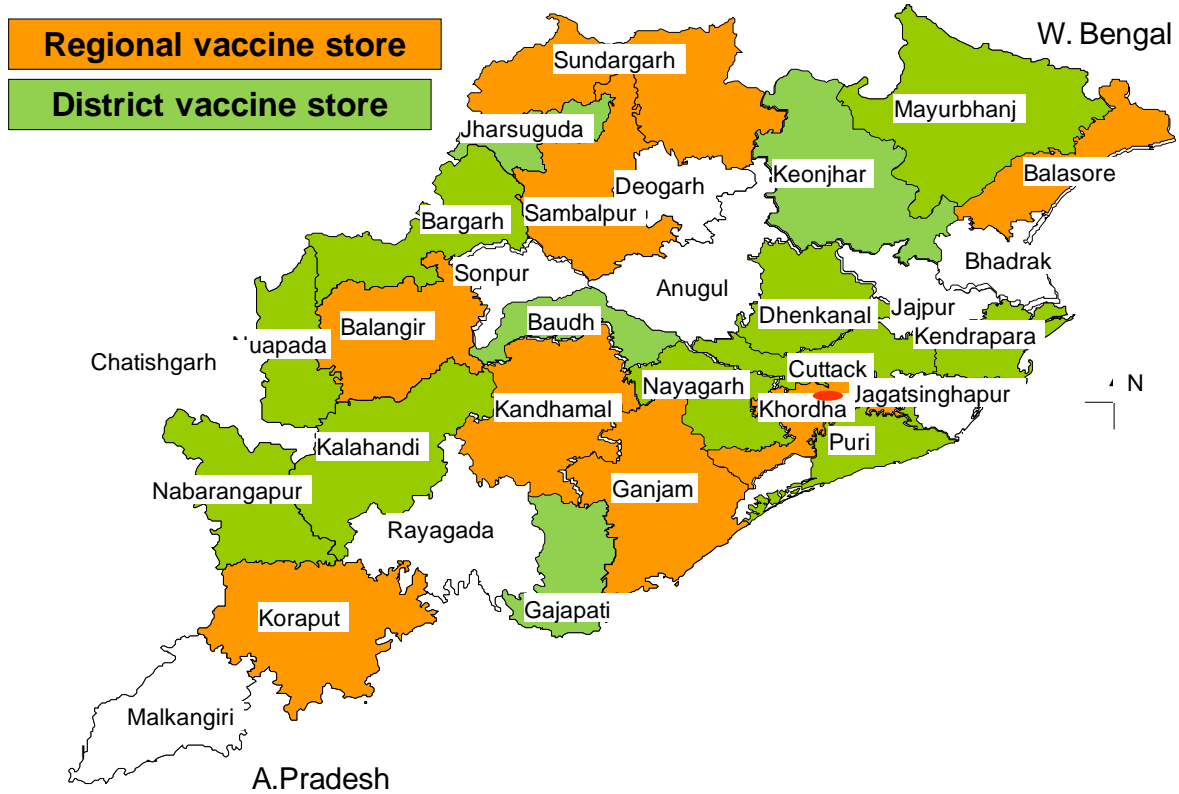


Assessment of Cold Chain & Vaccine Management in Orissa

using WHO/UNICEF Vaccine Management Assessment Tool (VMAT)

Additional report to 2007 report



25 August – 8 September 2009

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Abbreviations and Glossary

ADMO	Assistant District Medical Officer
BVS	Block vaccine store
°C	degree Celsius
CCM	Cold chain monitor
CCO	Cold Chain Officer
CDMO	Chief District Medical Officer
CFC	Chlorofluorocarbon (ozone depleting substance)
DIO	District Immunization Officer
EEFO	earliest-expiry-first-out
EPI	Expanded Programme on Immunization
EVSM	(WHO-UNICEF) Effective Vaccine Store Management initiative
GTN	Global Training Network
HWf	Health worker female
ILR points	Both ILR+ DF available
MI	Medical Institution
MO	Medical Officer
MOH	Medical Officer of Health (vaccine store and immunization point below the district level - hence considered as a service delivery point)
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
RI Coord	Routine Immunization coordinator
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

Executive Summary

The immunization coverage of Orissa has been improving progressively since the last four years. While the average is 61.3% for fully immunised child, There are reasons to review the management and logistics of the vaccines to ensure its safety and potency. This is particularly reflected through the monitoring of the medical college which was established since November 2007.

The first assessment of vaccine management using the WHO-UNICEF's Vaccine Management Assessment Tool (VMAT) was conducted in December 2007. The final report with the recommendations was published in form of a book for all associated staff to take appropriate action. In order to support the improvements, UNICEF introduced the State Maternal Child Survival Cell (SMCSC) within the Directorate of Health and Family Welfare dept. with the required human resource.

A total of 42 recommendations were provided in the earlier assessment report of 2007 for improving the system. By February 2008, a detailed work plan was prepared to implement these recommendations through the SMCSC. As of September 2009, only 6 (14%) of these have been implemented fully, other 50% are in the process of partial implementation, and 15 (36%) are still awaiting some action.

The current training and assessment was called to review the improvements since the last VMAT and to evaluate the preparedness of the state for introduction of new vaccines (MR, Pentavalent). This report is complementary to the printed report of 2007, and should be read together with that report. A separate document providing detailed status of the 2007 recommendation is also submitted along with this report to complete the set of recommendations that need to be implemented.

Significant improvements are seen in stock management due to introduction of the new well designed vaccine management registers for the different levels, though the training of the users is still continuing. Further improvements can be expected once all staff have been trained in proper use of these registers. There has also been adequate training in handling of diluents, and clear improvements are seen in this area.

On the other hand, progress has been slow or nil in several technical areas such as adequacy of cold chain and associated equipment, their preventive maintenance and development of contingency plans. A more proactive and determined action by the persons responsible at the state and RVS level would have yielded better results.

In order to redress the current weaknesses and some of the persistent old weaknesses, the following recommendations are provided, These are in addition to the recommendations from 2007.

Management - Policy

1. Segregate all DVS attached to RVS. Provide for adequate space, staff and equipment.

Human Resource

1. The CCO needs to be more proactive in management of the Cell and the cold chain aspects.
2. A proactive and committed cold chain consultant is needed to take on each of the technical recommendations and implement the same with the support of the state and respective RVS coordinators.
3. Performance of all staff of the cell, the cold chain consultant, and all the RVS and RI coordinators need to be monitored periodically.

Building

1. All Regional vaccine stores need expansion for adequate working and dry storage space
2. Many DVS and BVS also need to have a suitable room for the stores.

Equipment related

1. The cold chain equipment inventory needs to be updated so that the following can be defined with certain details:
 - ❖ Preparation and implementation of equipment plans
 - ❖ Procurement cold chain spares - which must be timely
2. Repair / replace the graph recorders at BBSR, Ganjam, Kandhamal and Sundergarh
3. Ensure that all WICs have loud working acoustic alarms
4. Procure and introduce use of freeze indicators for each and every distribution of freeze sensitive vaccines
5. Procure and install a computerized temperature monitoring system

Planning

1. Prepare contingency plans for all levels
2. Prepare a preventive maintenance plan

Implementation of Practices

1. The CCO needs to be more proactive in management of the Cell and the SVS
2. Enhance Monitoring of staff and practices
3. Follow up on all instructions in written form & file them
4. Maintain a service log sheet for each equipment
5. Compute vaccine requirements on 2 monthly basis and request GoI to ensure timely supplies to the state
6. Define safety stocks and working stocks at each level and maintain them
7. Introduce use of proper batch cards at RVS and DVS.
8. Implement OVLMS at all RVS and DVS
9. Always use standardised conditioned water/Ice Packs
(do not use Gel packs)

The assessment identified three DVS which require very specific attention They are in a rather bad situation , so much so that Cuttack and Bolangir had to be excluded from the total score, otherwise they would have pulled the whole score still lower. A separate note has been prepared on these DVS . In summary:

Cuttack : catering to 3rd largest target group

- ❖ More spacious, adequate store space is needed
- ❖ Trained competent staff is required

Bolangir :

- ❖ DVS building, equipment needs revamping, and proper staff needs to be appointed as store keeper
- ❖ Condemned equipment to be removed and auctioned

Navarangpur

- ❖ The building needs proper repairs.

1. 1. Introduction

The immunization coverage of Orissa has been improving progressively since the last four years. While the average is 61.3% for fully immunised child, There are reasons to review the management and logistics of the vaccines to ensure its safety and potency. This is particularly reflected through the monitoring of the medical college which was established by UNICEF since November 2007.

The first assessment of vaccine management using the WHO-UNICEF's Vaccine Management Assessment Tool (VMAT) was conducted in December 2007. The final report with the recommendations was published in form of a book for all associated staff to take appropriate action. In order to support the improvements, UNICEF introduced the State Maternal Child Survival Cell (SMCSC) within the Directorate of Health and Family Welfare dept. with the required human resource. The spider charts of the respective RVS were used as reference in the RVS to stimulate improvements.

UNICEF also engaged under the banner of the SMCSC, one cold chain consultant (CCC), 7 RVS-Coordinators (one for each RVS) and some RI coordinators for strengthening the activities in weaker districts.

The current training and assessment was called to train more staff in assessment and carry out an assisted assessment of the improvements since the last VMAT and to define the preparedness of the state for introduction of new vaccines (MR, Pentavalent).

The reader is request to read this report along with the previous report of 2007. Many of the basic information and background aspects are not repeated here. In addition the reader should refer to the report giving the status of the recommendation of 2007, as of September 2009 : "2b-Status of 2007 Recommendations in 2009.doc". The table below gives a summary overview of the implementation of these recommendations. A total of 42 recommendations were given. Only 14% have been implemented fully. 50% of the recommendations have been partially implemented., at times just begun, and 36% are awaiting action.

category	To implement	total	implemented	Partly implemented	Not imlemented
0	Most Urgent	9	3	4	2
1	Urgent	16	3	9	4
2	in 6 months	14	0	7	7
3	in 1 year	3	0	1	2
Total		42	6	21	15
	%	100%	14 %	50 %	36 %

As an example, the table below summarises the status of the recommendations that were required to be implemented most urgently (immediately following the December 2007 assessment).

Most urgent Recommendations	Achieved	Partially achieved	Pending
1. It is imperative to get this 2nd WIC repaired immediately or failing which to decide on procuring another WIC to replace it.	✓		
2. Rectify all non-functioning equipment or condemn them	✓		
3. Train staff on proper management of diluents during use.	✓		
4. Get all graphic chart recorders into working order		✓	✓
5. Put acoustic alarm put in to operation.		✓	✓
6. Set the generators at each RVS and DVS into operation.		✓	
7. DVS that do not have a genset should be provided with one. Provide funding and auto-start (for RVS)		✓	✓
8. Train staff on proper conditioning of ice packs to avoid freezing of vaccines.			✓

Most urgent Recommendations	Achieved	Partially achieved	Pending
9. Install computerised temperature monitoring at SVS.			✓

Note that recommendation 4 & 5 have been implemented unsuccessfully. The chart recorders and alarms have been non-functional after repair. Thus they can also be considered as still pending. Likewise, several technical recommendations have not been followed to completion amongst the recommendation given under other categories. A proactive approach to redressing the weakness has been wanting. Hence, one should not expect very significant improvements from last time.

2. The Methodology

38 staff were trained over 3.5 days in assessment. Following this, 8 teams were formed. 7 of them assessed respectively 1 RVS, 2 DVS under the respective RVS, and 2 BVS under each respective DVS. The 8th team assessed 4 DVS and 7 BVS under BBSR. During the training the SVS, 2 DVS and 3 BVS were also assessed. The blocks were selected based on their performance of coverage and reachable distance. One good and one poor performing blocks were selected. In total, 7 RVS, 20 DVS and 38 BVS were assessed.

The collected data was validated and verified with the help of selected team members. The selected team also analysed the results and developed the recommendations. this report gives the salient aspects of the findings and recommendations.

The table below tabulates the strengths and weaknesses listed out by team members at the start of the analysis exercise.

Criteria	✓ Strengths	❖ Weaknesses
2 Safe storage temperature	<ul style="list-style-type: none"> ✓ Good storage of T-series as per sensitivity stored in the WIC ✓ knowledge good practice of proper storage ✓ Manual temp recording good in most RVS vaccine stores 	<ul style="list-style-type: none"> ❖ Several Graph recorders are not working at SVS and RVS walk in cold rooms ❖ Diluent stored in the WIC below the refrigeration unit ❖ Contingency guidelines do not exist for handling emergencies of equipment breakdown or insufficiency of storage space at any level ❖ Partial knowledge of implementing Contingency
3 Sufficient Storage capacity	<ul style="list-style-type: none"> ✓ Capacity of BVS is sufficient ✓ Sufficient Ice pack freezing capacity at BVS ✓ Adequate space in WIC (+2 to +8 C) at all RVS and DVS 	<ul style="list-style-type: none"> ❖ -15 to -25 C storage capacity insufficient in RVS & DVS
4 Building, Equipment and Vehicles	<ul style="list-style-type: none"> ✓ Good Infrastructure in RVS Bolangir ✓ Generator working properly in many vaccine stores ✓ Sufficiency of stabilizer in many service points ✓ Adequate fuel storage for emergency 	<ul style="list-style-type: none"> ❖ poor infrastructure at several DVS (Cuttack, Bolangir, Navarnagpur, Puri, Kendrapada,) ❖ Auto start up not working for many generators ❖ Cold box not available for the storage of prepared I.P ❖ Generators ❖ infrastructure ❖ Limited space at RVS (Kandhamal, Sambalpur, Sundergarh)

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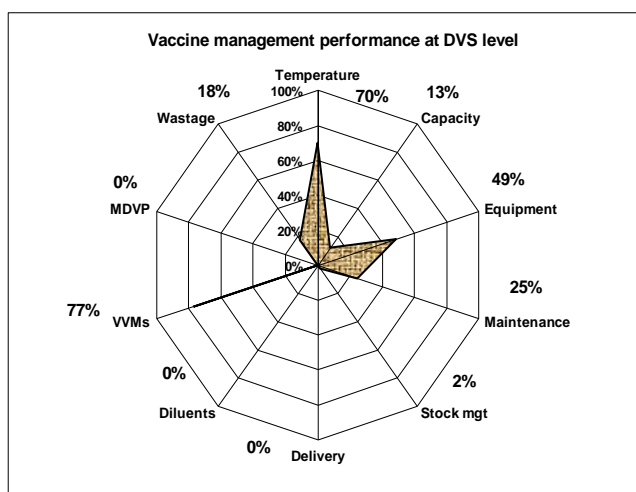
Criteria	✓ Strengths	❖ Weaknesses
		❖ DVS connected to RVS do not have proper space and equipment
5 Maintenance	<ul style="list-style-type: none"> ✓ Good log keeping of maintenance and repair ✓ Periodic Maintenance of RVS ✓ maintenance of cold chain equipment 	❖ no preventive maintenance plans plan
6 Stock management	<ul style="list-style-type: none"> ✓ Good Knowledge of DVS in-charge in stock management ✓ vaccine stored in orderly manner ✓ Block wise requirement posted in the RVS depot ✓ batch card used for Deep Freezer 	<ul style="list-style-type: none"> ❖ Stock management at BVS is poor - Registered not used properly yet ❖ poor Estimation of Vaccine requirements ❖ vaccine calculation very poor ❖ batch card not used inside WIC for the vaccine ❖ Stock management(stock issue register)
7 Safe Delivery of vaccine		<ul style="list-style-type: none"> ❖ vaccine distribution is irregular ❖ Deliveries
8 - Management diluents	✓ good management of diluents	
9 - VVM use	✓ Good knowledge and use of VVM	
11 - Wastage		❖ Recording , monitoring, and review of wastage

3. Findings

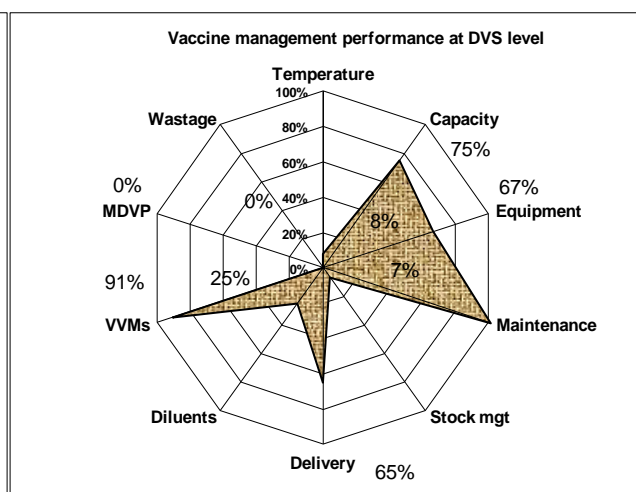
3.0. General

The assessment identified three DVS which were in a rather poor state. Two of these – Bolangir and Cuttack, if included in the assessment scoring, would pull the entire score to a rather poor performance. The spider graph depicts their lamentable situation, when compared to the consolidated graphs given on the next page.

Balangir DVS



Cuttack DVS



[Annexures D1 to D6](#), gives the results in form of spider graph for each of the RVS and its sub-stores. The scores used for consolidation of the results at different levels is given in the [annexure E](#). The table

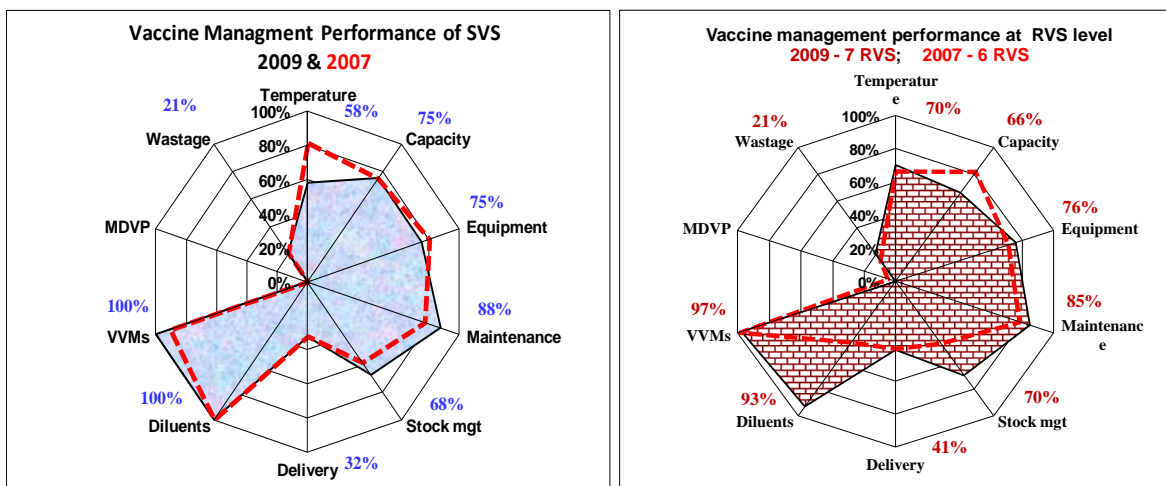
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below gives the average score for the RVSs, DVSs and BVSs.

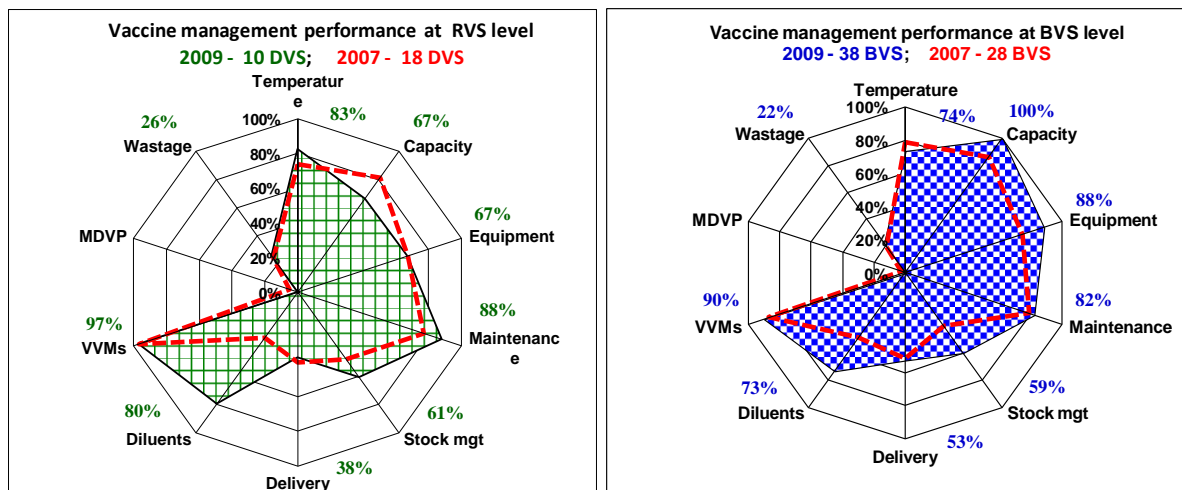
Cr.	Indicator	VMAT - Average		
		7 RVS	18 DVS	38 BVS
2	Vaccine storage temperature	70%	83%	74%
3	Cold store capacity	66%	67%	100%
4	Building, cold chain equipment and transport	76%	67%	88%
5	Maintenance of cold chain equipment and transport	85%	88%	82%
6	Stock management	70%	61%	59%
7	Effective vaccine delivery	41%	38%	53%
8	Correct diluents use for freeze dried vaccines	93%	80%	73%
9	Effective VVM use	97%	97%	90%
11	Vaccine wastage control	21%	26%	22%

All scores above **90% are marked in Green bold**, scores between 70% and 90% are marked in normal black font and scores ~~below 70% that need attention are noted as strikethrough text in red colour~~.

The current findings of the assessment in the form of spider chart are given below along with those of 2007 (marked in red dotted line).



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Due to the detailed validation of the data and a more experienced group than 2007, one can expect a more critical evaluation, and hence a lower scoring of performances even when these were similar to 2007 situation. Despite this, at all levels there is a significant improvement in stock management and handling of diluents. At DVS level the capacity has deteriorated as this time the DVS attached to the RVS were also assessed. These DVS are sharing much of the resources with RVS and hence are not self sufficient.

For SVS level an extensive assessment using the Effective Vaccine Store Management (EVSM) was carried out. A separate document reports on the same and hence will not be treated here.

The observations given here should be read in conjunction with the observations and recommendations given in 2007. The weaknesses identified in 2007, and still existent as the same have not been addressed may not be repeated here. The reader should refer to “2b-Status of 2007 Recommendations in 2009.doc” for the detailed status of past recommendations which have been partially or not implemented at all.

In some of the indicators the bar graphs are provided. The left one with a red dotted border corresponds to the bar graph obtained in 2007, and the one on the right with violet border marks the result of 2009.

3.1. 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, and this can cause irreversible damage.

The only way that it is possible to ensure that vaccines have been stored at the correct temperature at all times is by having adequate temperature recording at all stores having vaccines. In case of any danger, the vaccines can be saved using an adequate and ready contingency plan.

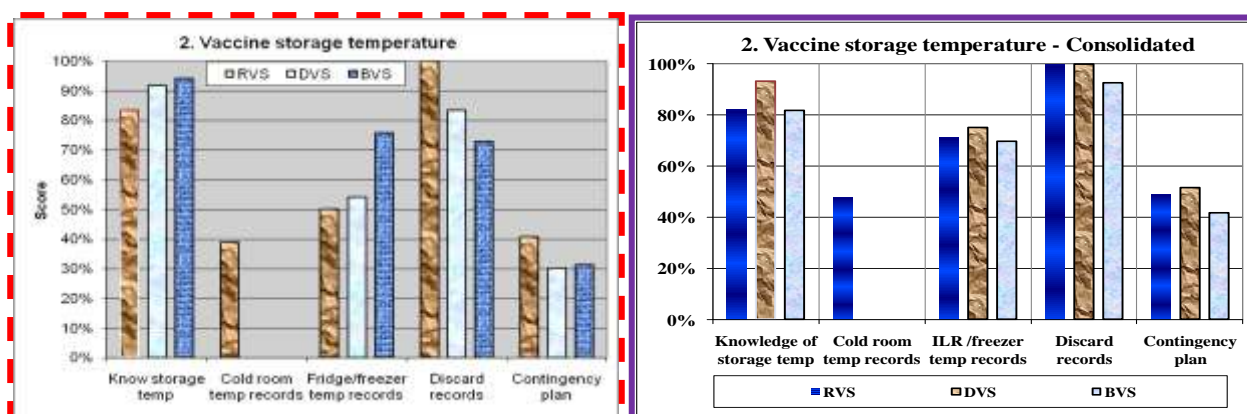
The following aspects are assessed here:

- 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 freezers 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
2007 Score	82%	66%	73%	79%	49%
2009 score	58%	70%	83%	74%	

The consolidated bar graph of RVS, SVS and BVS is show below. On the left is the result of 2007 and on the right that of 2009.



Most staff are knowledgeable about the proper temperature of storage. Some gaps prevail with respect to many staff thinking that BCG cannot be frozen.

The continuous temperature recording at 3 RVSs is not carried out due to non functioning of graph recorders. Manual temperatures are incomplete, with no info on the defrosting. The records are not systematically supervised and countersigned. The temperature recording book is less practical than a graph chart.

The key area of weakness is the persistent lack of contingency plans, proper listing and display of emergency numbers at visible location, and knowledge of staff on handling of emergencies.

Recommendations

- The temperature recording book should be replaced with a suitable graph chart where identification of over or undershooting of temperature will be easy. A model is suggested in [annexure F](#).
- There are some guidelines and template for preparation of contingency plans in the new stock registers. The RVS coordinators need to help the store managers at each level to prepare a plan most suitable to them.
- The emergency list should contain first the contact numbers of the technician and store manager , or any other staff capable of taking the necessary action, and not the CDMO, unless the latter insists on it.

3.2. 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
2007 Score	75%	82%	82%	86%	80%
2009 score	75%	66%	67%	100%	

At block level there is sufficiency of space and staff know how to manage extra stock. This results in 100% score. There is limitations of storage space in all the RVS and DVS attached to RVS, with the exception of Bolnagir WIC which is large and new. Many store managers have still gaps in management of excess stocks.

RVS & DVS attached to RVS at :	RVS management		DVS management	
	2-8 C Stocks	Addl. DF capacity needed	Addl. ILR Capacity needed	Addl. DF Capacity needed
	Mix with DVS	Ltrs		Ltrs
BBSR	No			
Balasore	No	330	320	75
Balangir	Mix	600	320	370
Ganjam	Mix	50	870	200
Kandhamal	Mix			
Koraput	No	610	OK	200
Sambalpur	No		OK	100
Sundergarh	No	130	350	180

The adjacent table defines the status of storage capacity at +2 to +8°C of the RVS and the DVS attached to the RVS. The vaccines stocks of DVS are mised in the WIC at 3 RVSs. There is a shortage of freezing space in 5 RVSs. The capacity required at respective RVSs is indicated in the table

In view of segregating the DVS from RVS, additional storage space at +2 to 8°C and minus temperature (for OPV) are needed. The same are also indicated in the table for the respective RVS and DVS.

Recommendation:

- The required additional space need to be provided in form of adequate equipment.

3.3. 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 keeping the 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
2007 Score	80%	71%	67%	75%	80%
2009 Score	75%	76%	67%	88%	

The limitation in terms of equipment for ensuring sufficiency of storage capacity has been mentioned in the previous section.

RVS & DVS attached to RVS at :	RVS management		DVS management
	RVS Store manager	RVS Support staff	DVS Support staff
	who / duty	Nos.	Nos.
BBSR	Same as SVS	3	
Balasore	DVS duty	3	X
Balangir	RVS Coor	X	X
Ganjam	DVS duty	X	X
Kandhamal	DVS duty	X	X
Koraput	DVS duty	X	X
Sambalpur	RVS Coor	2	X
Sundergarh	DVS duty	X	X

The adjacent table indicated the limitation of staffing at the RVS and DVS. ‘X’ indicates that adequate staff is insufficient or not present and needs to be placed. Most RVS store managers are also handling the DVS vaccine stocks and the stock registers.

At two RVS, the RVS coordinators are managing the store.

The table below summarises the status at the 7 RVS. ‘X’ here denotes that the situation is unsatisfactory and needs to be addressed.

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For example, in row 11, 5 RVSs do not have dedicated vaccine store managers. Likewise row 15 indicates that the cold chain store is inadequate in 2 RVSs and row 17 indicates that there is a limitation of dry space at all RVS. Based on the markings adequate action needs to be taken to improve the situation.

	Details of Infrastructure at Regional Vaccine Store	Balangir	Balasore	Ganjam	Kandhamal	Koraput	Sambalpur	Sundergarh
1	Support from CDMO	OK	good	good	ok	GOOD	Good	Good
2	ADMO FW / DIO	Yes	YES	Yes	Yes	YES	Yes	Yes
3	% Duty	50%	100%	100%	100%	100	50%	100%
4	Support from ADMO FW / DIO	OK	OK	good	good	GOOD	Good	Ok
5	Support from DPMU	Ok	good	poor	poor	??	??	??
6	RI Coordinator / Dy manager Child Health	Yes	no	Not available	Yes	YES	No	No
7	Support from RI Coordinator	Ok	NA	Ok	Ok	OK	X	X
8	RVS Coordinator	Yes	YES	Yes	Yes	YES	Yes	Yes
9	Support from RVS Coordinator	X	Ok	Ok	Ok	Ok	OK	Ok
10	% involvement	100%	100%	100%	100%	80%	100%	100%
11	Dedicated Vaccine store Keeper	X	X	100%	X	Ok	X	X
12	% of involvement	0%	100%	100%	100%	100	??	60%
13	Cold chain technician	1	1	1	1	1	1	1
14	% f involvement	100%	100%	100%	50%	100%	100%	100%
15	Cold chain room	Ok	Ok	Ok	X	OK	Ok	X
16	Technician workshop space	Ok	yes	X	OK	OK	X	X
17	Dry space	X	X	X	X	X	X	X
18	Continuous graph record	Working	working	Working	X	Working	Work ing	X
19	Manual temp records ok	Good	partial	X	Good	X	Good	Work ing
20	Cold Chain Capacity	OK	X	X	Good	X	Ok	X
21	Generator Status	Ok	Ok	Ok	Ok	OK	Ok	Ok
22	Cold Chain spares	OK	Ok	Ok	X	Working	Ok	X
23	Vax. Van required	Working	working	X	Working	X	Work ing	No
24	No Condemned Equipments	Yes	X	Yes	X	YES	Yes	Yes
25	Receipt from Upper level established periodically	X	X	Yes	X	X	X	X
26	Periodic supply to lower level established & followed.	X	X	Yes	X	X	X	X

Similar table for the 18 DVS is given in annexure. The gaps area marked n 'X' for the necessary action.

Remarks provided by the team leaders for each RVS and DVS is given in the excel file :

"4-Summary of Miscellaneous tables for assessment.xls" [Annexure G](#) gives the summary.

Recommendation:

- The required action should be undertaken for all areas marked as ‘X’ to address the current situation. Most of these are old issues not addressed following the 2007 assessment.

3.4. Maintenance of Building, Equipment and Transport

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

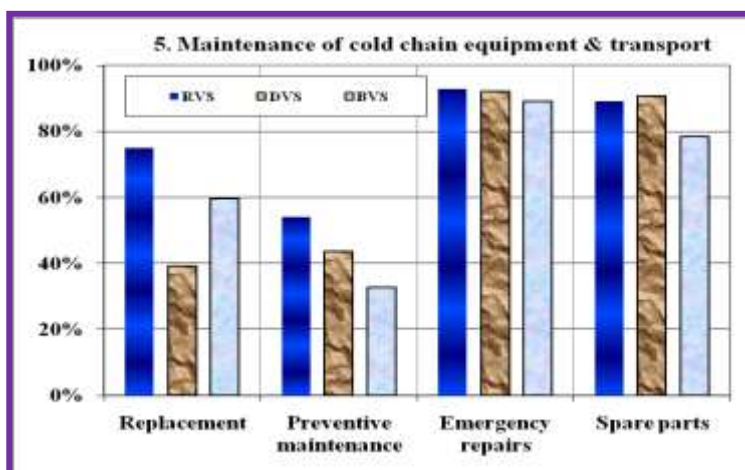
Vaccine Store	State	Regional	District	Block	Urban PPC
2007 Score	77%	78%	77%	79	83%
2009 Score	88%	85%	88%	82%	

In general the scores for this indicator is good. This is mainly because no vaccine is reported to have been damaged due to equipment breakdown. The bar graph indicates the still pending weak areas of replacement and maintenance plans.

The current equipment replacement plans are essentially limited to replacement of CFC units as defined by GoI. There is a delay in the implementation by 1-2 years.

Some plans for preventive maintenance were made at some RVS and DVS but not followed.

The movement of the technicians is essentially for repair. The repair documents are not supervised by a technically competent person.



The inventory of equipment and required spares is not up to date. This makes complete and timely indenting of spares difficult. As a consequence there will be delays in repair of defective equipment. If the concerned staff shall be proactive and take timely actions in addressing the weak areas of equipment, maintenance planning and follow ups with the RVS coordinators and technicians, the situation shall be significantly more positive.

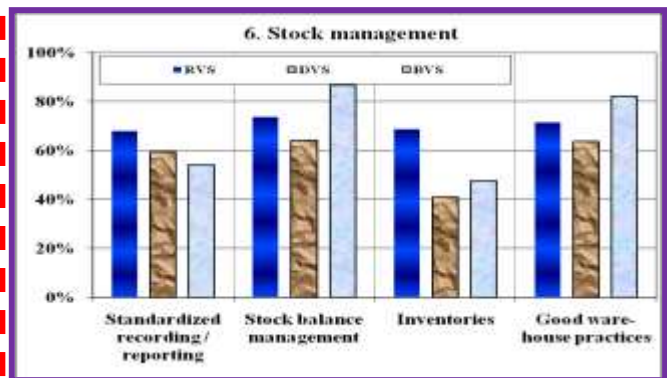
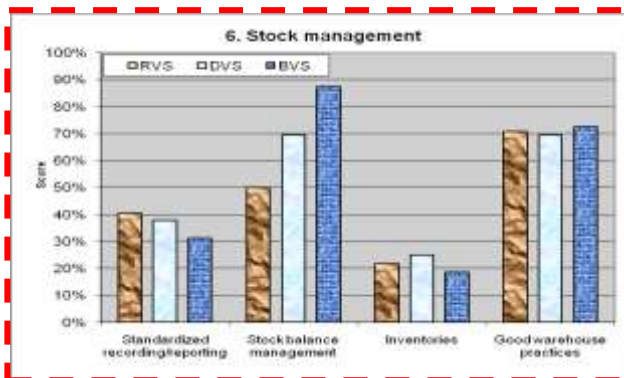
3.5. Stock Management

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
2007 Score	59%	46%	48%	40%	29%
2009 Score	68%	70%	61%	59%	



The scores above and bar graph indicate that there has been quite some improvement in the first three criteria of this indicator, thanks to the introduction of the new stock registers and practices associated with it. The shortfall from 100% arise due to the lack of training of the staff and proper follow ups by the trainers / RVS coordinators to ensure the registers are used correctly.

There is bound to be substandard warehouse practice so long as there is inadequate conditions of building, space and equipment in the vaccine stores,

Recommendation:

- To improve further proper batch card need to be introduced at SVS, RVS and DVS level. A format is proposed in [annexure H](#).
- Hands-on training should be given to all associated staff on how to use the batch cards and the stock registers.

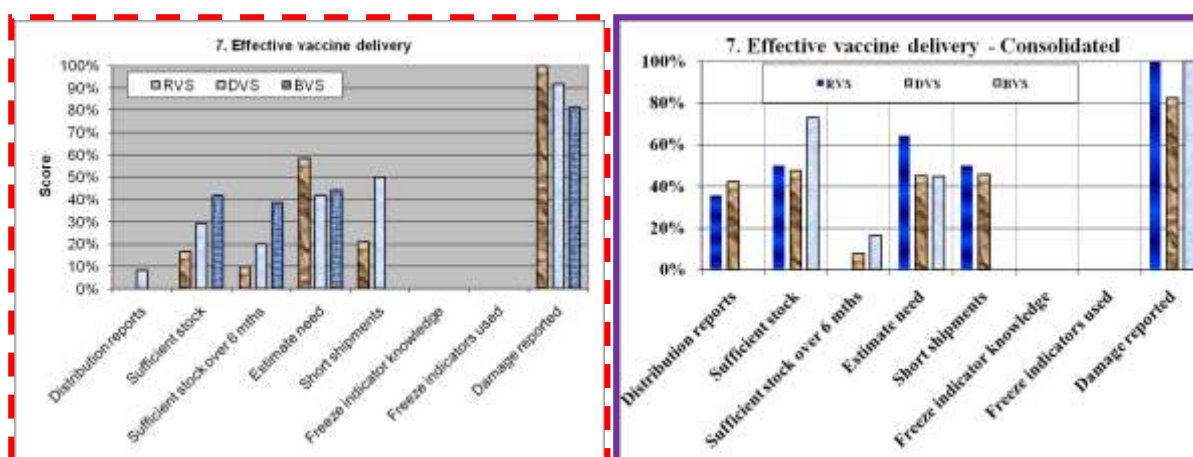
3.6. Effective Vaccine delivery

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.

Findings

Vaccine Store	State	Regional	District	Block	Urban PPC
2007 Score	32%	40%	41%	52%	49%
2009 Score	32%	41%	38%	53%	



The situation of this indicator has not changed since last time. The same issues mentioned in 2007 need to be addressed.

3.7. Correct diluents use for freeze dried vaccine

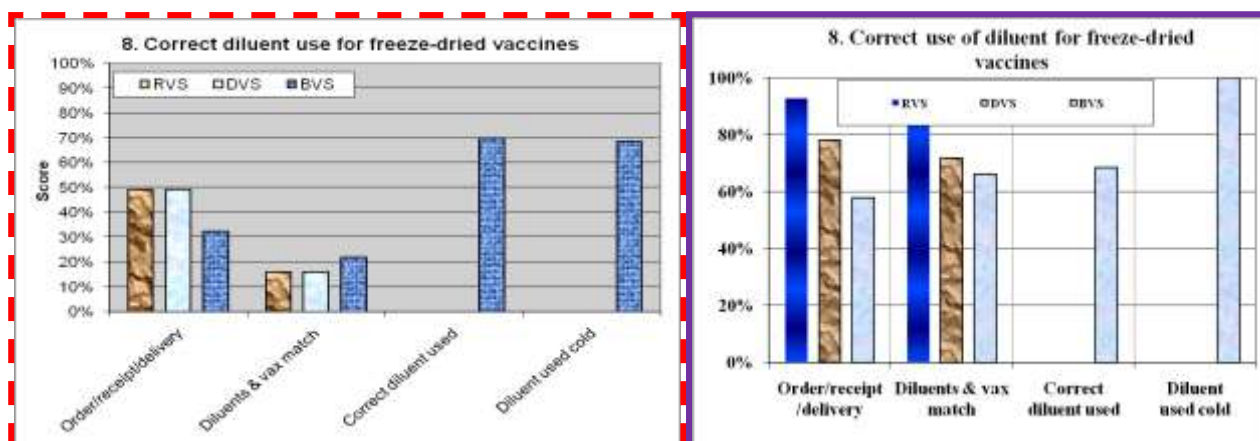
For the freeze dried vaccines the following parameters are assessed:

- 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 2-6 C, same as the vaccine before reconstitution.

Findings

Vaccine Store	State	Regional	District	Block	Urban PPC
2007 Score	100%	45%	33%	48%	38%
2009 Score	100%	93%	80%	73%	

This is another indicator where improvements have been significant.



The management o diluents have improved at the upper vaccine stores and at service level. It is very encouraging to note that the detrimental practices noted in 2007, have been eliminated.

With further regular practice of physical stock verification, the situation will improve well.

3.8. Effective VVM use

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

Findings

Vaccine Store	State	Regional	District	Block	Urban PPC
2007 Score	91%	99%	97%	87%	82%
2009 Score	100%	97%	97%	90%	

The absence of posters still remain as a small weakness.

3.9. Multi Dose Vial Policy

The MDVP is implemented correctly.

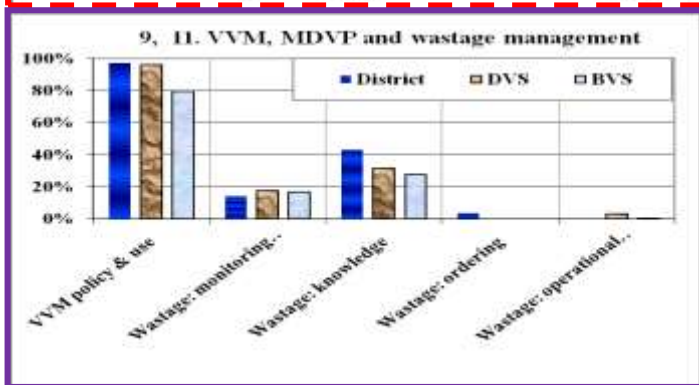
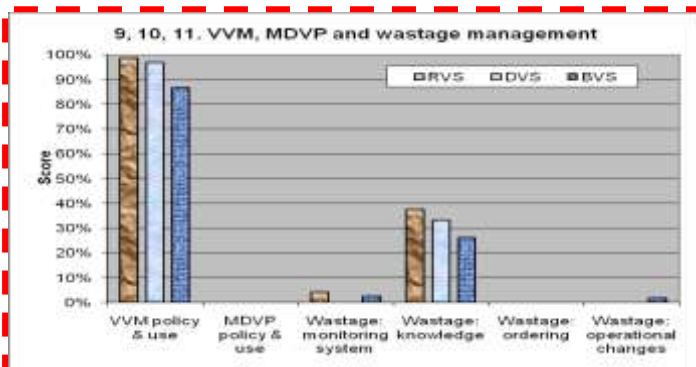
As the govt. of India has not adopted this policy, this criterion is not assessed.

3.10. 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
2007 Score	21%	16%	24%	19%	1%
2009 Score	21%	21%	26%	22%	



There is little change in this indicator.

It is however more important to first ensure proper supply of vaccines at the right time in the right place to not miss any child.

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 the correct form till the child than to compromise on basic care needed for the vaccine throughout the cold chain, in trying to save a few percentage of doses.

4. Ten Key Actions decided by RVS Coordinators

At the end of the analysis exercise, the RVS and RI coordinators were invited to select one of the remedial action they would follow up immediately on their return. The following table gives the list of their moral commitments along with the deadline they have suggested to accomplish the task.

SI No	RVS / District	Action	Completion period
1	RVS coordinator Kandhamal	Train people in correct calculation of working stock, and safety stock at : RVS, DVS, BVS levels,	Nov. end
2	RI Coordinator Gajapati:	Same as Kandhamal +	By Dec,09
3		Contingency plans for RVS, with Contact numbers	By Dec,09
4		Preventive maintenance plan	end of Oct,09
5	RVS Coordinator Ganjam	Introduction of maintenance & repair register for every block-	Oct, 2009
6	RVS coordinator Sundargarh	Training & follow up on proper stock maintenance	Oct,09 end
7	RVS coordinator Bolangir	Clear out all condemned equipment Installation of new equipment	Sept,09 end
8	RVS coordinator Sambalpur	Introduction of batch cards	1 month
9		Pull back excess/mismatched vaccines & diluents from BVS to DVS	2 Months
10	CC consultant	SVS- get & install new graph recorders	Immediate

5. Recommendations

Besides the incompletely implemented recommendations the following recommendations are suggested to improve the situation at all levels. The recommendations are classified according to the nature of their implementation:

Management - Policy

2. Segregate all DVS attached to RVS. Provide for adequate space, staff and equipment.

Human Resource

4. The CCO needs to be more proactive in management of the Cell and the cold chain aspects.
5. A proactive and committed cold chain consultant is needed to take on each of the technical recommendations and implement the same with the support of the state and respective RVS coordinators.
6. Performance of all staff of the cell, the cold chain consultant, and all the RVS and RI coordinators need to be monitored periodically.

Building

3. All Regional vaccine stores need expansion for adequate working and dry storage space
4. Many DVS and BVS also need to have a suitable room for the stores.

Equipment related

6. The cold chain equipment inventory needs to be updated so that the following can be defined with certain details:
 - ❖ Preparation and implementation of equipment plans
 - ❖ Procurement cold chain spares - which must be timely
7. Repair / replace the graph recorders at BBSR, Ganjam, Kandhamal and Sundergarh
8. Ensure that all WICs have loud working acoustic alarms
9. Procure and introduce use of freeze indicators for each and every distribution of freeze sensitive vaccines
10. Dispose of all condemned equipment and free usable space at all levels.
11. Procure and install a computerized temperature monitoring system

Planning

3. Prepare contingency plans for all levels
4. Prepare a preventive maintenance plan

Implementation of Practices

10. The CCO needs to be more proactive in management of the Cell and the SVS
11. Enhance Monitoring of staff and practices
12. Follow up on all instructions in written form & file them

13. Maintain a service log sheet for each equipment
14. Compute vaccine requirements on 2 monthly basis and request GoI to ensure timely supplies to the state
15. Define safety stocks and working stocks at each level and maintain them
16. Introduce use of proper batch cards at RVS and DVS.
17. Implement OVLMS at all RVS and DVS
18. Always use standardised conditioned water/Ice Packs
(do not use Gel packs)

The assessment identified three DVS which require very specific attention They are in a rather bad situation , so much so that Cuttack and Bolangir had to be excluded from the total score, otherwise they would have pulled the whole score still lower. A separate note has been prepared on these DVS . In summary:

Cuttack : catering to 3rd largest target group

- ❖ More spacious, adequate store space is needed
- ❖ Trained competent staff is required

Bolangir :

- ❖ DVS building, equipment needs revamping, and proper staff needs to be appointed as store keeper
- ❖ Condemned equipment to be removed and auctioned

Navarangpur

- ❖ The building needs proper repairs

ANNEXURES

A - List of Participants and Facilitators

	Name of Participants	Designation	District of Posting	Qualification	Contact no.
1	Dr. D.K. Panda	J.D. (RH)	State head Qtr	MBBS, MS (Gyn.)	9437089617
2	Dr. S.K. Brahma	DD (MCH)	State head Qtr	MBBS, MD	9437022246
3	R.K. Mishra	DD (Demo)	State head Qtr	MA, LLB	9437107253
4	Er. S.C Jena	CCO	State head Qtr	Dip. Eng. (Ref. and Air Conditioning)	9437873004
5	Er. S.M. Palo	CCC	State head Qtr	LME	9437261264
6	R.C. Mohanty	Foreman	State head Qtr	BA, ITI (Ref. and Air Conditioning)	9438439416
7	P.K. Khandei	Foreman	State head Qtr	Matric, ITI	9853606738
8	N.K. Swain	SI	State head Qtr	BA	9777520766
9	R.K. Mohapatra	Tech. Asst.	State head Qtr		
10	P.S. Tripathy	Sr. Asst.	State head Qtr	MBA, LLB	9861226383
11	P. Samantray	Vac. Store, I/C	State head Qtr		
12	Puspanjali Das	CA	State head Qtr	MBA, MCA	9861296644
13	Sanjay Satpathy	CA	State head Qtr		
14	Paritosh Kumar Panigrahi	SVLM	State head Qtr	MBA(F), CFA	9437188988
15	Dr. D. Choudhury	ADMO (FW)	Sambalpur		
16	Dr. D. Pradhan	ADMO (FW)	Kandhamal		
17	Dr. N. Acharya	ADMO (FW)	Jharsuguda	MS, (Gyn)	9861366617
18	Dr. J. Mahananda	ADMO (FW)	Bargarh	MD , (O&G(9437112569
19	Dr. P. Sahoo	ADMO (FW)	Bhadrak		
20	Dr. K. Mohapatra	ADMO (FW)	Koraput		
21	Dr. D. Nayak	RI Coordinators	Kandhamal	MBBS	9438677005
22	Dr. B. Mishra	RI Coordinators	Gajapati	BHMS, Health management	9438665692
23	Dr. A. Pattnaik	RI Coordinators	Malkangiri	BHMS, Health management	9438672485

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	Name of Participants	Designation	District of Posting	Qualification	Contact no.
24	Dr. A. Basantroy	RI Coordinators	Koraput	BHMS, Health management	9338382627
25	Jayant Pradhan	RI Coordinators	Bolangir	BSC, MA, PGDCA	9437522396
26	D.B. Das	RVS Coordinator	Balasore	BA, DIP. Material Management	9861172658
27	R.S. Pattanaik	RVS Coordinator	Ganjam	MBA	9438605329
28	R.K. Chand	RVS Coordinator	Koraput	BSC, MBA	9937785730
29	A.K. Mallick	RVS Coordinator	Kandhamal	BSC, LLB, DMM	9437825615
30	G.S. Pati	RVS Coordinator	Sundargarh	BA, CC in supply and LCM	9861853667
31	Bishnu Prasanna Tripaty	Cold Chain Tehnician	Balasore	IA, ITI	9437675595
32	Jibanlal Dandsena	Cold Chain Tehnician	Sambalpur	HSC, ITI	9937438073
33	Pradeep Das	Cold Chain Tehnician	Sundargarh	IA, ITI	9861819112
34	Avimanyu Mohanty	Cold Chain Tehnician	Koraput	IA, ITI	9437967359
35	Utpal Maity	Cold Chain Tehnician	Ganjam	HSC, ITI	9437160674
36	Baikuntha Bihari Beura	Cold Chain Tehnician	Cuttack	IA, ITI	9337872275
37	Lalatendu Das	Cold Chain Tehnician	Khurdha	IA, ITI	9437272316
38	Firoj mohan Majhi	Cold Chain Tehnician	Malkangiri	HSC, ITI	9438577032
39	Chinmay Ku. Sahu	Cold Chain Tehnician	Gajapati	HSC, ITI	9438298910
40	Manoranjan Mohapatra	Cold Chain Tehnician	Jagatsinghpur	HSC, ITI	9238592761
41	Khirod Biswal	Cold Chain Tehnician	Sonepur	ITI, Diploma	9438415617
42	Ratnakar Behera	Cold Chain Tehnician	Puri	IA, ITI	9437112409
43	Gajendra Tripathy	Cold Chain Tehnician	Kalahandi	IA, ITI	
44	Purna Chandra Mohapatra	Cold Chain Tehnician	Nayagarh	IA, ITI	9438377061
45	Ajay Ku. Pratihary	Cold Chain Tehnician	Jajpur	HSC, ITI	9861335908

B - Plan and groups for field exercise

Day 1

	Team 1	Team 2	Team 3	Team 4	Team 5	Team 6
Type of VS	SVS	DVS-1	DVS-2	BVS-1	BVS-2	BVS-3
Location of VS	Bhubaneswar	Cuttack	Khurda	Mahiderpada (CTC)	Balakati (Kh)	Balipatna(Kh)

Day 2

	Team 1	Team 2	Team 3	Team 4	Team 5	Team 6
Type of VS	BVS-1	BVS-2	BVS-3	SVS	DVS-1	DVS-2
Name of VS	Mahiderpada (CTC)	Balakati (Kh)	Balipatna(Kh)	Bhubaneswar	Cuttack	Khurda

Day 3

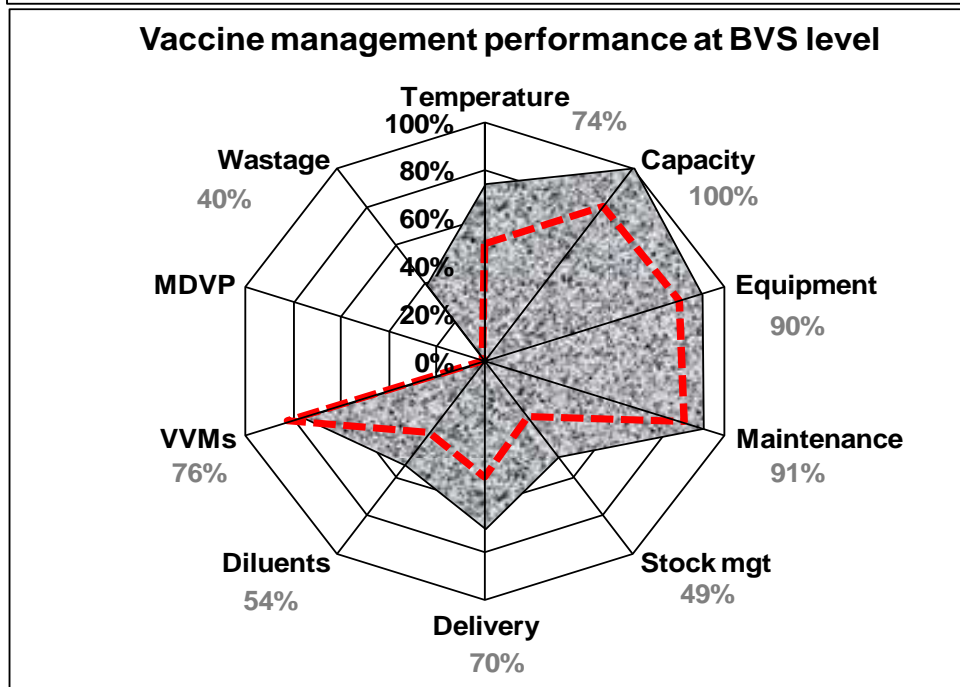
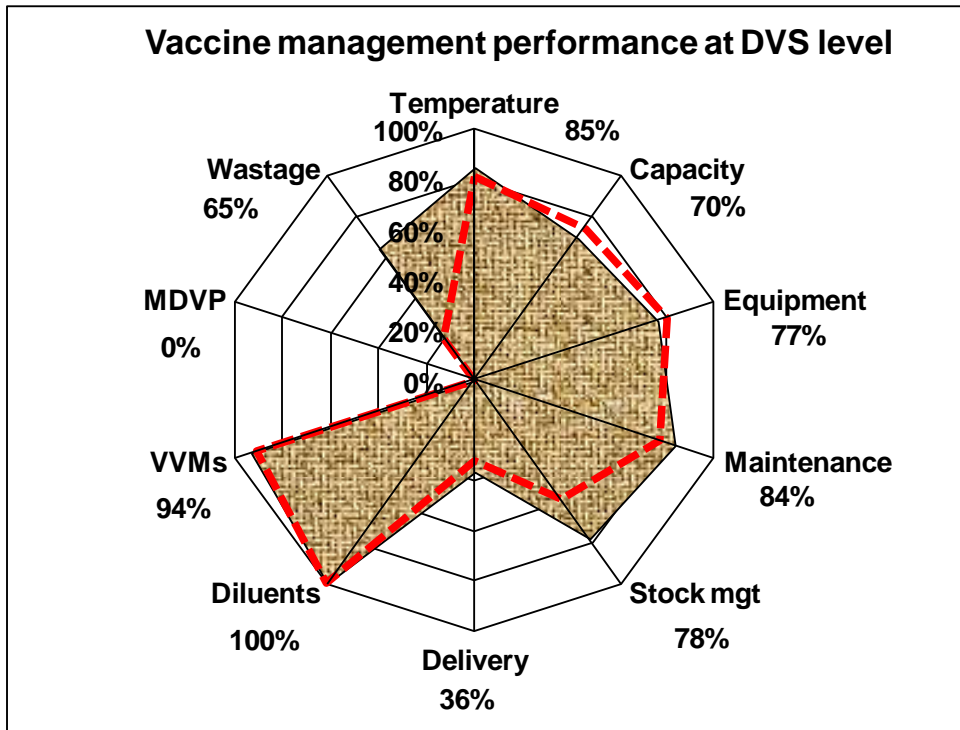
	Team 1	Team 2	Team 3	Team 4	Team 5	Team 6
Type of VS	BVS-2	BVS-3	SVS	DVS-1	DVS-2	BVS-1
Name of VS	Balakati (Kh)	Balipatna (Kh)	Bhubaneswar	Cuttack	Khurda	Mahiderpada (CTC)

Team No.	Team 1	Team 2	Team 3	Team 4	Team 5	Team 6
Team Leader	Dr. J. Mahananda - Bargadh	Dr. B. Mishra	Dr. A. Pattnaik	Dr. N. Acharya Jharsuda	Jayant Pradhan	Dr. A. Basantroy -
Asst. Team Leader	<i>RI-Coord Kandhamal</i>	<i>RI-Coord Gajapati</i>	<i>RI-Coord Malkangiri</i>	<i>RI-Coord Korapur</i>	<i>RI-Coord Bolangir</i>	<i>RVS-coord.- Ganjam</i>
	Dr. D. Nayak					<i>R. S. Patnaik</i>
<i>RVS-Coord</i>	D. B. Das- Balasore	R. K. Chand - Koraput	A. K. Mallik Kandhamal	G. S. Pati - sundergadh		
	CCT-Sambalpur	CCT-Sundergarh	CCT-Cuttack	CCT-Baleswar	CCT-Ganjam	CCT-Khurda
	CCT-Kalahandi	CCT-Koraput	CCT-Puri	CCT-Jajpur	CCT-Nayagarh	CCT-Gajapati
	CCT-Sonpur				CCT-jagatsinghpur	CCT-Malkangiri
Facilitators	S. C. Jena-CCO	S. Palo - CCC	P. Panigrahi - SVLM	P.K. Khandai-Foreman	R. C. Mohanty Foreman	<i>R. S. Patnaik</i>

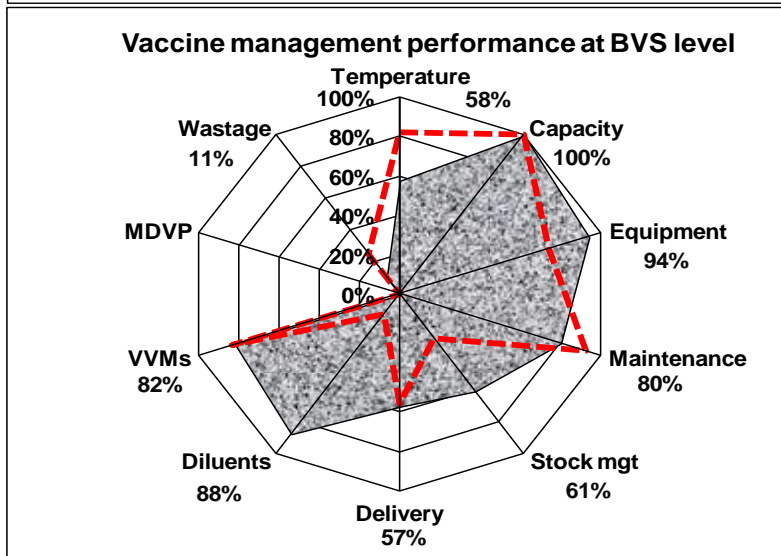
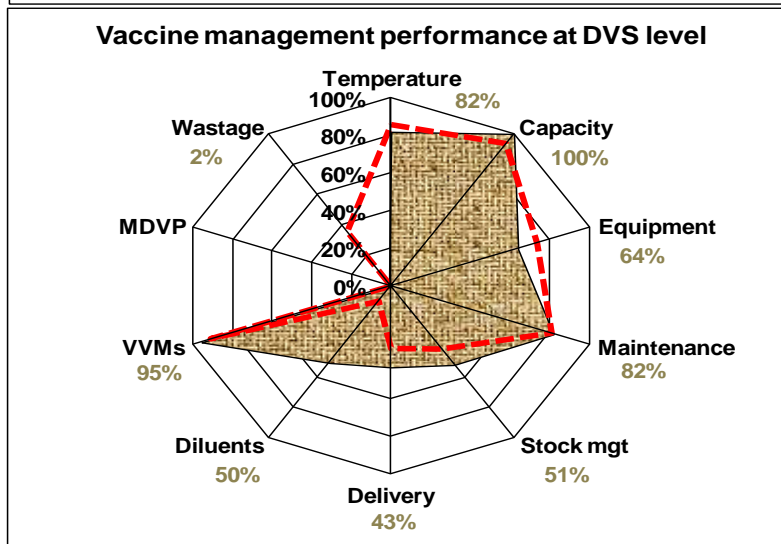
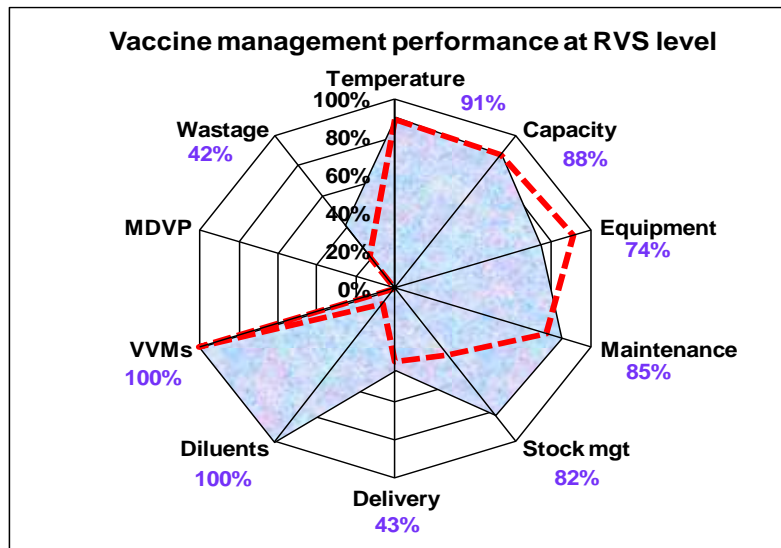
C - VMAT Assessment teams and Target Locations

Sl. No	RVS	Districts	Block	Team		
				Team Leader	Asst. Team Leader	Team Member
1	Koraput	Koraput	Laxmipur, CHC Boriguma		R.S.Pattanaik RVSC, Ganjam	Manoranjan Mohapatra, CCT Jagatsinghpur Ajay Ku. Pratihary, CCT Jajpur
			Dasmantpur Kundli			
		Nawrangpur	Dabugoan Papardahandi			
			Tentulikhunti Chandahandi			
2	Ganjam	Ganjam	Sergarh Bugurda	Dr. J. Mahananda ADMO-FW, Bargarh	G.S. Pati, RVSC, Sundargarh	Gajendra Tripathy, CCT, Kalahandi
			Kukurdakhandi, Khan ddauli			
		Gajapati	Mohana Gurandi			
			Guma, Raygarada			
3	Sambalpur	Sambalpur	Nakideul	Dr. D. Choudhury, ADMO-FW Sambalpur	Dr. B. Mishra, RIC, Gajapati	K.S.Patro, RVSC, Sambalpur, Utpal Maity, CCT, Ganjam
			Facimal			
			Lahirda Gorposh			
		Bargarh	Sohela Agalpur			
			Bhotli Bukuramunda			
		Deogarh	Telaibani Chatabar			
4	Sundargarh	Sundargarh	Sargipali	DMO-FW, Balasor	Jayant Pradhan, RIC, Bolangir	Jibanlal Dandsena, CCT, Sambalpur, Ratnakar Behera, CCT, Puri
			Mangaspur			
		Bordgoan Laing				
		Jharsuguda	Mundrajor Brajarajnar			
			Kulabira PPC			
5	Kandhamal	Kandhamal	Khajuriparad	ADMO- FW, Ganjar	Bishnu Prasana Tripathy, CCT, Balasore.	
			Phiringia Nougoan G.Udaigiri			
		Kalahandi	Jaipatana Junagarh			

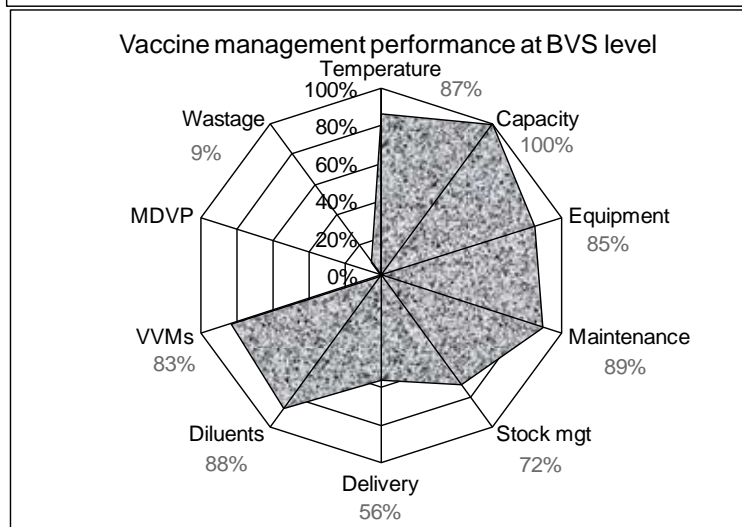
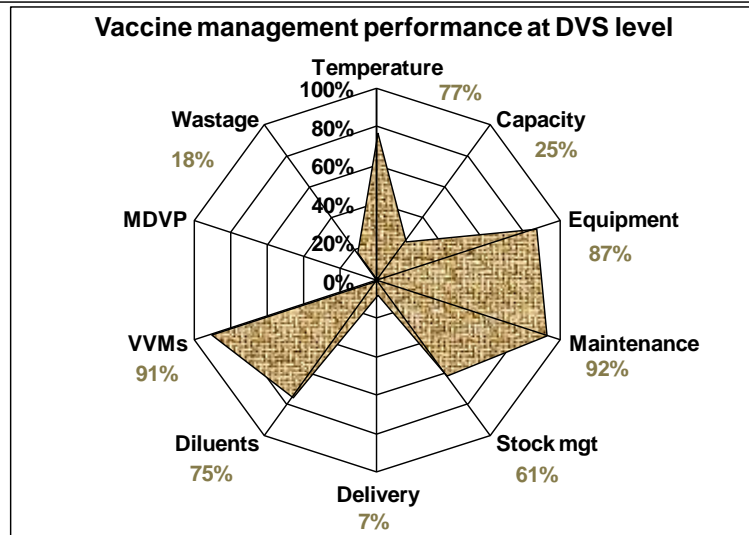
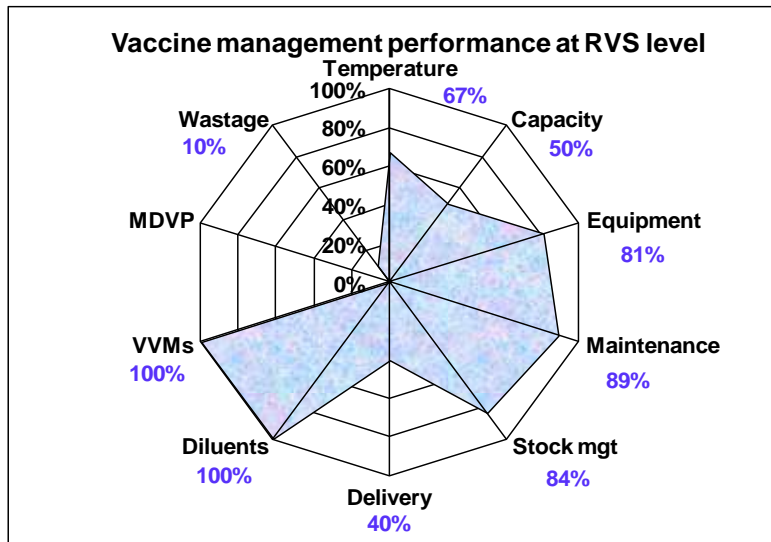
D1-Bubaneswar Region



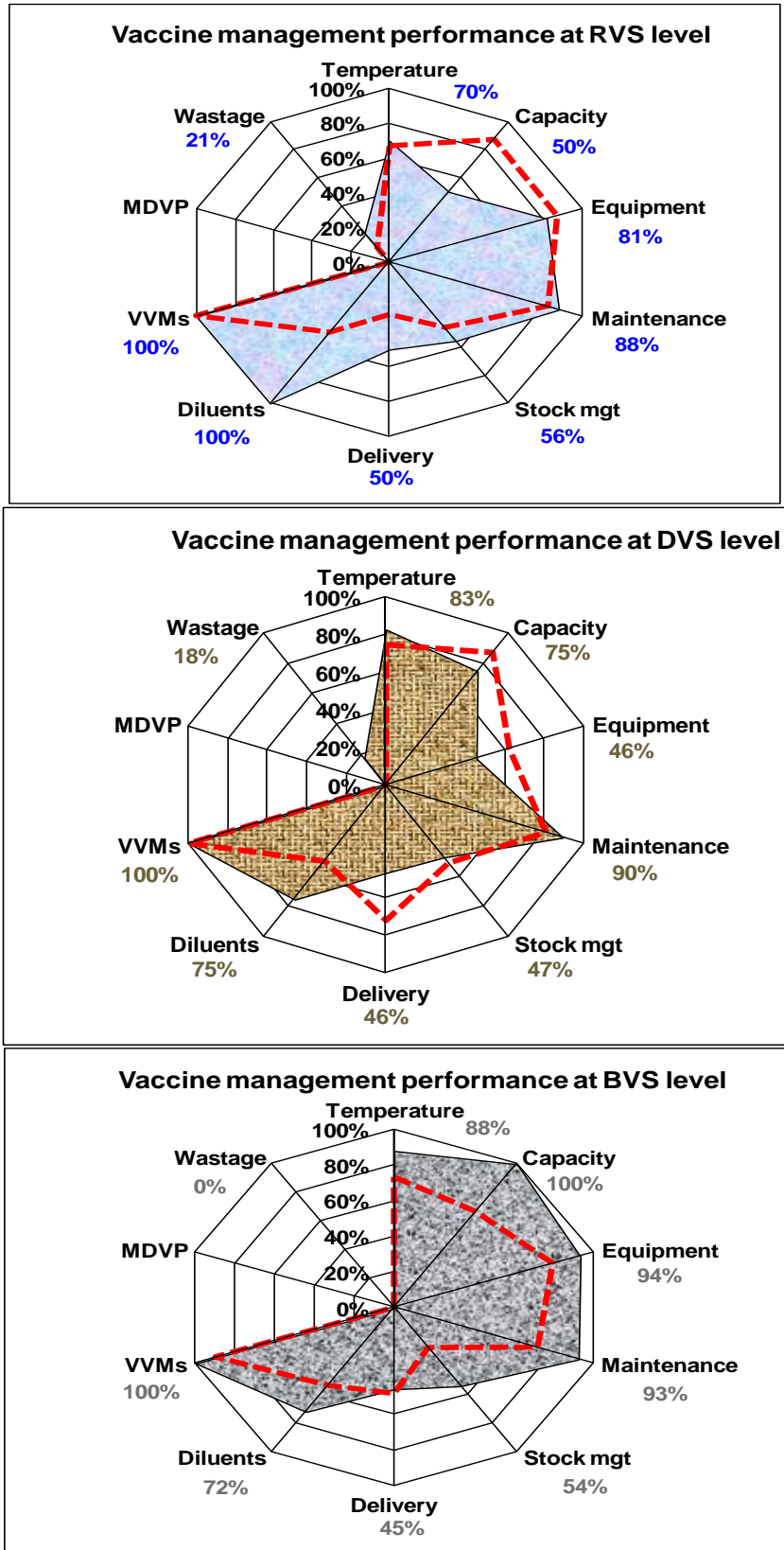
D2-Balasore Region



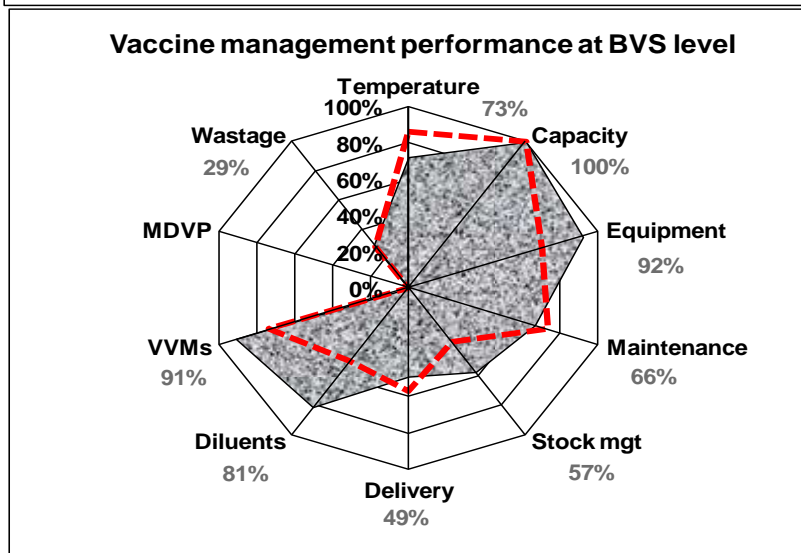
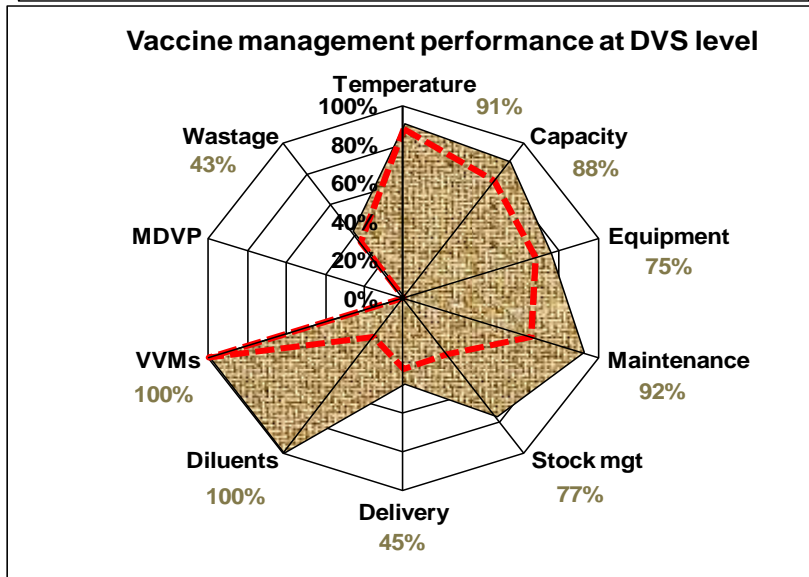
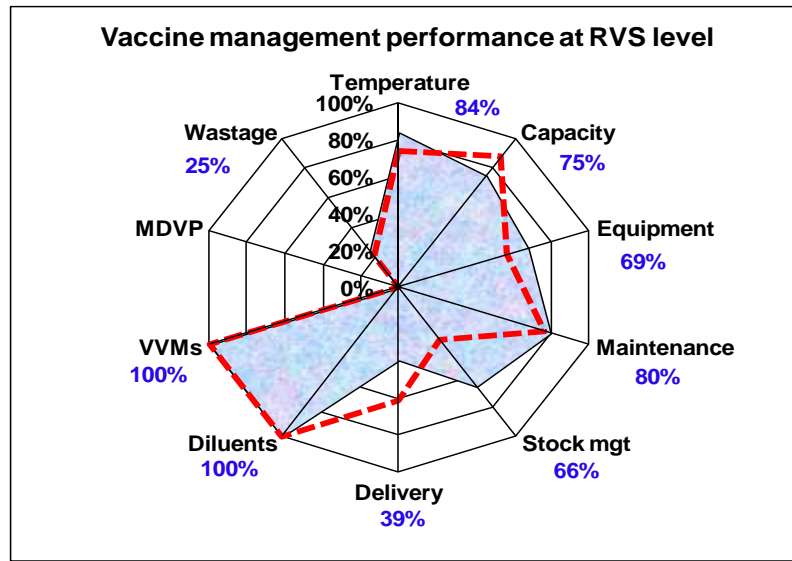
D3-Bolangir Region



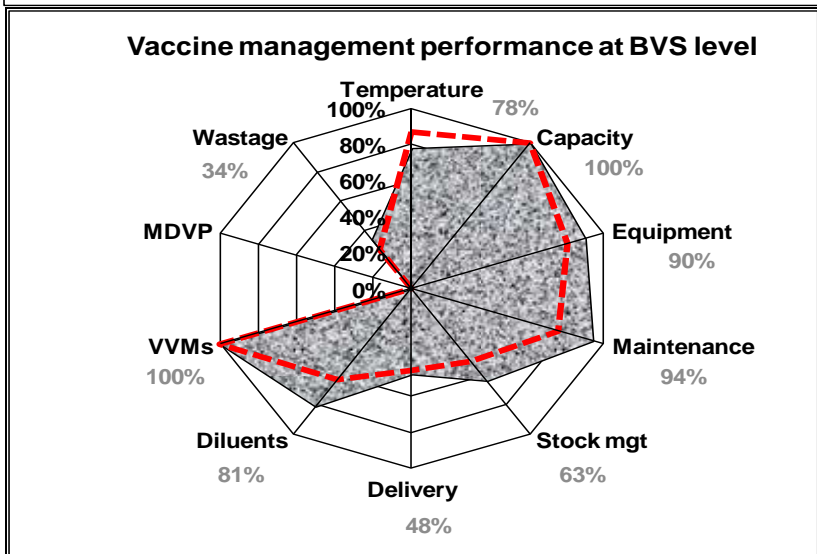
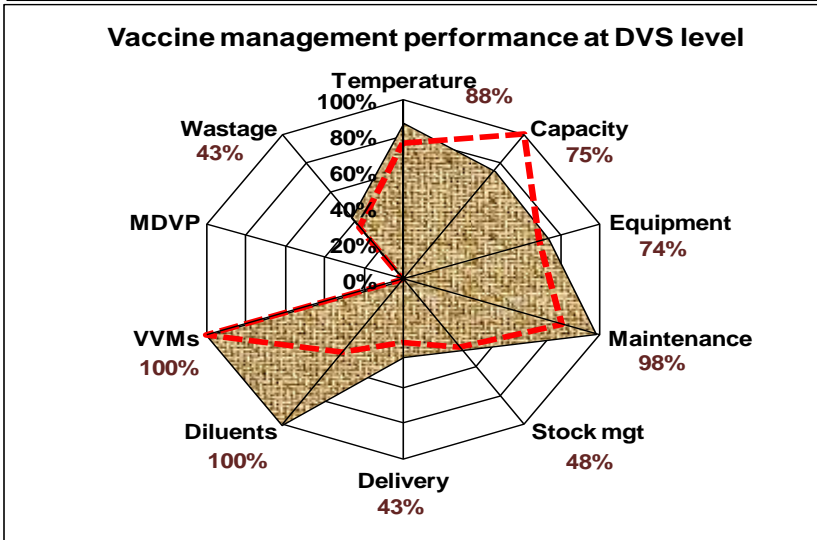
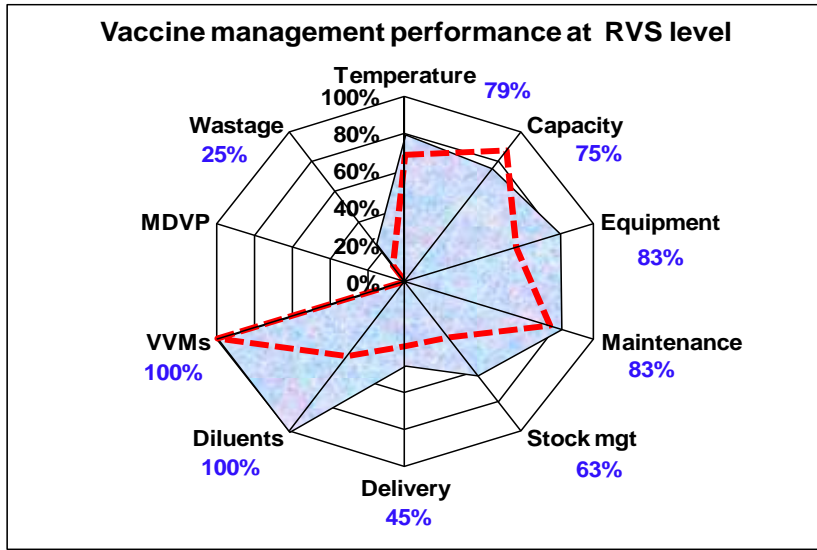
D4-Ganjam Region



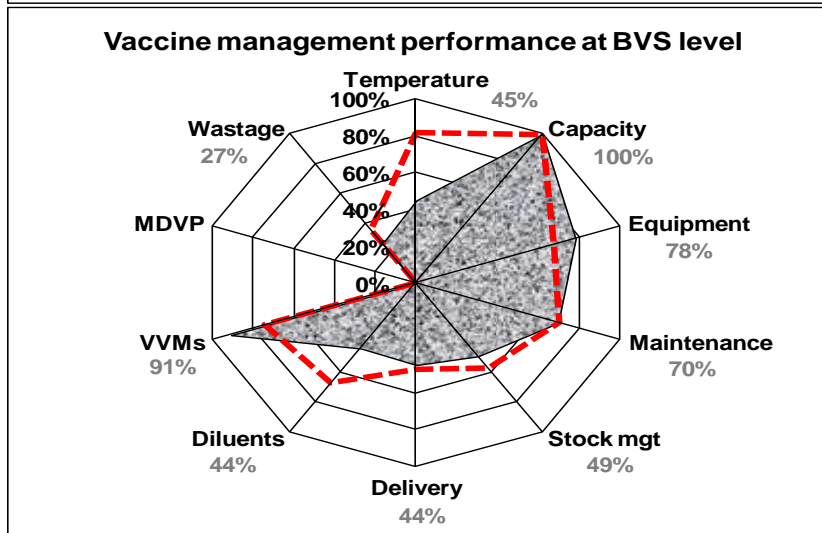
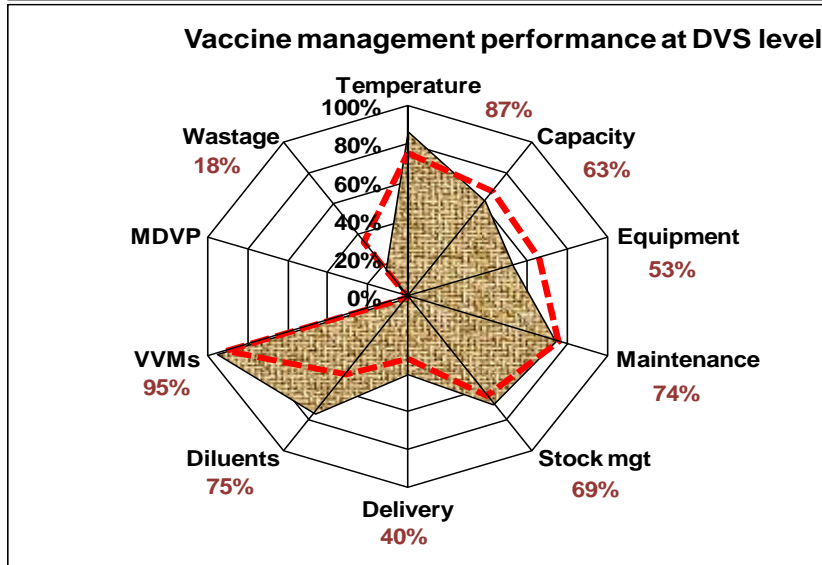
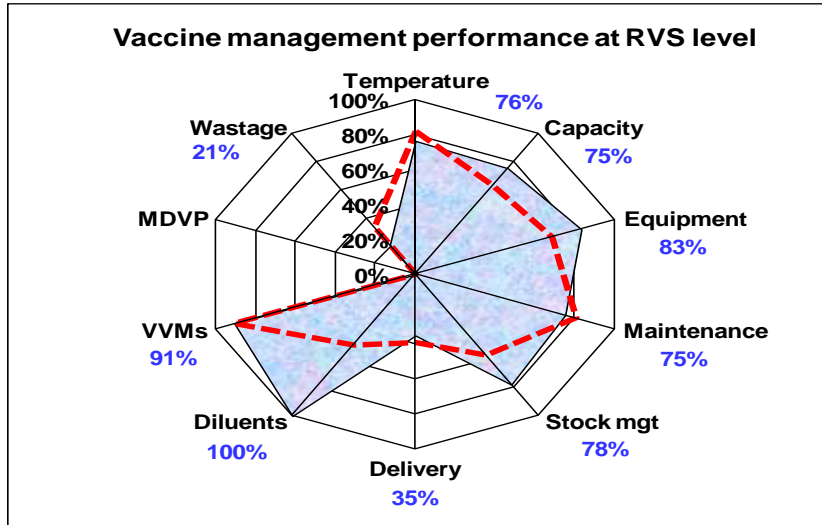
D5-Kandhamal Region



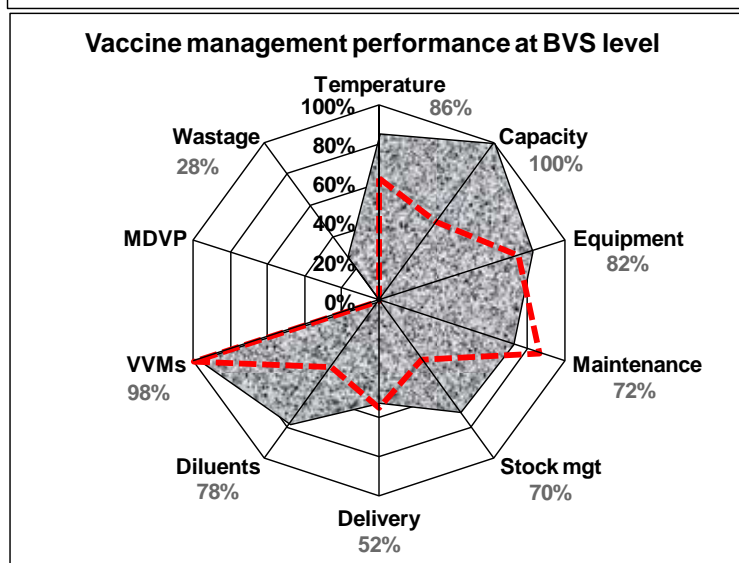
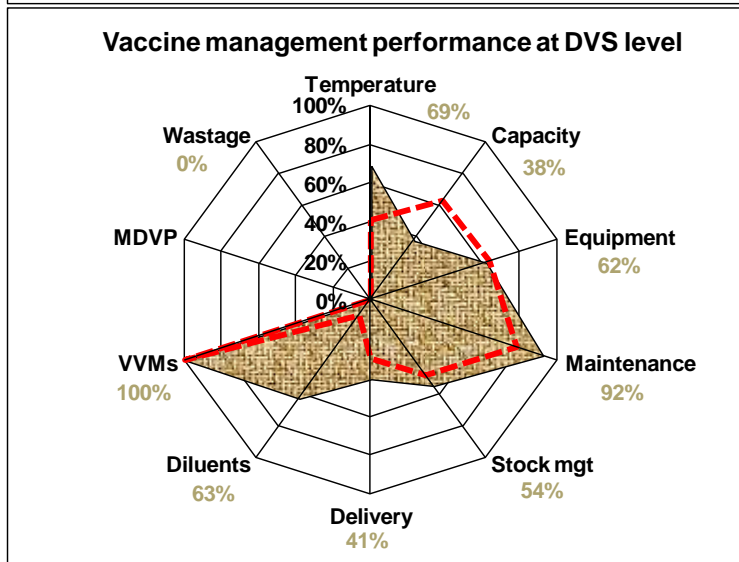
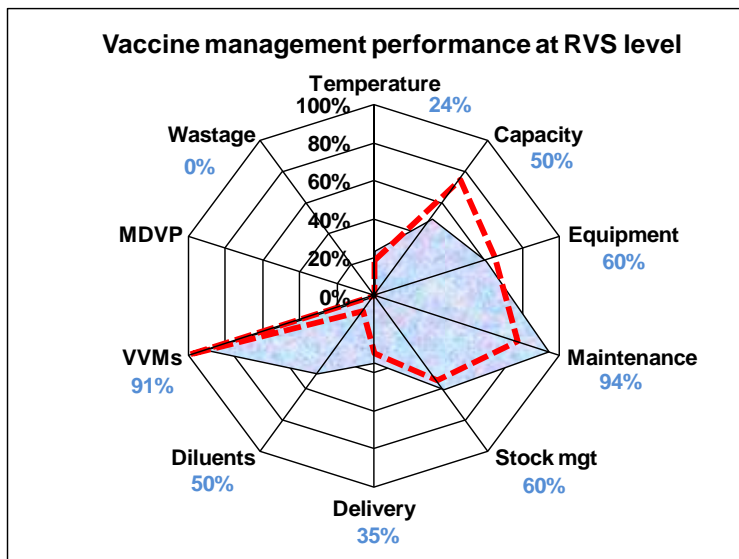
D6-KORAPUT Region



D7-Sambalpur Region



D8-Sundargarh Region



E-Indicator scores for all Regional, district and block level vaccine stores

		I. No.	1	2	3	4	5	6	7	8	9	10	11
		Indicator	VA process	Temperature	Capacity	Equip-ment	Maintenance	Stock mgt	Delivery	Dilutents	VVMs	MDVP	Wastage
SVS + RVS	Balangir	1	0%	67%	50%	81%	89%	84%	40%	100%	100%	0%	10%
	Balasore	1	0%	91%	88%	74%	85%	82%	43%	100%	100%	0%	42%
	BBSR	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Ganjam	1	0%	70%	50%	81%	88%	56%	50%	100%	100%	0%	21%
	Kandhamal	1	0%	84%	75%	69%	80%	66%	39%	100%	100%	0%	25%
	Koraput	1	0%	79%	75%	83%	83%	63%	45%	100%	100%	0%	25%
	Sambalpur	1	0%	76%	75%	83%	75%	78%	35%	100%	91%	0%	21%
	Sundergarh	1	0%	24%	50%	60%	94%	60%	35%	50%	91%	0%	0%
	Average	7	0%	70%	66%	76%	85%	70%	41%	93%	97%	0%	21%
DVS	Balangir	1	0%	77%	25%	87%	92%	61%	7%	75%	91%	0%	18%
	Balasore	2	0%	82%	100%	64%	82%	51%	43%	50%	95%	0%	2%
	BBSR	5	0%	85%	70%	77%	84%	78%	36%	100%	94%	0%	65%
	Ganjam	2	0%	83%	75%	46%	90%	47%	46%	75%	100%	0%	18%
	Kandhamal	2	0%	91%	88%	75%	92%	77%	45%	100%	100%	0%	43%
	Koraput	2	0%	88%	75%	74%	98%	48%	43%	100%	100%	0%	43%
	Sambalpur	2	0%	87%	63%	53%	74%	69%	40%	75%	95%	0%	18%
	Sundergarh	2	0%	69%	38%	62%	92%	54%	41%	63%	100%	0%	0%
	Average	8	0%	83%	67%	67%	88%	61%	38%	80%	97%	0%	26%
BVS level	Balangir	4	0%	87%	100%	85%	89%	72%	56%	88%	83%	0%	9%
	Balasore	4	0%	58%	100%	94%	80%	61%	57%	88%	82%	0%	11%
	BBSR	10	0%	74%	100%	90%	91%	49%	70%	54%	76%	0%	40%
	Ganjam	4	0%	88%	100%	94%	93%	54%	45%	72%	100%	0%	0%
	Kandhamal	4	0%	73%	100%	92%	66%	57%	49%	81%	91%	0%	29%
	Koraput	4	0%	78%	100%	90%	94%	63%	48%	81%	100%	0%	34%
	Sambalpur	4	0%	45%	100%	78%	70%	49%	44%	44%	91%	0%	27%
	Sundergarh	4	0%	86%	100%	82%	72%	70%	52%	78%	98%	0%	28%
AVERAGE	8	0%	74%	100%	88%	82%	59%	53%	73%	90%	0%	22%	

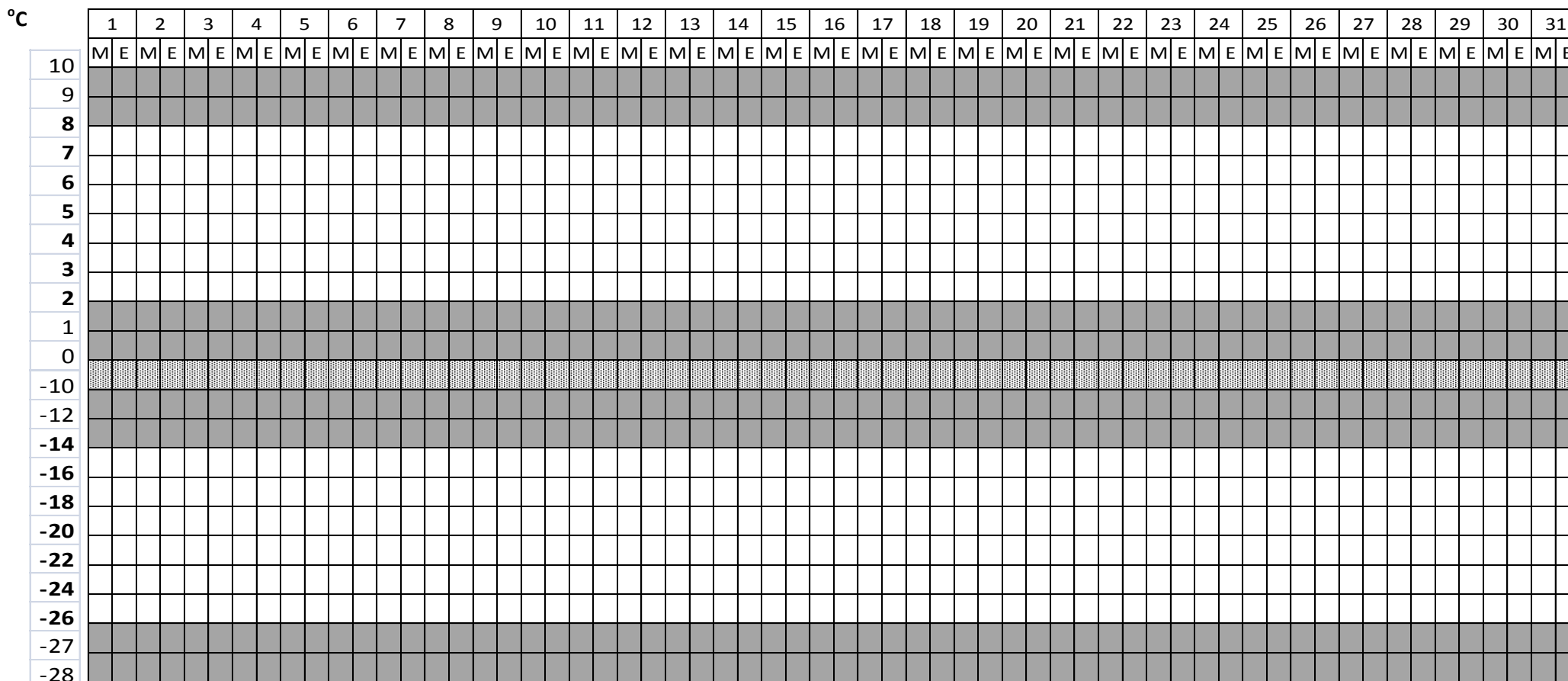
Colour codes : **Red**: scores less than 70% ; **Green** : scores greater than 90%.

Black : in between 70 and 90%.

F - Temperature monitoring sheet for Cold chain equipment operation

Vaccine Store name :	Unit Make:	Model no. No. :	Unit Type	Unit no.	MONTH:

Please put a dot corresponding to the temperature reading in the morning(M) and evening (E) and make a graph joining the dots



Recorded by :

Supervised By:

Supervisor's signature

Additional information regarding Cold Chain equipment operation

Date	Action taken	start	end	Remarks and details	Signature
Verified by :		Title:		Signature	

- Notes:**
- a) This page should be printed / copied on the back side of the temperature graph.
 - b) All special actions taken should be noted with details. c) At the end of the month, after verification, the temperature record should be filed and stored safely for at least 3 years.

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

Vaccine / diluent Batch card (A new card to be sued for each batch / lot of vaccine)						Vaccine Name :					
Consignment Arrival Details		Vaccine Details (Vials)		Diluent Details (Vials)		Max stock:					
Delivery No. :		Vial size :		Ampoule size :		Safety Stock:					
Date of arrival :		Batch No. :		Batch No. :		Status of Transport / monitors					
		Expiry date :		Expiry date :		Ice pack;					
Manufacturer :		Quantity :		Quantity :		Freeze Indicator:					
		Storage location :		Storage location :		Electronic Monitor					
Remarks :											
Vaccine issued / Received (Diluents if applicable is understood to be issued / received in same quantities as the vaccine)											
Date	Issued to / Received from	Voucher no.	Quantity in Vials / diluents			VVM				Remarks	Signature
			Issued / Received	Loss / Adjusted	Balance	1	2	3	4		

I- Benefits and difficulties of the VMAT exercise

Benefits

- ✓ Identified issues and solutions
- ✓ Better understanding on stock mgt
- ✓ 1 1 parameters of cold chain and vaccine mgt was learned
- ✓ Identified the wrong practices of the district of posting
- ✓ VMAT provided objectively for CM & VM
- ✓ Setting standard for VM & CM at all levels
- ✓ Provide scope for building capacity of CC & Vax handling in the dist.
- ✓ Priority of work in the field CM & VM
- ✓ Influence GOI for smooth/timely supply of vaccine logistics , cold chain equip, spare parts
- ✓ Help to work in a systematic way
- ✓ Confident to do Self assessment
- ✓ Funding for CCM & VM & funding distribution
- ✓ Help all to work together
- ✓ Better capacity building for better supervision
- ✓ Roles & Responsibilities are now clear for RVS & RI coordinator
- ✓ Better understanding of team work
- ✓ Better understanding of bad practices

Difficulties

- VMAT does not include system issues (admin,HR)
- Scoring clarification for all parameters and duration of training
- Need to incorporate AD syringe and other logistics
- ADMO(FW)s involvement in training +assessment
- 5 days trng needed
- Very difficult trng.