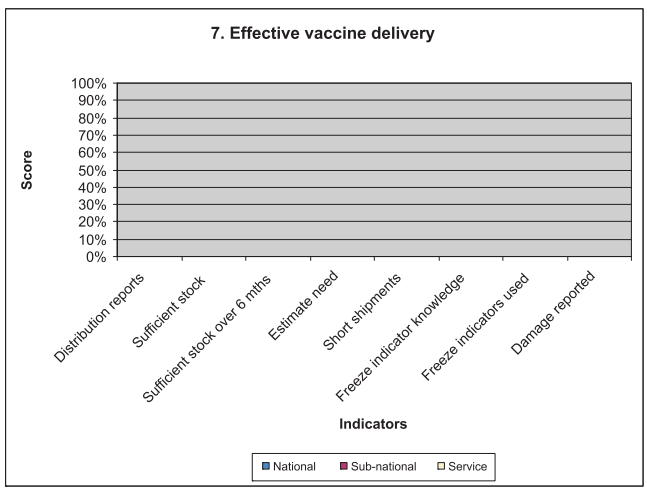

4. Buildings, equipment & transport
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Score
Primary accommodation
Subnational accommodation
Cold/freezer rooms
Fridges/freezers
Icepack freezers
Cold boxes
Generator
Transport
Refrigerated transport
Indicators
National
Sub-national
Service


5. Maintenance of cold chain equipment & transport
Score
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Replacement
Preventive maintenance
Emergency repairs
Spare parts
Indicators
National
Sub-national
Service


8. Correct diluent use for freeze-dried vaccines
Score
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Order/receipt/delivery
Diluents & vax match
Correct diluent used
Diluent used cold
Indicators
National
Sub-national
Service


6. Stock management
Score
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Standardized recording/reporting
Stock balance management
Inventories
Good warehouse practices
Indicators
National
Sub-national
Service


9, 10, 11. VVM, MDVP and wastage management
Score
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
VVM policy & use
MDVP policy & use
Wastage: monitoring system
Wastage: knowledge
Wastage: ordering
Wastage: operational changes
Indicators
National
Sub-national
Service


7. Effective vaccine delivery
Score
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Distribution reports
Sufficient stock
Sufficient stock over 6 mths
Estimate need
Short shipments
Freeze indicator knowledge
Freeze indicators used
Damage reported
Indicators
National
Sub-national
Service

VMAT: Tables

Table 1. Vaccine management performance by facility

Code	Facility▼ Criterion►	1 VA procs	2 Temperature	3 Capacity	4 Equipment	5 Maintenance	6 Stock mgt	7 Delivery	8 Diluents	9 VVMs	10 MDVP	11 Wastage	Total
ps01	0.0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
ps02	0.0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
ps03	0.0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	Average:	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	
sn01	0.0	Null	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
sn02	0.0	Null	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
sn03	0.0	Null	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
sn04	0.0	Null	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
sn05	0.0	Null	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	Average:	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	
sd01	0.0	Null	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
sd02	0.0	Null	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
sd03	0.0	Null	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
sd04	0.0	Null	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
sd05	0.0	Null	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
sd06	0.0	Null	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
sd07	0.0	Null	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
sd08	0.0	Null	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
sd09	0.0	Null	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
sd10	0.0	Null	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	Average:	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	

Notes

1) International vaccine arrival procedures do not apply at sub-national and service levels. To maintain visual consistency on the radar charts, at the lower levels this criterion is scored as for the national level.

Table 2. Vaccine management perfomance by level

Code	Facility▼ Criterion►	1 VA procs	2 Temperature	3 Capacity	4 Equipment	5 Maintenance	6 Stock mgt	7 Delivery	8 Diluents	9 VVMs	10 MDVP	11 Wastage	Total
	National	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
	Sub-national	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
	Service	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
	Average:	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	

Table 3. Vaccine management performance by indicator and level

Code	Indicator ▼	National	Sub-national	Service
1	**Vaccine arrival procedures**			
1.A	VARs	0%	0%	0%
1.B	Customs	0%	0%	0%
1.C	Clearing agent	0%	0%	0%
2	**Temperature**			
2.A	Know storage temp	0%	0%	0%
2.B	Cold room temp records	0%	0%	
2.C	Fridge/freezer temp records	0%	0%	0%
2.D	Discard records	0%	0%	0%
2.E	Contingency plan	0%	0%	0%
3	**Refrigeration capacity**			
3.A	Permanent store capacity	0%	0%	0%
3.B	Temporary store capacity	0%	0%	0%
3.C	Know how to adjust supply period	0%	0%	
4	**Equipment**			
4.A	Primary accommodation	0%		
4.B	Subnational accommodation		0%	
4.C	Cold/freezer rooms	0%	0%	
4.D	Fridges/freezers	0%	0%	0%
4.E	Icepack freezers	0%	0%	0%
4.F	Cold boxes	0%	0%	0%
4.G	Generator	0%	0%	
4.H	Transport	0%	0%	0%
4.J	Refrigerated transport	0%	0%	
5	**Maintenance**			
5.A	Replacement	0%	0%	0%
5.B	Preventive maintenance	0%	0%	0%
5.C	Emergency repairs	0%	0%	0%
5.D	Spare parts	0%	0%	0%
6	**Stock management**			
6.A	Standardized recording/reporting	0%	0%	0%
6.B	Stock balance management	0%	0%	0%
6.C	Inventories	0%	0%	0%
6.D	Good warehouse practices	0%	0%	0%
7	**Delivery**			
7.A	Distribution reports	0%	0%	
7.B	Sufficient stock	0%	0%	0%
7.C	Sufficient stock over 6 mths	0%	0%	0%
7.D	Estimate need	0%	0%	0%
7.E	Short shipments	0%	0%	
7.F	Freeze indicator knowledge	0%	0%	0%
7.G	Freeze indicators used	0%	0%	
7.H	Damage reported	0%	0%	0%
8	**Diluents**			
8.A	Order/receipt/delivery	0%	0%	0%
8.B	Diluents & vax match	0%	0%	0%
8.C	Correct diluent used			0%
8.D	Diluent used cold			0%
9	**VVMs**			
9.A	VVM policy & use	0%	0%	0%
10	**MDVP**			
10.A	MDVP policy & use	0%	0%	0%
11	**Wastage**			
11.A	Wastage: monitoring system	0%	0%	0%
11.B	Wastage: knowledge	0%	0%	0%
11.C	Wastage: ordering	0%		
11.D	Wastage: operational changes	0%	0%	0%

The assessment and training was conducted by : **Dr. Kshem Prasad, APT Progress**
under the technical guidance and oversight of UNICEF