National Effective Vaccine Management Assessment

India, 2013

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National Effective Vaccine Management Assessment

India, 2013

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The contents of the report are based on observations of assessors in the field. Analysis and recommendations are a result of multiple consultative processes with assessors and various stakeholders.

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Foreword

It gives immense pleasure to present the National Effective Vaccine Management Assessment (EVM) report – 2013, which was done for the first time in the country at the national level.

The National Universal Immunization program of India is one of the largest programs of its kind in the World covering almost 27 million children in a year. Cold chain and Vaccine Logistics Management is the most crucial component for successful implementation of the program. UNICEF has been a key partner in the strengthening the National Universal Immunization Program at the national and state levels through various innovative approaches. EVM has been one of such innovative initiatives undertaken, to assess the cold chain and logistics management system at all levels. A conscious effort was made to follow all the steps recommended by the WHO/UNICEF EVM assessment tool (latest version).

This document provides a comprehensive situational analysis of the cold chain infrastructure, human resources, stock management and monitoring of cold chain and logistics. The study findings will become the basis for the strengthening the Cold Chain and Vaccine Logistics Management system in the entire country at various levels for the routine immunization program and also facilitate the introduction of newer vaccines in the coming years. The findings will also feed into the forthcoming National Cold Chain and Vaccine Logistics Action Plan (NCCVLAP), a guiding document for improving supply chain system in the country.

I am confident that National EVM Assessment report would bring sharper focus towards Cold Chain component of the National Immunization Program resulting in improvement in quality of the immunization services and will be used by Immunization Division, Govt. of India as a guiding document.

(Dr. Rakesh Kumar)

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Table of Contents

Foreword *iii*
Acknowledgement *iv*
Abbreviations and Glossary *vii*

Executive Summary **xi**

Chapter 1: Introduction and Objectives **1**
Introduction 1
Immunisation supply chain system in India 2
Rationale 6
Objective 7
Specific objectives 7

Chapter 2: Methodology **8**

Chapter 3: Study Results **11**
PART-1: Consolidated EVM scores 11
PART-2: State and store-wise EVM scores 13
PART-3: Criteria wise detailed observations and issues 14

Chapter 4: Detailed Recommendations **48**
A. Management and Policy 49
B. Human Resource 51
C. Infrastructure 51
D. Documentation, Planning and MIS 55
E. Capacity Building 56
F. Supportive Supervision and Improvement in Practices 57
Chapter 5: Development of Improvement Plan **59**
What is an EVM Improvement Plan? 59
Why IP is important? 59
How to prepare an IP? 60

Chapter 6: Summary of Key Issues and Recommendations **61**
Key Issues 61
Key Recommendations 63

Chapter 7: Way Forward **65**

Annexures **67**

Abbreviations and Glossary

°C	Degree Celsius
AD	Auto-disable (syringe)
AEFI	Adverse Effect Following Immunisation
AMC	Annual Maintenance Contract
AWB	Airway Bill
BCG	Bacilli Calmette Guérin (tuberculosis vaccine)
CB	Cold Box
CC	Cold Chain
CC&VLM	Cold Chain and Vaccine Logistics Management
CCE	Cold Chain Equipment
CCL	Cold Chain Logistics
CCO	Cold Chain Officer
CCT	Cold Chain Technician (Refrigerator Mechanic)
CFC	Chloro-fluoro-carbon (ozone depleting substance)
CHC	Community Health Centre
CI	Critical Indicator (in EVM)
CMC	Comprehensive Maintenance Contract
cMYP	Comprehensive Multi Year Plan
CPCB	Central Pollution Control Board
CSSM	Child Survival and Safe Motherhood
DF	Deep Freezer
DH & FW	Directorate of Health & Family Welfare
DIO	District Immunisation Officer
DivVS	Divisional and Zonal Vaccine Store
DPT	Diphtheria, Pertussis and Tetanus vaccine
DQA	Data Quality Assessment
DRCHO	District RCH Officer
DVS	District Vaccine Store
EEFO	Earliest Expiry First Out
EPI	Expanded Programme for Immunisation
EVM	Effective Vaccine Management
EVSM	(WHO-UNICEF) Effective Vaccine Store Management
FI	Freeze Indicator
FIFO	First In First Out
FW	Family Welfare

GAVI	Global Alliance for Vaccines & Immunisation
GMSD	Government Medical Supply Depot
GoI	Government of India
HepB	Hepatitis B vaccine
HF	Health Facility
HLL	HLL Lifecare Limited, formerly Hindustan Latex Limited
HQ	Headquarter
ICMR	Indian Council of Medical Research
ILR	Ice-lined refrigerator
IP	Improvement Plan (After EVM assessment)
ISC	Immunisation Supply Chain
ISP	Immunisation Strengthening Project
ITSU	Immunisation Technical Support Unit
J&K	Jammu & Kashmir (State)
JE	Japanese Encephalitis
LDL	Lowest delivery level store
M-CHIP	Maternal & Child Health Integrated Programme
MDVP	Multi Dose Vial Policy / Open Vial Policy (currently partially adopted in India)
MH	Maharashtra (State)
MO	Medical Officer
MoHFW	Ministry of Health & Family Welfare of Govt. of India
MP	Madhya Pradesh (State)
MyP	Multi-year Plan
NCCMIS	National Cold Chain Management Information System
NCCTC	National Cold Chain Training Centre
NCCVMRC	National Cold Chain Vaccine Management Resource Centre
NIHFW	National Institute of Health & Family Welfare
NPSP	National Polio Surveillance Project
NRHM	National Rural Health Mission
OPV	Oral Polio Vaccine
OVLMS	Odisha Vaccine Logistics Management System
PHC	Primary Health Centre
PIP	Project Implementation Plan
PNA	Performance Need Assessment (Survey for Immunisation)
PPM	Planned Preventive Maintenance
PR	Primary store
ProMIS	Procurement Management Information System
PWD	Public Works Department
RCH	Reproductive and Child Health
RI	Routine Immunisation
RM or RT	Refrigeration Mechanic / Refrigeration Technician
RVS	Regional Vaccine Store
SCCO	State Cold Chain Officer
SD	Service Delivery (Point)
SEPIO	State EPI Officer

SHTO	State Health Transport Organisation (of Maharashtra Government)
SN	Sub-national store (zone, divisional or regional store-RVS)
SOP	Standard Operating Procedure
SR	Sickness Rate (Of Cold Chain Equipment)
SVS	State Vaccine Store
TN	Tamil Nadu (State)
TT	Tetanus Toxoid
UHC	Urban Health Centre
UIP	Universal Immunization Programme
UNICEF	United Nation's Children Fund
UP	Uttar Pradesh (State)
USAID	U.S. Agency for International Development
UT	Union Territory
VAR	Vaccine Arrival Report
VLM	Vaccine Logistics Manager
VLMIS	Vaccine Logistics Management Information System
VM	Vaccine Management
VMA	Vaccine Management Assessment – Tool
VS	Vaccine Store
VVM	Vaccine Vial Monitor
WB	West Bengal (State)
WHO	World Health Organization
WIC	Walk-in-Cooler (Cold room)
WIF	Walk-in-Freezer (Freezer room)

Executive Summary

Background

India has one of the largest immunisation programmes in the world, catering to nearly 27 million infants and 30 million pregnant women annually. Under National Rural Health Mission (NRHM), Ministry of Health and Family Welfare (MoHFW) has taken many initiatives to improve health systems and immunisation outcomes. For cold chain (CC) strengthening, MoHFW, with technical assistance from UNICEF, has established National Cold Chain and Vaccine Management Resource Centre (NCCVMRC) at National Institute of Health and Family Welfare (NIHFW), Delhi and National Cold Chain Training Centre (NCCTC) at State Health Transport Organisation (SHTO), Pune. In addition, MoHFW has launched National Cold Chain Management Information System (NCCMIS) for real time monitoring and management of CC systems.

Over the years, MoHFW, with UNICEF support, has identified gaps in CC infrastructure, human resources, stock management and monitoring of cold chain and logistics (CCL). Since 2007, systematic assessments were conducted in 10 states and one national vaccine store using the WHO/ UNICEF global tool i.e., Vaccine Management Assessment Tool (VMAT), later updated to Effective Vaccine Management (EVM) tool in 2010.

MoHFW officials, while interacting with global experts at a regional EVM workshop held at Kathmandu in August 2012, realised the need for a national EVM assessment. The major reasons were the slow process of state wise assessments; lack of assessment of national stores i.e., Government Medical Supply Depots (GMSDs) and need for development of National Cold Chain and Vaccine Logistics Action Plan (NCCVLAP) based on the recommendations of a national level assessment. Thereafter, the current study was conducted by NCCVMRC/ NIHFW with UNICEF support during February to April 2013.

Objective

The overall objective of the initiative was to identify gaps in the cold chain and vaccine logistics management (CC&VLM) system at all levels in order to strengthen the system based on the recommendations of the study through development of Improvement Plans (IP). Systematic development of NCCVLAP would help in standardisation of policies, processes and practices, required for an efficient, reliable and affordable Immunisation Supply Chain (ISC) system.

Methodology

The national EVM assessment followed all the steps recommended by the WHO/ UNICEF EVM assessment tool version 1.0.5 as mentioned below.

Sampling: As a first step, all the four GMSDs were selected. Then all the 36 states/Union Territories (UTs) catered by the GMSDs were listed. Out of these, 10 states were selected based on three criteria: 1. Introduction of pentavalent vaccine; 2. EVM not conducted in the last two years and 3. Representation of all geographical areas of the country. Then the districts and health facilities (HFs) were selected through systematic random sampling using the EVM sampling tool. The sites covered during National EVM assessors training (Delhi state vaccine store (SVS), Gurgaon regional vaccine store (RVS), Faridabad and Gurgaon district vaccine stores (DVS) and Gurgaon Primary Health Centre - PHC) were also added to the study sample. The total sample size was as follows:

Table 1: Total sample size

Govt. Medical Store Depot (GMSD)	State Vaccine Store (SVS) / Regional Vaccine Store (RVS)	Divisional Vaccine Store (DiviVS)	District Vaccine Store (DVS)	Health Facility (HF)	Total No. of Vaccine Stores and HFs
4	16	14	28	52	114

EVM training: Amongst officers from MoHFW, NIHFW, GMSDs, state governments, UNICEF, World Health Organization (WHO)-India National Polio Surveillance Project (NPSP), Immunisation Technical Support Unit (ITSU) and Maternal & Child Health Integrated Programme (M-CHIP), 41 national assessors (experts in immunisation/CC and vaccine management) were identified. All the assessors were trained at NIHFW for five days (04-08 March, 2013) by a team of facilitators from partner agencies including one international consultant. During the 3/5 day training, participants visited Delhi and Haryana vaccine stores to practice the EVM tools.

Field assessment and data collection: A total of 27 teams were formed, each comprising of two national assessors, joined by additional persons like a data handler and a Cold Chain Technician (CCT) in some assessment sites. Data was collected and filled in the EVM tool in excel sheet. Each team prepared a summary of major issues and recommendations for the sites/states visited.

Exercise of data consolidation, validation and analysis was conducted at the national level with select team leaders to arrive at common priority issues across the states. This was followed by national recommendations of the study.

The state level officers along with the study team leaders were called to NIHFW for debriefing and preparation of improvement plans.

Salient findings of the study

These are based on the analysis of a few critical questions selected by the facilitation team. The tables below depict the summary of consolidated EVM scores for the indicators clubbed into nine criteria and seven categories. As per WHO recommendation, the individual scores

Table 2: Summary of consolidated EVM criteria indicator scores

S.N.	Criteria	Consolidated Scores					
		GMSD (4)	SVS/ RVS (18)	DiviVS (14)	DVS (28)	HF (52)	National Average
1	Vaccine Arrival Process	52%	34%	NA	NA	NA	43%
2	Vaccine Storage Temperature	37%	43%	46%	71%	70%	54%
3	Storage Capacity	71%	66%	46%	57%	76%	63%
4	Building, Cold Chain Equipment & Transport	65%	64%	69%	70%	75%	69%
5	Maintenance & Repair	59%	61%	59%	58%	49%	57%
6	Stock Management	57%	56%	49%	46%	45%	51%
7	Distribution	24%	41%	39%	42%	77%	45%
8	Vaccine Management Practices	29%	50%	35%	47%	67%	46%
9	MIS & Supportive Functions	50%	65%	52%	58%	0%	56%

Red - <60%, Black – 60-79% and Green - >80%

should be more than 80% for a satisfactory performance.

Table 1 shows that all the criteria indicator scores were below 80%. However, HFs scored better as compared to the upper level of stores with regard to vaccine storage temperature, storage capacity, vaccine distribution and management practices. The majority of the indicators were less than 60% (27/41 scores), reflecting serious concerns. The rest of the indicators (14/41) had scores between 60-79%, suggesting further improvement to reach the 80% level.

Category scores influence criteria scores. All category scores in Table 2 were below 80% except for storage facility at HF level (88%). HFs scored better compared to the upper level of stores for building, storage capacity, equipment and training of the staff. About half of the indicators (16/34) scored less than 60%, reflecting serious

Table 3: Summary of consolidated EVM category indicator scores

S. N.	Criteria	Consolidated Scores					
		GMSD (4)	SVS/ RVS (18)	DiviVS (14)	DVS (28)	HF (52)	National Average
1	Building	60%	69%	69%	61%	78%	70%
2	Capacity	70%	69%	46%	61%	88%	73%
3	Equipment	71%	61%	70%	75%	71%	71%
4	Management	43%	45%	40%	43%	51%	47%
5	Repair & Maintenance	59%	57%	59%	57%	49%	54%
6	Training	57%	74%	69%	76%	75%	73%
7	Vehicles	42%	56%	52%	52%	NA	53%

Red - <60%, Black – 60-79% and Green - >80%

concerns, while the remaining 17 scored 60-79% suggesting further improvement to reach the 80% level. In addition, categories like management, repair and maintenance and vehicles scored below 60% across all levels.

Rajasthan, Madhya Pradesh (MP) and Kerala had better scores as compared to the other states. Good performance of Rajasthan and MP could be explained due to the vaccine management assessment conducted two years back followed by implementation of several strategies through the Implementation Plan (IP) developed after the EVM assessment.

Key Issues dentified

EVM as a diagnostic tool identified the gaps in the CC &VLM and the key issues were organised under the nine EVM criteria as follows:

1. Pre-shipment and Arrival Procedures

- Lack of national guidelines and standards for Vaccine Arrival Report (VAR) and its use.
- Lack of analysis of information collected by the vaccine stores on arrival of vaccine at all levels.
- Absence of software feature to generate VAR in Procurement Management Information System (ProMIS)/Vaccine Logistics Management Information System (VLMIS).

2. Vaccine and Diluent Storage Temperatures

- Manual temperature records showed little variation, which suggested need for further verification. Events of defrosting/repair/power outages were not recorded. Moreover, no supervisory comments were found in 70/114 facilities visited.
- Good quality (validated/calibrated) thermometers were not found in most locations.
- In over 70% of the bulk vaccine storage sites (divisional and above), continuous temperature monitoring system (Graphic Chart Recorder/Data Loggers) was dysfunctional due to faulty equipment/no consumables (charts, ink, fiber tip pens)/no internet connection for wireless data loggers.
- Only 30% sites (lowest of 14% in DiviVS) had a supervisory review of temperature recording book followed by corrective action.
- Temperature monitoring was not done over weekends/holidays.
- The booklet for manual temperature recording was not available in the majority of the vaccine stores.
- The manual temperature recording did not match with the 24x7 continuous temperature recording.

3. Capacity of Cold chain, Dry storage and Transport

- Shortage of vaccine storage space for $+2^0$C to $+8^0$C was found at all levels except in PHCs.
- GMSDs Kolkata, Chennai and Karnal required augmentation of storage space in addition to all SVS and 24 DVS assessed.
- Performance scores were below 80% in 23/28 DVS.
- Dry storage space was found inadequate at all levels.
- Many new Walk-in-Coolers (WICs)/ Walk-in-Freezers (WIFs) supplied by Government of India (GoI) to the states were either not installed or not functional.
- There was no online/offline system at vaccine stores to suggest how many more vaccines of different types could be accommodated at the facility.

4. Status of Buildings, Equipment and Transport

- The majority (12/16 states and 15/28 districts) of vaccine store buildings, equipment and transport indicators scored below 80%.
- The majority (98/114) of the vaccine store buildings in most of the states scored below the acceptable 80% level.
- Dry storage space especially in GMSDs, SVS and DiviVS was found to be inadequate, not climate compatible and not easily accessible.
- More than 45% of the vaccine stores at the divisional level and above did not have proper (standard) thermometers and continuous temperature records.
- Voltage stabilisers were missing for around half of Ice Lined Refrigerators (ILRs)/Deep Freezers (DFs).
- A functional alarm system was available in less than 50% WICs/WIFs.
- Only 36% of the DiviVS, 44% of the SVS and 56% of the DVS had functional communication links (telephone and internet).
- A functional generator with enough fuel was found in 43% SVS, 49% DVS and 57% DiviVS.
- Vaccine transport facilities were not available in 24% and were inadequate in 44% vaccine stores at the district level and above.

5. Maintenance of Buildings, Equipment and Transport

- The average score for Planned Preventive Maintenance (PPM) was 19% for the buildings and 34% for the equipment.
- There was no uniformity across the country regarding Annual Maintenance Contracts (AMCs)/ Comprehensive Maintenance Contracts (CMCs)/ PPM for the equipment.
- The majority of the WICs of GMSDs, state and divisional vaccine stores were more than 20 years old and concrete cold rooms in GMSDs even up to 50 years old.
- CC sickness rate was very high for ILR and DF in Bihar, Uttar Pradesh (UP), Madhya Pradesh (MP), Rajasthan and Chhattisgarh.

6. Stock Management System & Procedures

- Lack of standard vaccine management records (for indent, stock and issue) at all levels including GMSDs.
- All levels of vaccine stores did not define a maximum and minimum level for vaccines and diluents.
- All key parameters of vaccines and diluents were not recorded.
- Lack of recording of damaged or expired vaccines and their disposal as per Central Pollution Control Board (CPCB) guidelines.
- Internal reviews of vaccine loss were rarely carried out.
- Stock-out of vaccines (lasting several weeks) was found at all levels.
- Real time monitoring of vaccines was missing due to lack of online vaccine management system.

7. Effective Distribution between Each Supply Chain Level

- Distribution reports did not reflect the planned delivery schedule.
- The deliveries were not taking place in a timely manner (the maximum performance score was only 25%).
- Incorrect conditioning of ice packs and packing of cold boxes (CBs) was seen at GMSD, SVS and DiviVS, which validates the findings of the Indian Council of Medical Research (ICMR) temperature monitoring study.

- Freeze indicators were not used with every transport, which validates the ICMR study findings of exposure of vaccines to sub-zero temperatures during transportation.
- All vouchers did not have information on Vaccine Vial Monitor (VVM) status and much other required information.
- Contingency plans to manage emergencies during transport were not found in most locations.

8. Vaccine Management and Handling

- Though knowledge and use of VVM was excellent at all levels, knowledge and use of the "shake" test was not up to the mark.
- Only three out of 28 districts had a good reporting system for vaccine wastage that was being used for planning.
- The system of collection and disposal of sharps and syringes was poor.
- The disposal of vaccine vials was not practised across all levels.

9. MIS and Supportive Management Functions

- The quality of CC and vaccine management training material was found to be good.
- Evidence based method was not used for vaccine and syringe forecasting.
- Vaccine wastage data was not being used as it was not recorded and reported.
- Departmental technicians were responsible for equipment maintenance in the majority of the stores.

Key Recommendations

The recommendations to address the identified issues are organised under five heads: Management and policy; Human resource and capacity building; Infrastructure; Planning, documentation and MIS; Supportive supervision and improvement in practice. An improvement plan to strengthen the CC and the vaccine logistics system needs to be developed through a consultative process and should be implemented through annual health Project Implementation Plan (PIP) of the state and district.

1. Management and Policy

- Introduce VAR system for vaccine stores receiving vaccines directly from manufacturers.
- Implement real time VLMIS for all five levels of the supply chain. Integrate National Cold Chain Management Information System (NCCMIS) with VLMIS.
- Separate the two vaccine stores working from the same building (e.g., state/regional, regional/district, divisional/district) to avoid using the same equipment, reporting and managing the same set of documents and staff.
- Develop NCCVLAP.

2. Human Resource and Capacity Building

- Assign dedicated staff for CC&VLM at each level at least up to the district level.
- Designate a vaccine logistics manager (VLM) and a CCT for each GMSD and SVS.
- Train the existing staff of GMSD on data management.
- Assign semi-skilled helpers or electricians for 24x7 operations and monitoring of the cold rooms.
- Develop a training package for the VLMs and the immunisation programme managers and ensure their placement as required, to overcome attrition.

- Review knowledge and skill gaps to plan appropriate training and supportive supervision mechanisms.
- Provide regular orientation, once every three years for all staff on vaccine logistic management.

3. Infrastructure

a. Building

- Ensure dedicated stores for state, division, district and HFs.
- Consider the future need and long term planning as per national standards.
- Encourage regular coordination with PWD, electricity and municipal corporation/bodies or AMCs for regular maintenance.

b. Equipment

- Improve equipment specifications as per global standards.
- Minimise a variety of equipment to reduce the number of spare parts.
- Ensure that all WICs/WIFs have functional acoustic alarms and
- Conduct mapping of spare parts to repair non-functioning equipment (Solar, Haier, Blue Star, others).

c. Transport

- Ensure use of conditioned ice-packs during vaccine transportation.
- Promote the use of refrigerated vaccine vans at the district level and above.

d. Temperature Monitoring

- Develop a national temperature monitoring policy for different levels of vaccine stores.
- Undertake calibration of temperature monitoring devices.
- Undertake temperature mapping of cold rooms regular intervals.
- Ensure the use of freeze tags/freeze alert devices during transportation of vaccines.
- Use 30 days temperature recording devices and review temperature performance regularly.

4. Planning, Documentation and MIS

- Define a realistic stock level in months at all five-supply chain levels.
- Define, print and distribute standard vaccine stock registers in line with VLMIS.
- Ensure vaccine indent and distribution plans based on the required peak stocks.
- Develop a PPM for CCE by CCTs.
- Use regular data uploading in NCCMIS for performance assessment of CC at all levels.
- Establish a system for recording wastage in vaccine registers.

5. Improvement in Practice and Supportive Supervision

- All staff to practice manual temperature monitoring and recording twice daily, on all seven days including holidays.
- Maintain a service log sheet for each equipment. This can be done as part of the temperature-monitoring booklet, and should record power outages and the tasks undertaken during preventive maintenance.
- Diluents MUST be marked in the supply voucher and should be recorded just as the vaccines are recorded in stock registers.
- At Community Health Centres (CHCs) and PHCs, the deep freezers must be used exclusively to prepare ice packs. Vaccines must never be stored in the same unit.
- All vaccines should be kept in ILRs at the CHC and PHC.
- Always use standard ice packs, after correct conditioning (splash sound of water when shaken).

Way Forward

The CC&VLM system and the immunisation programme as a whole needs to be revitalised in order to improve the immunisation coverage and performance. A comprehensive list of recommendations has been provided to address the weaknesses that are responsible for the current performance of the immunisation programme. The following three tasks need to be performed as a priority:

1. Share EVM recommendations with national and state officers, as well as development partners at various levels.
2. Prepare IPs (national & state) in a consultative process based on EVM assessment findings and recommendations.
3. Implement IP and regular review of implementation status (also link with PIP submission).
4. Prepare National Cold Chain and Vaccine Logistics Action Plan with a long term vision that should guide strengthening of immunisataion supply chain system of the country.

Chapter 1

Introduction and Objectives

Introduction

India has one of the largest immunisation programmes in the world, catering to nearly 27 million infants and 30 million pregnant women annually. Immunisation services are delivered through about 29,000 health facilities (HFs) in 640 districts of 36 states/Union Territories (UTs). These HFs are equipped with cold chain equipment (CCE) i.e., ice lined refrigerators (ILRs) and deep freezers (DFs) to store vaccines at recommended temperatures. They further provide vaccines and supplies to about 150,000 sub-centre sites. India spends over Rs. 2.6 billion per year in immunisation programmes for immunising children against vaccine preventable diseases, including polio eradication, where it has maintained zero polio case for the last two years.

The Expanded Programme on Immunisation (EPI), a national programme for immunising all children during the first year of life with Diphtheria, Pertussis and Tetanus (DPT), Oral Polio Vaccine (OPV), Bacilli Calmette Guérin (BCG) and typhoid–paratyphoid fever vaccines was launched in 1978. In 1985, the name of EPI was changed to the Universal Immunisation Programme (UIP) to cover all districts in a phased manner by 1990. One of the objectives was to re-establish a reliable cold chain (CC) system till the HF level and to achieve self-sufficiency in vaccine production. UIP became a part of Child Survival and Safe Motherhood (CSSM) programme in 1992, Reproductive and Child Health (RCH) programme in 1997 and National Rural Health Mission (NRHM) in 2005.

Under NRHM, Ministry of Health and Family Welfare (MoHFW) has taken many initiatives to improve health systems and immunisation outcomes. For CC strengthening, MoHFW has established National Cold Chain and Vaccine Management Resource Centre (NCCVMRC) at National Institute of Health and Family Welfare (NIHFW), Delhi and National Cold Chain Training Centre (NCCTC) at State Health Transport Organisation (SHTO), Pune with technical support of UNICEF. In addition, MoHFW has launched National Cold Chain Management Information System (NCCMIS) for real time monitoring and management of CC systems.

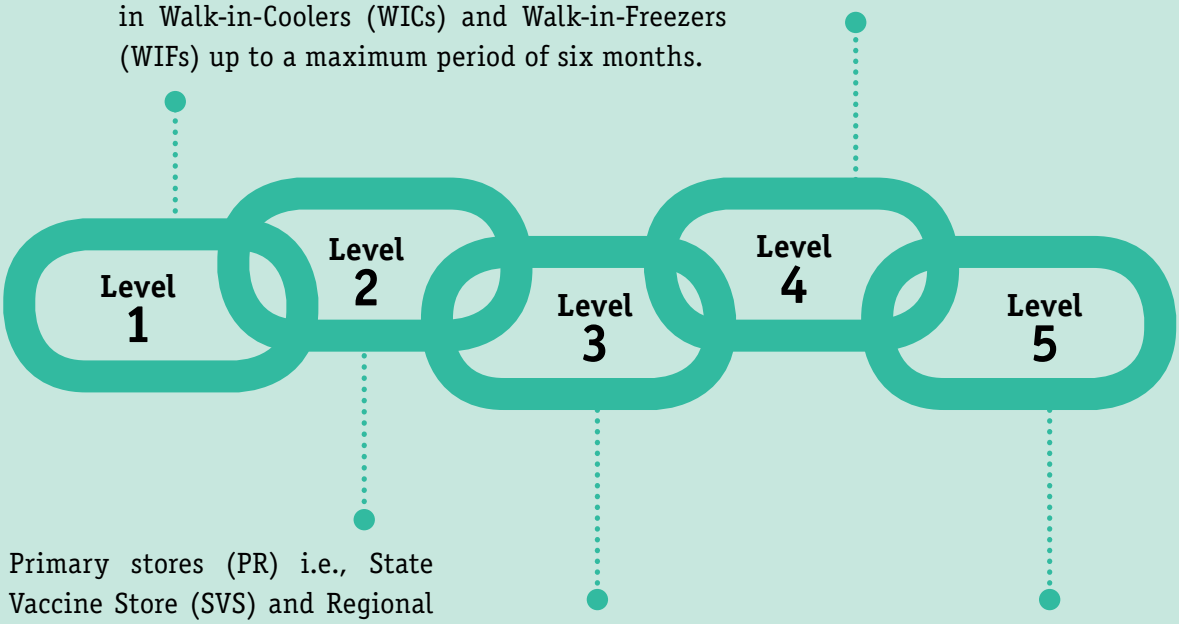
Over the years, MoHFW, with UNICEF support, has identified gaps in CC infrastructure, human resources, stock management and monitoring of CC and logistics. Since 2007, systematic assessments were conducted in 10 states and one national vaccine store using the WHO/UNICEF global tool i.e., Vaccine Management Assessment Tool (VMAT) later updated to Effective Vaccine Management (EVM) tool in 2010.

Immunisation supply chain system in India

India has five levels of immunisation supply chain as follows:

Primary stores (PR) i.e., Government Medical Supply Depots (GMSDs): These stores located in Karnal, Mumbai, Kolkata and Chennai are primarily responsible for supply of vaccines during emergencies (up to 20% of country demand) and meet 100% demand for supplementary immunisation activities like polio, measles and Japanese Encephalitis (JE) as well as auto disabled (AD) syringes, CCE and spare parts. They receive the supplies directly from the manufacturers and store the vaccines in Walk-in-Coolers (WICs) and Walk-in-Freezers (WIFs) up to a maximum period of six months.

Lowest Distribution Level i.e., DVS: These stores keep vaccines in large ILRs and DFs and in a few places in WICs for a maximum of three months. They supply vaccines to the sub-district vaccine stores such as Primary Health Centres (PHCs).



Primary stores (PR) i.e., State Vaccine Store (SVS) and Regional Vaccine Stores (RVS): These are SVS located in state headquarters (HQ) or regional HQ. These vaccine stores receive 80% supply of vaccines from the manufacturers and up to 20% from the GMSDs. They also store the vaccines in WICs and WIFs up to a maximum of six months. They supply the vaccines to divisional, zonal and district stores.

Sub-national (SN) stores i.e., Divisional or Zonal Stores (DiviVS): These vaccine stores maintain a bulk stock of vaccines in WICs up to a maximum of three months. They supply vaccines to the district vaccine stores (DVS).

Service delivery points or HFs i.e., Community Health Centre (CHC), PHC, Urban Health Centre (UHC), hospitals etc.: These HFs keep vaccines in ILRs for a maximum of five weeks. They supply vaccines to the outreach sites on immunisation session day.

Effective Vaccine Management tool

WHO-UNICEF designed the global EVM initiative, which integrated the learnings from the former Effective Vaccine Store Management (EVSM) initiative and the Vaccine Management Assessment (VMA) tool that were in use till August 2010, for such assessments. EVM follows the well-established principles of quality management like the ISO 9000 series of quality standards, which are used throughout the industrialised world.

EVM was designed to help countries to develop strength-in-depth by building a culture of quality based on a structured approach to supply chain management, monitoring and record keeping. The EVM tool assessed nine composite indicators based on processes, practices and policies of CC and vaccine management in the country as mentioned in the box below.

Box 1: Composite indicators

1. Vaccine arrival procedures
2. Vaccine storage temperatures
3. Cold storage capacity
4. Buildings, cold chain equipment (CCE) and transport
5. Maintenance of CCE and transport
6. Stock management
7. Effective vaccine delivery
8. Vaccine management practices
9. Standard Operating Procedures (SOPs) and supportive management systems

The EVM package was designed for use both as an assessment tool for the systematic analysis of strengths and weaknesses across the supply chain and as a supervisory aid to monitor and support the long-term progress of individual facilities.

The EVM tool also assesses the quality and sufficiency of the seven management categories required for the effective operation and control of the supply chain such as Buildings; Storage and transport capacity; CCE; Vehicles; Repair and maintenance; Training and Management systems.

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

- The Primary (PR) – is generally a national level store where the vaccine is received directly from the vaccine manufacturer or from an international supplier such as UNICEF Supply Division. The vaccine is usually stored in large cold rooms and freezer rooms. In the context of India, this would correspond to the four GMSDs, SVS and RVS.
- The SN level, where the vaccine is received from thePR, stored for an agreed period, and then distributed to lower levels stores or to HFs. This would correspond to the Divisional and Zonal Vaccine Store (DivVS) of a state that receives vaccines from the GMSDs or SVS/RVS and distributes vaccines to several districts below it. These are equipped with WICs.
- The lowest level delivery (LLD) store is where the vaccine is received, either from the PR or from an SN store. From this point it is distributed directly to service delivery points. The LLD does not provide any immunisation service. This would correspond to the District Vaccine Stores (DVS), which distribute the vaccines to blocks/CHCs and PHCs. The DVS are usually equipped with ILRs and DFs only.

- Service delivery (SD) points such as CHCs, PHCs and UHCs. They are referred to as HFs in the present context. They also distribute vaccines for outreach immunisation posts.

Note that Indicator 1 is applicable only at the primary level, i.e., at the national level vaccine store, SVS and RVS. Indicator 8 is mostly specific for the assessment of the periphery (SD or HF) level, while Indicator 9 is largely applicable to the national and state level. The nine criteria are generated from questions, which characterise the fundamental qualities of good vaccine supply chain practices during the last 12 months as mentioned in table Table 4.

Table 4: Fundamental qualities of good vaccine supply chain practices

S. N.	Global Criteria Indicator	Key EVM Questions	Number
E1	Pre-shipment and arrival procedure	1. Vaccine Arrival Report (VAR) 2. Lot release certificate 3. Procedure for checking and receiving	43
E2	Vaccine and diluent storage temperature	1. Knowledge of storage temperature range of vaccines 2. Knowledge of damage to vaccine by freezing 3. 24x7 temperature monitoring system in place for WIC/WIF 4. Formal review of temperature records and excursions and remedial actions 5. Temperature mapping of cold rooms & temperature monitoring study	15
E3	Cold storage, dry storage and transport capacity.	1. Net storage capacity for vaccine storage 2. Dry storage space 3. Storage capacity of vehicles during transportation 4. Freezing capacity to make ice packs 5. Sufficient cold boxes (CBs) 6. SOP setting for contingency plan	24
E4	Buildings, and transport systems	1. Quality of vaccine store building 2. Adequate space for packing 3. ILR/DF/WIC/WIF comply with minimum standards 4. Standby functional generator with fuel 5. Vehicle easy access to store and store security 6. Reliable and sufficient transport facilities	100
E5	Maintenance of buildings, CCE and vehicles	1. Planned preventive maintenance 2. Sickness Rate of equipment and vehicles	22

S. N.	Global Criteria Indicator	Key EVM Questions	Number
E6	Stock management system and procedures are effective	1. Standard stock book format for vaccine management 2. All stock transactions recorded and updated at the end of the day 3. Diluent information recorded 4. Documentation: Issue vouchers maintained and correctly used 5. Safe disposal of damaged or expired vaccine vials 6. Internal reviews of vaccine loss/ damages 7. Establish stock levels (maximum, re-order and safety stock) and no stock-outs of any vaccine 8. Physical inventory of vaccine (counting and reconciliation at least once in three months 9. Store all vaccines, diluents and droppers securely and correctly in the vaccine store	73
E7	Distribution between each supply chain level is effective	1. Maintain a programme for distribution of vaccine 2. Conditioning of ice packs during transportation 3. Contingency planning during transportation 4. Emergency contact points, contact numbers with drivers	25
E8	Appropriate vaccine management policies	1. Health workers correctly use "shake" test and know use of Vaccine Vial Monitor (VVM) 2. Health workers always use diluents and vaccines from the same manufacturer with matching presentations and keep them in the CC 3. Open vials of freeze dried vaccine discarded within 4 hrs of reconstitution	11
E9	Satisfactory information system & supportive management	1. Use an evidence based method to forecast the need for vaccines and consumables 2. State level CC inventory available and updated 3. All contracted and outsourced services (transport, maintenance) have effective and enforceable contracts and the service response is acceptable	43

A single common list of requirements, sub-requirements and questions is used for the entire supply chain. The EVM tool automatically filters this common list to create questionnaires that are specifically directed at each of the four levels described above. These level-specific questionnaires can be further filtered to pick out only the most critical indicators, depending on whether one wants to carry out a full EVM assessment at a specific facility or a rapid review assessment, respectively. EVM sets minimum standards for the entire vaccine supply chain management.

After completion of assessment and feeding of data in the EVM tool, scores are generated for different levels based on both EVM criteria indicators and categories. The questions under the nine EVM criteria indicators can be divided into seven broad management categories like Building, Storage Capacity, Equipment, Management Issues, Repair and Maintenance, Training and Vehicles. The resulting scores are used to depict on a radar graph the strengths and weaknesses of a country's vaccine management systems. The score helps assessors to identify and document the areas of strengths and good practices as well as the major knowledge and performance gaps in a consistent format. Based on these, the assessor can define targeted support and training needs to address the weaknesses in each indicator. A minimum of 80% score is recommended for each criterion. (Table No. 5)

Based on the detailed score of the indicators and the emerging recommendations, action can be taken under the respective categories for improving the performance of the different programmatic areas associated with the supply chain.

The table above shows the relation between the various criteria and categories. It is evident that most indicators contain components of management and training.

Rationale

The MoHFW officials, while interacting with global experts at a regional EVM workshop held at Kathmandu in August 2012, realised the need for a national EVM assessment.

Table 5: Vaccine management systems

EVM Categories / EVM Criteria Indicators	Building	Capacity	Equipment	Management	Repair & Maintenance	Training	Vehicle
1. Vaccine arrival				93%		3%	3%
2. Temperature				34%		66%	
3. Storage capacity		90%		10%			
4. Building, Equipment & Transport	45%		40%				15%
5. Maintenance					100%		
6. Stock management			1%	99%			
7. Distribution				63%		38%	
8. VM practices in the field				41%		59%	
9. Supportive functions				96%		4%	

The major reasons were the slow process of state wise assessments; lack of assessment of national stores i.e.,GMSDs and the need for development of National Cold Chain and Vaccine Logistics Action Plan (NCCVLAP) based on the recommendations of a national level assessment. Thereafter, the current study was conducted by NCCVMRC/ NIHFW with UNICEF support during February to April 2013.

Objective

The overall objective of the study was to identify gaps in the CC&VLM system at all levels in order to strengthen the system based on the recommendations of the study and for systematic development of National Cold Chain and Vaccine Logistics Action Plan (NCCVLAP), which would help in standardisation of policies, processes and practices of the Immunisation Supply Chain System.

Specific objectives

- To identify potential strengths and good practices on CC&VLM
- To identify resources and their training needs
- To develop the internal capacity of the system to conduct self-assessment periodically
- To strengthen future planning and prepare the system for future vaccine introduction and
- To prepare the improvement plan which would work as a road map for strengthening CC and vaccine logistics system in the country

Chapter 2

Methodology

The national EVM assessment followed all the10 stages as recommended by the WHO/ UNICEF EVM assessment tool version 1.0.5 as mentioned below.

Stage 1: P reparation for EVM mission and sampling

A meeting was held on 11th February 2013 under the chairmanship of Dr. M. K. Aggarwal, Deputy Commissioner (Universal Immunisation Programme - UIP) to discuss preparedness of the national EVM. Officials from Immunisation Technical Support Unit (ITSU), Maternal & Child Health Integrated Programme (M-CHIP)/ U.S. Agency for International Development (USAID), NCCVMRC-NIHFW, World Health Organization (WHO)-National Polio Surveillance Project (NPSP), UNICEF and MoHFW participated. Discussions were held regarding:

- The objectives and methodology of the mission
- Selection of national assessors
- Collection of background information regarding:
  - Demographic details
  - Immunisation coverage
  - Districts with population and CC point details
  - Vaccine supply chain system of the country (organogram with site names)
  - Equipment inventory
  - Human resources
  - Sampling of assessment sites using the standard EVM tool and deciding the criteria for selection of the states
  - Communication to the states regarding National EVM assessment and their active participation
  - Collection of all national guidelines on CC and vaccine management including financial aspects
  - Collection of information on vaccine procurement, GMSD operation, vaccine stock duration at different levels

The group decided on the states to be covered, sampling frame and confidence interval and precision timeline, team members and the size of the team and funding support and on international observers. A core group was formed consisting of partner agencies for the national EVM to discuss about the team to be supported by each agency and for the smooth completion of the national EVM.

Sampling: Two type of sampling methodology was used - Purposive Sampling and Systematic Random Sampling.

Purposive sampling was used for selection of all four GMSDs and 10 states supplied by these GMSDs. All the 35 states/UTs catered by the GMSDs were listed. Out of these, 10 states were selected based on three criteria: 1. Introduction of Pentavalent vaccine; 2. EVM not conducted in the last two years and 3. Representation of all

geographical areas of the country. The selected states were:

1. J&K (Northern state, GMSD Karnal)
2. Haryana (Northern state, GMSD Karnal)
3. Rajasthan (Northern state, GMSD Karnal)
4. UP (Northern state, GMSD Karnal)
5. Bihar (Eastern state, GMSD Kolkata)
6. Chhattisgarh (Tribal state, GMSD Mumbai)
7. Madhya Pradesh (MP) (state in the centre of the country, GMSD, Mumbai)
8. Karnataka (Southern state, GMSD Chennai)
9. Kerala (Southern coastal state, GMSD Chennai)
10. Tripura (North- eastern state, GMSD Kolkata)

Delhi State vaccine store was included as part of the training assessment.

Systematic random sampling was used to select districts andHFs. The sample size and selection of the sites to be assessed was defined with the help of the "Site Selection Tool". Out of the 301 districts (Lowest Delivery Level - LDL) in these 10 states, 23 districts were selected by the EVM sampling tool using 85% Confidence Interval with precision of 15% as agreed by the national core group. However, two states had no districts selected and hence they were added additionally, viz., J&K and Tripura were added to represent the hilly and NE states. In addition to the 23 districts selected through the EVM sampling tool, three more districts i.e., two from J&K and one from Tripura were added, obtaining a total of 26 districts finalised for assessment. For each district, two HFs SP) were selected.

The sites covered during the national EVM assessors training (Delhi SVS, Gurgaon RVS, Faridabad and Gurgaon DVS and Gurgaon PHC) were also added to the study sample. The total sample size was as follows:

Table 6: Total sample size

Govt. Medical Store Depot (GMSD)	State Vaccine Store / Regional Vaccine Store (RVS)	Divisional Vaccine Store (DiviVS)	District Vaccine Store (DVS)	Health Facility (HFs)	Total No. of Vaccine Stores and HFs
4	16	14	28	52	114

Stage 2: EVM training

There were 41 national assessors (experts in immunisation/CC and vaccine management) identified amongst officers from MoHFW, NIHFW, GMSDs, state governments, UNICEF, WHO-India (NPSP), ITSU and M-CHIP. All the assessors were trained at NIHFW for five days (04-08 March, 2013) by a team of facilitators from partner agencies including one international consultant.

The assessors were oriented to the questionnaires within each of the criteria of EVM, sharing actual related field situations and discussions. The training programme consisted of classroom sessions on 2-3 indicators each day in the morning followed by practical exercise of assessment in the nearby vaccine stores in the afternoon. It also included hands-on support during the assessment. This "learning by doing" approach helped the participants to get a better grasp at the tool and become more confident in its use.

For practical field training, participants were grouped into five teams. Each team visited one of the five vaccine stores by rotation (the Delhi SVS, Gurgaon DiviVS, Gurgaon DVS, Faridabad DVS Gurgaon – Village PHC). Each day after the field visit, the data was consolidated and analysed and the experiences of the participants were discussed.

Evaluation of the training course was based on pre and post-test questionnaires (the average score increased from 74% to 85%) and the course end evaluation was to get feedback on the training arrangements, training materials and methodology, training delivery of facilitators and the confidence of participants in using the EVM tool.

Stage 3: Field assessment and data collection

For actual assessment of selected vaccine stores, 27 teams were formed each comprising of two national assessors, joined by an additional person like a data handler and CCT in some assessment sites. The data was collected and filled in the EVM tool in an excel sheet. Each team prepared a summary of major issues and recommendations for the sites/states visited.

During the field assessment, upon identifying incorrect practices, the assessors tried to provide hands-on corrective action. Thus, the participants, through this exercise, learnt to practice hands-on supportive supervision.

Stage 4: Data validation and consolidation

It was conducted at the national level by the coordinators of the study along with select team leaders. At first, the correctness of the collected data was verified. Following this, the data was imported inside the tool and consolidated. Then the results were analysed in order to identify the strengths and weaknesses in the system based on the different scores of the criteria.

Stage 5: Analysis of results and development of recommendations

The results were analysed and discussed with the teams' lead assessors, state officers and partners to arrive at common priority issues across the states and the best ways to address the weaknesses. As a result, the recommendations were largely through the active participation and contributions of the participants, enhancing their taking of ownership.

Stage 6: Debriefing of findings to policy makers

The state level officers along with the study team leaders were called to NIHFW for debriefing of findings to policy makers.

Stage7: Improvement Plan (IP) preparation for CC&VLM strengthening

Dy, Commissioner–Immunisation, Director NRHM/Family Welfare (FW), State EPI Officer (SEPIO), Cold Chain Officer (CCO), Vaccine Logistics Manager (VLM) and Partners prepared an IP for CC&VLM strengthening for implementation of recommendations.

Stages 8, 9 and 10 should follow the study report submission. They are:

Stage8: Implementation of IPs

National level, GMSD level and state level activities recommended in the IP need to be implemented through annual health Project Implementation Plan (PIPs) of the states and the GMSDs.

Stage9: Review of implementation status of IP

Half-yearly and annual reviews of IP implementation status and follow up are recommended.

Stage 10: Follow up EVM after three years of implementation of IP

Chapter 3

Study Results

PART-1: Consolidated EVM scores

This section presents the findings for each global indicator/criteria. The results were based on the EVM reporting file generated by the EVM tool.

The EVM assessment tool consisted of about 356 questions, many of which were divided into sub-questions. As it was difficult to report at the national level regarding the entire gamut of the questionnaires, for the findings coming from 11 states (16 SVS and RVS), 14 divisions, 28 districts and 52 HFs, the facilitation team identified the critical questions under each indicator. The findings reported here are essentially based on the results of these critical questions at different levels. The consolidated scores of the four GMSDs are discussed separately.

The spider chart below reflects findings of assessment for all 114 sites.

The tables below depict the summary of consolidated EVM scores for the indicators clubbed into nine criteria and seven categories. As per WHO recommendation, the individual scores should be more than 80% for satisfactory performance.

Figure 1: National average - Criteria score

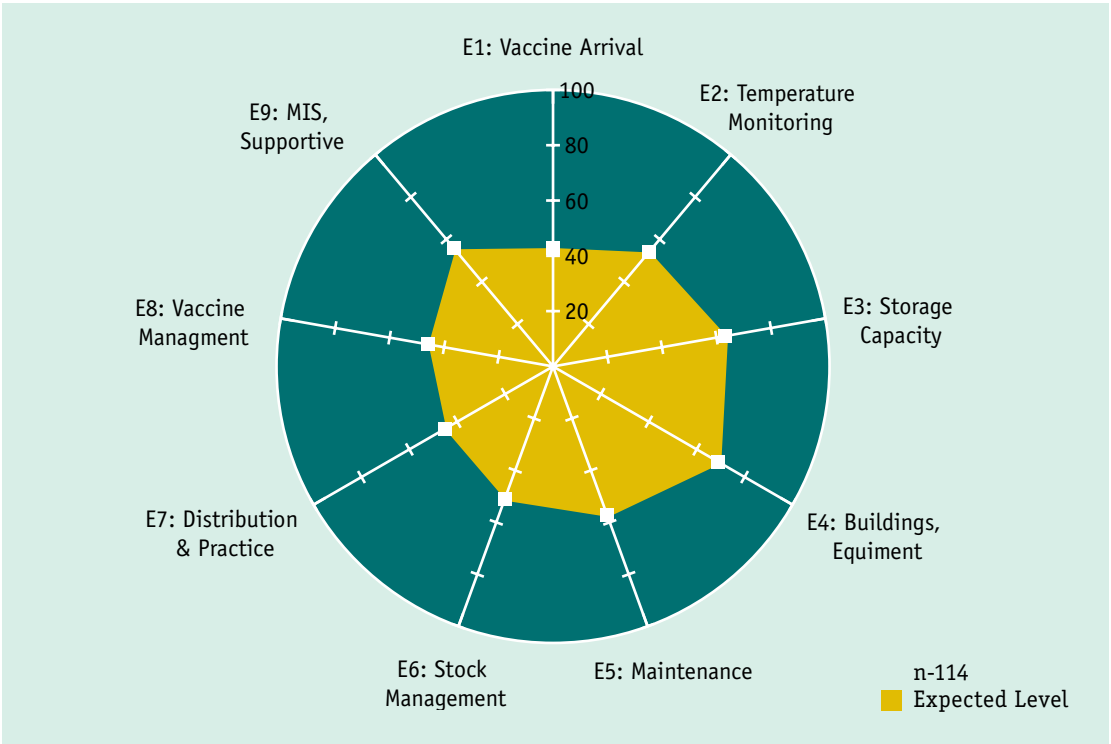


Table 7: Summary of consolidated EVM criteria indicator scores

S. N.	Criteria	Consolidated scores					
		GMSD (4)	SVS/ RVS (18)	DiviVS (14)	DVS (28)	HF (52)	National Average
1	Vaccine Arrival Process	52%	34%	NA	NA	NA	43%
2	Vaccine Storage Temperature	37%	43%	46%	71%	70%	54%
3	Storage Capacity	71%	66%	46%	57%	76%	63%
4	Building, CCE & Transport	65%	64%	69%	70%	75%	69%
5	Maintenance & Repair	59%	61%	59%	58%	49%	57%
6	Stock Management	57%	56%	49%	46%	45%	51%
7	Distribution	24%	41%	39%	42%	77%	45%
8	Vaccine Management Practices	29%	50%	35%	47%	67%	46%
9	MIS & Supportive Functions	50%	65%	52%	58%	0%	56%

Table 7 shows that all the criteria indicator scores were below 80%. However, health facilities scored better as compared to the upper level of stores with regard to Vaccine Storage Temperature, Storage Capacity, Vaccine Distribution and Management Practices. The majority of the indicators were less than 60% (27/41 scores), reflecting serious concerns. The rest of the indicators (14/41) had a score between 60-79% suggesting further improvement to reach the 80% level.

Category scores influence criteria scores. All category scores in Table 8 were below 80% except for storage facility at HF level (88%). HFs scored better as compared to the upper level of stores for building, storage capacity, equipment and training of the staff. About half of the indicators (16/34) scored less than 60%, reflecting serious

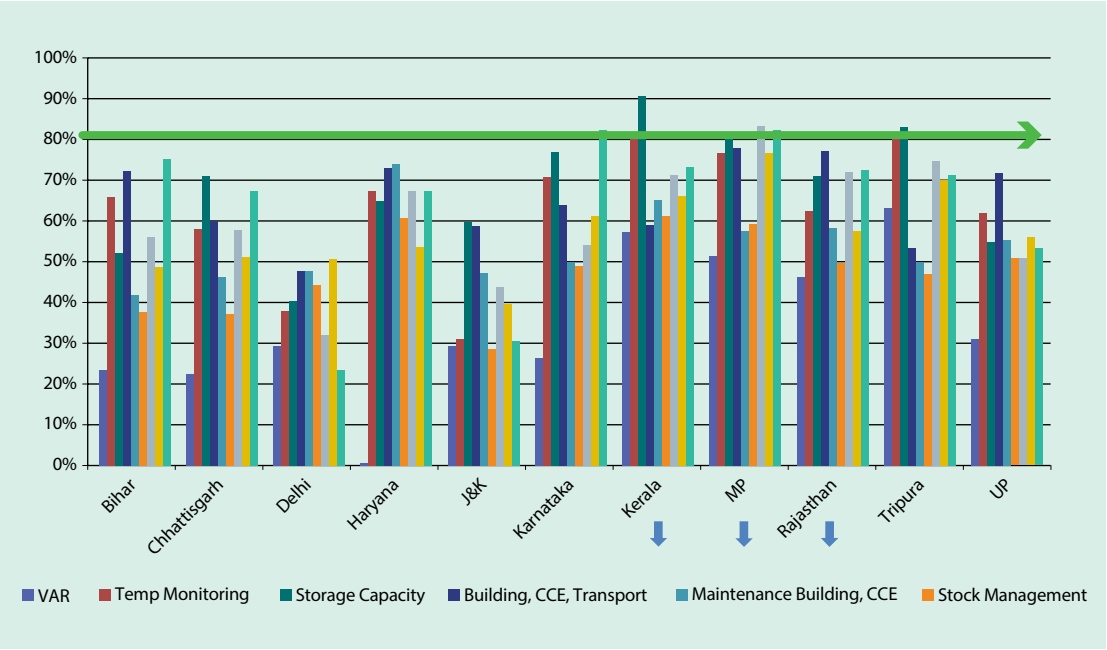
Table 8: Summary of consolidated EVM category indicator scores

S. N.	Criteria	Consolidated Scores					
		GMSD (4)	SVS/ RVS (18)	DiviVS (14)	DVS (28)	HF (52)	National Average
1	Building	60%	69%	69%	61%	78%	70%
2	Capacity	70%	69%	46%	61%	88%	73%
3	Equipment	71%	61%	70%	75%	71%	71%
4	Management	43%	45%	40%	43%	51%	47%
5	Repair & Maintenance	59%	57%	59%	57%	49%	54%
6	Training	57%	74%	69%	76%	75%	73%
7	Vehicles	42%	56%	52%	52%	NA	53%

concerns while the remaining 17 scored 60-79%, suggesting further improvement to reach the 80% level. In addition, categories like management, repair and maintenance and vehicles scored below 60% across all the levels.

PART-2: State and store-wise EVM scores

Figure 2: State-wise criteria scores

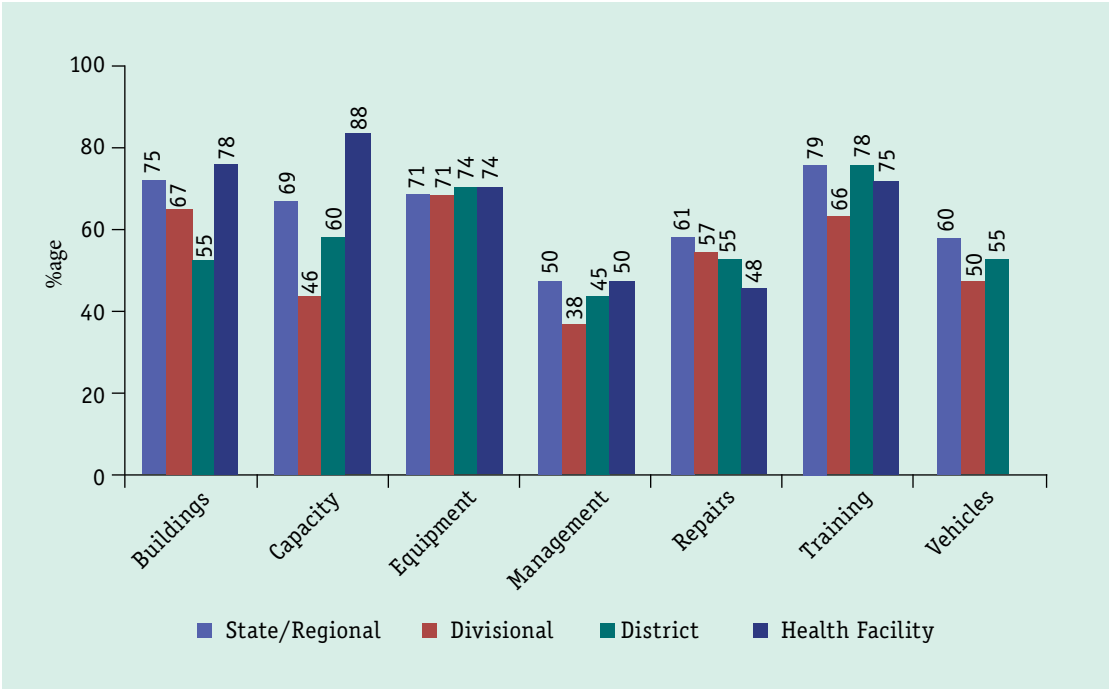


Rajasthan, MP and Kerala had better scores as compared to the other states. The good performance of Rajasthan and MP could be explained due to the VMA conducted two years back followed by implementation of several strategies through the improvement plans developed after the assessment.

Table 9: Government medical stores depot scores

S.N.	Indicator	Indicator Scores of four GMSDs				
		Karnal	Mumbai	Kolkata	Chennai	Combined
1	Vaccine Arrival Process	72%	44%	44%	46%	52%
2	Vaccine Storage Temperature	35%	58%	39%	16%	37%
3	Storage Capacity	54%	71%	63%	54%	61%
4	Building, CCE & Transport	50%	81%	67%	61%	65%
5	Maintenance & Repair	48%	83%	58%	48%	59%
6	Stock Management	57%	67%	59%	46%	57%
7	Distribution	27%	16%	27%	26%	24%
8	Vaccine Management Practices	33%	52%	7%	25%	29%
9	MIS & Supportive Functions	51%	51%	46%	51%	50%

Figure 3: Category scores at various store levels



PART-3: Criteria wise detailed observations and issues

1. Pre-shipment and arrival procedures

This indicator assessed the process of vaccine arrival from the manufacturer to the PR. It verified the following aspects:

- Standard process of reporting followed for all vaccine arrivals
- Completeness and correctness of all documents
- All vaccines arrived in good condition
- A Lot Release Certificate received for every lot of vaccines
- Customs clearance of the vaccine
- Measures for safekeeping of vaccines ensured during delays in custom clearance
- Effective process of receiving, clearing and checking of consumables

The standard practice was to use UNICEF-VAR form for all PRs receiving vaccine from the manufacturers. VAR reports (Annex-M) were analysed and the information utilised by the procurement agency to improve procurement and shipment quality. VAR was a formal feedback system from the vaccine stores to the procurement agency responsible for vaccine procurement.

This criterion was applicable only to GMSDs, SVS and RVS. In India, vaccines and consumables were received directly from the manufacturers (in-country or imported) at the GMSDs, SVS and RVS. SVS & RVS also received vaccines from the GMSDs, based on MoHFW release orders.

As mentioned above, all vaccines and consumables were received from domestic manufacturers with the exception of the JE vaccine. The latter was procured and received by HLL Lifecare Limited (HLL), which took care of most government procurements. The government staff was not involved in any customs clearance either at the GMSD or in any state. Hence, all questions related to custom clearance were not applicable.

Findings

Table 10: Summary scores

Vaccine Store	4 GMSDs	16 SVS/ RVS	14 DiviVS	28 DVS	52 HFs
Score	52%	34%	NA	NA	NA

Table 11: Indicator wise salient scores

Indicator	Aspects	GMSDs (%)	SVS (%)	GMSDs	SVS
	Number of sites	4	16	4	16
E1_02a	Vaccine Arrival Report exists	25	19	1	3
E1_03a	Total VARs/completed	1	13	0.0	2.1
E1_04a	No vaccines damaged during transport	100	100	**4.0**	**16.0**
E1_05a	Complete documentation	100	94	**4.0**	**15.0**
E1_07a	Lot release certificates rec.	100	73	**4**	**11.7**
E1_18a	Checking of all consumables - recording	100	**44**	**4**	**7**

There was no standard format for Vaccine Arrival Report (VAR) at these stores. In the absence of any Government of India (GoI) guidelines, each store recorded the desired information partly in the normal record book. Hence a variety of reports related to vaccine arrival information were found but none of them were complete. GMSDs had better information on VARs than the SVS. At a few sites, assessors also noticed Inspection note (I note) advocated by GoI for vaccine arrival. UNICEF VAR was used only for international vaccine procurement. During the review period of one year, it was observed that VAR was not accompanied with most of the vaccines procured through domestic manufacturers except for Pentavalent vaccine procured by UNICEF, which was also found to be incomplete. Details of VAR are mentioned below.

Table 12: Details of VAR

Name of GMSD	No. of Independent Vaccine Arrivals	No. of VARs accompanied the Vaccine	No. of VARs Completed
Kolkata	124	0	0
Chennai	65	3	3
Mumbai	69	0	0
Karnal	57	0	0

Box 2: Major issues identified

- Lack of national guidelines and standards for VAR.
- Lack of analysis of information collected by the vaccine stores on arrival of vaccines at all levels.
- Absence of software feature to generate VAR in Procurement Management Information System (ProMIS)/Vaccine Logistics Management Information System (VLMIS).
- GoI did not make UNICEF-VAR formats available to the states; this made the states dependant on the vaccine manufacturers.

2. Vaccine and Diluent storage temperatures

All vaccines are sensitive biological substances. Loss of potency of the vaccine is faster if exposed to higher temperatures. Some vaccines are also sensitive to freezing, and this can cause irreversible damage.

This indicator assessed the following aspects to ensure that vaccines were stored at the recommended temperatures:

- Knowledge of the storekeeper with regard to the storing temperature for the different vaccines and their sensitivity to freezing
- Whether the quality of CC was systematically monitored
- Availability of continuous temperature records (recorders discs/temperature loggers print out of the cold rooms and freezers rooms and refrigerated vehicles)
- Twice daily manual temperature recording for all equipment storing vaccines was maintained
- The temperature records were regularly inspected (at least once a month) and retained for auditing purposes.

Findings

Knowledge of the storekeepers (CC handlers) on temperature maintenance of the vaccines was found to be good. This validated the evaluation report of NIHFW

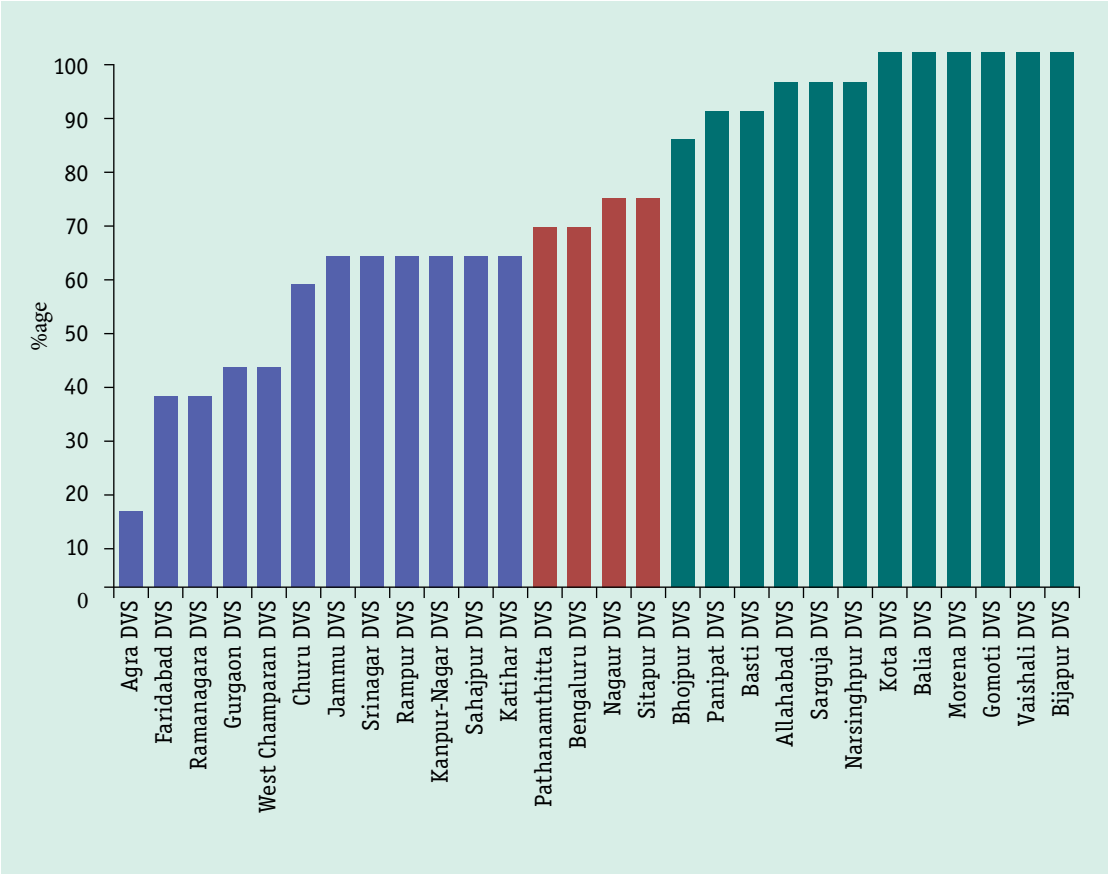
Table 13: Summary scores

Vaccine Store	4 GMSDs	16 SVS/ RVS	14 DiviVS	28 DVS	52 HFs
Score	37%	43%	46%	71%	70%

Table 14: Indicator wise salient scores

Indicator	Aspects	4 GMSD	18 SVS/ RVS	14 DiviVS	28 DVS*	52 HFs**
E2_01a	Temp. monitoring study and implementation of recommendation	0%	9%	0%	0%	0%
E2_02a	Mapping of WICs / WIFs	0%	0%	0%	0%	0%
E2_03a	Knowledge of correct storage temperature	100%	100%	93%	89%	87%
E2_04a	Knowledge of vaccines that are damaged by freezing	75%	88%	79%	89%	75%
E2_05a	Store keeper trained	**50%**	81%	**57%**	79%	NA
E2_07a	Manual temperature records	**50%**	**56%**	64%	64%	81%
E2_08a	Continuous records	25%	**13%**	**26%**	NA	NA
E2_10a	Seven day match between manual and continuous records	**0%**	**13%**	**14%**	NA	NA
E2_11a	Safe storage of temperature records for three years	25%	50%	50%	36%	52%
E2_12a	Monthly review by supervisor and corrective actions/ follow-up.	25%	31%	14%	43%	51%
E2_13a	Calibration of sensors	**0%**	**0%**	**7%**	NA	NA

Figure 4: Temp monitoring perfomance score at DVS



on CC handlers' training. Almost 70% of the storekeepers were trained in a two-day vaccine and CC handlers' training. However, the following quantitative observations need attention:

- Complete set of manual temperature record books for each equipment found in 80 out of 114 sites.
- Out of 34 stores with WICs/WIFs, only nine stores had complete temperature recording discs and hard copies of loggers.
- Out of 34 stores, four stores had manual temperature recording matching with the 24x7 temperature recording discs
- Out of 114 sites, 44 sites had supervisory review of temperature recordings and corrective action taken
- Functional graphic chart recorder with recording discs was found only in GMSD Kolkata.

Half of the DVS (14/28) had temperatures monitoring performance scores below 70%. The lowest performing store was the Agra DVS. But the six stores of Kota (Rajasthan), Balia (UP), Morena (MP), Gomoti and Vaishali (Bihar) and Bijapur (Karnataka) scored almost 100%. This signified that other stores of the same state could also perform better if they adopted the good practices of these stores. SVS Patna had wireless real time data loggers for temperature monitoring but hard copies of the recordings were not kept in the file nor reviewed by the supervisor.

Box 3: Major issues identified

- Manual temperature records showed little variation, which suggested the need for further verification. Events of defrosting/repairs/power outages were not recorded. Moreover, no supervisory comments were found in 70/114 facilities visited.
- Good quality (validated/calibrated) thermometers were not found in most locations.
- In over 70% of the bulk vaccine storage sites (district and above), continuous temperature monitoring system (Graphic Chart Recorder/Data Loggers) was dysfunctional due to faulty equipment/no consumables (charts, ink, fiber tip pen)/no internet connection for wireless data loggers.
- Only 30% sites (lowest of 14% in DiviVS) had a supervisory review of temperature recording book followed by corrective action.
- Temperature monitoring was not done over weekends/holidays.
- Booklet for manual temperature recording was not available in many vaccine stores.
- Manual temperature recording did not match with the 24x7 continuous temp recording.

3. Capacity of CC, Dry storage and Transport

This indicator assessed the following aspects:

- Storage capacity was sufficient to accommodate the maximum stock requirements for the routine immunisation and its consumables, and for supplementary immunisation if required
- Storage capacity was sufficient to accommodate the maximum stock requirements of vaccines and consumables for all supplementary immunisation at the temporary facilities if used for this purpose
- Transport capacity was able to meet the maximum demand
- There were a sufficient number of passive containers and the capacity to produce the required quantity of coolant as required
- Contingency plans were in place to protect the vaccines in case of any emergency.

Table 15: Summary scores

Vaccine Store	4 GMSDs	16 SVS/ RVS	14 DiviVS	28 DVS	52 HFs
Score	71%	66%	46%	57%	76%

Findings

The following seven critical aspects highlighted in light blue influenced the performance scores.

After reviewing the findings of different levels of stores, it was observed that none of the four GMSDs had enough space to store 20% of the state supply that was being routed through GMSDs as national buffer stock. In addition, campaign vaccines like Polio, Measles and JE when parked at GMSD, overloaded the available constrained CC space.

Table 16: Indicator wise salient scores

Indicator	Aspects	4 GMSDs	18 SVS/ RVS	14 Divisions	28 Districts	52 HFs
E3_01a	Sufficiency of storage at +2^{0}C to +8^{0}C Capacities available/ required.	0%	38%	43%	18%	83%
E3_02a	Sufficiency of storage at -15^{0}C to -15^{0}C capacities available / required.	100%	88%	29%	NA	NA
E3_03a	Sufficiency of dry storage - for syringes & Diluents. Capacities available/ required.	50%	50%	38%	NA	NA
E3_08a	Sufficient transport capacity?	25%	6%	7%	NA	NA
E3_09a	Sufficient capacity for freezing IPs / or storing them.	100%	75%	57%	82%	94%
E3_10a	Sufficient nos. of passive containers	100%	69%	64%	82%	85%
E3_11a	Contingency plan, emergency nos.	33%	40%	26%	38%	38%

Figure 5: Storage capacity of DVS

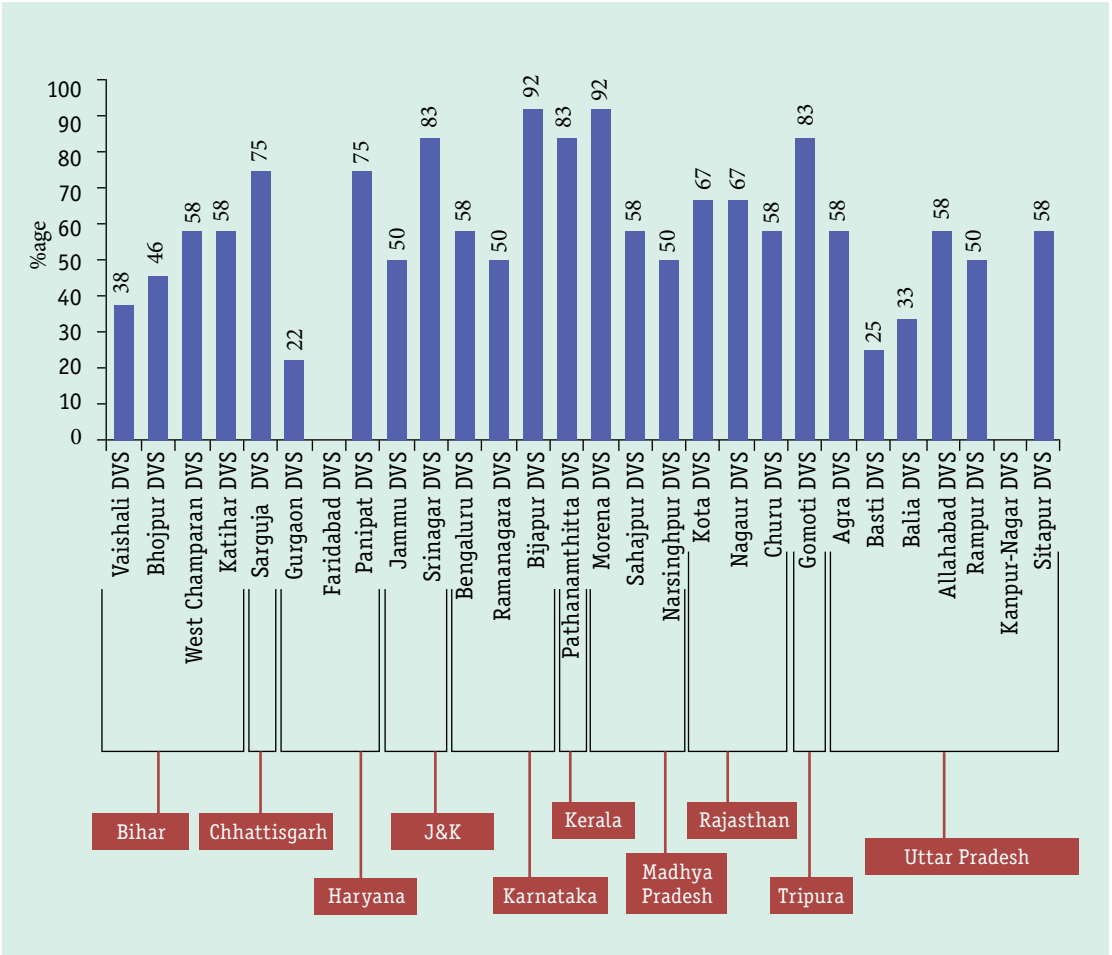
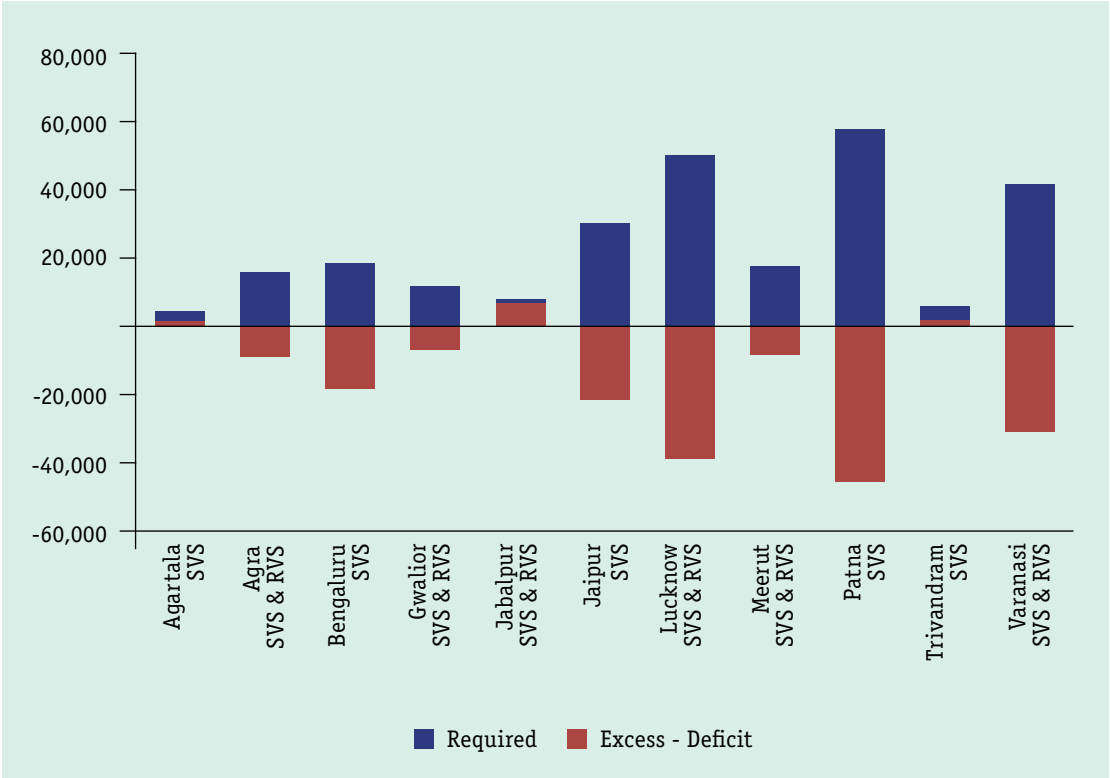
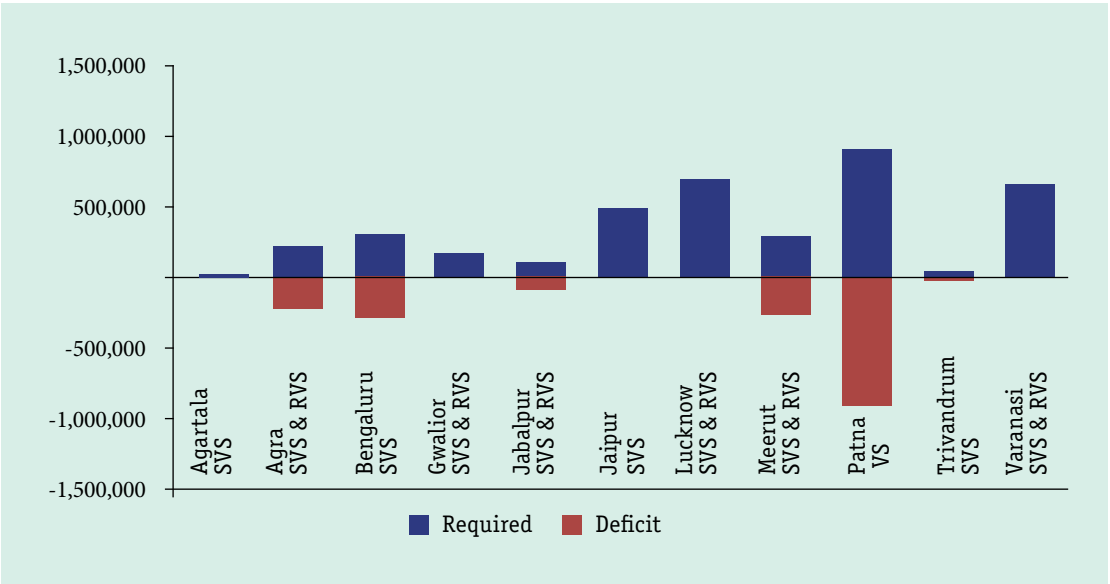


Figure 6: SVS & RVS - 2^0 - 8^0C space required vs excess (upward) deficit downward (litres)



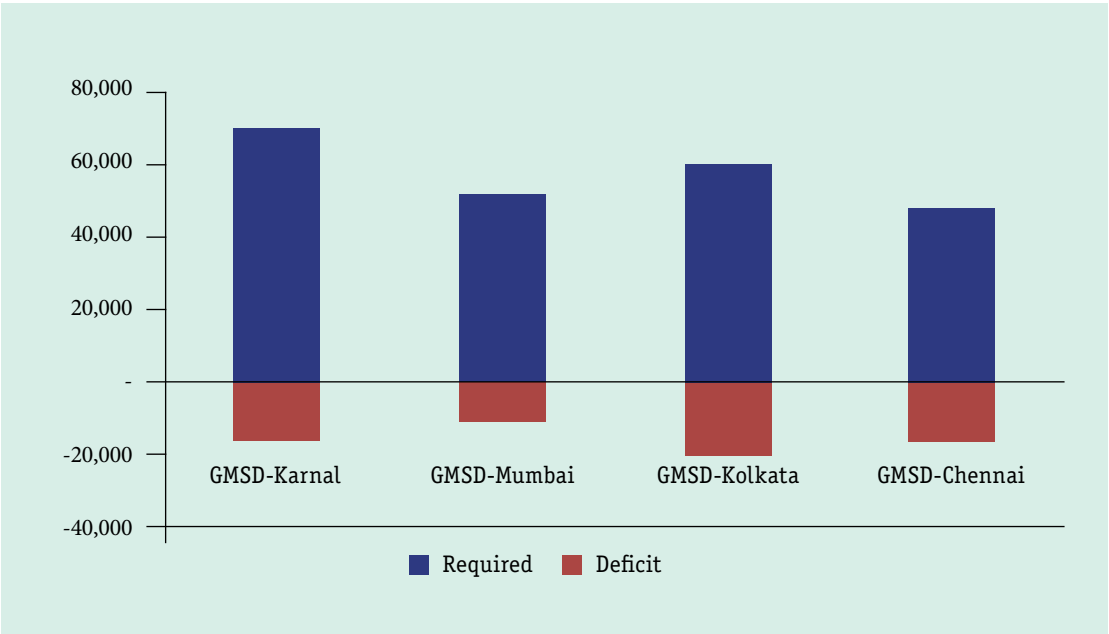
Out of 28 districts in 11 states, only four districts in four states had adequate storage capacity in the DVS. When capacity was reviewed at SVS/RVS level, it was found that none of the SVS/RVS had adequate storage space for +2°C to 8°C. Similarly, there was huge storage space deficiency for dry storage area also. Annexure H gives details of the available space.

Figure 7: SVS & RVS dry storage space required vs excess deficit (Litres)



All GMSDs had deficiency in storage space, with the highest deficiency in Kolkata. Due to inadequate storage space for both vaccine and dry storage, the practice of Earliest Expiry First Out (EEFO) was extremely difficult.

Figure 8: GMSDs - 2^0-8^0C cold chain space available vs deficit (Litres)



Storage capacity table - vaccine

Table 17: Summary of diluents and dry storage space requirement and availability

		Dry - Diluent (litres)			Dry - Syringes (litres)		
		Available	Required	Difference	Available	Required	Difference
1	GMSD-Karnal	12,000	14,866	**2,866**	4,804,400	4,819,943	**- 15,543**
2	GMSD-Mumbai	15,000	11,011	**3,989**	4,306,452	7,183,685	**- 12,877,233**
3	GMSD-Kolkata	Inadequate	12,747	**Grossly inadequate**	9,000,000	19,892,240	**- 10,892,240**
4	GMSD-Chennai	Inadequate	10,187	**Grossly inadequate**	Inadequate bld.	15,897,441	**Grossly inadequate**
STATE / RVS							
1	Agartala SVS	10	276	**- 266**	28,234	17,882	**10,352**
2	Agra SVS & RVS	Nil	3,369	**- 3,369**	Nil	218,426	**- 218,426**
3	Bengaluru SVS	Nil	7,590	**- 7,590**	Nil	292,984	**- 292,984**
4	Gwalior SVS & RVS	13,000	2,428	**10,572**	1,334,000	157,461	**1,176,539**
5	Jabalpur SVS & RVS	Nil	1,416	**- 1,416**	Nil	91,801	**- 91,801**
6	Jaipur SVS	50,000	12,416	**37,584**	11,200,000	479,287	**10,720,713**
7	Lucknow SVS &RVS	20,000	10,552	**9,448**	800,000	684,234	**115,766**
8	Meerut SVS RVS	Nil	7,135	**- 7,135**	Nil	275,432	**- 275,432**
9	Patna SVS	Nil	3,636	**- 3,636**	Nil	912,393	**- 912,393**
10	Trivandram SVS	Nil	766	**- 766**	Nil	29,565	**- 29,565**
11	Varanasi SVS & RVS	19,926	8,702	**11,224**	4,019,251	650,725	**3,368,526**
DIVISION							
1	AjmerDivVS	Nil	1,203	**- 1,203**	Nil	77,986	- 77,986
2	Allahabad DivVS	66,640	2,755	**63,885**		141,696	**- 141,696**
3	Bagalkot DivVS	Nil	76	**- 76**	Nil	2,930	**- 2,930**
4	Bikaner DivVS	Nil	1,792	**- 1,792**	135,000	116,177	**18,823**
5	East Champaran -DivVS	200	2,004	**- 1,804**	5,000	77,348	**- 72,348**
6	JaipurDivVS	Nil	2,501	**- 2,501**	Nil	96,558	- 96,558
7	Kanpur DivVS	1,500	2,642	**- 1,142**	160,000	171,367	**- 11,367**
8	Kurukshetra DivVS	3,000	1,034	**1,966**	80,000	39,912	**40,088**
9	Lucknow DivVS	5,000	3,128	**1,872**	300,000	202,823	**97,177**
10	Purnia DivVS	6,600	4,924	**1,676**	68,000	219,645	**- 151,645**

Out of the 34 major stores keeping bulk vaccines, only two i.e., SVS Jabalpur and Gwalior of MP had SOP and emergency plan for failure of equipment and transport. None of the GMSDs had any such plan to protect vaccine safety.

Box 4: Major issues identified

- Shortage of Vaccine storage space for +20 to +80C was found at all levels except at HFs (PHCs).
- GMSD Kolkata, Chennai and Karnal required augmentation of storage space.
- Performance scores were below 80% in 23/28 DVS.
- Dry storage space was found inadequate at all levels.
- Many new WICs/ WIFs supplied by GoI to the states were either not installed or not functional.
- There was no software/ system at vaccine stores to suggest how many more vaccines of different types could be accommodated at the facility.

4. Status of Buildings, Equipment and Transport

Good operating conditions of the building housing the vaccine store, the equipment storing the vaccines and the vehicles used for transport are important to ensure the safety of the vaccines. The following aspects were assessed:

- The location of the store building, the quality of construction and accessibility were satisfactory
- The building provided space for all the activities to be carried out there
- The building's condition was good with adequate ventilation
- Separate dry store building and store keeper's office
- The condition of all the equipment used e.g., WIC, WIF, ILR and DF, generators and voltage stabilisers was satisfactory
- The condition of transport vehicles and containers were satisfactory
- Continuous recorders, dual refrigeration units, units had shelves
- Each equipment had its own stabiliser
- Each WIC/WIF had an acoustic alarm

The performance scores were influenced by the following seven critical aspects which are highlighted in light blue

Findings

Reviewing the scores, it was found that at all levels scores were less than the accepted performance level of 80%. In SVS, 12 vaccine stores out of 16 and in DVS, 15 vaccine stores out of 28 had scores below 80%. Jammu SVS had the lowest score, while Jaipur SVS had the highest score among all the sites assessed. The lowest performing DVS was the Ramanagara vaccine store of Karnataka, while Bhojpur district of Bihar had the best scores among the assessed sites.

Table 18: Summary scores

Vaccine Store	4 GMSDs	16 SVS/ RVS	14 DiviVS	28 DVS	52 HFs
Score	66%	64%	69%	67%	74%

Table 19: Indicator wise salient scores on status of the building, equipment, and transport

Indicator	Aspects	4 GMSDs	18 SVS/ RVS	14 DiviVS	28 DVS	52 HFs
E4_01a	Vaccine store is secure and accessible	88%	91%	96%		
E4_02a	Dry store is secure and accessible	50%	28%	4%		
E4_03a	Vaccine store building status	39%	63%	66%	56%	78%
E4_04a	Separate dry store building status	22%	46%	16%		
E4_05a	Sufficient space to maintain and well ventilated vaccine store	50%	66%	64%		
E4_06a	Cold boxes (CBs) and passive containers check list	56%	60%	59%		
E4_08a	Store keeper's office	75%	72%	61%		
E4_09a	Secondary store check list	50%	56%	59%		
E4_10a	Secondary dry store	13%	34%	21%		
E4_11a	CR & FR checklist: good enclosure, continuous recorders, dual refr. units, have shelves	50%	74%	72%		
E4_12a	Warm clothing and training on working inside	13%	9%	7%		
E4_13a	ILRs/DFS checklist : continuous records, working thermometer, have baskets	0%	48%	55%	72%	74%
E4_14a	How many units are CFC-Free	71%	76%	74%	86%	84%
E4_15a	Gen is required and is installed	100%	50%	79%	54%	35%
E4_16a	Gen. is working, has enough fuel, and secured.	90%	43%	57%	49%	33%
E4_18a	Each equip. has its own stabiliser	81%	71%	54%	53%	48%
E4_19a	Each WIC/WIF has an acoustic alarm	45%	24%	21%		
E4_20a	Functioning alarm for ILR / DF	0%	14%			NA
E4_21a	Telecommunication	100%	44%	36%	57%	65%
E4_22a	Vehicle check list	42%	60%	52%	52%	
E4_23a	Status of refrigerated vehicle	0%	0%	0%		
E4_24a	Passive containers are WHO compliant	0%	75%	86%	86%	96%

Figure 9: Scores of SVS for building, equipment and transport

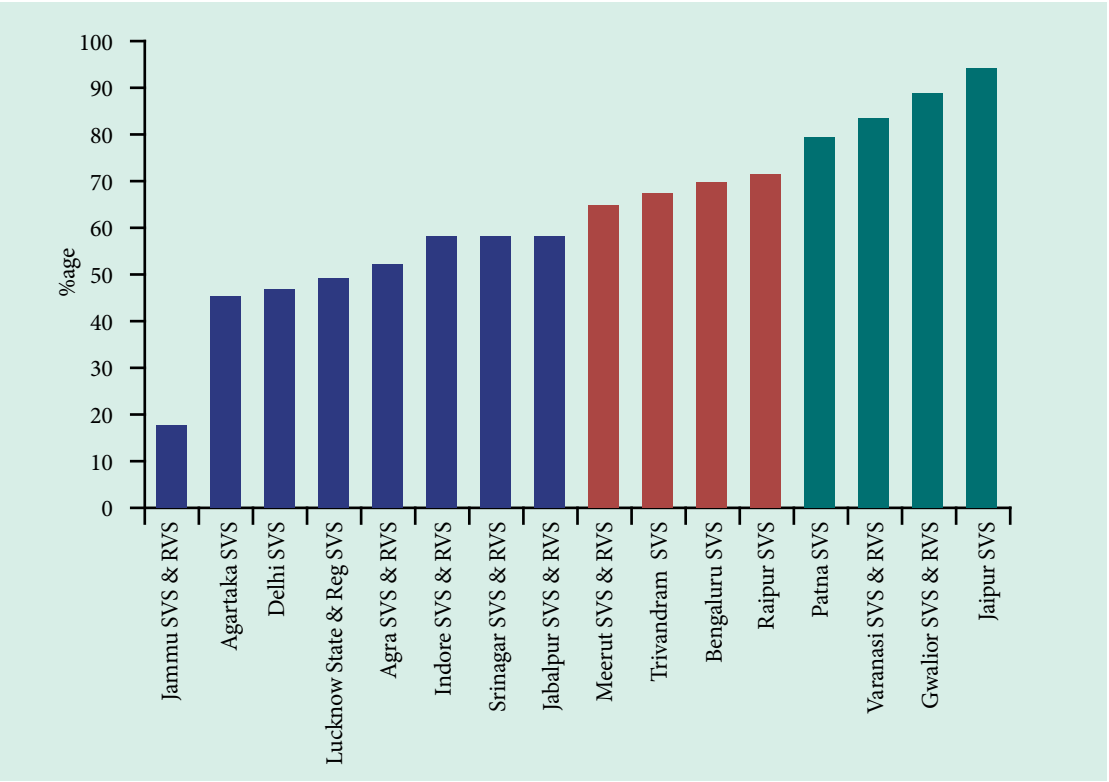
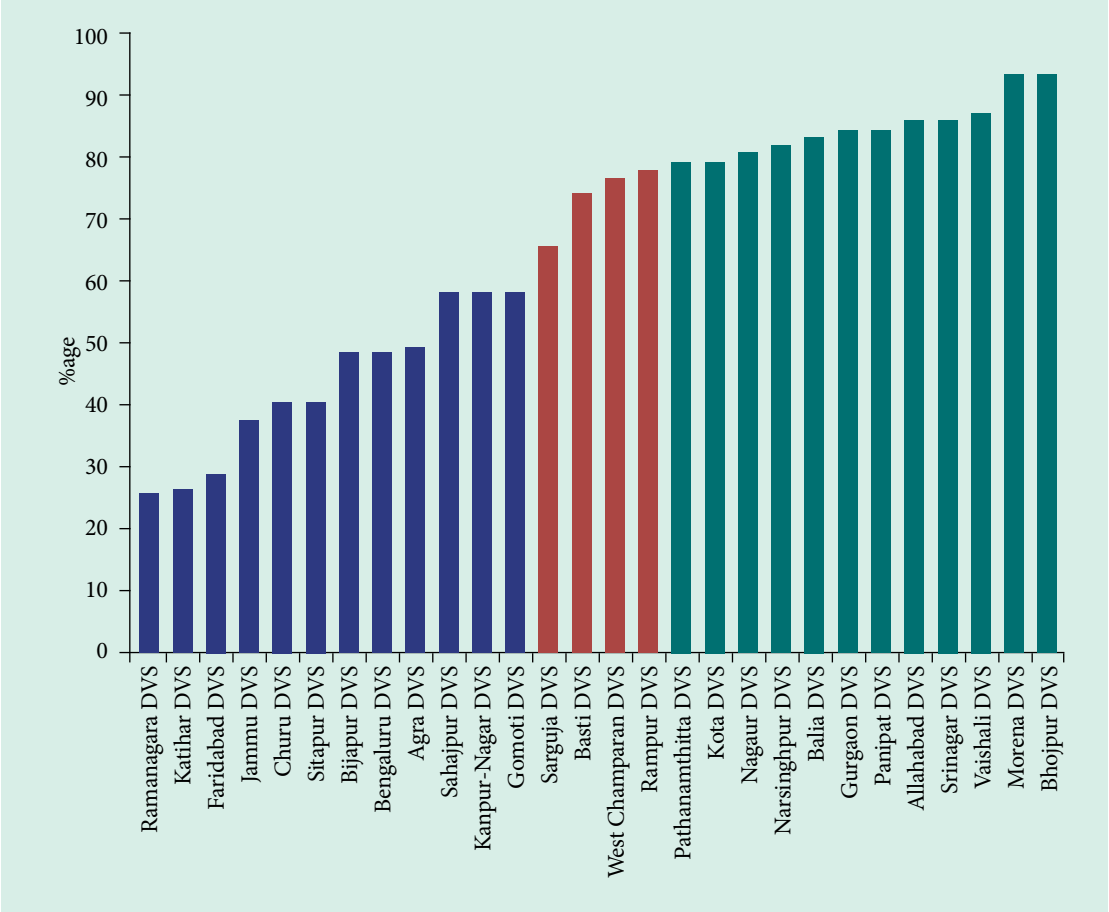


Figure 10: Scores of DVS for building, equipment and transport - E4



Buildings: vaccine store status

A 'Suitable' vaccine store building means

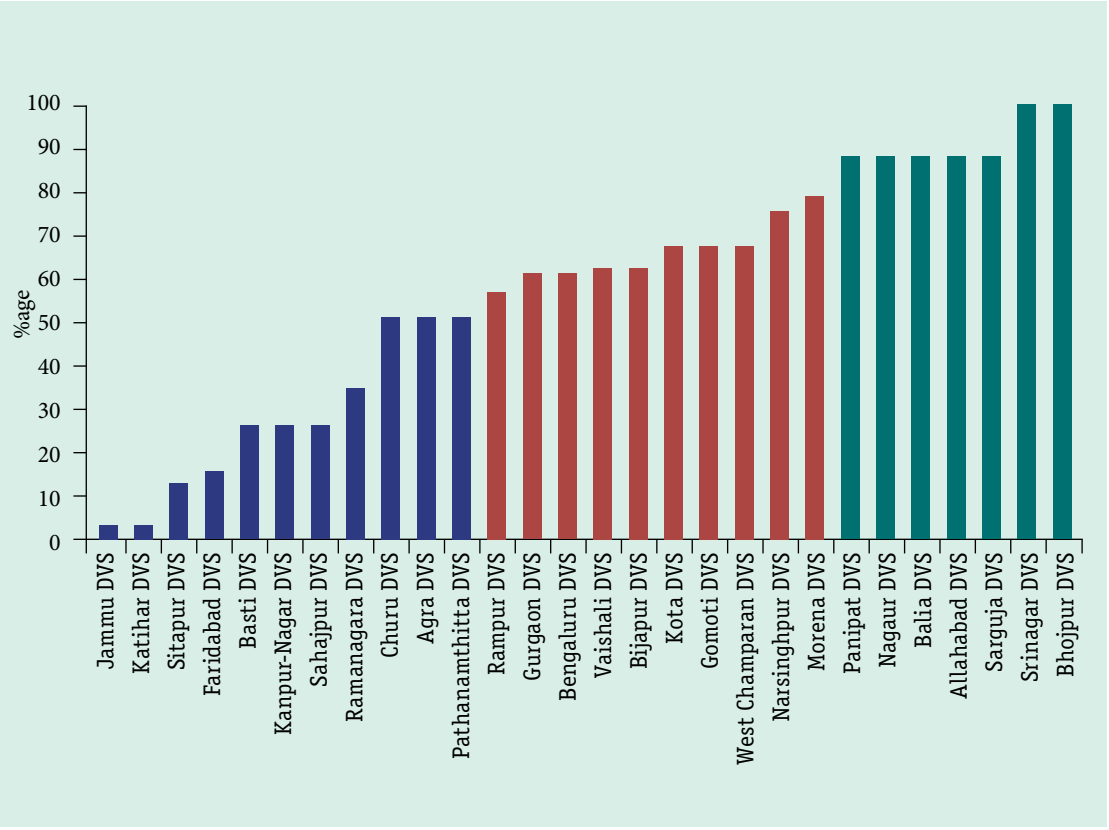
- Cold or temperate climates: thermally insulated and heated.
- Hot, wet climates: naturally ventilated or air-conditioned. Well protected against rain water/ seepage.
- Hot, dry climates: naturally ventilated or air-conditioned and/or passively protected against excessive heat build up. Protected against dust.
- The floor should have a proper slope and finish to allow dry & wet cleaning, as well as movement of small-wheeled pallet trucks.
- Fire extinguishers should be tested and certified annually. There should be a label on each one showing the test date.
- Satisfactory electrical system means that wiring, circuit breakers, electrical sockets and light fittings are of good quality and recommended standards, in good condition and securely fixed in place. All circuits should be properly earthed, and earthing of sockets can be checked periodically.
- In addition to the above parameters, it also should comply to the following:
  - Delivery vehicles easily reach the store
  - Roof to be free from leaks
  - External walls should be free of severe cracks or other major damage
  - Windows and external doors should be in a good condition and secure (with grills and/or locks)
  - Floor should be dry and reasonably levelled and smooth
  - With fire extinguishers and those that have been tested in the past 12 months
  - Electrical system quality and condition should be satisfactory
  - Drainage system working (both rainwater and foul drainage)
  - Working air-conditioning system (for hot climate)

Of all the 114 sites assessed, only 16 facilities scored good, while the rest 98 facility buildings scored poorly. Out of these 16 vaccine stores, 13 were HFs . HF level scores were better than GMSDs, SVS, DiviVS and DVS.

Out of the 16 State Vaccine Stores, only three scored more than 80%, while the rest scored less than 80%. Similarly, seven out of the 28 DVS scored more than 80%, while the rest were below 80%. Jammu and Katihar (Bihar) DVS scored zero. The details of the number of buildings of the vaccine stores at the district level and above which were below the acceptable limit:

- In UP, 14 out of 15 stores scored less than 80%, of which the worst performing stores were Lucknow SVS , Kanpur DiviVS, and DVS of Sitapur, Basti and Kanpur Nagar.
- In Karnataka, five out of five scored less than 80%, with the worst performing store being the Ramanagar DVS.
- In Bihar, six out of seven stores scored less than 80%, with the worst performing store being the Katihar DVS.
- In Rajasthan, five out of six scored less than 80%, with the worst performing store being the Bikaner DiviVS.

Figure 11: Vaccine store building status, DVS (E4 03a)



Well-organised vaccine store building of Haryana

Dry storage building

The building should be easily accessible by road for delivery vehicles and should be secure. Scores for separate dry storage building was much below 80% for all level of stores. GMSDs and divisional level of stores scored the lowest. The dry storage buildings of the divisional level and above were below the acceptable limit:

- In UP, six out of 10 vaccine stores (Basti DiviVS, Meerut SVS, Azamgarh DiviVS, Kanpur DiviVS and Moradabad DiviVS)
- All three stores in Bihar (Patna, East Champaran and Purnia Divi VS)
- In MP, one out of three stores (Indore SVS)

- Both the stores in Karnataka (Bengaluru SVS and DiviVS)

None of these stores had climate compatible storage sites to store syringes and droppers.

Access to dry storage sites at Kolkata and Karnal GMSD

Condition of dry storage sites at Kolkata and Chennai GMSD

Dry storage site of SVS Lucknow

Well organised dry storage site of RVS Lucknow

Telecommunication facility

Scores for tele-communication of vaccine stores required significant improvement. Though the majority of the GMSD and DVS had telephones the SVS and DiviVS stores in most of the states were without dedicated telephone or internet connection. Communication from these stores became challenging without this facility. [Only 36% of DiviVSand 44% SVS had working communication links.]

Table 20: Acoustic alarm status in WIC-WIF

	Location	WIF		WIC	
		No.	Functional Alarms	No.	Functional Alarms
GMSD	Karnal	3	0	2	0
	Mumbai	5	3	3	2
	Kolkata	5	5	4	2
	Chennai	2	2	3	0
	Total	**15**	**10**	**12**	**04**
SVS/RVS	Agartala	1	0	2	0
	Bengaluru	1	0	2	0
	Delhi	0	0	2	0
	Jaipur	1	1	2	2
	Patna	2	1	3	0
	Raipur	0	0	2	1
	Trivandrum	0	0	1	0
	Agra	1	0	1	0
	Gwalior	1	0	1	1
	Indore	1	1	2	1
	Jabalpur	1	1	1	1
	Jammu	1	0	2	0
	Lucknow	1	0	2	0
	Meerut	1	0	1	0
	Srinagar	0	0	2	0
	Varanasi	1	0	2	0
	Total	**8**	**2**	**14**	**3**
DiviVS	Ajmer	0	0	2	0
	Allahabad	0	0	2	0
	Azamgarh	0	0	1	1
	Bagarkot	0	0	1	1
	Basti	0	0	1	0
	Bikaner	0	0	1	0
	Jaipur	0	0	1	0
	East Champaran	0	0	1	0
	Gurgaon	0	0	1	0
	Kanpur	0	0	1	0
	Kurukshetra	0	0	1	0
	Lucknow	0	0	1	0
	Moradabad	0	0	1	1
	Purnia	1	0	1	0
	Total	**1**	**0**	**16**	**3**
Grand Total		**14**	**4**	**44**	**9**

Functional alarm system: 13 out of 58 i.e., 22.4%

A poorly maintained WIC in Jammu

A well maintained ILR and DF in Tripura PHC

In all four GMSDs, scores for continuous recorders of temperature and working thermometers were grossly inadequate, which was below the acceptable limit. Out of the 27 WIC/WIFs in the four GMSDs, the alarm systems of only 14 WIC-WIFs were found to be functional. The maximum number of functional alarms were found in Kolkata (7 out of 9), whereas, Karnal does not have any alarm system. This is a very risky situation as the vaccine getting exposed to a harmful temperature range may be missed by store managers.

Equipment

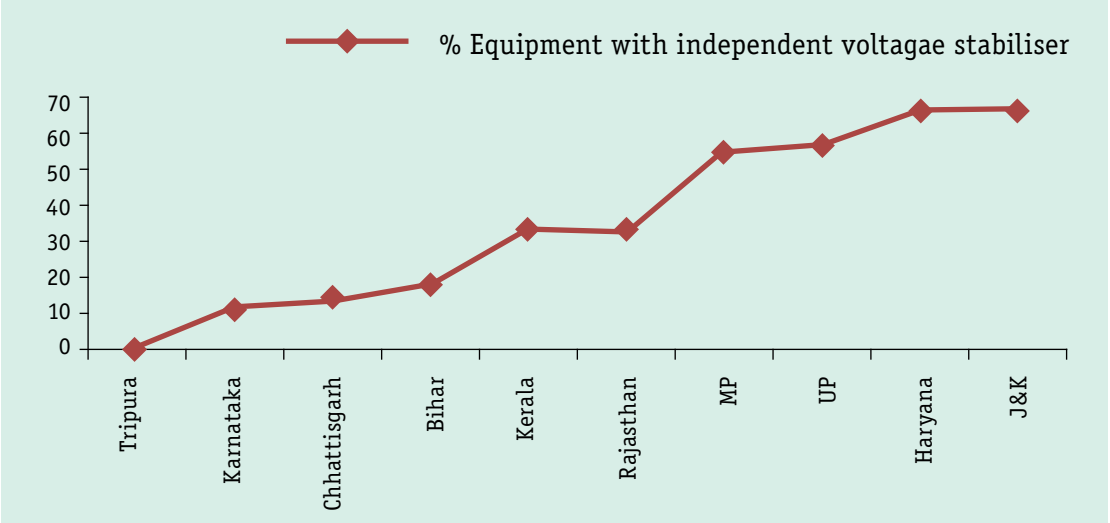
ILRs and DFs at the district level and below did not have independent voltage stabilisers in more than 45% sites. This might affect the efficient functioning of the machines. Heading – Equipment with independent voltage stabilisers

Functional working generator with enough fuel was observed in 43% SVS, 49% DVS and 57% DiviVS. Correct spelling of Voltage 1. Add s to Stabiliser (chart bottom) 2. Delete extra space b/w independent & voltage

Transport

There was no refrigerated vaccine van in any of the 114 sites visited by the teams. Vaccines were transported to the states by the GMSDs through hired refrigerated trucks (which could not be assessed by the team) through thermocol boxes andCBs. More than 36% (21/58 district level and

Figure 12: Equipment with independent voltage stablisers (%) (Only in the assessed sites)



Box 5: Main issues identified

- The majority (12/16 states and 15/28 districts) of vaccine store building, equipment and transport indicators scored below 80%.
- The majority (98/114) of the vaccine store buildings in most of the states scored below the acceptable 80% level.
- Dry storage space especially in GMSDs, state and divisional stores was found to be inadequate, not climate compatible and not easily accessible.
- More than 45% vaccine stores at the divisional level and above did not have proper (standard) thermometers and continuous temperature records.
- Voltage stabilisers were missing for around half of ILRs/ DFs.
- A functional alarm system was available in less than 50% WICs/ WIFs.
- Only 36% of the divisional, 44% of the state and 56% of the DVS had functional communication links (telephone and internet).
- Functional generators with enough fuel was found in 43%SVS, 49% DVS and 57% DiviVS.
- Vaccine transport facilities were not available in 24% and inadequate in 44% vaccine stores at the district level and above.

above stores excluding GMSDs) had their own transport in a good condition. While 44% (22) had transport in poor condition, 24% (14) did not have any transport for vaccines.

5. Maintenance of Buildings, Equipment and Transport

To ensure the safety of vaccines till final utilisation, the building, equipment and transport vehicles need to be maintained and upgraded periodically. Hence, it is important to ensure that:

- A periodic preventive maintenance plan for building, equipment and vehicles is in place and being implemented with maintenance agreement, service records as well as visual evidence.
- An arrangement is in place to carry out prompt repairs of equipment and vehicles in case of any failures.

Table 21: Summary scores

Vaccine Store	4 GMSDs	16 SVS / RVS	14 DiviVS	28 DVS	52 HFs
Score	59%	57%	59%	57%	49%

Findings

The performance scores for the maintenance of buildings, equipment and transport were influenced by the following five critical aspects which are highlighted in light blue.

An effective PPM programme for buildings should cover several years into the future and should set target dates for routine maintenance such as re-decoration, electrical safety inspections, fire-extinguisher maintenance, etc. If

Table 22: Indicator wise salient scores

Indicator	Aspects	4 GMSD	18 SVS/ RVS	14 Divisions	28 Districts	52 HFs
E5_01a	Planned Preventive Maintenance (PPM) for building exists and is followed - reports available.	17%	23%	17%	15%	23%
E5_02a	PPM for equipment exists and is followed - reports available. Staff assigned	25%	28%	41%	39%	37%
E5_03a	PPM for vehicles exists and is followed - service logs available.	0%	27%	14%	14%	
E5_04a	Operation status of WIC / WIF equipment	95%	87%	88%		
E5_05a	Operation status of ILR / DF equipment	0%	67%	64%	89%	86%
E5_06a	Operation status of IP freezers	100%	75%	59%	75%	
E5_07a	Any delay - cancellation of deliveries due to transport problem.	25%	75%	71%	88%	

Red - <60%, Orange – 60-79% and Green - >80%

an effective maintenance programme is in place, the building should be in good condition. Indicators of poor building maintenance include broken light bulbs, leaks and damp stains, blocked drains, flaking paintwork, etc. PPM should be recorded in a maintenance record book or worksheet. A permanent member of the facility staff must be formally assigned to carry out the tasks below and these should not be left to ancillary staff such as cleaners.

- Check for excessive ice accumulation on evaporator units or the inside lining. Ice accumulation or condensation along the panel joints in cold rooms and freezer rooms is a sign that panel joints are leaking or poorly designed.
- Some flooded batteries (not sealed) require regular checking of electrolyte levels and topping up with distilled water.
- All solar panels should be cleaned from time to time to maintain efficiency. This is particularly important in places with excessive dust or snow.

The performance score was close to 60% at state and division level, but poor at districts and HFs. It was particularly weak at the district level. The average scores for PPM of the buildings was 19% and for equipment 34% for all sites. Equipment AMC was available only at Kolkata and Chennai GMSD. In Kolkata, the AMC with Voltas had expired in October 2012 and in Chennai, the AMC was only for WIF and not for WIC. At several sites it was observed that regular maintenance and cleaning was difficult due to the large number of stocks. Scores for PPM for vehicles for vaccine transportation along with available service log book was extremely low at 14%.

Out of the 61 WICs working in the GMSDs, SVS and DiviVS which were assessed, 46% were less than 10 years old, 9% were between 10-20 years old and 39% were more than 20 years old.

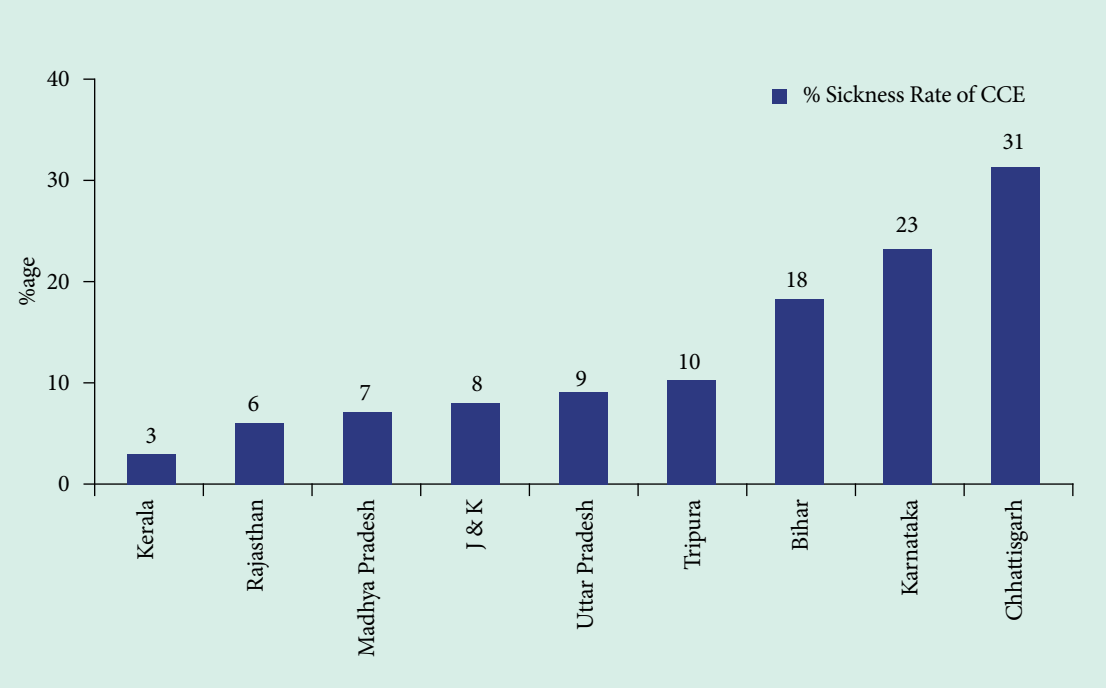
Table 23: Assessment of WICs

Age of WICs in GMSDs, SVS/DiviVS (Total - 61)	< 10 years	28 (46%)
	10 - 20 Years	9 (15%)
	> 20 years	24 (39%)

GMSD Karnal had a big concrete cold room that was more than 45 years old and the second WIC was more than 12 years old. Three cold rooms were hired from an agricultural storage facility that lacked a good temperature control system. Kolkata GMSD had one WIC which was more than 30 years old that needed replacement. GMSD Chennai had a more than 50 years old concrete cold room and two Blue Star WICs that were more than 15 years old. One WIC in Mumbai GMSD was more than 25 years old. Similarly, several WICs of Uttar Pradesh (UP) were more than 27 years old (Kanpur, Lucknow, Moradabad and Agra). Patna and Purnia SVS of Bihar, Gwalior, Indore of MP, Ajmer SVS of Rajasthan had WICs more than 28 years old and WIC of Bengaluru SVS of Karnataka was more than 21 years old. The summary table on WICs includes the details of WICs.

On analysing the sickness rate of equipment at the sites assessed, it was revealed that ILR/DF sickness rate was very high in Chhattisgarh, Bihar, MP, UP and Rajasthan against the GoI permissible limit of 2%.

Figure 13: State-wise % sickness rate of CCE



Box 6: Major issues identified

- The average score for PPM was 19% for the buildings and 34% for the equipment.
- There was no uniformity across the country regarding AMCs/ Comprehensive Maintenance Contract (CMCs)/PPM for the equipment.
- The majority of the WICs of GMSDs, SVS and DiviVS were more than 20 years old with concrete cold rooms in GMSDs even up to 50 years old.
- CC sickness rate was very high for ILRs and DFs in Bihar, UP, MP, Rajasthan and Chhattisgarh.

6. Stock Management System & Procedures

In order to maintain the quality of vaccines and consumables throughout the CC , it is essential to keep complete and accurate records of all stocks and their transactions. A stock control system comprises of several steps, each of which must be performed regularly, accurately and completely. Here the following aspects were assessed:

- A standardised recording and reporting system, preferably computerised at the primary level was in place and was being followed
- All lots of vaccines, diluents and consumables were recorded at the time of arrival, distribution and dispatch along with all their salient parameters
- Proper requisition and receipt forms were in place
- Deliveries were made following EEFO
- Storekeepers knew when to override EEFO based on (VVM) status
- Every delivery had its respective issue voucher and these matched with the stock record entry
- Arrival vouchers were complete with arrival details
- Peak and minimum levels were defined and stocks of vaccines and diluents were maintained within these levels
- There were no instances of stock-outs or short shipments
- Periodic physical inventories conducted and physical verification matched with stock records
- Good warehouse practices were followed
- Internal reviews of damaged vaccines were implemented
- Standard recording system was in place for safe disposal of damaged or expired stock
- All stocks and records were safe.

Table 24: Summary scores

Vaccine Store	4 GMSDs	16 SVS / RVS	14 DiviVS	28 DVS	52 HFs
Score	57%	55%	48%	46%	44%

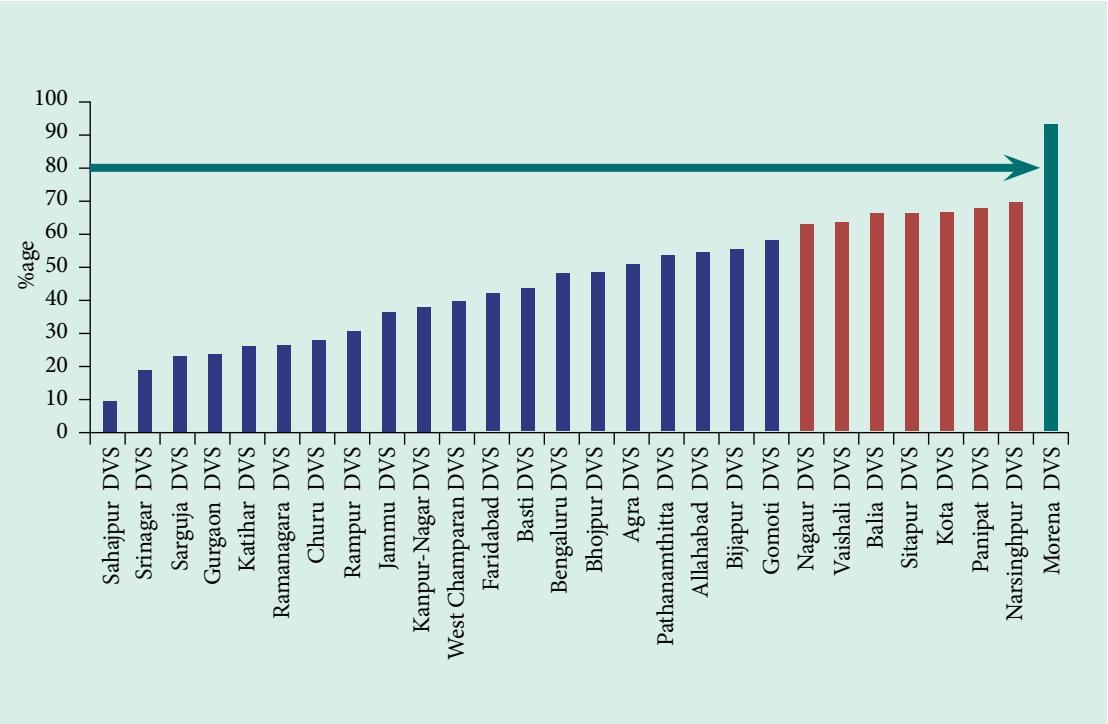
Findings

The following 12 critical aspects highlighted in light blue influenced the performance scores for stock management system and procedures.

Table 25: Indicator wise Score

Indicator	Aspects	4 GMSD	18 SVS/ RVS	14 DiviVS	28 DVS	52 HF
E6_02a	Computer software, system, back-up etc., are adequate	33%	19%	0%	2%	
E6_03a	Are all transactions updated in 1 day	100%	75%	86%	79%	71%
E6_04a	Are all salient vaccine parameters recorded	78%	70%	60%	56%	52%
E6_05a	Are all salient diluent parameters recorded	57%	46%	35%	34%	27%
E6_06a	Internal distribution reports exist	100%	63%	43%		
E6_07a	Requisition/ indent form used for ordering vaccines	0%	75%	64%	57%	63%
E6_08a	Pre-delivery & pre-collection information	50%	56%	79%	46%	63%
E6_09a	EEFO is being followed.	50%	69%	64%	64%	50%
E6_10a	VVM used as exception to follow EEFO	100%	81%	71%	79%	73%
E6_11a	Are there issue vouchers for every delivery	75%	88%	71%		
E6_12a	Issue vouchers match delivery records	100%	100%	79%		
E6_13a	Are there arrival vouchers for every delivery	25%	69%	79%	71%	52%
E6_14a	Arrival vouchers have completed arrival section	50%	56%	43%	57%	35%
E6_15a	Damaged or expired stock is properly recorded and disposed off in accordance with standing orders	100%	38%	36%	29%	23%
E6_16a	Has there been any damaged vaccine	75%	38%	36%	18%	10%
E6_17a	Disposal facility in accordance with national / WHO norms	75%	31%	14%	32%	33%
E6_18a	Discard records kept for 3 years	100%	19%	21%	25%	8%
E6_19a	Internal review of vaccine loss carried out	50%	13%	7%	21%	13%
E6_20a	Peak, reorder and minimum levels are defined. Stocks were within the peak and minimum level	0%	14%	10%	7%	NA
E6_21a	Instances of stock-outs - or short-shipments	0%	38%	29%	45%	43%
E6_22a	How frequently is the physical inventory carried out	0%	31%	29%	50%	52%
E6_23a	Vaccines - Does the physical check match with stock records?	50%	64%	54%	60%	50%
E6_24a	Consumables - Does the physical check up match the stock records?	50%	69%	34%	62%	46%
E6_25a	Vaccines - Good warehousing practices must be followed	45%	66%	69%	59%	67%
E6_26a	Consumables - Good warehousing practices must be followed	31%	47%	43%	40%	64%
E6_27a	Are the records secured?	100%	94%	100%	96%	87%

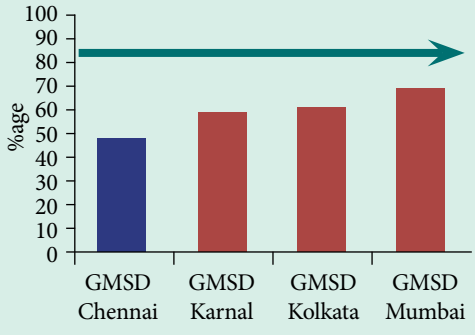
Figure 14: Stock management scores DVS-E6



The average performance score of this indicator was 51% at GMSD, SVS, DiviVS and DVS, and it dropped to 44% at the HF level. The performance level was poor across all levels and it was below 60%.

In India, 80% of the vaccine supply to the states was delivered directly by the manufacturers. GMSDs kept 20% of the requirement of these states as buffer stock. In addition to certain campaign vaccines and syringes, the GMSDs were expected to keep six months of the syringe stocks/ requirements for the states and all CCE and spare parts for further distribution.

Figure 15: Stock management score of GMSDs-E6

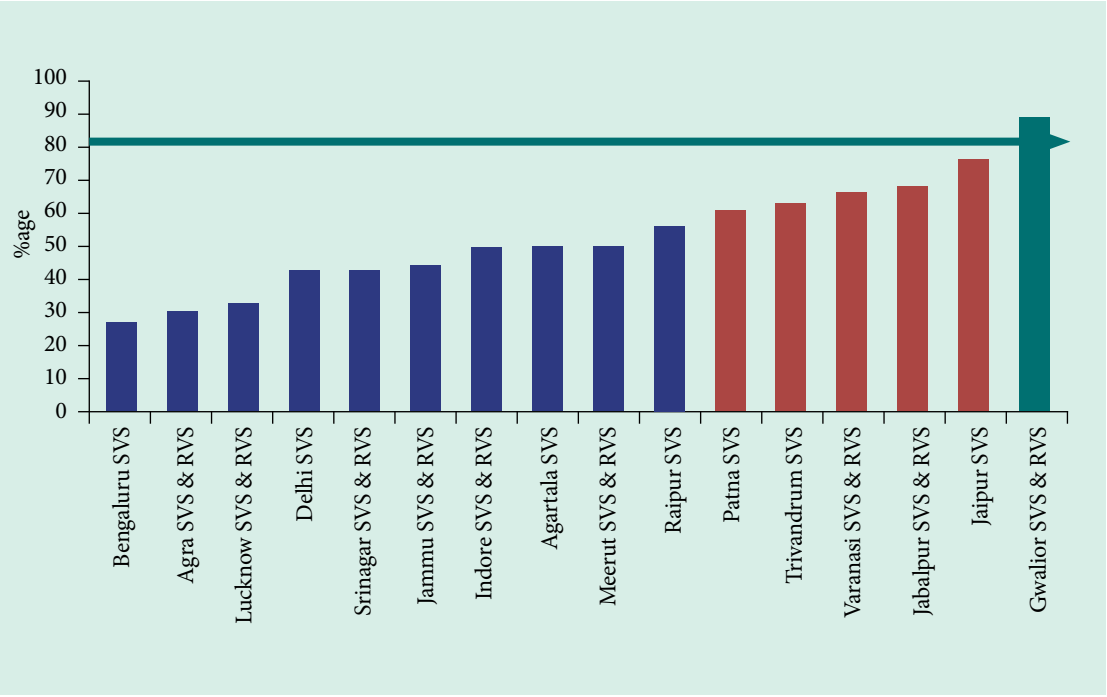


Government Medical Stores Depots

The role of GMSDs in stock management is limited to storing items (ncluding vaccines) received from suppliers/ manufacturers and releasing/ transporting items to states as per instructions received from the immunisation division. GMSDs do not forecast requirements or procure immunisation supplies. The MoHFW manages this.

Scores for stock management all the four GMSDs were below 80% and except Mumbai, the rest of the three GMSDs scored less than 60%. Chennai scored the lowest in stock management.

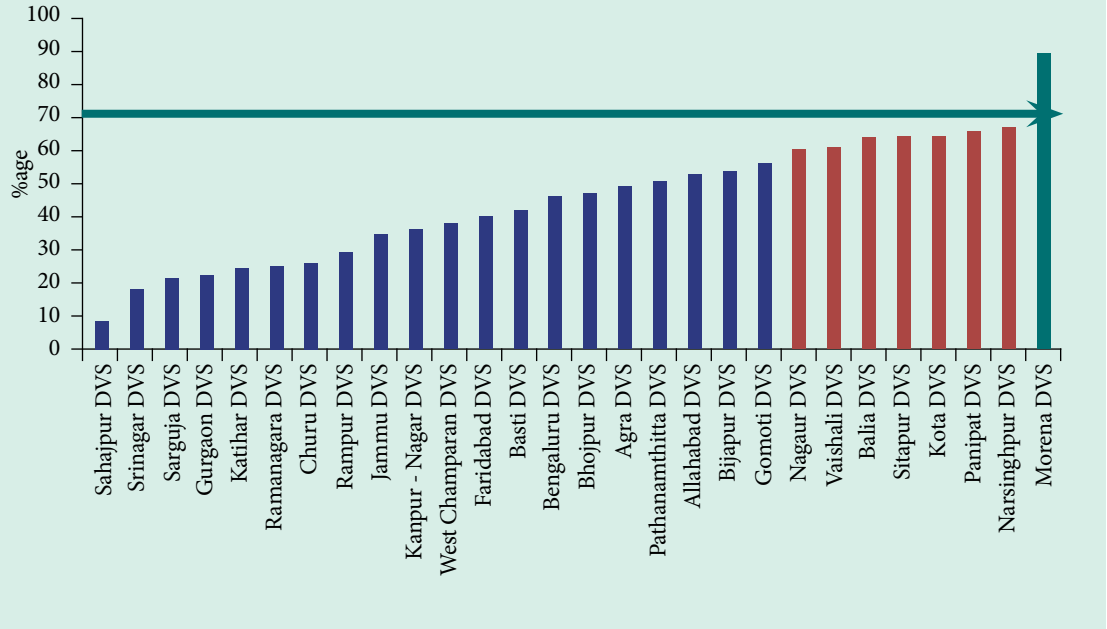
Figure 16: Stock Management Scores of SVS-E6



Out of the 16 SVS/RVS assessed, all except Gwalior had stock management performance score of less than 80%. Bengaluru SVS had the lowest score of 29% and Gwalior had the highest score of 93%.

Out of 28 DVS assessed, 27 had performance scores of below 80% and 20 had scores less than 60%, which signify that vaccine management performance was poor across all the states at the district level. Sahajpur

Figure 17: Stock management scores of DVS-E6



DVS had the lowest scores of 9% vs 92% in Morena. Both these vaccine stores were in MP.

GMSDs were receiving vaccines from manufacturers at the rate of one or two independent arrivals every week. GMSD Kolkata received 124 independent vaccine arrivals in the one-year review period. Similarly, several states received a very high number of arrivals, compared to the infrastructure and human resources available with them.

Some of the aspects of vaccine management that were very critical for safe immunisation programmes scored at a very low level such as:

- All parameters of vaccines (type of vaccine, vial size, quantity received, vaccine manufacturer, batch number, expiry date of each vaccine batch, VVM status and location in the store) were not recorded and the performance score ranged between 52-60% at PHC and DVS.
- Diluent record keeping was poor at all levels. Records of all diluents packed separately from the vaccine to which they belonged, need to be maintained with the following information:
  - Type of diluent
  - Diluent presentation (vial size)
  - Quantity received in doses
  - Diluent manufacturer
  - Manufacturing batch or lot number
  - Expiry date of each batch
  - Location in the store
- Performance score in this regard was very low at 27% for PHC level and 34% at DVS level. In such situations, the chances of issue of wrong diluents would be very high and that could lead to avoidable Adverse Effect Following Immunisation (AEFI).
- Damaged or expired stocks of vaccines need to be properly recorded and disposed as per Central Pollution Control Board (CPCB) guidelines. Both these parameters scored extremely poor at all levels, except GMSDs. The performance scores were the lowest the the level of PHC and DVS, where chances of AEFI were the highest.
- GMSD-Kolkata had informed MoHFW of expired DPT vaccines, asking for instructions for their disposal. Instructions were still awaited. Performance scores for recording of damaged vaccine were very low at 10% at PHCs, 18% at the DVS and 36%-38% at the DiviVS and SVS.
- Internal reviews of vaccine loss were rarely carried out. Performance scores were: PHC-13 %, District -21%, DiviVS-7% and SVS-13 %.
- The maximum and minimum levels for vaccines were not defined at any level. Stocks were observed in several sites either at the maximum or at the minimum level. The performance scores were: DVS-7%, DiviVS 10%, SVS-14% and GMSD-0%
- There had been several instances of stock-outs of several vaccines at various levels. During the review period, the stock-out of at least one vaccine was recorded in:
  - 32 out of 52 HFs
  - 17 out of 28 DVS
  - 11 out of 14 DiviVS
  - 12 out of 16 SVS

The performance scores at all levels was much below the accepted level of 80%. The scores were: GMSD - 0%, SVS - 38%, DiviVS - 29%, and DVS- 45% and PHC- 43%.

In all GMSDs, the buffer stock for DPT was always below the required level (20% of all

Figure 18: Stock movement of DPT

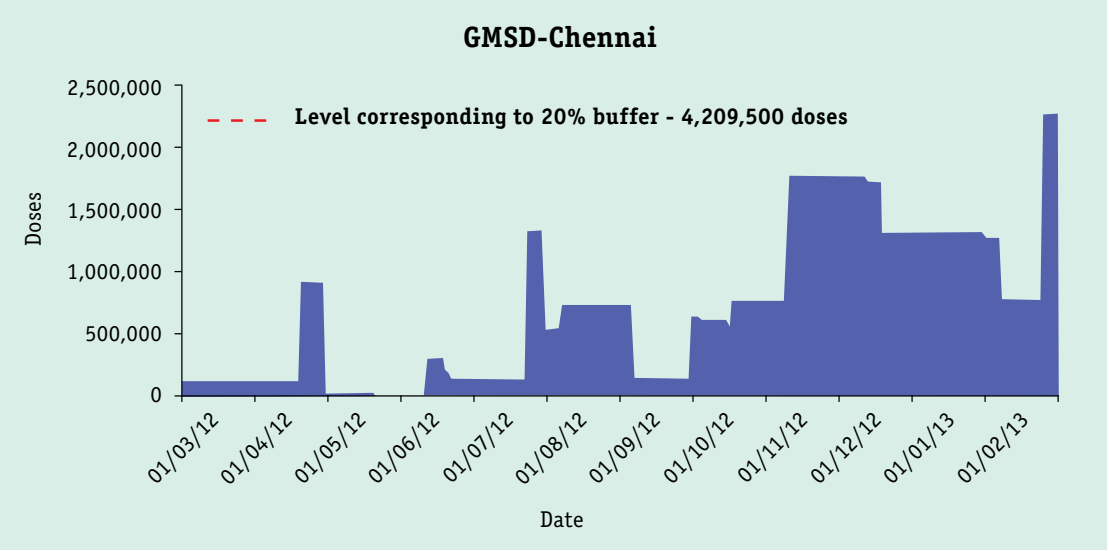


Figure 19: Stock movement of DPT

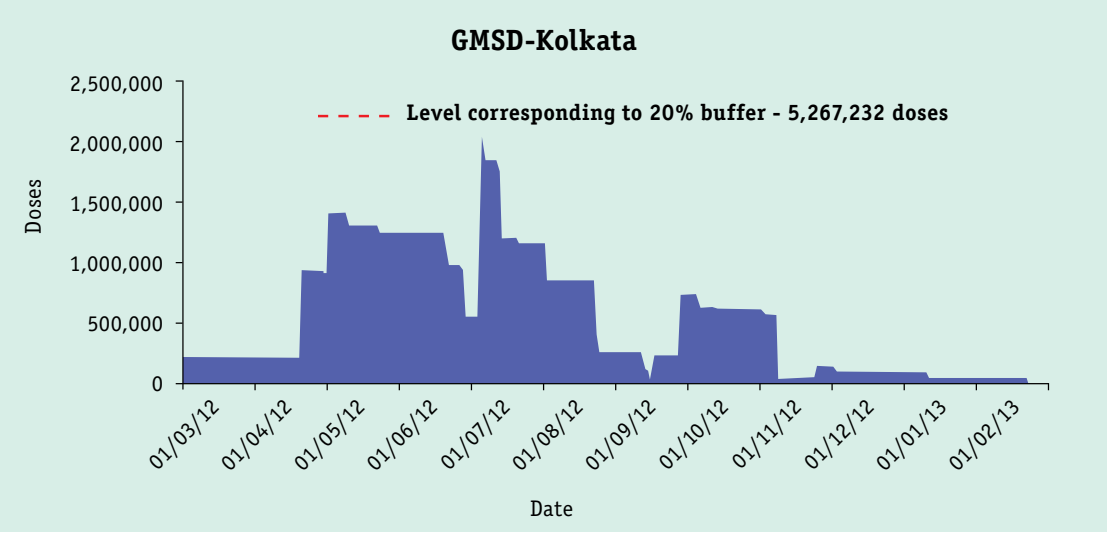


Figure 20: Stock movement of DPT

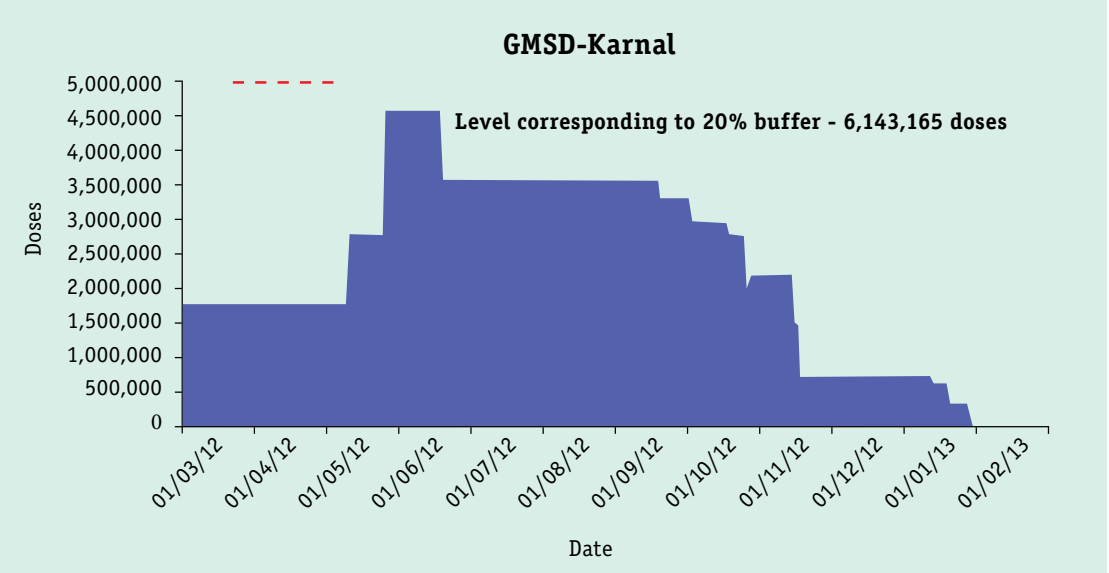
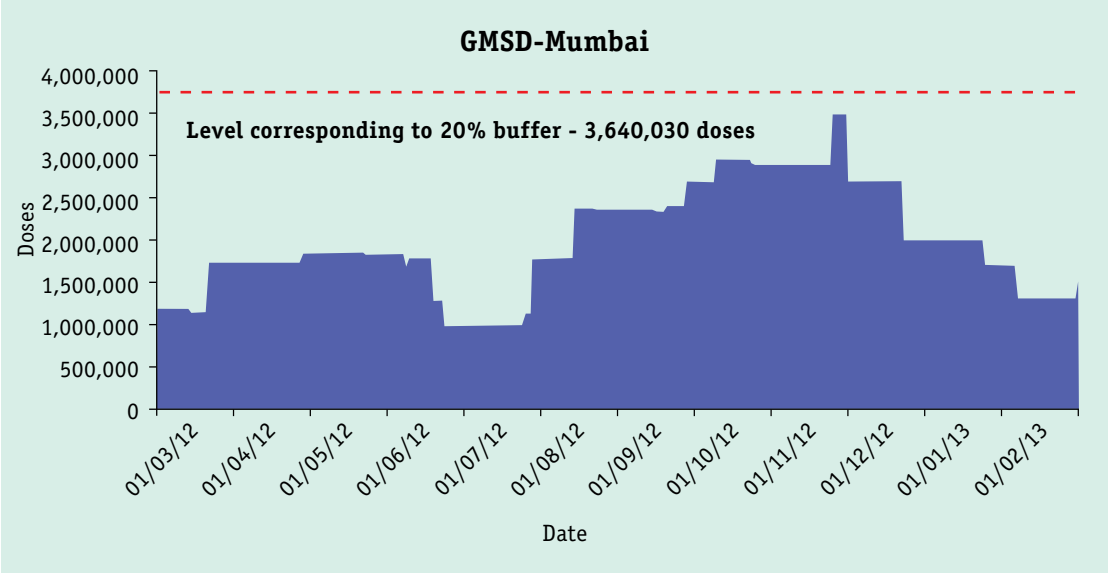


Figure 21: Stock ovement of DPT



stocks needed by states) throughout the review period. There had been an instance when the stock-out lasted for 58 days.

Box 7: Major issues identified

- Lack of standard vaccine management records (for indent, stock and issue) at all levels including GMSDs.
- All levels of vaccine stores did not define a maximum and minimum level for vaccines and diluents.
- All key parameters of vaccines and diluents were not recorded
- Lack of recording of damaged or expired vaccines and their disposal as per CPCB guidelines.
- Internal reviews of vaccine loss were rarely carried out.
- Stock-out of vaccines (lasting several weeks) was found at all levels.
- Real time monitoring of vaccines was missing due to lack of online vaccine management system.

There is a need to improve the physical inventory of the vaccines and physical checks to match the stocks in records. Different types of formats of record books were used at different levels of various stores. However, the Bin card system of GMSDs was good. SVS and vaccine stores below it required to have a standard documentation system for vaccine management. Use of online real time vaccine logistics management system did not exist at any level in all 114 sites that were assessed. In GMSDs, ProMIS was used, but it did not capture all the information required for vaccine stock management.

7. Effective Distribution between each supply chain level

For an effective immunisation programme, timely deliveries of the required quantities of vaccines are important. The parameters assessed here ensured the effectiveness of the vaccine distribution between each level of the supply chain. These were:

- The vaccine distribution plan existed, implemented in a timely fashion and was monitored
- A system to manage short shipment was in place

- Vaccines were correctly packed during transport
- Freeze indicators (FI) were used correctly to monitor the quality of the transport
- Received vouchers had VVM and FI information
- A system was in place to take corrective action effectively, in case of vaccine damage during transport
- Emergencies during transport were managed well.

Findings

The following six critical aspects that are highlighted in light blue influenced the performance scores for efficient distribution.

Table 26: Summary scores

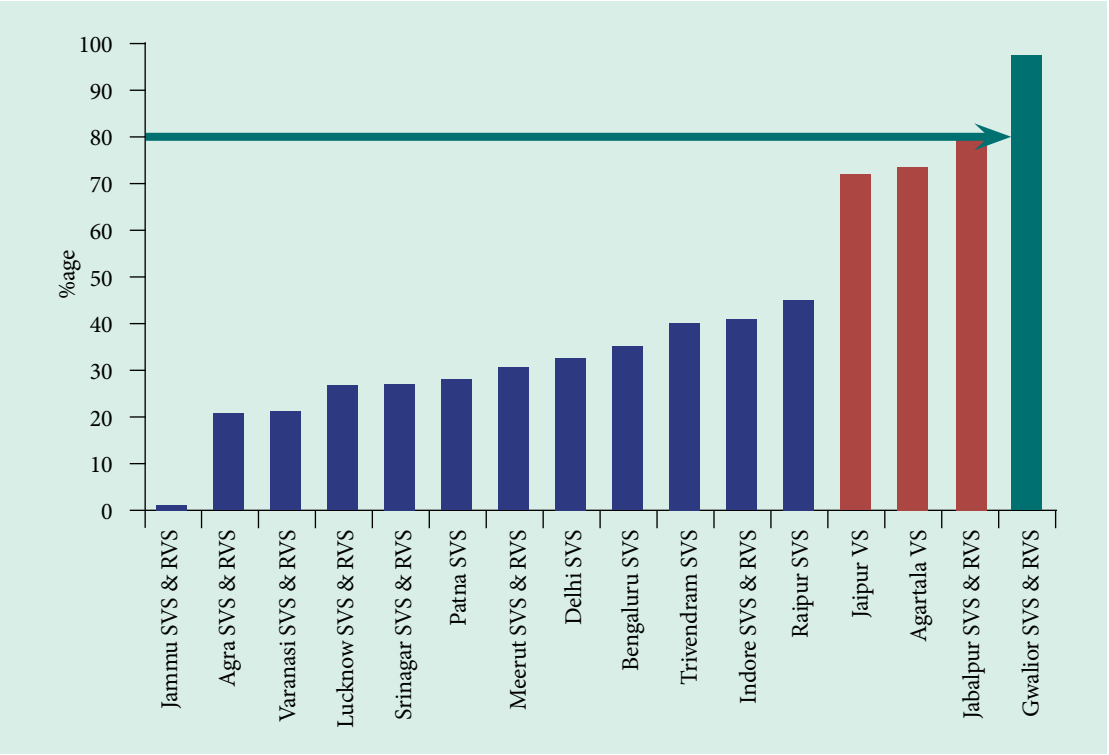
Vaccine Store	4 GMSDs	16 SVS/ RVS	14 DiviVS	28 DVS	52 HFs
Score	21%	41%	40%	42%	77%

The performance was below the acceptable level at every level except at the level of the HF. The performance score of GMSDs was also much below the 80% acceptable level. However, distributions from the GMSDs were mostly regulated by the MoHFW.

Table 27: Indicator wise Score

Indicator	Aspects	4 GMSDs	18 SVS/ RVS	14 DiviVS	28 DVS	52 HFs
E7_01a	Distribution reports demonstrate compliance with the planned delivery schedule.	0%	25%	14%	18%	
E7_02a	Actual deliveries conducted according to plan.	0%	19%	7%	18%	
E7_03a	The deliveries occurred in a timely manner.	0%	25%	13%	14%	
E7_04a	There is reporting of actual delivery and comparison with plan	0%	13%	14%	11%	
E7_06a	Correct conditioning of ice packs and packing of CBs.	13%	53%	57%	70%	65%
E7_07a	Correct use and transport using refrigerated vehicles.	0%	0%	0%		
E7_10a	FIs used with every transport	0%	3%	13%	3%	
E7_11a	Do received vouchers have VVM and FI information	0%	12%	8%	4%	
E7_12a	Vaccine loss due to transport is <1% How is the loss managed	75%	94%	86%	89%	90%
E7_13a	Emergency during transport is managed well	33%	42%	40%		

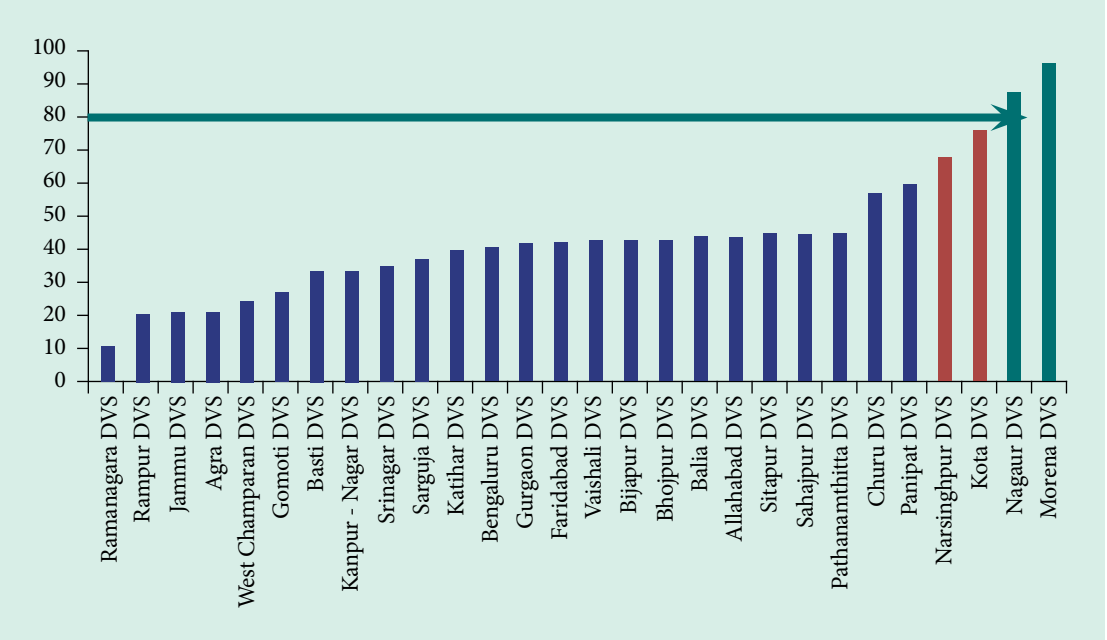
Figure 22: Effective Vaccine Distribution Scores of SVS



States

Out of the 16 SVS, none except the Gwalior SVS scored more than 80%. SVS of Jaipur (Rajasthan), Agartala (Tripura), Jabalpur (MP) scored close to 80%. All the SVS of UP, Bihar, Karnataka, Kerala and J&K scored even less than 40%.

Figure 23: Effective Vaccine Distribution Scores - District Stores



Districts

Similarly, out of 28 DVS, only two had a performance score of 80% and above. These were Nagaur of Rajasthan and Morena of MP. Twenty-two stores scored below 60% and 16 of these scored below 40%. The performance scores signified that there were serious concerns needing immediate improvement in the distribution system both at the state and at the district level.

Out of 16 SVS, distribution reports demonstrating compliance with the planned delivery schedule were seen only in SVS Agartala, Gwalior, Jabalpur and Jaipur. Similarly, out of 28 DVS, only five i.e., Kota, Churu, Nagaur of Rajasthan and Morena and Narsinghpur of MP had compliance as per planned distribution.

Box 8: Major issues identified

- Distribution reports did not reflect the planned delivery schedule.
- The deliveries were not taking place in a timely manner (maximum performance score was only 25%).
- Incorrect conditioning of ice packs and packing of CB was seen at GMSD, SVS andDiviVS, which validate the findings of the ICMR temperature monitoring study.
- FIs were not used with every transport and this validates the Indian Council of Medical Research (ICMR) study finding of exposure of vaccines to sub-zero temperatures during transportation.
- All vouchers did not have information on VVM status and a lot of other required information.
- Contingency plans to manage emergencies during transport were not found in most locations.

8. Vaccine Management and Handling

This criterion is essentially applied to the service delivery level. Only six out of 16 questions were applied at the SVS, RVS and DVS. For the proper vaccine management and handling, several parameters were assessed:

- Knowledge and proper use of VVM and "shake" test by the staff
- The freeze dried vaccines and their corresponding diluents were correctly ordered, received, stored and distributed
- The vaccines were always used with their corresponding diluents
- Diluents were maintained at +2°C to +8°C, which is the same as the vaccine before reconstitution
- The reconstituted vaccines were discarded within four hours of reconstitution or at the end of each immunisation session, whichever came first.
- The Multi Dose Vial Policy (MDVP) was implemented correctly.
- A vaccine wastage monitoring system was in place
- Reporting forms were used to monitor vaccine wastage
- Wastage used to make necessary corrections when re-ordering vaccines
- Regular supportive supervision existed
- An effective system for disposal of used sharps and vials existed

Findings

Table 28: Summary scores

Vaccine Store	4 GMSDs	16 SVS/ RVS	14 DiviVS	28 DVS	52 HFs
Score	29%	50%	35%	47%	67%

The following 11 critical aspects that are highlighted in light blue influenced the performance scores for vaccine management and handling.

Table 29: Indicator wise salient scores

Indicator	Aspects	4 GMSD	18 State / RVS	14 DiviVS	28 DVS	52 HFs
E8_01a	Knowledge and use of "shake" test	8%	36%	31%	38%	19%
E8_02a	Vaccine and diluent of same manuf. used	NA	NA	NA	NA	71%
E8_03a	Diluents are kept in CC before use	NA	NA	NA	NA	94%
E8_04a	Opened reconstituted vials discarded as per rule	NA	NA	NA	NA	98%
E8_05a	VVM instructions/ posters available	50%	63%	43%	57%	42%
E8_06a	Knowledge of VVM	75%	100%	86%	93%	100%
E8_07a	All vaccines in VVM usable stage	NA	NA	NA	NA	100%
E8_08a	Knowledge of use of VVM for vaccines management	NA	NA	NA	NA	94%
E8_10a	MDVP knowledge good	NA	NA	NA	NA	19%
E8_11a	MDVP implementation correct	NA	NA	NA	NA	17%
E8_12a	Periodic immunisation report	50%	20%	4%	15%	10%
E8_13a	Wastage rate computed and used	0%	13%	0%	12%	3%
E8_14a	Supportive supervision	25%	56%	29%	50%	54%
E8_15a	System of collection and disposal of sharps and syringes	NA	NA	NA	NA	50%
E8_16a	System of disposal of vials	NA	NA	NA	NA	48%

The performance score was below 80% at all levels, though at 67% it was the highest at the HF level and the lowest at the division and GMSD level.

Knowledge and use of VVM was excellent at all levels. However, it was poor for the "shake" test. All vaccines used in the field were of usable VVM. Out of 28 DVS, only three (Allahabad (UP), Morena (MP) and Bijapur of Karnataka) had a good wastage reporting system and used it for planning.

The performance score for supportive supervision was variable at different levels and it varied between 25-56% with the lowest at GMSDs.

Box 9: Major issues identified

- Though knowledge and use of VVM was excellent at all levels, knowledge and use of the "shake" test was not up to the mark.
- Only three out of 28 districts had a good reporting system for vaccine wastage that was being used for planning.
- System of collection and disposal of sharps and syringes was poor.
- Disposal of vaccine vials was not practised across all levels.

9. MIS and Supportive Management Functions

This criterion is essentially applicable at the primary (national or state) level. Only four out of 18 questions apply at the RVS and DVS level. It was not applicable and, therefore, not scored for the HF level, although marked as 0 in the spider graph. The aspects evaluated here were:

- Suitable SOPs and training materials existed
- Vaccine and syringes forecasting was based on evidence based data
- Field data on wastage was collected and the same was used for programme management purpose
- A CC and vehicle inventory existed and was updated
- An annual work plan was in place
- Out-sourced services were fully funded; adequate agreements were in place.

Findings

The scores were between 50-64% at the state and district level. GoI had SOPs based on WHO recommendations and these were updated from time to time. The quality of training materials used for CC and vaccine management was good. The MoHFW had developed several manuals, which formed part of the teaching aids, guidelines and SOPss.

They were supplied to the states for further distribution and use at respective levels. Some of the important documents directly related to or covering the Vaccine and CC management were:

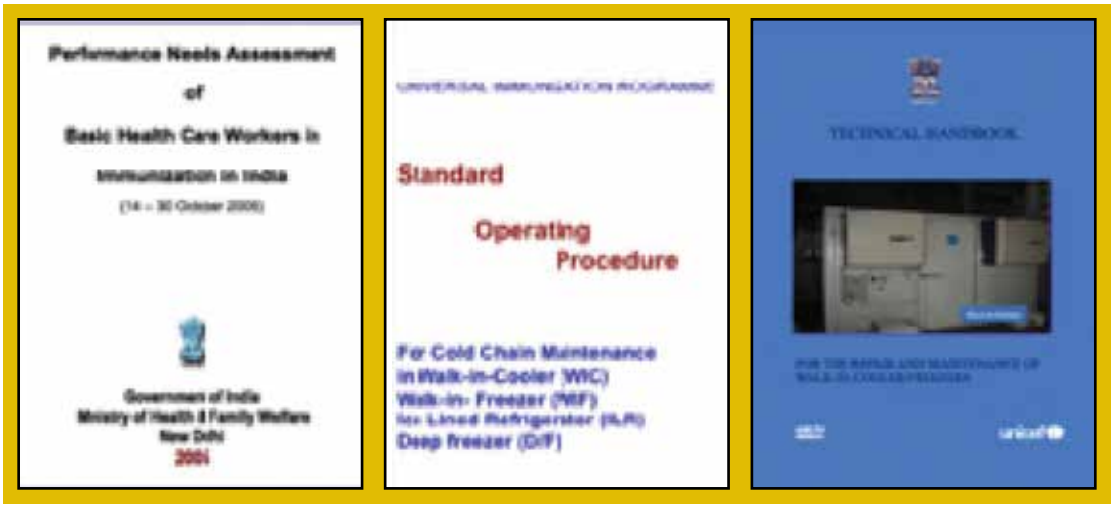
1. Handbook of CC and Vaccine Handlers.
2. Immunisation Handbook for Medical Officers and Health Workers
3. Several other technical manuals.

Table 30: Summary scores

Vaccine Store	4 GMSD	16 SVS/ RVS	14 DiviVS	28 DVS	52 HF
Score	50%	64%	52%	58%	NA

Table 31: Indicator wise scores

Indicator	Aspect	4 GMSD	18 SVS / RVS	14 DiviVS	28 DVS	52 HF
E9_02a	SOP following WHO recommendations	100%	78%	NA	NA	NA
E9_03a	SOPs are revised/ updated	100%	75%	NA	NA	NA
E9_04a	Copy of SOP	75%	56%	64%	64%	0%
E9_05a	Quality of training material	100%	84%	NA	NA	NA
E9_06a	Training material consistent with WHO/ national recommendations	100%	86%	NA	NA	NA
E9_07a	Vaccine forecasting	NA*	48%	38%	46%	NA
E9_08a	Evidence based method for syringes forecast	NA*	81%	64%	68%	NA
E9_09a	Use of documents on vaccine wastage		5%	NA	NA	NA
E9_10a	CC inventory exists - is regularly updated	94%	58%	Not assessed	Not assessed	Not assessed
E9_11a	Vehicle inventory exists - is regularly updated	25%	31%	Not assessed	Not assessed	Not assessed
E9_13a	Work plan/ Budget includes CCE, vehicles, waste management, staff resource and staff training	58%	80%	Not assessed	Not assessed	Not assessed
E9_16a	Outsourced storage	19%	0%	Not assessed	Not assessed	Not assessed
E9_17a	Outsourced transport	50%	0%	Not assessed	Not assessed	Not assessed
E9_18a	Outsourced equipment maintenance	25%	6%	Not assessed	Not assessed	Not assessed



These were updated, reprinted and distributed as and when GoI and the states identified the need.

The forecast of vaccines at the state level was based on the total and target population obtained from the extrapolation of the 2011 Census. However, the wastage rate was not evidence based and coverage was assumed 100% for all antigens. The state defined the forecast for each level and facility. Evidence based method used for syringe forecasting was low at HFs and the DVS but good at SVS. However, the vaccine forecasting performance score was low at all levels with a range of 38-48%. For vaccine wastage documentation, the performance score was only 5%. Score of CCE inventory was fairly good for GMSDs.

Through National Health Mission of MoHFW, every year the state prepared a work plan and budget in Part C and B of the Programme Implementation Plan (PIP) for the implementation of the upcoming year's immunisation programme. The plan contained the line items that covered all the salient aspects of the programme.

Box 10: Major issues identified

- Quality of CC and vaccine management training material was found to be good.
- Evidence based method was not used for vaccine and syringe forecasting.
- Vaccine wastage data was not being used as it was not recorded and reported.
- The departmental technicians were doing the equipment maintenance in the majority of the stores.

Chapter 4

Detailed Recommendations

The EVM exercise helped to identify the strengths and weaknesses of the current vaccine and CC management system in the country. The performance on the whole was below the acceptable global standard in all the nine criteria of EVM. The performance at the HF level was observed to be better than the upper level of the supply chain. A comprehensive analysis of the weaknesses led to a set of recommendations. Implementing them would ensure improved performance and a greater success of the immunisation programme. The recommendations have been categorised into:

A. Management and policy
B. Human resource
C. Infrastructure (Building, Equipment, Transport and Temperature Monitoring)
D. Planning, documentation and MIS
E. Capacity building
F. Supportive supervision and improvement in practices

In each of these categories, a priority has been defined between 1 and 4 for each recommendation based on the score and criticality of the indicator that affect the CC and vaccine logistics. These are listed below:

Table 33: Category of recommendations

Priority	Activity Time Frame
1	Urgent - To be implemented immediately or within the next 3 months
2	To be implemented within the next 6 months
3	To be implemented within a year
4	To be implemented within the next 2 years

These categorised recommendations would help to draw up an action plan and a road map by the respective authorities at five different levels (National-Immunisation Division MoHFW, GMSD, State, Regional, District and HF) to rapidly implement the corrective actions.

A. Management and Policy

Table 33: Detailed recommendations

Priority	Gaps Identified	Action to be taken
2	1. Lack of minimum standards for different aspects of the immunisation programme to define quality parameters, specifically with the logistics management aspects, both at the national level and within each state. These should include but not be limited to the following: a. The human resource (HR) at the respective level with a clear job description b. System of documentations, record keeping, reporting and feedback c. Storage capacities and stock level policy d. Equipment type and capacity to be used at different supply chain levels e. Ensuring safety aspects for vaccines and HR engaged in WIC/WIF operation and vaccine handling	**Develop National Cold Chain and Vaccine Logistics Action Plan with the following components:** a. Procurement policy of CCE b. Specification committee with technical experts from the programme and experts of CC engineering c. Develop mechanism to assess performance of CCE procured by MoHFW regularly in a testing laboratory of MoHFW/independent lab d. Define norms of CC points and expansion of CC points e. HR Plan with a plan to build capacity to manage the programme at all levels and also follow the safety norms recommended in the occupational health guidelines f. Develop and implement MIS for CC and vaccine management g. Strengthen NCCTC and NCCVMRC for them to play a greater role in CC and vaccine management for MoHFW h. Promote indigenous CCE to ensure easy availability of spares, maintenance and after sales support i. Develop national standards of CC&VLM j. Improve management skills of managers k. SOPs at different levels to manage emergencies
2	2. Absence of national guidelines, format and system for reporting every arrival of vaccines at the GMSD or states (National-Vaccine Arrival Report).	a. Introduce VAR format and guidelines and SOPs b. Use VAR data for improvement in procurement system c. Incorporate VAR in the VLMIS.
1	3. Absence of real time monitoring of vaccine management at all five-supply chain levels. There was no national level vaccine logistics MIS system. The MIS system currently used were different in different states (e.g., PRoMIS, Odisha Vaccine Logistics Management System (OVLMS), other excel based tools etc.)	I. Assess the existing MIS capabilities and limitations, and adapt either the most suitable one or design and develop a new one based on the recommended practices and standards for vaccine stock management. It should fulfill the following minimum requirements: a. It should be an on-line tool that can be updated from the national level down to district level. b. It should be designed to provide the required reports at different levels for different purpose (stock balance, transaction details, wastages, damages, etc.) c. All data entry interface should be very user friendly - the screen interface should tally with the standardised forms to make all entries. d. The mandatory forms such as the National VAR, National Consumables Arrival Reports, Requisition forms, Receipt vouchers, should be an integral part of the MIS. It should allow online approvals by seniors. e. It should define at each respective level, the minimum and peak stock levels, and sound alarms whenever these levels are breached. II. GoI should explore the possibility of integrating this VLMIS component in the National CC – MIS (NCC-MIS) III. Introduce National Vaccine Logistics MIS for real time monitoring that should include at least all the four GMSDs, SVS and DVS.

<table>
<tr><td></td><td>4. The current practice was to store one month of vaccine stock at the RVS and DVS without any buffer stock. Hence, there seemed to be sufficient storage capacity for all vaccines. However, the GoI guideline recommended keeping at least three months of stock at SVS, RVS and DVS and in addition 25% as buffer stock (say one more month)- i.e., a maximum stock. No proper plans for the vaccine indenting and supply existed at most of the stores in the states.</td><td>I. Supply frequencies should be defined for all levels based on GoI guidelines and should be adhered to by the manufacturers/ suppliers and higher level stores.
II. Minimum & Maximum stock level should be defined at all levels and the old stock policy levels need to be redefined.

MoHFW should define storage policies for storage of vaccines and syringes and for frequency of supply of vaccines from the manufacturers/ suppliers to ensure that required stocks are always available at state vaccine stores.</td></tr>
<tr><td>2</td><td>5. The current level of knowledge of wastage control was poor, and there was no formal system to monitor wastage. Hence, adequate use of any kind of information on wastage was not possible.</td><td>Establish a system of recording all kinds of wastages
• Encourage staff to record them without apprehension of disciplinary action.

GoI guidelines clearly state that every child should be vaccinated – staff should open a vial even for a single child.

Establish the practice of maintaining wastage records and review them as per following plan:
<table><tr><th>SVS</th><th>RVS</th><th>DVS</th><th>CHC / PHC</th><th>Session</th></tr><tr><td>Once every 6 months</td><td>Once every 3 months</td><td>Once every 3 months</td><td>Once every month</td><td>Once every week</td></tr></table></td></tr>
<tr><td>1</td><td>6. There were no clear directions and guidelines or policy to manage emergencies related to CC failure, arrival of excess vaccines, or failure of the transportation vehicle.</td><td>Develop SOPs to manage such emergencies especially at a higher level of supply chain where vaccines are stored in bulk quantities like RVS, SVS and GMSDs</td></tr>
<tr><td>2</td><td>7. CCTs were not well equipped with toolkits and the required spares or appropriate funds for the purchase of locally available spares or transport for field visits.</td><td>All CCTs to be supplied with tool kits and adequate spares and given support for undertaking regular repair and maintenance work.</td></tr>
<tr><td>2</td><td>8. Staff engaged in Immunisation Vaccine and logistics management was not provided with regular refresher training. Though there was a training fund, there was no policy to train workers every three years.</td><td>Develop a training data base and map the various trainings received by the staff and provide necessary refresher training compulsorily if one has to work for CC and vaccine management.</td></tr>
</table>

B. Human Resource

2	1. There were no national guidelines for HR required for CC&VLM at any level except for the CCO and CCT. Even these positions were not filled in all the states and districts. As the immunisation programme expanded hugely in terms of equipment, vaccines and beneficiaries and geographical spread, managing the immunisation supply chain required specialised staff. • There were no vaccine logistics managers in the Immunisation Division, GMSDs, SVS, RVS and DiviVS • The clerical or statistical assistants managed vaccines as any other non-perishable item without having any knowledge of vaccine storage, distribution and stock management principles. • Presently no CCTs were posted in the GMSDs and state stores. No semi-skilled workers were appointed to ensure round the clock presence for monitoring and operating of the WICs and WIFs containing bulk vaccines. • No standards/ guidelines exist for minimum qualification of the staff to manage bulk quantity of vaccine.	I. The Immunisation Division of MoHFW should have at least four highly skilled national vaccine logistics managers and two national CCOs looking after two GMSDs each. These should be part of the MoHFW annual budget and independent of partner support. II. CC staff recruited in the NCCVMRC and NCCTC should support the Immunisation Division in addition to their mandate till the above positions are sanctioned. III. There should be a VLM at the state and regional level and in all large districts. The logistic managers should also manage the CC inventory using the NCCMIS at their respective levels and coordinate the logistics of vaccines and consumables. IV. CCTs and semi-skilled helpers should be recruited for DiviVS, SVS and GMSDs. V. At the sub-district and HF levels, CCH should be provided with regular refresher training. VI. MoHFW should issue instructions that only trained pharmacists should be appointed as storekeepers at every level in compliance with minimum standards. VII. There should be detailed job descriptions for different staff from the CCO to store keepers and mechanics at different levels to be reviewed periodically, based on programme needs.
	2. The activities of all staff involved in CC and vaccine logistics need to be supervised in a structured manner. Parameters for supervision need to be defined. These were lacking at all levels.	At every level, a suitable system of identification of supervisors should be carried out.

C. Infrastructure

a. Building

2	1. There were no national building standards for a vaccine store at different levels. Most of the buildings including GMSDs were very old and in a bad condition. The location of the store building, the quality of construction and regular maintenance and accessibility were found unsatisfactory in most places. In addition, most of the buildings assessed lacked: • Adequate space for all the activities to be carried out there • Good storage conditions with adequate ventilation • Separate dry store building and store keeper's office	a. MoHFW should develop standard vaccine store prototypes for different levels and should circulate to the states for adaptation. States like Orissa, Andhra Pradesh and Jharkhand had developed their own standard prototypes based on the WHO model quality plan. These can be reviewed and shared with all states. b. Every state should plan to establish vaccine stores with repair and maintenance workshops in each district and at State HQ. Refer annexure L for a standard vaccine store.

2	2. In several places, it was observed that the SVS also worked as the DiviVSor DVS and not segregated in terms of building, equipment, records and human resources. The same equipment and records were being used for different supply chain levels. This created mismatches in stock records. Each level of the store should have at least their own equipment and records.	a. MoHFW should issue guidelines to the states and provide appropriate resources for construction of dedicated vaccine stores at different levels of supply chain. b. If the construction of a new building is not feasible, then at least expansion of the existing building should be planned to meet storage space requirements.
2	3. Vaccine store building at all levels was observed to be poorly maintained. Electrical connections and fittings were found to be of poor quality, creating risk of malfunctioning, and of fire. For several years vaccine stores with gross visible damage were not repaired due to lack of funds or coordination issues between Health department and Public works Department (PWD)..	a. MoHFW needs to issue direction and guidelines to the states regarding minimum repair and maintenance required at the vaccine stores of different levels including electrical works. b. Efforts should be made to enhance and improve coordination between Health and PWD at state & district levels.
2	4. Dry storage sites in most of the vaccine stores were not climate resistant and not adequately ventilated, illuminated and were without any temperature control system. Mostly dry storage and vaccine storage sites were located in separate places and made logistics management and appropriate bundling more challenging.	Every vaccine store should have its own dry storage site. Dry storage should be air-conditioned.
2	5. New and adequate buildings/ facilities were needed for the present and future needs at the GMSD level. Access to the existing GMSD site was an issue, especially when big trucks arrived for loading and unloading vaccines & equipment.	All GMSDs should be located at the outskirts of the city with modern facilities of transportation and lifting devices and with proper road access.
b. Equipment		
1	1. Many of the new WIC and WIF for the SVS and RVS procured in recent years had serious lacunae in the power rating of their stabilisers and quality of their installation. These WICs/ WIFs were without graphic chart recorders and alarm systems.	All new WICs should be made functional as per the required standards.
2	2. WIC/ WIF, ILR and DF had crossed the recommended service periods and there were frequent failures. Several equipment was not repaired due to lack of spare parts and non-availability of skilled technicians.	Replace old equipment with new equipment and streamline spare parts procurement. Improve spare parts stock management at GMSD, SVS and DVS levels. Share the State Health Transport Organisation (SHTO), Pune model on decentralised procurement with all states.
1	3. The practice of every WIC, WIF, ILR and DF having its own functioning independent stabiliser was not uniform across all the states.	Procure & supply the required number of stabilisers to ensure one stabiliser for each CCE .

2	4. The equipment inventory needs to be corrected and updated, as there was significant difference between the values listed in it and the actual available gross volume in the WIC and WIFs. The inventory also did not provide the exact model numbers of the CCE at the RVS and DVS, which would allow precise determination of net vaccine storage space available. All GMSDs and several SVS/ RVS need immediate augmentation of available CC space, especially for +2°C to +8°C	• Update equipment inventory and evaluate the exact storage space at every SVS, RVS and DVS based on physical verification. • Use the results to determine additional requirements of equipment, based on the MoHFW recommendation of peak storage of vaccines at respective levels. • Undertake rapid National CC assessment using NCCMIS and certain selected state visits,
2	5. Condemned equipment occupied usable space in many districts. This lead to limitation of floor space to add more equipment.	Accelerate the condemnation process in the states through simplification of guidelines and frequent follow up.
2	6. All equipment procured should adhere to global/ national standards (WHO-PQS), incorporating inputs from the experts from the field and subject experts. Past procurement specifications need improvements. Equipment type to be used should depend on population and level of the store.	Procurement of CCE should be based on needs assessment. A sample of new equipment should have performance assessment within six months to one year of the induction into the system.
2	7. There were no real plans for preventive maintenance for equipment. Service was basically on demand. Refrigeration technicians visited the CHCs and PHCs during the vaccine deliveries and had a quick look at the equipment, which could be considered only as a rapid verification as the time available was too short to conduct any proper maintenance. In many states, viz., Bihar, Chhattisgarh and Karnataka, the response time of the technicians was very high, resulting in a high number of equipment accumulated for repairs.	Prepare work plans for the refrigeration technicians, which should be monitored by the State Cold Chain Officer (SCCO). The plans should include preventive maintenance and on demand repairs. The maintenance and repair works must be reviewed quarterly to systematically strengthen the technical operations. The review should look into the CC performance indicators such as total sickness rate, response time and downtime of equipment. SCCOs need to be more proactive in monitoring repair and maintenance of the equipment.
c. Transport		
2	1. There were no refrigerated vaccine vans/ trucks at any of the sites visited. Transport services were mostly outsourced at the GMSD level. At the state level, the existing non-refrigerated vaccine vans were overburdened to manage supplies where districts did not have insulated or normal vans with CBs to collect vaccines from higher supply levels.	MoHFW may consider supplying refrigerated trucks/ vans for GMSDs, SVS and DiviVS to manage temperatures between +2°C to +8°C during transportation. This would reduce demand for large numbers of icepacks to be frozen and conditioned.

	2. Maintenance of existing vaccine vans was not planned and lacked appropriate financial resources and guidelines for upkeep and reliable operations.	Ensure periodic maintenance of vehicles so that these have lower breakdowns and provide longer service. Funds for such services should be earmarked for facilities with vehicles.
2	3. Frozen IPs used for vaccine transportation were not properly conditioned. At the state level, several variety of IPs were used including gel IP which was not recommended. There were no MoHFW guidelines for removal and disposal of all these gel packs received from the manufacturers and suppliers.	MoHFW should circulate guidelines for immediate disposal of gel packs, along with instructions for use of standard ice packs. An assessment can be made regarding availability of different type of ice packs of standard sizes in order to benefit from recommended hold over time.
2	4. There were no national guidelines available regarding maintaining temperature during transportation of bulk supplies.	FIs should be used for any transportation of vaccines for more than one hour.
d. Temperature monitoring		
1	1. Currently, except for the twice daily manual temperature recording of CCEs, MoHFW did not have detailed guidelines for temperature monitoring of vaccine CCs at different levels of the supply chain and during transportation.	Develop a temperature monitoring policy and standards for vaccine and for dry storage at all levels as recommended in the EVM tool. • All bulk vaccine stores (GMSDs, SVS, RVS and DiviVS) equipment should have wireless data loggers with real time temperature monitoring. • All ILRs and DFs should have at least 30 days temperature recording (30DTR) which can be reviewed.
2	2. Guidelines for calibration of the temperature monitoring devices did not exist. CCOs and CCTs were neither skilled nor instructed to do so.	Develop guidelines for calibration of temperature monitoring devices and build capacity of the staff handling CCs and vaccines.
2	3. None of the WICs or WIFs had been subjected to temperature mapping study.	Conduct temperature-monitoring studies once every 3-5 years. Caliberate temperature sensors at least once a year, especially for each WIC and WIF.
3	4. Vaccine quality is directly related to temperature maintenance of CC system. There were several instances of temperature breaches that might have caused damage to the vaccine. Except for the ICMR temperature monitoring study conducted in 2012, there was no other study available. This study gave information for 10 states only.	Temperature monitoring studies should be in-built and the programme officer and manager should undertake the following on a regular basis at all levels: • CCO needs to ensure availability of logistics required for temperature monitoring • Review temperature records weekly
2	5. Temperature monitoring information was not used to diagnose technical problems with the CCE.	CCO and CCT need to review temperature records and analyse the trend to diagnose technical issues with the CCE and take corrective measures where required.
1	Programme officers at the state level were not using existing temperature monitoring data (e.g., Wireless data loggers) for programmatic correction	SIO/CCOs need to view and keep hard copies of the wireless temperature loggers and review for any specific trend to fix the problem with the practice or equipment failure.

D. Documentation, Planning and MIS

1	1. There were no national guidelines for use of vaccine stocks/ issue registers, though standardised formats are available.	MoHFW to guide the states to follow formats for stock and issue as provided in CC handlers book and ensure that all states adopt them for: Stock balance; Issue of vaccines; Distribution plans; maintenance plans and reporting and wastage recording
	2. Vaccine deliveries took place in the states and GMSDs without pre notifications and at the district and sub district level without a vaccine delivery schedule.	Improve transportation of vaccines from the district to the block with a schedule of vaccine supply. Similarly, RVS should supply to districts using refrigerated vans, with pre-arrival information and agreements with DVS.
	3. One CC point covered a population up to 400,000, which made vaccine delivery a challenge.	MoHFW should support states to increase the number of CC points with a plan to reach one for every 40,000 population, to improve vaccine delivery.
2	4. State CCOs did not have plans to ensure that all refrigeration technicians define a Planned Preventive Maintenance (PPM) and that funds for mobility were made available. Maintenance funds were found to be inadequate in most of the states especially where the CC points were few in number though the number of equipment was much higher.	Every CCT must submit a tour plan to the State CCO at the start of every month, and report on works carried out at the end of the month. Also, the same could be entered into the NCCMIS. CC maintenance funds need to be planned based on the number of equipment and CC points
1	5. CC MIS was implemented in most of the states. However, updating of data was not regular, risking the real time monitoring of the CC system accurately.	GMSD, states and districts need to update NCCMIS data regularly. MoHFW should send instructions to accelerate NCCMIS implementation in the states and districts not covered yet.
2	6. There were different temperature recording formats/ logbooks found in the field, most of them without the information on power breakdown or maintenance/ transfer related information for the equipment.	Design a standardised temperature record booklet. Print and distribute them across the state. The booklet should have the possibility to include information regarding maintenance services conducted on the equipment.
1	7. No SOPs for contingency plans at any level were found.	Develop contingency plan and SOP for all levels and review and monitor for compliance.
2	8. National CC MIS data quality needed to be improved.	DQA (Data Quality Assessment) of NCCMIS should be done, and also assistance to states and districts to amend mistakes.
3	9. There was no system to collect vaccine wastage data in the field which could be consolidated at district, divisional and state levels.	Develop vaccine wastage documentation and reporting system through VLMIS. A system of formal review to steer the programme needs to be established. While reducing wastage has been emphasised a lot, its impact on dropout needs to be also verified and corrective action taken.

E. Capacity Building

	1. Staff at several stores had been appointed without any formal or adequate on-the-job training. Handling of vaccines by such staff poses a serious threat to the potency of the vaccines. None of the GMSD staff had been trained on vaccine handling and management. It was observed that the majority of the staff lacks skills in the following areas: • Stock management • Vaccine distribution • Storage temperature • Documentation of wastage • Temperature monitoring devices and procedures • Detection of vaccine exposed to sub-zero temperatures and conducting the "shake" test • Calibration of thermometers • Calibration of the temperature monitoring devices • NCCMIS handling and data uploading	All staff must be provided with adequate quality training before they can assume the duty of vaccine handling. *Untrained staff should never be given the responsibility of handling vaccines.* Preferably, train at least two staff from every vaccine store, so as to replace the other in case of need. The following training needs to be given to all CCT and vaccine handlers at all levels: • Provide a two day vaccine handlers training to all those involved in the handling of vaccines. • Induction training on immunisation programme using a two day health workers module • A two-day training programme on NCCMIS (only CCT)
	2. Many new CCT had not received any training like : • Induction training on Immunisation programme • ILR/ DF repair and maintenance • Voltage stabiliser and generator • Solar equipment In addition, many old technicians who were placed at SVS or RVS had not received any training on WIC/ WIF. For the last two years these trainings at NCCTC had been stopped due to funding issues.	NCCTC and NCCVMRC, with direction and funding from the Immunisation division need to accelerate these trainings.
	3. Periodic capacity building programme for induction of new supervisors and mid-level managers on what to supervise and how to supervise was needed. In addition, there was need to improve techno-managerial skills of programme managers	Effective CC and vaccine management course developed by NIHFW/ UNICEF should be finalised and training should be given to all programme managers up to the district level.

F. Supportive Supervision and Improvement in Practices

	1. Lack of supportive supervision remained one of the weakest links in the immunisation system, which contributed to the deterioration of practices and good performance. The supervising staff were not fully informed of what and how to supervise.	Develop a checklist for supportive supervision to include all aspects where improvement in practice is required.
Areas requiring immediate attention include the following: • Recording of matching (same manufacturer, vaccine batch) diluents along with vaccines • Periodic physical verification of stocks and its recording • Correct filling of returned vouchers after due verification • Health staff to keep a copy of the SOP to manage contingencies related to equipment & transportation failure and knowing what to do. • How to read temperature and record in the register, including power failure, equipment breakdown-repairs, preventive maintenance etc. General cleanliness of vaccine storage, icepack conditioning and packing areas as well as preventive maintenance and general upkeep of the equipment.		
a. Vaccine Distribution Staff had poor knowledge and practice in: 1. Conditioning of ice packs. 2. Packing of CBs. 3. Use of standard ice packs.		Supportive supervision with demonstration at the work site to be done for conditioning of IP and packing of CBs.
b. Temperature recording The following wrong practices were observed • Temperatures recorded without actually carrying out the reading • Temperatures not recorded on holidays • Incorrect temperatures recorded during days of defrosting • Duration of power failure not documented • WICs/ WIFs graphic chart recorders were not in use for several years • Manual temperature recording had been stopped due to wireless temperature loggers Such incorrect practices made the vaccine unsafe, threatened the potency and gave false assurance of protection.		Temperature monitoring and recording should be carried out twice daily, and all seven days of the week. **All staff MUST record the reading correctly after due verification.** All additional salient aspects associated with the operation of the equipment should also be noted (e.g., hours of power breakdown, defrosting, servicing etc.).
c. Stock keeping Diluent and VVM record keeping was not seen in the majority of the vaccine stores		All salient parameters of vaccines & diluents must be noted such as: • VVM stage (for vaccines) • Manufacturer • Batch number and • Expiry date Verify stock records for sufficiency of working and buffer stocks, and in and out transactions and ensure that immediate action is taken when buffer stock is breached.

d. Vaccine arrival VARs are helpful in consolidating all the salient details of vaccine arrivals for all future references. The current practice was to fill these reports only during the arrivals of the campaign vaccine or UNICEF procured vaccine.	Fill up the VAR for every type and lot of vaccine to ensure proper traceability of each lot of vaccine arriving in the state. Copies of blank VARs should be kept at all SVS for this purpose as the same were not supplied during the shipment by GMSDs and local manufacturers. A supervisor should verify the VAR and a copy should be sent to MoHFW/Procurment division, NCCVMRC or UNICEF (if procured by UNICEF) as required for further record and follow-ups
e. Modernised dry storage practice The dry storage system had not been modernised for many decades: • Storage was done in such a way that prior lots went deeper into the storage area/ corners and became inaccessible. • Cartons protecting vaccines got damaged because of multilayer stacking and the weight of these stacked cartons on top. • The current system did not allow separate batch wise storage for separate syringe types (0.5 ml, 2 ml , 5 ml). • Poorly maintained buildings allowed pests, rodents and dampness to affect stocks, especially when not moved (EEFO/First In First Out - FIFO) for a long time. • Fire extinguishers needed timely maintenance and recharge. It was found that recharging was not done for several years. • Stocks kept near windows, generators, condensers, ILRs/DFs could get damaged.	For easy access to all the stocks: • A heavy duty storage system (adjustable shelving, hydraulic material handling) to facilitate the practice of EEFO and FIFO principle should be used. Such system also allows safe stock keeping due to protection from direct sunlight, heat sources, dampness, rodents/pests etc. As there are only two-three cartons stacked on each level, they remain useful and provide protection during onward distribution to lower levels. • For better control of stocks, bin cards should be used, one for each incoming type and batch. • Annual maintenance should be followed rigorously for fire extinguishers, and old fire extinguishers may be used for demonstration and training, before recharge.
f. Record keeping of equipment and maintenance Currently, the service logbook and repair logbook for every equipment was not maintained uniformly across the country.	Maintain a service log sheet for every equipment. This can be done as part of the temperature monitoring booklet. Repair records of each equipment should be maintained by the technician to ensure quick response time to put all defective equipment into operation.

Chapter 5

Development of Improvement Plan

What is an EVM Improvement Plan ?

EVM is a diagnostic tool and identifies issues of Cold Chain Logistics (CCL) system that needs to be fixed and to be sustained. But the success of the EVM initiative lies in developing an implementable IP and then actually implementing the IP and reviewing the IP on a regular basis for strengthening the CCL system. While EVM is a diagnostic tool, IP lays down the treatment strategies for the gaps in the CCL system.

Development of an improvement plan is the key output of the EVM assessment and its recommendations. While a skilled facilitation is needed to make sure that the plan does indeed address key deficiencies, it should be possible to provide a menu of innovative approaches and technologies for consideration, guided by country realities. In addition, the template used for the plan is also used to enhance monitoring of the implementation of the plan.

Why IP is important?

Issues in CCL are more management issues than technical. The following points are important for IP:

- Solutions to technical issues of CCL are known and relatively easy to fix, though the majority of issues identified in EVM are management and capacity-related
- A comprehensive plan is needed for strengthening routine systems
- It is necessary to improve coverage both in QUANTITY and QUALITY
- It ensures the country's readiness for introduction of new vaccines and appropriate utilisation of resources
- It is a pre-requisite to get funds from Global Alliance for Vaccines & Immunisation (GAVI)
- It prepares a roadmap for strengthening the CCL system
- It facilitates effective utilisation of funds in the CCL system

Guiding principles of IP

- Government ownership: The government should lead IP development and the partners can support facilitation.
- Plan needs to be reviewed regularly for progress of implementation.
- Engagement of Expanded Programme for Immunisation (EPI) staff at all levels
  - Engage EPI staff at national and sub-national levels in IP development
  - Disseminate widely, leveraging existing mechanisms
- Foundational plan for improving immunisation supply chain performance:
  - Identifies priority action areas and establishes accountability for improving performance
  - Takes a longer-term view and reflects future needs (new vaccine introductions, population growth, etc.)

- Integration with other planning processes
- Government should adapt the IP template to align with existing planning and budgeting documents.
  - IP should be consistent with and input into other planning documents such as Comprehensive Multi Year Plan (cMYP), national and sub-national annual work plans, etc.,
- Dynamic and living document
- Needs regular review and monitoring for implementation of recommendations

Components of IP

Recommendations of EVM should directly link EVM findings with IP. Key performance indicators for EVM criteria should be created. IP should be developed in compatible excel-based tools for easy analysis and review of the progress.

Improvement Plan template should incorporate:

- All recommendations of EVM should be addressed in the respective IPs at different levels, tagged to specific EVM criteria and categories.
- Each recommendation can have several tasks and sub tasks. EVM categories are as follows:
  1. Management and policy
  2. HR
  3. Infrastructure (Building, Equipment, Transport and Temperature Monitoring)
  4. Planning, documentation and MIS
  5. Capacity building
  6. Supportive supervision and improvement in practices

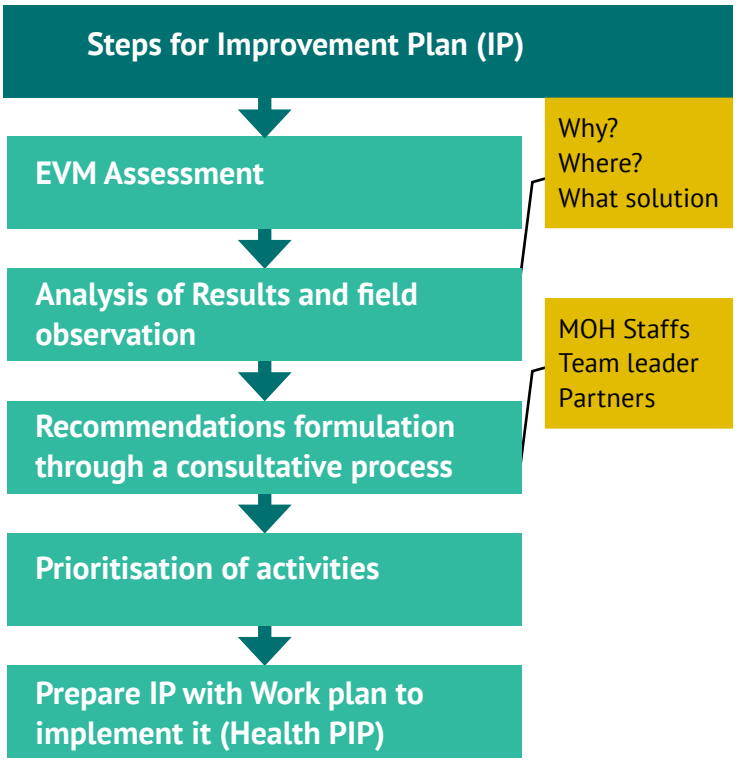
Steps of Improvement Plan:

1. Preparation of IP
2. Implementation of IP (budget allocation, planning activities in national annual PIP)
3. Review and monitoring of IP
4. Revising IP and inclusion of additional activities

How to prepare an IP?

1. Classify the recommendations into different EVM and PIP categories
2. MoHFW with support of partners should prioritise the activities
3. Minimum investment and maximum output activities should be identified
4. DEFINE the outcome indicator AND TIMELINE
5. Define specific level for action taken (e.g., primary, regional, district)
6. Add annexure which explains EVM criteria and categories
7. Add fields for monitoring:
   a. Define process indicators
   b. Add 'status of implementation'
   c. Add 'traffic light' formatting (red/yellow/green) for at-a-glance update of implementation status

Figure 24: Steps for improvement plant (IP)



Chapter 6

Summary of Key Issues and Recommendations

Key Issues

EVM as a diagnostic tool identified the gaps in the CC and vaccine logistics system. Key issues were organised under the nine EVM criteria as follows:

1. Pre-shipment and arrival procedures

- Lack of national guidelines and standards for VAR.
- Lack of analysis of information collected by the vaccine stores on arrival of vaccine at all levels.
- Absence of software feature to generate VAR in ProMIS / VLMIS.
- GoI did not make UNICEF-VAR formats available to the states; this made the states dependent on the vaccine manufacturers.

2. Vaccine and diluent storage temperatures

- Manual temperature records showed little variation, which suggested a need for further verification. Events of defrosting/ repair/ power outages were not recorded. Moreover, no supervisory comments were found in 70/114 facilities visited.
- Good quality (validated/calibrated) thermometers were not found in most locations.
- In over 70% of the bulk vaccine storage sites (district and above), continuous temperature monitoring system (Graphic Chart Recorder/ Data Loggers) was dysfunctional due to faulty equipment/ no consumables (charts, ink, fiber tip pens)/ no internet connection for wireless data loggers.
- Only 30% sites (lowest of 14% in DiviVS) had a supervisory review of temperature recording book followed by corrective action.
- Temperature monitoring was not done over weekends/ holidays.
- Booklet for manual temperature recording was not available in many vaccine stores.
- Manual temperature recording did not match with the 24x7 continuous temperature recording.

3. Capacity of CC, dry storage and transport

- Shortage of vaccine storage space for +20C to +80C was found at all levels except at HFs (PHCs).
- GMSDs Kolkata, Chennai and Karnal required augmentation of storage space.
- Performance scores were below 80% in 23/28 DVS.
- Dry storage space was found inadequate at all levels.
- Many new WICs/ WIFs supplied by GoI to the states were either not installed or not functional.

- There was no software/ system at vaccine stores to suggest how many more vaccines of different types could be accommodated at the facility.

4. Status of Buildings, Equipment and Transport

- The majority (12/16 state and 15/28 district) of vaccine store buildings, equipment and transport indicators scored below the 80% level.
- The majority (98/114) of the vaccine store buildings in most of the states scored below the acceptable 80% level.
- Dry storage space especially in GMSDs, state and divisional stores was found to be inadequate, not climate compatible and not easily accessible.
- More than 45% of the vaccine stores at the divisional level and above did not have proper (standard) thermometers and continuous temperature records.
- Voltage stabilisers were missing for around half of ILRs/ DFs.
- A functional alarm system was available in less than 50% of WICs/WIFs.
- Only 36% of DiviVS , 44% of the SVS and 56% of the DVS had functional communication links (telephone and internet).
- A functional generator with enough fuel was found in 43% SVS , 49% DVS and 57% DiviVS .
- Vaccine transport facilities were not available in 24% and were inadequate in 44% vaccine stores at the district level and above.

5. Maintenance of Buildings, Equipment and Transport

- The average score for PPM was 19% for the buildings and 34% for the equipment.
- There was no uniformity across the country regarding AMCs/CMCs/PPM for the equipment.
- The majority of the WICs of GMSDs, SVS DiviVS were more than 20 years old with concrete cold rooms in GMSDs even up to 50 years old.
- CC sickness rate was very high for ILR and DF in Bihar, UP, MP, Rajasthan and Chhattisgarh.

6. Stock Management System & Procedures

- Lack of standard vaccine management records (for indent, stock and issue) at all levels including GMSDs.
- All levels of vaccine stores did not define a maximum and a minimum level for vaccines and diluents.
- All key parameters of vaccines and diluents were not recorded
- Lack of recording of damaged or expired vaccines and their disposal as per CPCB guidelines.
- Internal reviews of vaccine loss were rarely carried out.
- Stock-out of vaccines (lasting several weeks) was found at all levels.
- Real time monitoring of vaccines was missing due to lack of online vaccine management system.

7. Effective Distribution between Each Supply Chain Level

- Distribution reports did not reflect the planned delivery schedule.
- The deliveries were not taking place in a timely manner (maximum performance score was only 25%).
- Incorrect conditioning of ice packs and packing of CBs was seen at GMSD, SVS and DiviVS , which validates the findings of the ICMR temperature monitoring study.
- FIs were not used with every transport and this validates the ICMR study finding of exposure of vaccines to sub-zero temperatures during transportation.

- All vouchers did not have information on VVM status and much other required information.
- Contingency plans to manage emergencies during transport were not found in most locations.

8. Vaccine Management and Handling

- Though knowledge and use of VVM was excellent at all levels, knowledge and use of the "shake" test was not up to the mark.
- Only three out of 28 districts had a good reporting system for vaccine wastage that was being used for planning.
- The system of collection and disposal of sharps and syringes was poor.
- Disposal of vaccine vials was not practised across all levels.

9. MIS and Supportive Management Functions

- Quality of CC and vaccine management training material was found to be good.
- Evidence based method was not used for vaccine and syringe forecasting.
- Vaccine wastage data was not being used as it was not recorded and reported.
- Departmental technicians were doing the equipment maintenance in the majority of the stores.

Key Recommendations

The recommendations to address the identified issues are organised under five heads: Management and policy; Human resource and capacity building; Infrastructure; Planning, documentation and MIS; Supportive supervision and improvement in practice. An IP to strengthen CC&VLM system needs to be developed through a consultative process and should be implemented through annual health PIP of the state and district.

1. Management and Policy

- Introduce VAR system for vaccine stores receiving vaccines directly from manufacturers.
- Implement real time VLMIS for all five levels of supply chain. Integrate NCCMIS with VLMIS.
- Separate the two vaccine stores working from same building (e.g., state/regional, regional/district, divisional/district) to avoid using the same equipment, reporting and managing the same set of documents and staff.
- Develop NCCVLAP.

2. Human Resource and Capacity Building

- Assign dedicated staff for CC and logistics management at each level.
- Designate a vaccine logistics manager (VLM) and a CCT for each GMSD and SVS.
- Train the existing staff of GMSD on data management.
- Assign semi-skilled helpers or electricians for 24x7 monitoring of the cold rooms.
- Develop a training package for the VLMs and the immunisation programme managers and ensure their placement as required to overcome attrition.
- Review knowledge and skill gaps to plan appropriate training and supportive supervision mechanisms.
- Provide regular orientation once every 3 years for all staff.

3. Infrastructure

a. Building

- Ensure dedicated stores for state, division, district and HFs.
- Consider the future need as per national standards.
- Encourage regular coordination with PWD, Electricity and Municipal Corporation/bodies or AMCs for regular maintenance.

b. Equipment

- Improve equipment specifications as per global standards.
- Minimise a variety of equipment to reduce the number of spare parts.
- Ensure that all WICs/WIFs have functional acoustic alarms.
- Conduct mapping of spare parts to repair non-functioning equipment (Solar, Haier, Blue Star, others).

c. Transport

- Ensure use of conditioned icepacks during vaccine transportation.
- Promote use of refrigerated vaccine vans at the district level and above.

d. Temperature Monitoring

- Develop a national temperature monitoring policy for different levels of vaccine stores.
- Undertake calibration of temperature monitoring devices.
- Undertake temperature mapping of cold rooms.
- Ensure use of freeze tag/freeze alert device during transportation of vaccines.
- Use 30 days temperature recording devices and review temperature performance regularly.

4. Planning, Documentation and MIS

- Define a realistic stock level in months at all five-supply chain levels.
- Define, print and distribute standard vaccine stock registers, in line with VLMIS.
- Ensure vaccine indent and distribution plans based on the required peak stocks.
- Develop preventive maintenance plan for CCE by CCTs.
- Use regular data uploading in NCCMIS for performance assessment of CC at all levels.
- Establish a system for recording wastage in vaccine registers.

5. Improvement in Practice and Supportive Supervision

- All staff to practice manual temperature monitoring and recording twice daily, on all seven days including holidays.
- Maintain a service log sheet for each equipment. This can be done as part of the temperature-monitoring booklet, and should record power outages and the tasks undertaken during preventive maintenance.
- Diluents MUST be marked in the supply voucher and should be recorded just like the vaccines in stock registers.
- At CHCs and PHCs, the deep freezers must be used exclusively to prepare ice packs. Vaccines must never be stored in the same unit.
- All vaccines should be kept in ILRs at the CHC and PHC.
- Always use standard Ice packs, after correct conditioning (splash sound of water when shaken).

Chapter 7

Way Forward

The CC, and VM system and the immunisation programme as a whole needs to be revitalised in order to improve immunisation coverage and performance. A comprehensive list of recommendations has been provided to address the weaknesses that are responsible for the current performance of the immunisation programme. The following three tasks need to be performed as a priority:

- Share EVM recommendations with national and state officers, as well as development partners at various levels.
- Prepare national and state IP in a consultative process based on EVM assessment findings and recommendations.
- Implement IP and regular review of implementation status (also link with PIP submission).
- Prepare National Cold Chain and Vaccine Logistics Action Plan with a long term vision that should guide strengthening of immunisataion supply chain system of the country.

Annexures

A. Schedule of EVM Assessors' Training Programme

B. Pre-course questionnaire and performance

C. Teams and schedules for field practicals

D. Detailed performance score - consolidated for GMSDs

E. Consolidated for States

1. Detailed performance scores

2. Summary of state assessments

F. Detailed performance score - 26 Districts

G. Detailed performance score - 52 HFs

H. Estimation of Vaccine Storage Space required

I. Estimation of Dry Storage Space required for diluents and syringes

J. Performance of CCE - spot sickness rate

K. VAR format

L. Vaccine store prototype and design considerations

M. List of assessors for National EVM

N. Team of assessors and field location for assessment

Annexure - A: Orientation of National Assessors in Effective Vaccine Management Assessment

National Institute of Health and Family Welfare, New Delhi
4th to 8th March 2013

Day-1 - Monday

Starting time	Duration (Hr:Min)	Topic	Facilitator
9:00	0:30	Registration	DP
9:30	0:10	Welcome Address	Dir. NIHFW
9:40	0:10	Overview of the UIP in India	Dr. A. Khera
9:50	0:10	UNICEF strategy and contribution to strengthen the immunisation supply chain	Dr. S. Gupta
10:00	0:10	WHO role for strengthening immunisation	Dr. S. Bahl
10:10	0:10	House rules	RP
10:20	1:00	Pre-course questionnaire and review	KP/ SD
11:20	**0:30**	**Tea Break**	
11:50	0:10	Objective of the National EVM	Dr. M. K. Aggarwal
11:50	0:10	Importance of Cold Chain & Vaccine Management in the Immunisation programme	Dr. P. Haldar
12:00	0:30	Introduction to EVM and its impact on the Immunisation programme	KP/ SD
12:00	0:30	Supply chain levels and sampling of sites for the national EVM	SD
12:30	0:30	Questionnaire - E0 - General information + Location sheet	KP
13:00	**0:45**	**Lunch**	
13:45	0:15	***Energiser***	***Participant***
14:00	0:45	Questionnaire 2 - Temperature Monitoring	MG
14:45	1:00	Questionnaire 3 - Storage and Transport Capacity	SD/ KP
15:45	**0:30**	**Tea Break**	
16:15	0:45	Questionnaire 3 - Storage and Transport Capacity (continued)	SD/ KP
17:00	0:30	Guidance on Field Exercise & Team Formation	DP/ BS
17:30	0:10	***Evaluation of the day***	***Participant***

Day-2 - Tuesday

Starting time	Duration (Hr:Min)	Topic	Facilitator
8:30	0:15	***Energiser***	***Participant***
8:45	0:10	***Summary of what we learnt new the previous day***	***Participant***
8:55	1:00	Questionnaire 4 - Building, Equipment and Transport	MG
9:55	0:45	Questionnaire 5 - Maintenance	DKD/ RP
10:40	0:10	Instruction for field work	KP/ SD
10:50	**0:30**	**Tea Break**	
11:20	6:00	***Travel to specified site - Practical assessment exercise - for indicators 2, 3, 4 & 5 at specified vaccine stores. Return travel to start at 16.30. Packed lunch will be provided.***	***TL / F.***
17:20	**0:30**	**Return to venue - Submission of data - Tea Break**	
17:50	0:15	***Evaluation of the day and closing***	***Participant***

Day-3 Wednesday

Starting time	Duration (Hr:Min)	Topic	Facilitator
9:00	0:15	***Energiser***	***Participant***
9:15	0:15	***Summary of what we learnt new the previous day***	***Participant***
9:30	0:40	Review of the results of the previous day	KP/ SD
10:10	0:50	Questionnaire 6 - Stock management systems	SD
11:00	**0:30**	**Tea Break**	
11:30	0:45	Questionnaire 7 - Distribution	KP
12:15	0:15	Field work plan	
12:30	**0:45**	**Lunch**	
13:15	4:00	***Travel to specified site - Practical assessment exercise -*** ***for Indicators 6 & 7 at specified vaccine stores*** ***Return travel to start at 16.15***	***TL / F***
17:15	**0:30**	**Return to venue - Submission of data - Tea Break**	
17:45	0:30	Discussion on the experience and results of field work	KP/ SD
18:15	0:15	***Evaluation of the day and closing***	***Participant***

Day-4 - Thursday

Starting time	Duration (Hr:Min)	Topic	Facilitator
8:30	0:15	***Energiser***	***Participant***
8:45	0:10	***Summary of what we learnt new the previous day***	***Participant***
8:55	0:30	Review of the results of the previous day	KP/ SD
9:25	0:30	Questionnaire 8 - Vaccine Management	DP
9:55	**0:30**	**Tea Break**	
10:25	1:00	Questionnaire 9 - MIS & Management system with NCCMIS	PP
11:25	1:00	Questionnaire 10 - Vaccine Arrival	KP
12:25	0:15	Details of field work	DP/ BS
12:40	**0:45**	**Lunch**	
13:25	4:00	***Travel to specified site - practical assessment exercise -*** ***for Indicators 1, 8 & 9 at specified vaccine stores*** ***Return travel to start at 16.30***	***TL / F.***
17:25	**0:30**	**Return to venue - Submission of data - Tea Break**	
17:55	0:15	***Evaluation of the Programme***	***Participant***

Day-5 - Friday

Starting time	Duration (Hr:Min)	Topic	Facilitator
8:30	0:15	***Energiser***	***Participant***
8:45	0:10	***Summary of what we learnt new the previous day***	***Participant***
8:55	0:30	Review of the results of the previous day	KP/ SD
9:25	0:30	Introduction to development of Improvement Plan	SD
9:55	**0:30**	**Tea Break**	
10:25	1:00	Details on Field Assessment programme & administrative guidelines	SD / DP
10:25	1:00	Distribution on EVM tool	KP/ SD
11:25	1:00	Distribution of data collection tools and formats	KP/ SD
12:25	0:35	Post-course questionnaire	DP/ BS
13:00	**0:45**	**Lunch**	
13:45	0:15	***Energiser***	***Participant***
14:00	1:30	Exercises with reporting formats & data collection tools.	KP/ SD
15:30	0:30	Instruction for supportive supervision & recording during field assessment	KP
16:00	0:30	Evaluation of the programme	DP

Starting time	Duration (Hr:Min)	Topic	
16:30	0:10	Address by Joint Secretary, Reproductive Child Health (RCH)	Dr. R. Kumar
16:40	**0:30**	**Tea Break**	
17:10	0:30	Closure	Director, NIHFW Dr. M.K. Aggarwal Dr. P. Haldar

	Glossary	Name of the Facilitators - Organisation	Mobile No.
	BS	Dr. Balwinder Singh - ITSU	88266 08777
	DP	Dr. Deepak Polpakara - NIHFW	98688 78721
	DKD	Mr. D. K. Deshmukh - NCCTC-SHTO	094-23-577295
	KP	Dr. Kshem Prasad - APT-Progress & UNICEF Consultant	094432 62241
	MG	Mr. Manish Gangal - UNICEF	8800-539906
	PP	Mr. Paritosh Panigrahi - MoHFW	98682 48788
	RP	Dr. Renu Paruthi - WHO-NPSP	98104 05852
	SD	Dr. Srihari Dutta - UNICEF	95601 98557

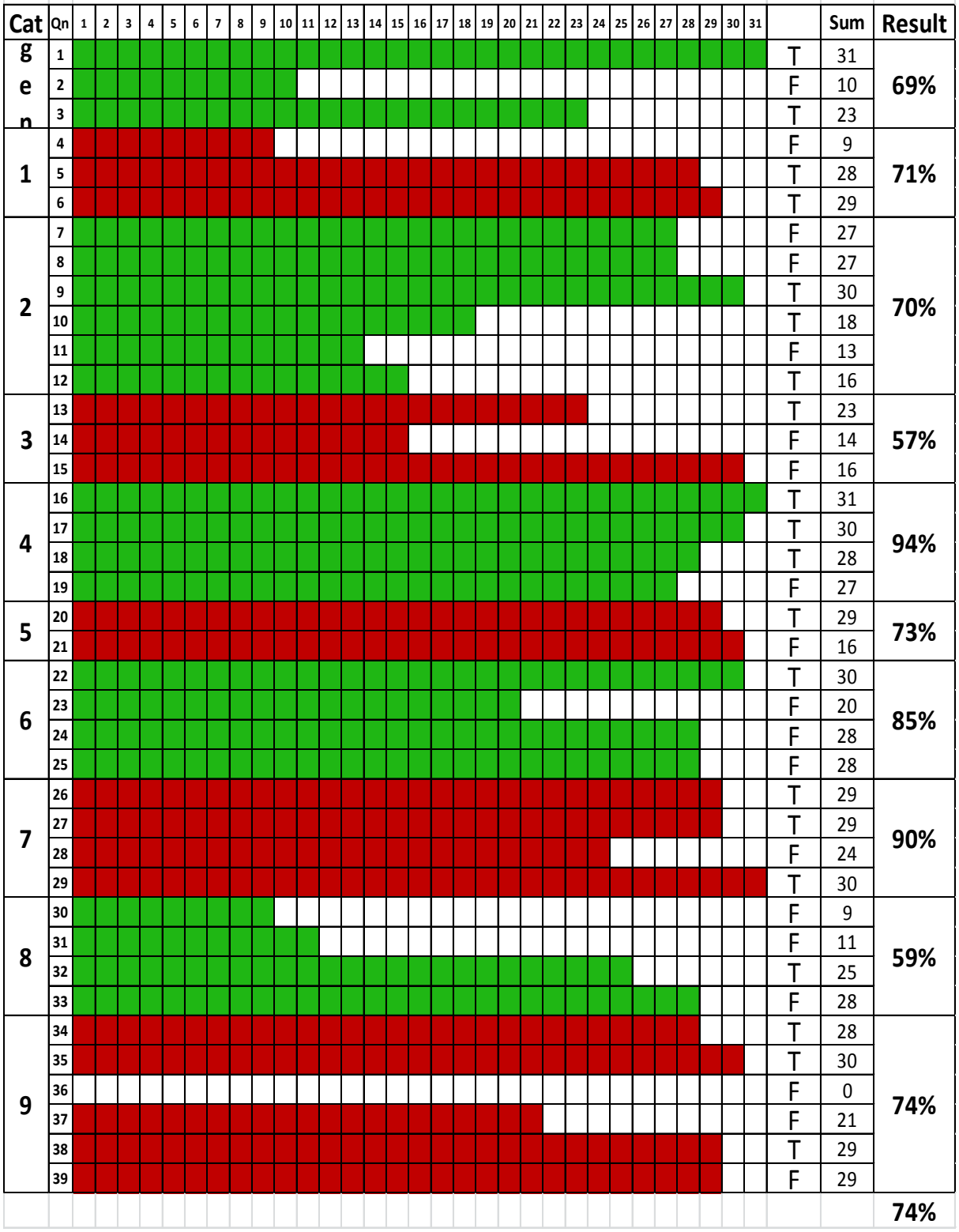
Annexure-B: Pre-course Questionnaire

S. N.	QUESTION	T or F
	E0. General	
1	Training of EVM field assessors is an essential component of the EVM assessment process.	
2	The quality of the EVM assessment depends on the abilities of the lead assessor.	
3	An essential part of an EVM assessment is the assessment team's list of recommendations.	
	E1. Pre-shipment and arrival procedures	
4	National vaccination staff must never delegate the vaccine customs clearance procedures to a clearing agent.	
5	One Vaccine Arrival Report (VAR) must be filled for each shipment, and for each vaccine.	
6	Clearance through customs is a high-risk procedure for vaccine safety, especially if it takes a long time.	
	E2. Maintaining correct storage temperatures	
7	If a vaccine vial, which has to be stored at +2°C to +8°C, is exposed to negative temperatures, it can still be used, provided it is not completely frozen.	
8	BCG vaccine must always be kept below -15^0C, at all levels in the supply chain.	
9	All cold rooms and freezer rooms should be 'temperature mapped' and the results of the mapping should be documented.	
10	The maximum percentage of vaccine damage that can be accepted in a primary (national) store over a 12-month period is 1%.	
11	To compare vials in the "shake" test, you need one vial to TEST (suspected frozen), and one vial that has not been frozen.	
12	During the "shake" test, one should start observing the vials as soon as they are shaken vigorously for 10-15 seconds.	
	E3. Maintaining sufficient cold store capacity	
13	The net storage volume available at each of the three storage temperatures (-20°C, +2°C to +8°C and ambient) should exceed the volume of vaccines and diluents to be stored at each of these temperatures.	
14	If the net storage volume is less than the estimated volume of the vaccines and the diluents, there is nothing else to do but to obtain additional CC equipment.	
15	When calculating the volume of a cold room or freezer room, the top shelves must be excluded.	
	E4. Buildings, Equipment and Transport	
16	All refrigerated trucks used for transporting vaccine must be fitted with a temperature logger.	
17	All vaccine cold rooms must have a continuous temperature recording device and a dial or digital thermometer.	
18	A person should never enter a cold room or freezer room without informing a colleague first.	
19	It is acceptable to use any functioning refrigerators for storing vaccines.	

S. N.	QUESTION	T or F
	E5. Maintenance	
20	The EPI manager and delegated staff are responsible for PPM of buildings, equipment and transport.	
21	The EPI manager should personally be responsible for day-to-day repairs and renewals in the vaccine store.	
	E6. Stock management	
22	The store staff should regularly check for the expiry dates and VVM status of vaccines in stock.	
23	The store staff must carry out a physical inventory of vaccines, diluents and all consumable stocks once every year.	
24	The diluents of different vaccines are interchangeable.	
25	The diluents do not require recording, since they may easily be replaced.	
	E7. Distribution	
26	There should be a written distribution programme from the primary store to the intermediate stores.	
27	Poor communication with intermediate stores commonly leads to under or over-supply during distribution.	
28	The primary store should handle repeated stock-outs at the periphery by distributing more vaccines than requested.	
29	The requested vaccine quantity must be checked against previous requisitions and predicted demand, based on the annual plan.	
	E8. Vaccine management	
30	Frozen icepacks should be conditioned for half an hour to prevent freezing during distribution.	
31	If a FI in one of the boxes of vaccines is activated, that box of vaccine should be discarded.	
32	If there is no VVM attached to the vial, the Multi Dose Vial Policy cannot be practised.	
33	If the inner square of VVM is lighter than the outer circle, the vaccine can be used even if the expiry date has passed.	
	E9: Information systems and supportive management functions	
34	An SOP describes the current acceptable way of performing a procedure.	
35	The EPI manager should participate in preparation of the SOPs of the vaccine store.	
36	Everyone handling vaccines and CC should be trained in vaccine management once a year.	
37	The CCE inventory only needs to be updated when new equipment is received.	
38	The contract document for outsourced services should clearly define the deliverables, enforceable penalties and make provisions for managerial interventions by EPI programme.	
39	Outsourcing of equipment maintenance to a private company results in the better CC performance, even without active follow up.	

Pre-Course Performance Matrix

Participant number



Cat	Qn	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		Sum	Result
gen	1																																T	31	69%
	2																																F	10	
	3																																T	23	
1	4																																F	9	71%
	5																																T	28	
	6																																T	29	
2	7																																F	27	70%
	8																																F	27	
	9																																T	30	
	10																																T	18	
	11																																F	13	
	12																																T	16	
3	13																																T	23	57%
	14																																F	14	
	15																																F	16	
4	16																																T	31	94%
	17																																T	30	
	18																																T	28	
	19																																F	27	
5	20																																T	29	73%
	21																																F	16	
6	22																																T	30	85%
	23																																F	20	
	24																																F	28	
	25																																F	28	
7	26																																T	29	90%
	27																																T	29	
	28																																F	24	
	29																																T	30	
8	30																																F	9	59%
	31																																F	11	
	32																																T	25	
	33																																F	28	
9	34																																T	28	74%
	35																																T	30	
	36																																F	0	
	37																																F	21	
	38																																T	29	
	39																																F	29	
																																			74%

Annexure-C: National EVM Assessor's Training - Field Training Plan

Day- 2 – Tuesday					
Type of VS	SVS	RVS	DVS-1	DVS-2	PHC
Name of the store	Delhi	Gurgaon	Gurgaon	Faridabad	Gurgaon
	Team - 1	Team - 2	Team - 3	Team – 4	Team - 5
Observers	SD	KP		MG	DP

Day- 3 – Wednesday					
Type of VS	SVS	RVS	DVS-1	DVS-2	PHC
Name of the store	Delhi	Gurgaon	Gurgaon	Faridabad	Gurgaon
	Team - 4	Team - 5	Team - 1	Team – 2	Team - 3
Observers	KP	MG		DP	SD

Day- 4 – Thursday					
Type of VS	SVS	RVS	DVS-1	DVS-2	PHC
Name of the store	Delhi	Gurgaon	Gurgaon	Faridabad	Gurgaon
	Team - 2	Team - 3	Team - 4	Team – 5	Team - 1
Observers	MG	DP		SD	KP

Team Formations

	Team - 1	Team – 2	Team - 3	Team – 4	Team - 5
Team leader	Dr. Rajesh Chawada	Dr. Bhrigu Kapuria	Dr. Bhupendra Tripathi	Dr. Jagadeesan M	Mr. Vipin Srivastava
Facilitator	Dr. Nilanjan Mitra	Dr. Renu Paruthi	Dr. S. Dalpat	Dr. Sanjay Bhardwaj	Dr. Byomakesh Mishra
Team members	Dr. Jagdish Chander	Mr. Subhas Kumar	Dr. Sanjeev K Das	Sandeep Khan	Mr. Dheeraj Bhatt
	Mr. Surendra Vyas	Mr. Suri Babu	Dr. B. P. Mahopatra	Ms. Saroj Naithani	Sanju Mithapali
	Mukunda Galagali	Mr. Sashank Pathak	Dr. Abhimanyu Saxena	Dr. Ajith Basant Ray	Dr. Maujammil
	Dr. Kanupriya	Ram Ratan	Mrs. Jayamani	Dr. Kamal Jeet Singh	Dr. Maheshwar Prasad
	Dr. Raveesha R Mugali	Dr. Asha Raghavan	Dr. Jyoti Prakash Samal	Rakesh Sharma	Dr. Manisha Chawla
	NIHFW-1	NIHFW-2	NIHFW-3	NIHFW-4	

Annexure – D: GMSD-wise Scores

GMSD Location	Criteria								
	E1	E2	E3	E4	E5	E6	E7	E8	E9
	E1: Vaccine arrival	E2: Temperature	E3: Storage capacity	E4: Buildings, Equipment, Transport	E5: Maintenance	E6: Stock management	E7: Distribution	E8: Vaccine management	E9: MIS, supportive functions
GMSD -Karnal	72%	35%	56%	51%	48%	57%	27%	33%	51%
GMSD Mumbai	44%	58%	81%	81%	83%	67%	16%	52%	51%
GMSD Kolkata	44%	39%	71%	67%	58%	59%	27%	7%	46%
GMSD Chennai	46%	16%	72%	61%	48%	46%	26%	25%	51%

Annexure – D2: GMSD Service Area-wise, Level-wise Scores

GMSD Karnal

Level of vaccine stores	E1	E2	E3	E4	E5	E6	E7	E8	E9
Karnal	72%	35%	56%	51%	48%	57%	27%	33%	51%
States	32%	37%	56%	60%	56%	50%	29%	40%	53%
Divisional	0%	43%	49%	69%	59%	49%	40%	31%	45%
Districts	0%	67%	47%	68%	60%	46%	43%	43%	46%
HF	0%	65%	72%	76%	55%	44%	72%	66%	0%

GMSD Mumbai

Level of vaccine stores	E1	E2	E3	E4	E5	E6	E7	E8	E9
Mumbai	44%	58%	81%	81%	83%	67%	16%	52%	51%
States	44%	57%	67%	71%	68%	68%	65%	75%	82%
Districts	0%	88%	69%	77%	57%	48%	61%	68%	75%
HFs	0%	71%	89%	73%	46%	49%	91%	68%	0%

(No DiviVS assessed under GMSD serviced areas)

GMSD Kolkata

Level of vaccine stores	E1	E2	E3	E4	E5	E6	E7	E8	E9
Kolkata	44%	39%	71%	67%	58%	59%	27%	7%	46%
States	43%	34%	67%	64%	59%	57%	50%	55%	63%
Divisional	0%	60%	39%	64%	57%	36%	41%	40%	77%
Districts	0%	77%	57%	70%	51%	46%	35%	38%	77%
HF	0%	75%	63%	69%	33%	33%	81%	64%	0%

GMSD Chennai

Level of vaccine stores	E1	E2	E3	E4	E5	E6	E7	E8	E9
Chennai	46%	16%	72%	61%	48%	46%	26%	25%	51%
States	41%	52%	83%	71%	63%	47%	37%	38%	77%
Divisional	0%	77%	47%	90%	66%	69%	40%	68%	77%
Districts	0%	67%	71%	51%	55%	45%	34%	53%	61%
HF	0%	81%	89%	73%	49%	55%	78%	72%	0%

Annexure- E-1: State-wise, Level-wise Scores

Bihar

	Criteria								
	E1	E2	E3	E4	E5	E6	E7	E8	E9
	E1: Vaccine arrival	E2: Temperature	E3: Storage capacity	E4: Buildings, Equipment, Transport	E5: Maintenance	E6: Stock management	E7: Distribution	E8: Vaccine management	E9: MIS, supportive functions
State & Regional Level	23%	35%	44%	82%	64%	63%	28%	53%	61%
Divisional Level	0%	60%	39%	64%	57%	36%	41%	40%	77%
District Level	0%	71%	50%	73%	49%	43%	37%	30%	77%
Health Facility Level	0%	69%	58%	73%	30%	31%	75%	61%	0%

Chhattisgarh

	Criteria								
	E1	E2	E3	E4	E5	E6	E7	E8	E9
	E1: Vaccine arrival	E2: Temperature	E3: Storage capacity	E4: Buildings, Equipment, Transport	E5: Maintenance	E6: Stock management	E7: Distribution	E8: Vaccine management	E9: MIS, supportive functions
State & Regional Level	22%	52%	33%	73%	65%	58%	44%	51%	67%
District Level	0%	94%	75%	67%	63%	22%	36%	50%	68%
Health Facility Level	0%	43%	88%	50%	28%	34%	75%	51%	0%

Delhi

	Criteria								
	E1	E2	E3	E4	E5	E6	E7	E8	E9
	E1: Vaccine arrival	E2: Temperature	E3: Storage capacity	E4: Buildings, Equipment, Transport	E5: Maintenance	E6: Stock management	E7: Distribution	E8: Vaccine management	E9: MIS, supportive functions
State & Regional Level	29%	38%	40%	48%	47%	44%	32%	50%	23%

Haryana

	Criteria								
	E1	E2	E3	E4	E5	E6	E7	E8	E9
	E1: Vaccine arrival	E2: Temperature	E3: Storage capacity	E4: Buildings, Equipment, Transport	E5: Maintenance	E6: Stock management	E7: Distribution	E8: Vaccine management	E9: MIS, supportive functions
Divisional Level	0%	48%	81%	70%	71%	61%	61%	42%	50%
District Level	0%	54%	32%	67%	65%	44%	47%	32%	56%
Health Facility Level	0%	93%	86%	80%	84%	77%	92%	83%	0%

Jammu & Kashmir

	Criteria								
	E1	E2	E3	E4	E5	E6	E7	E8	E9
	E1: Vaccine arrival	E2: Temperature	E3: Storage capacity	E4: Buildings, Equipment, Transport	E5: Maintenance	E6: Stock management	E7: Distribution	E8: Vaccine management	E9: MIS, supportive functions
State & Regional Level	29%	18%	56%	38%	53%	45%	13%	34%	29%
District Level	0%	61%	67%	63%	60%	27%	28%	23%	16%
Health Facility Level	0%	22%	57%	66%	37%	20%	67%	50%	0%

Karnataka

	Criteria								
	E1	E2	E3	E4	E5	E6	E7	E8	E9
	E1: Vaccine arrival	E2: Temperature	E3: Storage capacity	E4: Buildings, Equipment, Transport	E5: Maintenance	E6: Stock management	E7: Distribution	E8: Vaccine management	E9: MIS, supportive functions
State & Regional Level	26%	50%	72%	73%	50%	29%	34%	31%	84%
Divisional Level	0%	77%	47%	90%	66%	69%	40%	68%	77%
District Level	0%	67%	67%	41%	53%	42%	31%	54%	56%
Health Facility Level	0%	75%	88%	69%	46%	52%	71%	68%	0%

Kerala

	Criteria								
	E1	E2	E3	E4	E5	E6	E7	E8	E9
	E1: Vaccine arrival	E2: Temperature	E3: Storage capacity	E4: Buildings, Equipment, Transport	E5: Maintenance	E6: Stock management	E7: Distribution	E8: Vaccine management	E9: MIS, supportive functions
State & Regional Level	57%	55%	94%	69%	77%	65%	39%	45%	69%
District Level	0%	67%	83%	81%	61%	52%	44%	50%	77%
Health Facility Level	0%	100%	92%	86%	61%	63%	100%	84%	0%

Madhya Pradesh

	Criteria								
	E1	E2	E3	E4	E5	E6	E7	E8	E9
	E1: Vaccine arrival	E2: Temperature	E3: Storage capacity	E4: Buildings, Equipment, Transport	E5: Maintenance	E6: Stock management	E7: Distribution	E8: Vaccine management	E9: MIS, supportive functions
State & Regional Level	51%	58%	78%	70%	69%	72%	72%	83%	87%
District Level	0%	85%	67%	80%	55%	56%	69%	74%	77%
Health Facility Level	0%	81%	89%	80%	52%	54%	96%	74%	0%

Rajasthan

	Criteria								
	E1	E2	E3	E4	E5	E6	E7	E8	E9
	E1: Vaccine arrival	E2: Temperature	E3: Storage capacity	E4: Buildings, Equipment, Transport	E5: Maintenance	E6: Stock management	E7: Distribution	E8: Vaccine management	E9: MIS, supportive functions
State & Regional Level	46%	65%	78%	98%	77%	79%	71%	63%	84%
Divisional Level	0%	54%	60%	77%	65%	52%	55%	43%	81%
District Level	0%	76%	64%	68%	55%	52%	73%	45%	59%
Health Facility Level	0%	59%	78%	77%	53%	42%	79%	69%	0%

Tripura

	Criteria								
	E1	E2	E3	E4	E5	E6	E7	E8	E9
	E1: Vaccine arrival	E2: Temperature	E3: Storage capacity	E4: Buildings, Equipment, Transport	E5: Maintenance	E6: Stock management	E7: Distribution	E8: Vaccine management	E9: MIS, supportive functions
State & Regional Level	63%	32%	89%	46%	53%	52%	73%	58%	64%
District Level	0%	100%	83%	60%	58%	57%	26%	67%	77%
Health Facility Level	0%	97%	79%	53%	44%	38%	100%	77%	0%

Uttar Pradesh

	Criteria								
	E1	E2	E3	E4	E5	E6	E7	E8	E9
	E1: Vaccine arrival	E2: Temperature	E3: Storage capacity	E4: Buildings, Equipment, Transport	E5: Maintenance	E6: Stock management	E7: Distribution	E8: Vaccine management	E9: MIS, supportive functions
State & Regional Level	31%	40%	56%	64%	54%	47%	26%	34%	65%
Divisional Level	0%	37%	32%	63%	52%	43%	25%	22%	26%
District Level	0%	70%	40%	69%	60%	49%	34%	52%	44%
Health Facility Level	0%	74%	71%	78%	54%	44%	66%	66%	0%

Annexure- E-2: Summary of State Assessments (Scores of EVM)

Kerala

SVS/ RVS	DiviVS	DVS	Health Facilities
Trivandrum	NA	Pathanamthitta	Anicad Chathankarry

Criteria	SVS level	DVS level	Block level
Vaccine arrival procedures	**57%**	**Not applicable**	**Not applicable**
Vaccine Arrival Report (VAR) form	UNICEF VAR is used only for Pentavalent vaccine.	Not applicable	Not applicable
Lot release certificate	Lot release certificate not available for vaccines other than Pentavalent	Not applicable	Not applicable
Procedures for checking and receiving	No standard procedure in place	Not applicable	Not applicable
Temperature maintenance	**55%**	**67%**	**100%**
Temperature monitoring study	Not done	Not applicable	Not applicable
Temperature mapping of cold rooms	Not done	Not applicable	Not applicable
Knowledge of storage temperature range of vaccines	Adequate	Adequate	Adequate
Knowledge of damage to vaccine by freezing	Adequate	Adequate	Adequate
Formal review of temperature records and excursions and remedial actions	Formally reviewed, however, no excursion reported during the review period	Not done	Formally reviewed, however, no excursion reported during the review period
24x7 temperature monitoring system in place for WIC/ WIF	Not available	Not applicable	Not applicable
Storage capacity	**94%**	**83%**	**91%**
Net storage capacity of vaccine storage (2°C to 8°C) for Routine Immunisation (RI)	Sufficient storage capacity	Sufficient storage capacity	Sufficient storage capacity
Dry storage space	Sufficient storage capacity	Not applicable	Not applicable
Storage capacity of vehicles during transportation	Not available	Not applicable	Not applicable
Sufficient CBs	Sufficient CBs available	Sufficient CBs available	Sufficient CBs available
SOP setting for contingency plan	SOPs available, however, emergency contact details not available.	Inadequate	Emergency contact details available, SOPs not available
Building, Equipment and Transport	**69%**	**81%**	**88%**
Vehicle easy access to store and store secure	Yes	Yes	Yes

Criteria	SVS level	DVS level	Block level
Quality of vaccine store building	Adequate conditions, however, electrical and drainage system not satisfactory,	Not suitable building	Suitable building
Adequate space for packing	Adequate space	Not critical	Not critical
Store keeper's office large enough and close to packing area	Adequate	Not applicable	Not applicable
WICs/ WIFs comply with minimum standards	Comply except for continuous temperature recorder	Not applicable	Not applicable
Refrigerators and freezers comply with minimum standards	Comply except for availability of basket	Yes	Yes
Standby generator commissioned at site	Not available	Available	Available at Chatenkery, not available at Anicad
Generator operational, with required capacity and sufficient fuel	Not available	Available	Available at Chatenkery, not available at Anicad
Reliable and sufficient transport facilities	Yes	Vehicle is under general hospital charge and vehicle comes to store whenever required	Not applicable
Maintenance	**77%**	**61%**	**65%**
Planned Preventive Maintenance	No documentary evidence available	No documentary evidence available	No documentary evidence available
Sickness rate of equipment	0%	7.70%	0% for both HF
Stock management	**65%**	**52%**	**64%**
All stock transactions recorded and updated at the end of the day	Yes	Yes	Yes
Diluent information recorded	No	No	No
Documentation: Issue vouchers maintained and correctly used	Yes	No	Not available at Chatenkery, available at Anicad
Safe disposal of damaged or expired vaccines in accordance with standing orders	Yes	Stock control system not designed	Stock control system not designed
Internal reviews of vaccine loss/damages	No	Yes	Yes
Establish stock levels (Maximum, re-order and safety stock)	No	No	Not available
No stock-outs of any vaccine	There were stock-outs	There were stock-outs	There were stock-outs

Criteria	SVS level	DVS level	Block level
Physical inventory of vaccine (counting and reconciliation at least once in 3 months	Physical counting of vaccines done regularly	Physical counting of vaccines done regularly	Physical counting of vaccines done regularly
Physical stock of vaccines and diluents match the recorded stocks in stock book	Mismatch	Mismatch	Mismatch at Chatenkery
Store all vaccines, diluents and droppers securely and correctly in the vaccine store	EEFO not followed and content labels not fixed	EEFO not followed and content labels not fixed	Yes
Distribution	**39%**	**44%**	**100%**
Maintain a programme for distribution of vaccine from the issuing store to each receiving store	No	No	Not critical
Conditioning of ice packs during transportation	Yes	Yes	Yes
Only standard (GoI supplied) ice packs used for transportation of vaccine?	No	Yes	Yes
Contingency planning during transportation (emergency contact points, contact numbers with drivers)	No written contingency plan	Not applicable	Not applicable
Vaccine management	**45%**	**50%**	**84%**
Health workers know how to read, interpret and use VVM	Yes	Yes	Yes
Health workers always use diluents and vaccines from same manufacturer and with matching presentations	Yes	Yes	Yes
Diluents always kept in CC before and during immunisation session	Not applicable	Not applicable	Yes
Open vials of freeze dried vaccines discarded within 4 hours	Not applicable	Not applicable	Yes
Correct wastage rates are used for estimation	No	No	No
Facility receives regular supervision	No	Yes	Yes
MIS, supportive functions	**69%**	**77%**	
Use an evidence based method to forecast the need for vaccines and consumables	Evidence based coverage and vaccine wastage not used	Evidence based coverage and vaccine wastage not used	Not applicable

Criteria	SVS level	DVS level	Block level
State level CC inventory available and updated	Just initiated, collected only once	Not applicable	Not applicable
All contracted and outsourced services (transport, maintenance) have effective and enforceable contract and service response is acceptable	No	Not applicable	Not applicable

Haryana

State/ Region	Division	District	HF-1	HF-2
	Kurukshetra	Panipat	Pattikalyana	Chulkana

Criteria	RVS level	DVS level	Block level
Vaccine arrival procedures	State store of Haryana was not functional for last one and a half years. SEPIO informed that the WIC and WIF were being installed and it was expected to be functional within the next two months.		
VAR form			
Lot release certificate			
Procedures for checking and receiving			
Temperature maintenance	**46%**	**89%**	**100%**
Temperature monitoring study	Not Done	Not done	Not done
Temperature mapping of cold rooms	Not Done	Not done	Not done
Knowledge of storage temperature range of vaccines	Yes	Yes	Yes
Knowledge of damage to vaccine by freezing	Yes	Yes	Yes
Formal review of temperature records and excursions and remedial actions	District Immunisation Officer (DIO) claimed to have checked records but no signatures seen and no action taken for missing records.	Yes	Yes
24x7 temperature monitoring system in place for WIC/WIF	Not available		
Storage capacity	**94%**	**75%**	**100%**
Net storage capacity of vaccine storage (2°C to 8°C) for RI	Sufficient space	Insufficient space	Sufficient space
Dry storage space	Sufficient space		

Criteria	RVS level	DVS level	Block level
Freezing capacity to prepare ice packs	Sufficient capacity	Sufficient capacity	Sufficient capacity
Sufficient CBs	Yes	Yes	Yes
SOP setting for contingency plan	Not there	Available	Available
Building, Equipment and Transport	**90%**	**87%**	**83%**
Vehicle's easy access to store and the store is secure	Yes		
Quality of vaccine store building	Good quality	Good quality	Good quality
Adequate space for packing	Yes		
Store keeper's office is large enough and close to packing area	Yes		
WIC/ WIF complies with minimum standards	Temperature recorder disc not working		
Refrigerators and freezers comply with minimum standards	No ILR available	Yes	Yes
Standby generator commissioned at site	Yes	Yes	No
Generator operational, with required capacity and sufficient fuel	Yes	Yes	No
Reliable and sufficient transport facilities	Yes	Vaccine van is 16 years old, and as insurance cannot be renewed after 14 years, it needs to be replaced. Van was nonfunctional for 15 months from September, 2011 till 07.01.2013 due to lack of funds. Repair was done in January, 2013.	
Maintenance	**86%**	**67%**	**89%**
PPM	No	No	Available in Chulkana, Not available in Pattikalyana
Sickness rate of equipment	0%	0%	0%
Standard stock book format used (including all necessary columns for recording)	Yes, except for location in store	Yes, except for location in store and vaccine presentation	Yes, except for vaccine presentation
All stock transactions recorded and updated at the end of the day	Yes	Yes	Yes
Diluent information recorded	Manufacturer's name and expiry date not mentioned	Vaccine presentation not mentioned	Vaccine presentation not mentioned

Criteria	RVS level	DVS level	Block level
Documentation: Issue vouchers maintained and correctly used	Yes		
Safe disposal of damaged or expired vaccines in accordance with standing orders	Yes	Yes	Process in place, staff has inadequate knowledge at Pattikalyana
Internal reviews of vaccine loss/ damages	No	Yes	Yes
Establish stock levels (Maximum, re-order and safety stock)	No	No	
No stock-outs of any vaccine	Yes	No	Yes
Physical inventory of vaccine (counting and reconciliation at least once in 3 months	No records found	Yes	Yes
Physical stock of vaccines and diluents match the recorded stocks in stock book	Matched	Matched	Matched
Store all vaccines, diluents and droppers securely and correctly in the vaccine store	Content labels not fixed	Content labels not fixed	Not arranged in EEFO order at Pattikalyan
Distribution	**60%**	**59%**	**88%**
Maintain a programme for distribution of vaccines from issuing store to each receiving store	No	No	
Conditioning of ice packs during transportation	Yes	Yes	Yes, except at Pattikalyana
Only standard (GoI supplied) ice packs used for transportation of vaccine?	Yes	Yes	Yes
Contingency planning during transportation (emergency contact points, contact numbers with drivers)	No written plan		
Health workers correctly use the "shake" test when needed	Inadequate knowledge	No	Inadequate knowledge
Health workers know how to read, interpret and use VVM	Yes	Yes	Yes
Health workers always use diluents and vaccines from the same manufacturer and with matching presentations			Yes
Diluents always kept in CC before and during immunisation session?			Yes

Criteria	RVS level	DVS level	Block level
Open vials of freeze dried vaccines discarded within 4 hours			Yes
Correct wastage rates are used for estimation	No	No	Not in Pattikalyana
Facility receives regular supervision	Yes	Yes	Yes
MIS, supportive functions	**77%**	**68%**	
Use an evidence based method to forecast the need for vaccines and consumables	Coverage and wastage rate not considered	Coverage and wastage rate not considered	
State level CC inventory available and updated			
All contracted and outsourced services (transport, maintenance) have effective and enforceable contracts and the service response is acceptable			

Rajasthan

State / Region	Division	District	HF-1	HF-2
Rajasthan SVS	Jaipur DiviVS	Kota DVS	Mandana	Sultanpur
	Bikaner DiviVS	Churu DVS	Binadesar	Lalgarh
	Ajmer DiviVS			
		Nagaur DVS	Jakholi	Chhotiberi

Criteria	SVS level	RVS Level	DVS level	Block level
Vaccine arrival procedures	**46**			
VAR form	No			
Lot release certificate	Yes			
Procedures for checking and receiving	Yes			
Temperature maintenance	**78**	**54**	**76**	**58.8**
Temperature monitoring study	No			
Temperature mapping of cold rooms	No	Only in Bikaner		
Knowledge of storage temperature range of vaccines	Yes	Yes	Yes	Yes, except Chhoteberi and Lalgarh
Knowledge of damage to vaccine by freezing	Yes	Yes except Ajmer	Yes	Yes, except Chhoteberi and Lalgarh
Formal review of temperature records and excursions and remedial actions	Yes	No	Only in Kota	Only in Mandana, Sultanpur and Jakhali
24x7 temperature monitoring system in place for WIC/ WIF	No	Yes		

Criteria	SVS level	RVS Level	DVS level	Block level
Storage capacity	**78**	**60**	**64**	**82.3**
Criteria	SVS level	RVS Level	DVS level	Block level
Net storage capacity of vaccine storage (2°C to 8°C) for RI	No	Only in Bikaner	No	Only in Sultanpur, Chhoteberi, Lalgarh, Jakhali and Binadesar
Dry storage space	Yes	No		
Storage capacity of vehicles during transportation	No	Only in Ajmer		
Freezing capacity to prepare ice packs	Yes	Yes	Yes	Yes
Sufficient CBs	Yes	Yes	Yes	Yes
SOP setting for contingency plan	No	No	No	No
Building, Equipment and Transport	**93**	**77.3**	**68**	**79.3**
Vehicle's easy access to store and the store is secure	Yes	Yes		
Quality of vaccine store building	Yes	Not appropriate in Bikaner	Not appropriate in Churu	Not in Binadesar and Lalgarh
Adequate space for packing	Yes	Yes, except in Bikaner		
Store keeper's office large enough and close to packing area	Yes	Yes, except in Bikaner		
WIC/ WIF complies with minimum standards	Yes	Not in Jaipur		
Refrigerators and freezers comply with minimum standards	Yes	Yes	Not appropriate in Churu	Not in Binadesar and Lalgarh
Standby generator commissioned at site	Yes	Not in Jaipur	Not in Kota and Churu	Not in Sultanpur, Chhoteberi, Lalgarh, Jakhali and Binadesar
Generator operational, with required capacity and sufficient fuel	No	No	No	No
Reliable and sufficient transport facilities	Yes	Yes	Not in Churu	
Maintenance	**77**	**64.6**	**55.3**	**53.3**
PPM	No	No	No	No
Sickness rate of equipment	0%	8%	4%	5.50%
Stock management	**79**	**52**	**51.6**	**41.6**
Standard stock book format used (including all necessary columns for recording)	Not covering all details	Not covering all details	Not covering all details	Not covering all details

Criteria	SVS level	RVS Level	DVS level	Block level
All stock transactions recorded and updated at the end of the day	Yes	Yes	Yes	Not in Chhotbari, Binadesar and Lalgarh
Diluent information recorded	Not covering all details	Not covering all details	Not covering all details	Not covering all details
Documentation: Issue vouchers maintained and correctly used	Yes	Not in Bikaner		
Safe disposal of damaged or expired vaccines in accordance with standing orders	Yes	Not in Ajmer and Bikaner	Not in Nagaur and Churu	Not in Binadesar and Lalgarh
Internal reviews of vaccine loss/ damages	No	No	No	No
Establish stock levels (Maximum, reorder and safety stock)	No	No	No	
No stock-outs of any vaccines	Yes	Not in Bikaner	Not in Churu	Not in Binadesar and Lalgarh
Physical inventory of vaccine (counting and reconciliation at least once in 3 months	No	No	Only in Churu	No
Physical stock of vaccines and diluents match the recorded stocks in stock book	Yes	Yes	Not in Sultanpur	Not in Binadesar and Sultanpur
Store all vaccines, diluents and droppers securely and correctly in the vaccine store	Yes	Yes	Yes	Yes
Distribution	**61**	**55.3**	**72.6**	**79.2**
Maintain a programme for distribution of vaccines from issuing store to each receiving store	Yes	Not in Ajmer and Bikaner	Yes	
Conditioning of ice packs during transportation	Yes	Yes	Not in Churu	Not in Chhoteberi and Lalgarh
Only standard (GoI supplied) ice packs used for transportation of vaccine?	Yes	Yes	Not in Churu	Not in Chhoteberi and Lalgarh
Contingency planning during transportation (emergency contact points, contact numbers with drivers)	Partially present	Partially present		
Vaccine management	**63**	**42.6**	**45.3**	**69**
Health workers correctly use the “shake” test when needed	No	No	Only in Kota	No
Health workers know how to read, interpret and use VVM	Yes	Yes	Yes	Yes

Criteria	SVS level	RVS Level	DVS level	Block level
Health workers always use diluents and vaccines from the same manufacturer and with matching presentations				Yes
Diluents always kept in CC before and during immunisation session?				Yes
Open vials of freeze dried vaccines discarded within 4 hrs				Yes
Correct wastage rates are used for estimation	No	No	No	No
Facility receives regular supervision	Yes	Not in Ajmer and Bikaner	Not in Nagaur and Churu	Not in Binadesar and Lalgarh
MIS, supportive functions	**87**	**81**	**59**	
Use an evidence based method to forecast the need for vaccines and consumables	Wastage rate and coverage not considered	Wastage rate and coverage not considered	Wastage rate and coverage not considered	
State level CC inventory available and updated	They have records of the financial year where they had updated CCE. They also had the distribution list against available equipment.			
All contracted and outsourced services (transport, maintenance) have effective and enforceable contracts and the service response is acceptable	No			

Tripura

STATE / RVS	Divisions	Districts	Health FAcilities
Agartala SVS	X	Gomati District	Kokraban PHC
			Silachori PHC

Criteria	SVS level	DVS level	HF1	HF2
Vaccine arrival procedures	**33%**			
VAR form	The state has the invoice of the GMSD as well as they have one format which contains the lot no. manufacture details and expiry date. But it does not have the signature of the "Inspection Supervisor" (As per the UNICEF VAR).The VAR does not have advance notice and actual receive.			
Lot release certificate	Available			
Procedures for checking and receiving	No formal procedure of checking and reporting			
Temperature maintenance	**16%**	**100%**	**100%**	**94%**
Temperature monitoring study	Not done			
Temperature mapping of cold rooms	Not done			
Knowledge of storage temperature range of vaccines	Yes	Yes	Yes	Yes
Knowledge of damage to vaccine by freezing	Yes	Yes	Yes	Yes
Formal review of temperature records and excursions and remedial actions	Not done	Since the last 4 years there have been no excursions or breakdowns	Yes	There is a signature of the MO on a regular basis in the temperature record book
24x7 temperature monitoring system in place for WIC/ WIF	The cold room and freezer room does not have any data lodger for temperature recording.			
Storage capacity	**83%**	**83%**	**83%**	**75%**

Criteria	SVS level	DVS level	HF1	HF2
Net storage capacity of vaccine storage (2°C to 8°C) for RI	Adequate space available	Adequate space available	Adequate space available	Adequate space available
Dry storage space	The syringes and CBs are stored at the central ware house of the state which is in a separate building. The building is of 1,500 sqft and there is enough space for storing of these consumables.	Not critical	Not critical	Not critical
Storage capacity of vehicles during transportation	The state store does not have its own vehicle. The general practice of the state is that districts receive the vaccines for the store. The state does not have a dedicated vaccine van.	Not critical	Not critical	Not critical
Freezing capacity to prepare ice packs	Sufficient	Sufficient	Sufficient	Sufficient
Sufficient CBs	Yes	Yes	Yes	Yes
SOP setting for contingency plan	Not available	Not available	Not available	Not available
Building, Equipment and Transport	**48%**	**60%**	**82%**	**35%**
Vehicle's easy access to store and the store is secure	Yes	Not critical	Not critical	Not critical
Adequate space for packing	Hand-wash facility and temperature of packing area not appropriate	Not critical	Not critical	Not critical
Store keeper's office large enough and close to packing area	Room not large enough	Not critical	Not critical	Not critical
WIC/ WIF complies with minimum standards	Fridge tag inside the WIC and temperature recorder is available in WIC. Temperature is manually recorded but it is not regular. Shelves not available	Not applicable	Not applicable	Not applicable

Criteria	SVS level	DVS level	HF1	HF2
Refrigerators and freezers comply with minimum standards	Not appropriate, thermometers not available	Yes	No baskets available	No thermometers and baskets available
Standby generator commissioned at site	There is no independent generator in the store. Although there are three connected generator but these are from other source.	Not available	Not available	Not available
Generator operational, with required capacity and sufficient fuel	Not available	Not available	Not available	Not available
Reliable and sufficient transport facilities	Not available	Not available	Not applicable	Not applicable
Maintenance	**47%**	**58%**	**33%**	**33%**
PPM	Plan not available	Plan not available	Plan not available	Plan not available
Sickness rate of equipment	15.10%	10%	0%	0%
Stock management	**50%**	**57%**	**51%**	**24%**
Standard stock book format used (including all necessary columns for recording)	VVM Status, Vaccine presentation and location not available	Manufacturer's name not available	Manufacturer's name not available	only quantity is mentioned
Diluent information recorded	Not available	Not available	Only Diluent name and quantity mentioned	Not available
Documentation: Issue vouchers maintained and correctly used	Yes	Not critical	Not critical	Not critical
Safe disposal of damaged or expired vaccines in accordance with standing orders	Not available	Not available	Not available	Not available
Internal reviews of vaccine loss/damages	Yes	No	No	No
Establish stock levels (Maximum, reorder and safety stock)	The state does not have a stock level policy.	No	Not critical	Not critical
No stock-outs of any vaccine	No	Yes	No	No
Physical inventory of vaccine (counting and reconciliation at least once in 3 months	There is no record of counting of the vaccines and diluent stock during the assessment period.	Yes	Yes	No

Criteria	SVS level	DVS level	HF1	HF2
Physical stock of vaccines and diluents match the recorded stock in stock book	Mismatch	Mismatch	Mismatch	Matched
Store all vaccines, diluents and droppers securely and correctly in the vaccine store	The vaccines are kept as per EEFO and a tag " Vaccine Out" (Name of the vaccine is written) is kept inside the WIC	There are 2 ILR in the DVS. The store keeper uses one ILR for newly arrived vaccine and another ILR is used for outgoing vaccines to the PHCs. There is no tagging of names of the Vaccines in the store. All vaccines are kept as per the order.	EEFO not followed	In the ILR there is no basket and the vaccines are kept in a plastic jar for which all vaccines are kept at one level
Distribution	**54%**	**26%**	**25%**	**50%**
Maintain a programme for distribution of vaccines from the issuing store to each receiving store	Yes	No		
Conditioning of ice packs during transportation	Yes	Yes	Yes	Yes
Contingency planning during transportation (emergency contact points, contact numbers with drivers)	No			
Vaccine management	**35%**	**67%**	**68%**	**63%**
Health workers correctly use the “shake” test when needed	The store keeper could only narrate and demonstrate the “shake” test. But he could not tell when it is to be done.	Limited knowledge	Limited knowledge	Limited knowledge
Health workers know how to read, interpret and use VVM	Yes	Yes	Yes	Yes
Health workers always use diluents and vaccines from the same manufacturer and with matching presentations			Yes	Yes
Diluents always kept in CC before and during immunisation session			Yes	Yes
Open vials of freeze dried vaccines discarded within 4 hours			Yes	Yes
Correct wastage rates are used for estimation	No	No	No	No
Facility receives regular supervision	Yes	Yes	Yes	Yes

Criteria	SVS level	DVS level	HF1	HF2
MIS, supportive functions	32%	77%		
Use an evidence based method to forecast the need for vaccines and consumables	Yes	Yes, however, coverage and wastage rate not considered.		
State level CC inventory available and updated	No			
All contracted and outsourced services (transport, maintenance) have effective and enforceable contract and service response is acceptable	No			

Chhattisgarh

State / Region	Division	District	HF-1	HF-2
Raipur SVS		Surguja DVS	Narmadapur CHC	Lakhanpur CHC

Criteria	SVS level	DVS level	Block level
Vaccine arrival procedures	0%		
VAR form	Not available		
Lot release certificate	Not available for all releases		
Procedures for checking and receiving	Not in place		
Temperature maintenance	52%	94%	35%
Temperature monitoring study	Not done		
Temperature mapping of cold rooms	Not done		
Knowledge of storage temperature range of vaccines	Yes	Yes	Yes
Knowledge of damage to vaccines by freezing	Yes	Yes	No
Formal review of temperature records and excursions and remedial actions	Yes	Yes	Not in Narmadapur
24x7 temperature monitoring system in place for WIC/ WIF	No		
Storage capacity	33%	75%	83%
Net storage capacity of vaccine storage (2°C to 8°C for RI	Not sufficient	Not sufficient	Sufficient
Dry storage space	Not available		
Storage capacity of vehicles during transportation	Not available		
Freezing capacity to prepare ice packs	Yes	Yes	Yes
Sufficient CBs	Yes	Not sufficient	Yes

Criteria	SVS level	DVS level	Block level
SOP setting for contingency plan	Available	Not available	Not available
Easy access of vehicle to store and the store is secure	Yes		
Quality of vaccine store building	No fire extinguisher or proper drainage system	No fire extinguisher	Not appropriate
Adequate space for packing	Yes		
Store keeper's office large enough and close to packing area	Yes		
WIC/ WIF comply with minimum standards	Yes		
Refrigerators and freezers comply with minimum standards	Yes	Baskets are insufficient	Baskets and thermometers are not sufficient in Narmadapur
Standby generator commissioned at site	No	No	No
Generator operational, with required capacity and sufficient fuel	No	No	No
Reliable and sufficient transport facilities	No up-to-date maintenance	No	
Maintenance	**65%**	**63%**	**33%**
PPM	Not in place	Not in place	Not in place
Sickness rate of equipment	0%	0%	46%
Stock management	**58%**	**22%**	**36%**
Standard stock book format used (including all necessary columns for recording)	VVM status not available	Vaccine presentation, manufacturer's name and VVM status missing	Vaccine presentation, manufacturer's name and VVM status missing
All stock transactions recorded and updated at the end of the day	Yes	Yes	Not updated in Lakahanpur
Diluent information recorded	Yes, except for location in store	No	No
Documentation: Issue vouchers maintained and correctly used	Yes		
Safe disposal of damaged or expired vaccines in accordance with standing orders	No	No	No, labelling is done in Lakahanpur
Internal reviews of vaccine loss/damages	No	No	No
No stock outs of any vaccine	Yes	No	Yes
Physical inventory of vaccines (counting and reconciliation at least once in 3 months	Not in place	Not in place	Not in place

Criteria	SVS level	DVS level	Block level
Physical stock of vaccines and diluents match the recorded stock in stock book	Not equal	Mismatch	Mismatch
Store all vaccines, diluents and droppers securely and correctly in the vaccine store	Labels not fixed and not in EEFO order	Labels not fixed and not in EEFO order	Labels not fixed and not in EEFO order at Narmadapur
Distribution	**44%**	**16%**	**75%**
Maintain a programme for distribution of vaccines from issuing store to each receiving store	No	No	
Conditioning of ice packs during transportation	Yes	Yes	Yes
Only standard (GoI supplied) ice packs used for transportation of vaccine	Yes	No	No
Contingency planning during transportation (emergency contact points, contact numbers with drivers)	Not in place		
Vaccine management	**51%**	**50%**	**51%**
Health workers correctly use the "shake" test when needed	No	No	No
Health workers know how to read, interpret and use VVM	Yes	Yes	Yes
Health workers always use diluents and vaccines from the same manufacturer and with matching presentations			No
Diluents always kept in CC before and during immunisation session			Yes
Open vials of freeze dried vaccines discarded within 4 hours			Yes
Correct wastage rates are used for estimation	No	No	No
Facility receives regular supervision	Yes	Yes	No
MIS, supportive functions	**45%**	**23%**	
State level CC inventory available and updated	Not properly updated		
All contracted and outsourced services (transport, maintenance) have effective and enforceable contract and service response is acceptable	No		

Bihar

STATE / RVS	Divisions	Districts	Health FAcilities
Patna SVS	East Champaran- Motihari	West Champaran-Betia	Lauriya
			Sikta
	Purniya	Katihar	Amdabad
			Katihar Urban
		Bhojpur	Agion
			Koilwar
		Vaishali	Hajipur
			Jandaha

Criteria	SVS level	RVS Level	DVS level	Block level
Vaccine arrival procedures	**23%**			
VAR form	No			
Lot release certificate	Available			
Procedures for checking and receiving	No			
Temperature maintenance	**22%**	**60%**	**70.75%**	**69%**
Temperature monitoring study	No			
Temperature mapping of cold rooms	No	No		
Knowledge of storage temperature range of vaccines	Yes	Yes	Yes	Yes
Knowledge of damage to vaccine by freezing	Yes	Yes	Not in West Champaran	Yes
Formal review of temperature records and excursions and remedial actions	No	Only in Purnia	Only in Vaishali	Only in Koliwar, Hajipur, Jandaha
24x7 temperature monitoring system in place for WIC/ WIF	No	No		
Storage capacity	**44%**	**39.50%**	**50%**	**57.70%**
Net storage capacity of vaccine storage (2°C to 8°C) for RI	No	No	No	Only in Amdabad, Kolivar, Hajipur and Jandaha
Storage capacity of vehicles during transportation	No	No		
Freezing capacity to prepare ice packs	No	Only in Purnia	Not in Katihar and Vaishali	Not in Sikta
Sufficient CBs	No	Yes	Yes	Yes
SOP setting for contingency plan	Not available	Not available	Not available	Not available
Building, Equipment and Transport	**82%**	**63%**	**72.75%**	**73%**
Vehicle has easy access to store and the store is secure	Yes	Yes		

Criteria	SVS level	RVS Level	DVS level	Block level
Quality of vaccine store building	No fire extinguisher	No	No, conditions are critically poor in Katihar	No, conditions are critically poor in Amdabad
Adequate space for packing	No	No		
Store keeper office large enough and close to packing area	No	No		
WIC/ WIF complies with minimum standards	Yes	No continuous temperature recorders and shelves		
Refrigerators and freezers comply with minimum standards	No	No	No	Only in Agion, Hajipur and Bhojpur
Standby generator commissioned at site	Yes	Not in Purnia	Not in Katihar	Not in Amdabad, KatiharSadar and Hajipur
Generator operational, with required capacity and sufficient fuel	Yes	Not in Purnia	Not in Katihar	Not in Amdabad, Katihar Sadar and Hajipur
Reliable and sufficient transport facilities	No	Only in Purnia	Only in Bhojpur and Vaishali	
Maintenance	**64%**	**56.50%**	**49.25%**	**29.50%**
PPM	No	No	Only in Vaishali	No
Sickness rate of equipment	0%	0%	21%	11.50%
Stock management	**63%**	**36%**	**43.75%**	**31%**
Standard stock book format used (including all necessary columns for recording)	No vaccine presentation status available	No	No	No
All stock transactions recorded and updated at the end of the day	Yes	Yes	Not in Katihar	Not in Katihar and Amadabad
Diluent information recorded	No	No	No	No
Documentation: Issue vouchers maintained and correctly used	Yes	Only in Purnia		
Safe disposal of damaged or expired vaccines in accordance with standing orders	No	No	No	No
Internal reviews of vaccine loss/ damages	No	No	No	No
Establish stock levels (maximum, re-order and safety stock)	No	No	No	
No stock outs of any vaccine	No	No	Only in Katihar	Only in Agion
Physical inventory of vaccine (counting and reconciliation at least once in 3 months	Yes	No	Only in Vaishali	No

Criteria	SVS level	RVS Level	DVS level	Block level
Physical stock of vaccines and diluents match the recorded stocks in stock book	Yes	Mismatch	Matched only in Bhojpur and Vaishali	Matched only in Lauriya and Jandaha
Store all vaccines, diluents and droppers securely and correctly in the vaccine store	No	No	No	No
Distribution	**28%**	**41%**	**36.75%**	**75%**
Maintain a programme for distribution of vaccines from issuing store to each receiving store	No	Only in Purnia	No	
Conditioning of ice packs during transportation	No	Yes	No	Only in Sikta, Amdabad, Koliwar and Hajipur
Only standard (GoI supplied) ice packs used for transportation of vaccine	No	Yes	No	Only in Sikta, Amdabad, Koliwar and Hajipur
Contingency planning during transportation (emergency contact points, contact numbers with drivers)	No	No		
Vaccine management	**53%**	**40%**	**30%**	**60.70%**
Health workers correctly use the "shake" test when needed	No	Yes	Only in Katihar	No
Health workers know how to read, interpret and use VVM	Yes	Yes	Yes	Yes
Health workers always use diluents and vaccines from the same manufacturer and with matching presentations				Not in Koliwar and Jandaha
Diluents always kept in CC before and during immunisation session				Yes
Open vials of freeze dried vaccine discarded within 4 hours				Yes
Correct wastage rates are used for estimation	No	No	No	No
Facility receives regular supervision	Yes	No	No	No
MIS, supportive functions	**61%**	**77%**	**77%**	
Use an evidence based method to forecast the need for vaccines and consumables	Coverage and wastage rate not considered	Coverage and wastage rate not considered	Coverage and wastage rate not considered	
State level CC inventory available and updated	Yes			
All contracted and outsourced services (transport, maintenance) have effective and enforceable contract and service response is acceptable	No			

Jammu and Kashmir

STATE/ RVS	Divisions	Districts	Health Facilities
Jammu		Jammu	Jourian
			Sai R S Pura
Srinagar		Srinagar	PHC Harwan
			NTPHC Panthachowk

Criteria	SVS level	DVS level	Block level
Vaccine arrival procedures	**52%**		
VAR form	Not available		
Lot release certificate	Not available		
Procedures for checking and receiving	Not in place		
Temperature maintenance	**17.50%**	**61%**	**29.25%**
Temperature monitoring study	Not done		
Temperature mapping of cold rooms	Not done		
Knowledge of storage temperature range of vaccines	Yes	Yes	Yes, except in Jourian and Pathanchowk
Knowledge of damage to vaccines by freezing	No	Yes	No, except in Sai RS Pura
Formal review of temperature records and excursions and remedial actions	No	No	No
24x7 temperature monitoring system in place for WIC/ WIF	No		
Storage capacity	**56%**	**66.50%**	**46.75%**
Net storage capacity of vaccine storage (2°C to 8°C) for RI	Yes	No	Not in Harwana and Pathanchowk
Dry storage space	approximate 200 ft available for dry storage		
Storage capacity of vehicles during transportation	Not available		
Freezing capacity to prepare ice packs	Yes	No	Yes, except in Sai RS Pura
Sufficient no. of CBs	No	Yes	Not in Harwana
SOP setting for contingency plan	No	No	No
Building, Equipment and Transport	**34.50%**	**63%**	**47.50%**
Easy access of vehicle to the store and store is secure	No fenced compound wall with arrangements for 24 hour guard or surveillance		
Quality of vaccine store building	Yes	No	Yes
Adequate space for packing	No		

Criteria	SVS level	DVS level	Block level
Store keeper's office large enough and close to packing area	No		
WIC/ WIF complies with minimum standards	Recorders and shelves not available		
Refrigerators and freezers comply with minimum standards	No thermometers	Yes	No thermometers at Jourian
Standby generator commissioned at site	No	Not required	Only at Sai RS Pura
Generator operational, with required capacity and sufficient fuel	No	No	No
Reliable and sufficient transport facilities	No	No	
Maintenance	**54%**	**60.50%**	**57.50%**
PPM	Not available	Not available	Not available
Sickness rate of equipment	12.50%	5%	8.30%
Stock management	**43%**	**27.50%**	**24.50%**
Standard stock book format used (including all necessary columns for recording)	Inadequate information in Srinagar, VVM status missing in Jammu	Inadequate	Inadequate except for Jourian
All stock transactions recorded and updated at the end of the day	Yes	Not in Srinagar	Only in Jourian
Diluent information recorded	Not complete	Not complete	No
Documentation: Issue vouchers maintained and correctly used	Yes		
Safe disposal of damaged or expired vaccines in accordance with standing orders	No	No	No
Internal reviews of vaccine loss/ damages	No	No	No
Establish stock levels (maximum, re-order and safety stock)	No	No	
No stock-outs of any vaccine	Not in Jammu	Not in Jammu	Not in Jourian
Physical inventory of vaccine (counting and reconciliation at least once in 3 months	No	No	Only in Jourian and Sai RS Pura
Physical stock of vaccines and diluents matches the recorded stocks in the stock book	Mismatch	Mismatch	Mismatch
Store all vaccines, diluents and droppers securely and correctly in the vaccine store	No	No	not in Sai RS Pura and Harwana
Distribution	**16%**	**27.50%**	**43.75%**

Criteria	SVS level	DVS level	Block level
Maintain a programme for distribution of vaccine from the issuing store to each receiving store	No	No	
Conditioning of ice packs during transportation	No	No	Not in Harwana
Only standard (GoI supplied) ice packs used for transportation of vaccine	Not in Jammu	Not in Srinagar	Not in Harwana
Contingency planning during transportation (emergency contact points, contact numbers with drivers)	No		
Vaccine management	**34%**	**23%**	**51%**
Health workers correctly use the "shake" test when needed	No	No	No
Health workers know how to read, interpret and use VVM	Yes	Yes	Yes
Health workers always use diluents and vaccines from the same manufacturer and with matching presentations			Only in Pathanchowk
Diluents always kept in CC CC before and during the immunisation session?			Not in Sai RS Pura
Open vials of freeze dried vaccines discarded within 4 hours			Not in place at Harwana
Correct wastage rates are used for estimation	No	No	Available only at Sai RS Pura
Facility receives regular supervision	Not in Jammu	No	Only at Harwana and Pathanchowk
MIS, supportive functions	**30.50%**	**16%**	
Use an evidence based method to forecast the need for vaccines and consumables	Not complete	Not complete	
State level CC inventory available and updated	Not in place at Jammu		
All contracted and outsourced services (transport, maintenance) have effective and enforceable contracts and the service response is acceptable	Not available		

Madhya Pradesh

State / Region	Division	District	HF-1	HF-2
Madhya Pradesh	Indore	Shahjapur	Polakalan	Bholai
	Gwalior	Morena	Posha	Amba
	Jabalpur	Narsingpur	PHC Bohhani	PHC Barhata

Criteria	SVS level	DVS level	Block level
Vaccine arrival procedures	**26%**		
VAR form	Not in Indore and Jabalpur		
Lot release certificate	Yes		
Procedures for checking and receiving	Only in Jabalpur		
Temperature maintenance	**47%**	**85%**	**80.33%**
Temperature monitoring study	Not done in Jabalpur		
Temperature mapping of cold rooms	No		
Knowledge of storage temperature range of the vaccines	Yes	Yes	Yes
Knowledge of damage to vaccine by freezing	Yes	Yes	Yes
Formal review of temperature records and excursions and remedial actions	Not in Indore	Not In Shajapur	Not in Bholai, Polay Kalan and Polah Bada
24x7 temperature monitoring system in place for WIC/ WIF	Only in Jabalpur		
Storage capacity	**72%**	**66.66%**	**88.83%**
Net storage capacity of vaccine storage (2°C to 8°C) for RI	Not in Gwalior and Indore	Not in Shajapur and Narshinghpur	Yes
Dry storage space	Not in Jabalpur		
Storage capacity of vehicles during transportation	No		
Freezing capacity to prepare ice packs	Yes	Yes	Yes
Sufficient CBs	Yes	Not in Narsinghpur	Not in Paloha Bada and Barha Bada
SOP for setting contingency plan	Yes	Partially available	Partially available
Building, Equipment and Transport	**59%**	**79.66**	**80.50%**
Vehicle has easy access to store and the store is secure	Yes		
Quality of vaccine store building	Yes	Not good in Sahajpur	Yes
Adequate space for packing	Less space in Indore		

Criteria	SVS level	DVS level	Block level
Store keeper's office is large enough and close to packing area	Yes		
WIC/ WIF complies with minimum standards	Not complying with a few standards		
Refrigerators and freezers comply with minimum standards	Not in Gwalior	Yes	Yes
Standby generator commissioned at site	In Gwalior only	In Morena and Narsinghpur	Only in Nithara and Barha Bada
Generator operational, with required capacity and sufficient fuel	In Gwalior only	In Morena and Narsinghpur	Only in Nithara and Barha Bada
Reliable and sufficient transport facilities	Only in Gwalior	In Morena and Sahajpur	
Maintenance	**53%**	**55.66%**	**52.00%**
PPM	No	No	No
Sickness rate of equipment	11%	0%	16.00%
Stock management	**51%**	**56.66%**	**54.16%**
Standard stock book format used (including all necessary columns for recording)	In Gwalior and Indore	No	No
All stock transactions recorded and updated at the end of the day	Yes	Yes	Not in Paloha Bada
Diluent information recorded	Yes	Not in Sahajpur	Not in Palay kalan
Documentation: Issue vouchers maintained and correctly used	Yes		
Safe disposal of damaged or expired vaccines in accordance with standing orders	Not in Indore	Only in Morena and Narsinghpur	Only in Nithara
Internal reviews of vaccine loss/ damages	Only in Gwalior	Only in Morena	Only in Nithara
Establish stock levels (maximum, re-order and safety stock)	Not complete	Not complete	
No stock-outs of any vaccine	No	Only in Morena	Only in Nithara, Mauha, Bholai and Polay kalan
Physical inventory of vaccine (counting and reconciliation at least once in 3 months	No	Only in Morena and Narsinghpur	Only in Nithara , Mauha and Barha Bada
Physical stock of vaccines and diluents matches the recorded stocks in the stock book	Only in Jabalpur	Only in Narsinghpur and Morena	Only in Nithara and BarhaBada
Store all vaccines, diluents and droppers securely and correctly in the vaccine store	Yes	Yes	Yes
Distribution	**40%**	**68.66%**	**95.83%**

Criteria	SVS level	DVS level	Block level
Maintain a programme for distribution of vaccine from issuing store to each receiving store	Not present in Indore	Not present in Sahajpur	
Conditioning of ice packs during transportation	Yes	Yes	Yes
Only standard (GoI supplied) ice packs used for transportation of vaccine	Yes	Yes	Yes
Contingency planning during transportation (emergency contact points, contact numbers with drivers)	Not in Indore		
Vaccine management	**50%**	**74.33%**	**73.50%**
Health workers correctly use the "shake" test when needed	Yes	Yes	Not in Mauha and Barha Bada
Health workers know how to read, interpret and use VVM	Yes	Yes	Yes
Health workers always use diluents and vaccines from the same manufacturer and with matching presentations			Not in Polay kalan
Diluents always kept in CC before and during immunisation session			Yes
Open vials of freeze dried vaccine discarded within 4 hours			Yes
Correct wastage rates are used for estimation	Yes		
Facility receives regular supervision	Only in Jabalpur	No	No
MIS, supportive functions	**87%**	**77%**	
Use an evidence based method to forecast the need for vaccines and consumables	Wastage and Coverage not included	Wastage and Coverage not included	
State level CC inventory available and updated	Yes		
All contracted and outsourced services (transport, maintenance) have effective and enforceable contract and service response is acceptable	No		

Karnataka

State/Region	Division	District	HF-1	HF-2
Karnataka SVS	Bagalkot RVS	Bengaluru Urban	Abbigere	Chikkabanavara
		Rama nagara	Sangikhatta	Bidadi
		Bijapur	Lachyan	Ukkali

Criteria	SVS level	RVS Level	DVS level	Block level
Vaccine arrival procedures	**26%**			
VAR form	Only one VAR is available for Pentavalent vaccines received on 18th December 2012. For arrival of vaccines during the review period only one VAR is available.			
Lot release certificate	Not available for all transactions			
Procedures for checking and receiving	No formal procedure is followed			
Temperature maintenance	**50%**	**77%**	**64%**	**73.66%**
Temperature monitoring study	As part of ICMR study			
Temperature mapping of cold rooms	No	No		
Knowledge of storage temperature range of vaccines	Yes	Yes	Yes	Yes
Knowledge of damage to vaccine by freezing	Yes	Yes	Not in Ramnagara	Not in Abiggere
Formal review of temperature records and excursions and remedial actions	No	Yes	Only in Bijapur	Only in Ukkali and Abiggere
24x7 temperature monitoring system in place for WIC/ WIF	No	Yes		
Storage capacity	**72%**	**47%**	**66.66%**	**88.00%**
Net storage capacity of vaccine storage (2°C to 8°C) for RI	Not sufficient	Sufficient	Not in Bengaluru and Ramnagara	Sufficient
Dry storage space	Yes	Yes		
Storage capacity of vehicles during transportation	No	No		
Freezing capacity to prepare ice packs	Sufficient	Not sufficient	Sufficient	Sufficient
Sufficient CBs	Yes	No	Yes	Not in Bidadi

Criteria	SVS level	RVS Level	DVS level	Block level
SOP setting for contingency plan	Incomplete	Incomplete	Incomplete	Incomplete except for Abiggere and Sankigatta
Building, Equipment and Transport	**73%**	**90%**	**41%**	**69.00%**
Vehicle has easy access to the store and the store is secure	No	Yes		
Quality of vaccine store building	Inadequate	Inadequate	Inadequate	Quality is perfect only in Chikkabangara and Abigger
Adequate space for packing	Inadequate	Inadequate		
Store keeper's office is large enough and close to the packing area	Yes	Yes		
WIC/ WIF complies with minimum standards	No continuous recorders	No shelves		
Refrigerators and freezers comply with minimum standards	No	No	No	Only comply in Chikkabanvara and Ukkali
Standby generator commissioned at site	Yes	Yes	No	No
Generator operational, with required capacity and sufficient fuel	Yes	Yes	No	No
Reliable and sufficient transport facilities	No	Yes	No	
Maintenance	**50%**	**66%**	**52.66%**	**45.66%**
PPM	No	No	No	No
Sickness rate of equipment	0%	0%	18%	5.50%
Stock management	**29%**	**69%**	**42.33**	**45.66%**
Standard stock book format used (including all necessary columns for recording)	Inadequate	Inadequate	Inadequate except Bijapur	Inadequate except Sankighatta
All stock transactions recorded and updated at the end of the day	No	No	Not updated in Bijapur	Not updated in Chikabanvara, Lachyan and Ukkali
Diluent information recorded	Incomplete	Incomplete	Incomplete	Incomplete
Documentation: Issue vouchers maintained and correctly used	No	Yes		
Safe disposal of damaged or expired vaccine, in accordance with standing orders	No	Yes	Only in Bijapur	No

Criteria	SVS level	RVS Level	DVS level	Block level
Internal reviews of vaccine loss/ damages	No	No	No	No
Establish stock levels (maximum, re-order and safety stock)	Incomplete	Incomplete	Incomplete	
No stock-outs of any vaccine	No	Yes	Yes	Not in Bidadi and Ramnagara
Physical inventory of vaccine (counting and reconciliation at least once in 3 months	No	Yes	Not in Bengaluru	Not in Ramnagara
Physical stock of vaccine and diluent matches the recorded stock in stock book	No	Yes	Yes	Not in Bidadi and Lachyan
Store all vaccine, diluents and droppers securely and correctly in the vaccine store	Yes	Yes	Yes	Yes, except for Ramnagara
Distribution	**34%**	**40%**	**30.66%**	**70.83%**
Maintain a programme for distribution of vaccine from issuing store to each receiving store	No	No	No	
Conditioning of ice packs during transportation	No	No	No	Not in Ramnagara
Only standard (GoI supplied) ice packs used for transportation of vaccine	Yes	Yes	Yes	Yes
Contingency planning during transportation (emergency contact points, contact numbers with drivers)	No	No		
Vaccine management	**31%**	**68%**	**53.66%**	**68.16%**
Health workers correctly use the "shake" test when needed	No	Yes	Only in Bengaluru and Bijapur	No
Health workers know how to read, interpret and use VVM	Yes	Yes	Yes	Yes
Health workers always use diluents and vaccines from the same manufacturer and with matching presentations				Yes, except Bidadi and Ukkali
Diluent always kept in CC before and during immunisation session?				Yes

Criteria	SVS level	RVS Level	DVS level	Block level
Open vials of freeze dried vaccine discarded within 4 hrs				Yes
Correct wastage rates are used for estimation	No	No	Only in Bijapur	No
Facility receives regular supervision	No	Yes	Only in Bijapur	Only in Abiggere, Ukkali and Lachyan
MIS, supportive functions	**84%**	**77%**	**58.66%**	
Use an evidence based method to forecast the need for vaccines and consumables	Coverage and wastage rate not included	Coverage and wastage rate not included	Only in Bijapur	
State level CC inventory available and updated	No			
All contracted and outsourced services (transport, maintenance) have effective and enforceable contract and service response is acceptable	No			

Uttar Pradesh

State/ Region	Division	District	HF-1	HF-2
RVS Lucknow	Lucknow	Sitapur	Sanda	Mishrik
	Kanpur	Kanpur Sadar	Kakwan	Patara
RVS Meerut	Moradabad	Rampur	Rampur PPC	Tanda
RVS Varanasi	Allahabad	Allahabad	Mega	Bahariya
	Basti	Basti	PPC Basti	Bhanpur
	Azamgarh	Ballia	Vaina	Siyar
RVS Agra		Agra	Kheragarh	Jagner

Criteria	SVS level	RVS Level	DVS level	Block level
Vaccine arrival procedures	**31%**			
VAR form	No			
Lot release certificate	Not available in Lucknow for all transactions			
Procedures for checking and receiving	Complete procedures not followed in Lucknow and Agra			
Temperature maintenance	**40%**	**37%**	**70%**	**74%**
Temperature monitoring study	No			
Temperature mapping of cold rooms	No	No		

Criteria	SVS level	RVS Level	DVS level	Block level
Knowledge of storage temperature range of vaccines	Yes	Yes except in Azamgarh	Not in Agra	Not in Sanda, Vaina and Rampur Urban
Knowledge of damage to vaccine by freezing	Yes	Yes, except in Azamgarh and Lucknow	Yes	Not in Sanda, Vaina and Rampur Urban
Formal review of temperature records and excursions and remedial actions	No	Only in Allahabad	Only in Balia and Basti	Only in Tanda, Megakhedi, Vaina, Bhanpur, Kheragarh
24x7 temperature monitoring system in place for WIC/ WIF	No	In place at Moradabad, Kanpur and Allahabad		
Storage capacity	**56%**	**32%**	**40%**	**71%**
Net storage capacity of vaccine storage (2°C to 8°C) for RI	Insufficient	Only in Basti and Azamgarh	Insufficient	Sufficient in Jagner, Kheragarh, Bhanpur, Basti PPC, Siar, Mega, Bahriya,Tanda, Kakwan, Patara,Sanda and Mishrikh
Dry storage space	Sufficient only in Lucknow	Sufficient only in Kanpur, Moradabad and Lucknow		
Storage capacity of vehicles during transportation	No	No		
Freezing capacity to prepare ice packs	Yes, except in Agra	Yes, except in Basti, Azamgarh and Kanpur	Yes, except in Kanpur and Basti	Yes, except in Rampur Urban
Sufficient CBs	Yes, except in Agra	Yes, except in Azamgarh and Lucknow division	Yes, except in Balia and Kanpur	Yes, except in Siar and Kheragarh
SOP setting for contingency plan	No	No	No	Contact details present only in Kakwan
Building, Equipment and Transport	**64%**	**63%**	**69%**	**78%**
Vehicle has easy access to the store and the store is secure	Yes, except in Lucknow	Yes, except in Kanpur		
Quality of vaccine store building	Not suitable in Lucknow	Not suitable in Basti and Kanpur	Not suitable in Sitapur and Kanpur	Not suitable in Megakhedi
Adequate space for packing	No	Only in Allahabad		
Store keeper's office is large enough and close to the packing area	Only in Varanasi	Only in Moradabad		
WIC/ WIF complies with minimum standards	No	Only in Moradabad and Kanpur		

Criteria	SVS level	RVS Level	DVS level	Block level
Refrigerators and freezers comply with minimum standards	No	Only in Basti, Allahabad and Knapur	Only in Sitapur	Only in PHC Kakwan
Standby generator commissioned at site	Only at Lucknow	Only at Lucknow	Only at Agra and Sitapur	Only at Jagner, Megakhedi, Rampur Urban, Sanda and Mishrikh
Generator operational, with required capacity and sufficient fuel	Only at Varanasi	Only at Basti, Moradabad and Kanpur	Only at Balia, Allahabad and Kanpur	Only at Kakwan, Patara, Siar, Vaina, Basti PPC, Tanda, Bhanpur and Baheria
Reliable and sufficient transport facilities	Only at Varanasi and Lucknow	Only at Allahabad	Only at Rampur, Basti and Allahabad	
Maintenance	**54%**	**52%**	**60%**	**54%**
PPM	No	No	No	No
Sickness rate of equipment	23%	13%	3%	9.00%
Stock management	**26%**	**25%**	**34%**	**66%**
Standard stock book format used (including all necessary columns for recording)	No	No	No	No
All stock transactions recorded and updated at the end of the day	Not in Lucknow	Not in Azamgarh and Lucknow	Not in Agra	Not in Bhanpur and Kakwan
Diluent information recorded	No	No	No	No
Documentation: Issue vouchers maintained and correctly used	Not in Lucknow	Not in Azamgarh and Lucknow		
Safe disposal of damaged or expired vaccine in accordance with standing orders	Only in Meerut	Only in Allahabad	Only in Balia	Only in Kakwan
Internal reviews of vaccine loss/ damages	No	Only in Agra	Only in Sitapur	Only in Kheragarh
Establish stock levels (maximum, re-order and safety stock)	No	No	No	
No stock-outs of any vaccine	No	No	Only in Agra	No
Physical inventory of vaccine (counting and reconciliation at least once in 3 months	Only in Varanasi	Only in Allahabad	Only in Basti, Balia and Allahabad	Only in Jagner, Kheragarh, Bhanpur, Basti PPC, Vaina, Siar, Mega and Bahariya
Physical stock of vaccines and diluents match the recorded stocks in the stock book	No	Only in Allahabad	Only in Sitapur	No

Criteria	SVS level	RVS Level	DVS level	Block level
Store all vaccines, diluents and droppers securely and correctly in the vaccine store	Only in Varanasi	Only in Allahabad and Moradabad	Only in Allahabad	No
Distribution	**47%**	**43%**	**49%**	**44%**
Maintain a programme for distribution of vaccine from the issuing store to each receiving store	No	No	No	
Conditioning of ice packs during transportation	No	Only in Allahabad	Only in Balia, Allahabad and Sitapur	Only at Basti, Bahariya and Rampur Urban
Only standard (GoI supplied) ice packs used for transportation of vaccine?	Yes	Yes	Yes	Yes
Contingency planning during transportation (emergency contact points, contact numbers with drivers)	No	No		
Vaccine management	**34%**	**22%**	**52%**	**66%**
Health workers correctly use the "shake" test when needed	No	No	Only in Basti and Kanpur	No
Health workers know how to read, interpret and use VVM	Yes	Not in Azamgarh and Lucknow	Yes	Yes
Health workers always use diluents and vaccines from the same manufacturer and with matching presentations				Not in Jagner, Siar, Kakwan and Mishrikh
Diluents always kept in CC before and during immunisation session				Yes, except Rampur Urban and Mishrikh
Open vials of freeze dried vaccine discarded within 4 hours				Yes
Correct wastage rates are used for estimation	No	No	Only in Allahabad	No
Facility receives regular supervision	Only in Meerut	No	Only in Sitapur	Only in Bahariya and Megakhadi
MIS, supportive functions	**65%**	**26%**	**44%**	
Use an evidence based method to forecast the need for vaccines and consumables	Coverage and wastage not included	Coverage and wastage not included	Coverage and wastage not included	
State level CC inventory available and updated	Incomplete			
All contracted and outsourced services (transport, maintenance) have effective and enforceable contracts and the service response is acceptable	In Agra and Lucknow			

Annexure- F: District Wise Criteria Scores

	Criteria								
	E1	E2	E3	E4	E5	E6	E7	E8	E9
	E1: Vaccine arrival	E2: Temperature	E3: Storage capacity	E4: Buildings, Equipment, Transport	E5: Maintenance	E6: Stock management	E7: Distribution	E8: Vaccine management	E9: MIS, supportive functions
Gurgaon DVS	0%	39%	22%	87%	80%	23%	41%	0%	0%
Faridabad DVS	0%	33%	0%	28%	48%	41%	41%	50%	100%
Panipat DVS	0%	89%	75%	87%	67%	67%	59%	45%	68%
Jammu DVS	0%	61%	50%	38%	51%	35%	21%	23%	9%
Kota DVS	0%	100%	67%	81%	75%	66%	75%	73%	77%
Nagaur DVS	0%	72%	67%	83%	49%	62%	87%	39%	23%
ChuruDVS	0%	56%	58%	40%	42%	27%	56%	24%	77%
SrinagarDVS	0%	61%	83%	89%	69%	18%	34%	23%	23%
Agra DVS	0%	11%	58%	51%	69%	50%	21%	23%	77%
Basti DVS	0%	89%	25%	76%	61%	43%	33%	73%	77%
Balia DVS	0%	100%	33%	86%	62%	66%	43%	58%	77%
Allahabad DVS	0%	94%	58%	89%	73%	54%	43%	76%	23%
Rampur DVS	0%	61%	50%	80%	54%	29%	20%	38%	9%
Kanpur Nagar DVS	0%	61%	0%	59%	43%	37%	33%	50%	23%
Sitapur DVS	0%	72%	58%	41%	59%	66%	44%	50%	23%
Sarguja DVS	0%	94%	75%	67%	63%	22%	36%	50%	68%
Morena DVS	0%	100%	92%	96%	77%	92%	95%	100%	77%
Sahajpur DVS	0%	61%	58%	59%	35%	9%	44%	50%	77%
Narsinghpur DVS	0%	94%	50%	84%	52%	69%	67%	73%	77%
Gomoti DVS	0%	100%	83%	60%	58%	57%	26%	67%	77%
Vaishali DVS	0%	100%	38%	90%	56%	63%	42%	30%	77%
Bhojpur DVS	0%	83%	46%	97%	33%	48%	42%	37%	77%
West Champaran DVS	0%	39%	58%	78%	58%	39%	24%	23%	77%
Katihar DVS	0%	61%	58%	26%	50%	25%	39%	30%	77%
Pathanamthitta DVS	0%	67%	83%	81%	61%	52%	44%	50%	77%
Bengaluru DVS	0%	67%	58%	49%	77%	47%	40%	50%	77%
Ramanagara DVS	0%	33%	50%	25%	42%	25%	10%	23%	0%
Bijapur DVS	0%	100%	92%	49%	39%	55%	42%	88%	91%

Annexure- G: Health Facility Wise Criteria Scores

	Criteria								
	E1	E2	E3	E4	E5	E6	E7	E8	E9
	E1: Vaccine arrival	E2: Temperature	E3: Storage capacity	E4: Buildings, Equipment, Transport	E5: Maintenance	E6: Stock management	E7: Distribution	E8: Vaccine management	E9: MIS, supportive functions
Gurgaon PHC	0%	79%	58%	74%	75%	52%	100%	81%	0%
HFPattikalyana	0%	100%	100%	66%	78%	92%	75%	72%	0%
HF-Chulkana	0%	100%	100%	100%	100%	87%	100%	95%	0%
HF-Jourian	0%	0%	75%	51%	22%	37%	100%	52%	0%
HF-Sai, R.S. Pura	0%	59%	71%	77%	44%	18%	100%	46%	0%
HF-Mandana	0%	100%	67%	58%	67%	59%	75%	76%	0%
HF-Sultanpur	0%	88%	83%	94%	61%	49%	100%	78%	0%
HF-Chhotiberi	0%	0%	75%	94%	44%	42%	50%	75%	0%
HF-Jakhali	0%	100%	83%	77%	53%	55%	100%	72%	0%
HF-Binadesar	0%	65%	83%	76%	42%	14%	100%	53%	0%
HF- Lalgarh	0%	0%	78%	66%	53%	31%	50%	60%	0%
HF- Harwana	0%	29%	33%	73%	33%	11%	0%	43%	0%
HF-Pathanchowk	0%	0%	50%	63%	49%	15%	67%	59%	0%
HF-Jagner	0%	85%	83%	85%	48%	43%	75%	61%	0%
HF- Kheragarh	0%	94%	58%	84%	61%	68%	50%	73%	0%
HF- Bhanpur	0%	100%	75%	84%	42%	28%	75%	60%	0%
HF-Basti PPC	0%	100%	83%	86%	69%	55%	100%	83%	0%
HF-Vaina	0%	41%	50%	96%	54%	54%	50%	76%	0%
HF-Siar	0%	71%	58%	95%	61%	58%	75%	72%	0%
HF-Mega	0%	100%	75%	32%	50%	49%	0%	61%	0%
HF-Bahariya	0%	94%	83%	89%	61%	51%	100%	73%	0%
HF-Tanda	0%	100%	83%	85%	55%	37%	50%	53%	0%
HF-Rampur Urban	0%	12%	25%	49%	25%	32%	100%	60%	0%
HF-Kakwan	0%	100%	92%	91%	69%	44%	75%	65%	0%
HF- Patra	0%	71%	75%	91%	53%	39%	50%	65%	0%
HF- Sanda	0%	0%	75%	68%	50%	19%	50%	66%	0%
HF- Mishrikh	0%	71%	75%	53%	61%	43%	75%	47%	0%
HF-Pratapgarh	0%	50%	92%	56%	22%	32%	75%	51%	0%
HF-Narmadapur	0%	35%	83%	43%	33%	36%	75%	51%	0%
HF-Nithara	0%	100%	100%	97%	78%	94%	100%	88%	0%
HF-Mauha	0%	100%	92%	74%	78%	72%	100%	68%	0%
HF-Bholai	0%	65%	100%	88%	36%	38%	100%	76%	0%
HF-Polaykalan	0%	71%	100%	84%	25%	41%	100%	70%	0%
HF-Paloha Bada	0%	65%	67%	55%	44%	9%	100%	62%	0%

	Criteria								
	E1	E2	E3	E4	E5	E6	E7	E8	E9
	E1: Vaccine arrival	E2: Temperature	E3: Storage capacity	E4: Buildings, Equipment, Transport	E5: Maintenance	E6: Stock management	E7: Distribution	E8: Vaccine management	E9: MIS, supportive functions
HF-Barha Bada	0%	85%	75%	86%	53%	71%	75%	78%	0%
HF-Silachari PHC	0%	94%	75%	35%	44%	34%	100%	76%	0%
HF-Kakraban PHC	0%	100%	83%	72%	44%	43%	100%	79%	0%
HF-Hajipur	0%	94%	38%	63%	33%	10%	100%	55%	0%
HF-Jandaha	0%	65%	75%	90%	25%	27%	100%	65%	0%
HF-BJR AGION	0%	65%	75%	93%	33%	37%	50%	63%	0%
HF-BR Koilwar	0%	94%	75%	97%	22%	39%	100%	55%	0%
HF-Lauriya CPW	0%	71%	58%	73%	33%	33%	50%	58%	0%
HF-SIKTA	0%	65%	33%	69%	28%	54%	75%	64%	0%
HF-Katihar Sadar	0%	29%	50%	26%	33%	17%	50%	65%	0%
HF-CHC Chathenkery	0%	100%	92%	91%	61%	62%	100%	84%	0%
HF-PHC Anicad	0%	100%	92%	81%	61%	65%	100%	84%	0%
HF-Chikkabanavara	0%	65%	92%	100%	69%	51%	75%	67%	0%
HF-Abbigere	0%	71%	100%	86%	69%	66%	50%	79%	0%
HF-Sankighatta	0%	71%	100%	53%	42%	56%	100%	63%	0%
HF-CHC Bidadi	0%	65%	58%	56%	39%	38%	25%	54%	0%
HF-Ukkali	0%	100%	83%	62%	42%	52%	100%	71%	0%
HF-Lachyan	0%	79%	92%	57%	13%	46%	75%	75%	0%

Annexure - H: Summary of Vaccine Storage Requirement and Availability

S. No.	Location	+2°C to +8°C			-15°C to -25°C		
		Available	Required	Difference	Available	Required	Difference
		L.	L.	L.	L.	L.	L.
1	GMSD-Karnal	55,068	70,954	- 15,886	17,857	6,757	11,100
2	GMSD-Mumbai	41,410	52,553	- 11,143	29,294	5,005	24,289
3	GMSD-Kolkata	40,000	60,837	- 20,837	37,894	5,794	32,100
4	GMSD-Chennai	32,000	48,619	- 16,619	9,524	4,630	4,894
STATE / RVS							
1	Agartala SVS	4,324	1,316	3,008	1,568	125	1,443
2	Agra State & RVS	7,236	16,077	-8,841	9,042	1,531	7,511
3	Bengaluru SVS		18,636	-18,636		2,292	-2,292
4	Gwalior SVS & RVS	4,732	11,590	-6,858	5,410	1,104	4,306
5	Jabalpur SVS & RVS	7,920	6,757	1,163	6,070	644	5,426
6	Jaipur-SVS	8,558	30,486	-21,928	9,871	3,749	6,122
7	Jammu SVS & RVS		18,636	-18,636		2,292	-2,292
8	Lucknow SVS &RVS	11,197	50,362	-39,165	2,640	4,796	-2,156
9	Meerut SVS & RVS	8,991	17,519	-8,528		2,154	-2,154
10	Patna SVS	12,162	58,035	-45,873	8,108	7,137	971
11	Trivandram SVS	6,030	1,881	4,149	1,676	231	1,445
12	Varanasi SVS & RVS	10,256	41,531	- 31,275	7,143	3,955	3,188
DIVISION							
1	Ajmer-DiviVS	4,279	5,740	- 1,461	1,613	547	1,066
2	Allahabad DiviVS	14,652	9,659	4,993	264	832	-568
3	Bagalkot DiviVS		186	-186		23	-23
4	Bikaner Divi-VS	5,220	8,551	-3,331	712	814	-102
5	East Champaran DiviVS	4,294	4,920	-626		605	-605
6	Jaipur DiviVS	468	6,142	-5,674	364	755	-391
7	Kanpur DiviVS	4,054	12,613	-8,559	448	1,201	-753
8	Kurukshetra DiviVS	5,128	2,539	2,589	540	312	228
9	Lucknow DiviVS	5,070	14,929	- 9,859	3,700	1,422	2,278
10	Purnia Div-VS	6,625	13,998	- 7,373	9,100	1,172	7,928

Annexure - I: Summary of Diluents and Dry Storage Requirement and Availability

S. No.	Location	Dry - Diluents			Dry – Syringes		
		Available	Required	Difference	Available	Required	Difference
		L.	L.	L.	L.	L.	L.
1	GMSD Karnal	12,000	14,866	-2,866	4,804,400	4,819,943	-15,543
2	GMSD Mumbai	15,000	11,011	3,989	4,306,452	17,183,685	-12,877,233
3	GMSD Kolkata		12,747	-12,747	9,000,000	19,892,240	-10,892,240
4	GMSD Chennai		10,187	-10,187		15,897,441	-15,897,441
STATE / RVS							
1	Agartala SVS	10	276	-266	28,234	17,882	10,352
2	Agra SVS & RVS		3,369	-3,369		218,426	-218,426
3	Bengaluru SVS		7,590	-7,590		292,984	-292,984
4	Gwalior SVS & RVS	13,000	2,428	10,572	1,334,000	157,461	1,176,539
5	Jabalpur SVS & RVS		1,416	-1,416		91,801	-91,801
6	Jaipur SVS	50,000	12,416	37,584	11,200,000	479,287	10,720,713
7	Lucknow SVS & RVS	20,000	10,552	9,448	800,000	684,234	115,766
8	Meerut SVS & RVS		7,135	-7,135		275,432	-275,432
9	Patna SVS		3,636	-3,636		912,393	-912,393
10	Trivandrum SVS		766	-766		29,565	-29,565
11	Varanasi SVS & RVS	19,926	8,702	11,224	4,019,251	650,725	3,368,526
DIVISION							
1	Ajmer DiviVS		1,203	-1,203		77,986	-77,986
2	Allahabad DiviVS	66,640	2,755	63,885		141,696	-141,696
3	Bagalkot DiviVS		76	-76		2,930	-2,930
4	Bikaner DiviVS		1,792	-1,792	135,000	116,177	18,823
5	East Champaran DiviVS	200	2,004	-1,804	5,000	77,348	-72,348
6	Jaipur DiviVS		2,501	-2,501		96,558	-96,558
7	Kanpur DiviVS	1,500	2,642	-1,142	160,000	171,367	-11,367
8	Kurukshetra DiviVS	3,000	1,034	1,966	80,000	39,912	40,088
9	Lucknow DiviVS	5,000	3,128	1,872	300,000	202,823	97,177
10	Purnia DiviVS	6,600	4,924	1,676	68,000	219,645	-151,645

Annexure – J: Sickness Rate – For Facilities Visited During National EVM

State	Facility	Number of ILRs, DFs, solar refrigerators available	Number of functional ILRs, DFs, solar refrigerators operational	Sickness rate (%)
Uttar Pradesh	1.1 DVS Agra	15	15	0
	HF Jagner	5	3	40
	HF Kheragarh	7	7	0
	1.2 DVSBasti	13	13	0
	HF Bhanpur	5	5	0
	HF Basti PPC	3	3	0
	1.3. DVSBallia	13	12	8
	HF Vaina	5	4	20
	HF Siar	6	6	0
	1.4. DVSAllahabad	22	22	0
	HF Mega	6	6	0
	HF Bahariya	6	6	0
	1.5. DVS Rampur	18	17	6
	HF Tanda	11	9	18
	HF Rampur Urban	4	2	50
	1.6. DVS Kanpur Nagar	7	7	0
	HF Patra	5	5	0
	HF Kakwan	3	3	0
	1.7. DVSSitapur	21	19	10
	HF Sanda	3	3	0
	HF Mishrikh	5	5	0
Total for Uttar Pradesh		**183**	**172**	**6**
Bihar	2.1. DVSWest Champaran	8	8	0
	HF Lauriya	3	3	0
	HF Sikta	3	1	67
	2.2. DVSKatihar	8	8	0
	HF Katihar Sadar	2	2	0
	HF Amdabad	4	2	50
	2.3. DVS Vaishali	13	9	31
	HF Hajipur	3	3	0
	HF Jandaha	4	3	25
	2.4. DVS Bhojpur	18	15	17
	HF Agion	2	2	0
	HF Koilwar	3	2	33
Total for Bihar		**71**	**58**	**18**

State	Facility	Number of ILRs, DFs, solar refrigerators available	Number of functional ILRs, DFs, solar refrigerators operational	Sickness rate (%)
Rajasthan	3.1. DVSChuru	12	12	0
	HF Binadesar	2	2	0
	HF Lalgarh	1	1	0
	3.2. DVSNagaur	9	8	11
	HF Chotiberi	2	2	0
	HF Jakhali	2	2	0
	3.3. DVSKota	2	2	0
	HF Mandana	3	2	33
	HF Sultanpur	3	3	0
Total for Rajasthan		**36**	**34**	**6**
Madhya Pradesh	4.1. DVSMorena	20	20	0
	HF Nithara	8	8	0
	HF Mauha	3	3	0
	4.2. DVSSahajpur	12	12	0
	HF Bholai	4	2	50
	HF Polay kalan	4	2	50
	4.3. DVSNarsinghpur	4	4	0
	HF Paloha Bada	2	2	0
	HF Barha Bada	2	2	0
Total for Madhya Pradesh		**59**	**55**	**7**
Chhattisgarh	5.1. DVSSarguja	5	5	0
	HF Pratapgarh	5	2	60
	HF Narmadapur	3	2	33
Total for Chhattisgarh		**13**	**9**	**31**
Karnataka	1.1 DVSBengaluru	6	6	0
	HF Chikkabannavara	1	1	0
	HF Abbigere	2	2	0
	1.2 DVSBijapur	47	33	30
	HF Ukkali	2	2	0
	HF Lachyan	2	2	0
	1.3. DVSRamanagara	4	3	25
	HF Sankighatta	2	2	0
	HF Bidadi	3	2	33
Total for Karnataka		**69**	**53**	**23**

State	Facility	Number of ILRs, DFs, solar refrigerators available	Number of functional ILRs, DFs, solar refrigerators operational	Sickness rate (%)
Jammu & Kashmir	SVS Jammu	8	7	13
	DVS Jammu	8	8	0
	RVS Srinagar	10	9	10
	DVS Srinagar	5	5	0
	HF Sai, RS Pura	2	2	0
	HF Jourian	3	2	33
	HF Harwana	2	2	0
	HF Pathanchowk	2	2	0
Total for Jammu & Kashmir		**40**	**37**	**8**
Kerala	Trivandrum SVS	15	15	0
	Pathanamthitta DVS	13	12	8
	HF Chathenkery	2	2	0
	HF Anicad	2	2	0
Total for Kerala		**32**	**31**	**3**
Tripura	Agartala SVS	13	11	15
	Gomoti DVS	10	9	10
	HF Silachari	3	3	0
	HF Kakrban	3	3	0
Total for Tripura		**29**	**26**	**10**
Overall Sickness Rate		**532**	**475**	**11**

Annexure – K: Vaccine Arrival Report (VAR)1

This report is to be filled in by authorised staff, ratified by the Store Manager or the EPI Manager, and forwarded to the procurement agency within three days of vaccine arrival. Use one report for each vaccine in the shipment.

Country				
Report No.			**Date Of Report**	

Place, date and time of inspection	Name of cold store, date and the time vaccines are entered into cold store

Part I – Advance Notice

Main Documents	Date received by consignee	Copy of airway bill (AWB)	Copy of packing list	Copy of invoice	Copy of release certificate
Pre-advice					
Shipping notification		Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐

List other documents (if requested)	

Part II – Flight Arrival Details

AWB Number	Airport of destination	Flight No.	ETA as per notification		Actual time of arrival	
			Date	Time	Date	Time

Name of clearing agent: ..... on behalf of: .....

Part III – Details of Vaccine Shipment

Purchase Order No.	Consignee	Vaccine description (Type and doses/ vial)	Manufacturer	Country

Vaccine				Diluents/ droppers			
Lot Number	Number of boxes	Number of vials	Expiry date	Lot Number	Number of boxes	Number of units	Expiry date

(Continue on separate sheet if necessary)

	Yes	No	Comments
Was quantity received as per shipping notification?	☐	☐	
If not, were details of short-shipment provided prior to vaccine arrival?	☐	☐	

.....

1 Adopted from the Standard UNICEF Vaccine Arrival Report from WHO Guidelines on the international packaging and shipping of vaccines (WHO/IVB/05.23)

No. = Number

WHO recommends all UN agencies, countries and non-governmental organisations procuring vaccines adopt this report.

Report No.	

Part IV — Documents Accompanying the Shipment

Invoice	Packing list	Release certificate	Vaccine Arrival Report	Other
Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	
Comments				

Part V — Status of Shipping Indicators

Total number of boxes inspected:			
Coolant type:	Dry ice ☐	Icepacks ☐	No coolant ☐
Temperature monitors present:	VVM ☐	Cold-chain card ☐	Electronic device Type: .....

Provide elow details of status only when problems are observed (in addition, fill in alarm reporting form if there are any alarms in electronic devices):

Box Number	Lot NO.	Alarm in electronic device				Cold-chain monitor				Date/ time of inspection
		>=450C	>=300C	>=100C	<=-0.50C	A	B	C	D	

(Continue on separate sheet if necessary)

Part VI — General Conditions of Shipment

What was the condition of boxes on arrival?	
Were necessary labels attached to shipping boxes?	
Other comments including description of alarms in electronic devices: (continue on separate sheet if necessary).	

Part VII — Name and Signature

.....	.....	.....	.....
Authorised Inspection Supervisor	DATE	Central store or EPI Manager	DATE

For Procurement Agency office use only

Date received by the office: ..... Contact person: .....

Guidelines for completing the Vaccine Arrival Report

The Vaccine Arrival Report (VAR) is a comprehensive record of cold-chain conditions during transport and of required compliance with shipping instructions. Recipient governments and procurement agencies (UNICEF country offices, UNICEF Supply Division, PAHO Revolving Fund), are responsible for the report, and for taking appropriate action if problems are reported (e.g., follow-up with the manufacturer, forwarding agent, WHO, etc.).

Use one report form for each shipment and for each vaccine in the shipment. In shipments containing diphtheria–tetanus–pertussis (DTP)–Hepatitis B (HepB) and Haemophilus influenzae type b (Hib) vaccines, use one form for DTP–HepB and a separate form for Hib. In the case of short-shipments (where parts of the original quantities are not delivered), complete a separate report for each part delivered.

Complete the form as described below. In the header boxes at the top of the form, enter the name of the recipient country, the report number, and details of place and date of inspection and storage. The report number is an internal number for organising records; compile it as follows: country code; year; number for each report (e.g., BUR–2005–001 for one vaccine; BUR–2005–002 for a second vaccine, etc.). In the case of a short-shipment, the numbers for the separate deliveries would be, for example, BUR–2005–003.1, BUR-2005-003.2, etc.

Part I – Advance notice

I.1 Enter dates and details of documents received in advance of the vaccine shipment.

Part II – Flight arrival details

II.1 Fill in details of expected and actual arrival times for the shipment.

II.2 Fill in the name a) of the clearing agent and b) for whom the agent acts (e.g., the Ministry of Health, UNICEF or WHO).

Part III – Details of vaccine shipment

III.1 Fill in details of the order (purchase order number, consignee, vaccine description etc.).

III.2 For each batch of vaccine included in the shipment, record:
- a) the number of shipping boxes;
- b) the number of vials;
- c) the expiry date.

The number of boxes you enter should always match the number of boxes shown in the packing list. If it does not, note under Comments if advance notice of a change in the quantity was provided. It is not necessary to count the number of individual vaccine packs in each shipping box for this report.

III.3 For the diluents and droppers (if included) with each batch of vaccine in the shipment, record:
- a) the number of shipping boxes;
- b) the number of vials;
- c) the expiry date.

The information for III.2 and III.3 is also in the packing list.

Note: Diluents for freeze-dried vaccine and droppers for oral polio vaccine (OPV) are integral parts of the vaccine, so always include them on the same form. If diluent/droppers are delivered separately, consider it a short-shipment.

Part IV – Documents accompanying shipment

The packing list should indicate which box contains the shipping documents (usually Box 1).

IV.1 If this information is not included in the packing list or in documents sent separately by courier, pouch or other means, note this under Comments.

IV.2 Verify that all necessary documents are present and complete the form accordingly.

Note: If the lot release certificate is missing, do not use the vaccines; keep them on hold in cold storage until the relevant document has been obtained from the vaccine manufacturer.

PART V – Status of shipping indicators

Inspect the temperature monitors in all boxes before putting vaccines into cold

storage. For very large shipments, or when immediate storage in the shipping boxes is required, check a representative number of boxes before placing the shipment in the cold store. Complete inspection of all boxes the next day or as soon as possible thereafter; under Comments, note the date and time when the complete inspection took place.

Note: In this report, enter the information below (V.1) only for boxes in which the temperature monitor shows a change that indicates potential damage to vaccines (alarm indication in the electronic device, or cold-chain monitor card as per vaccine/ threshold table in card).

V.1 Enter:
- a) the number of boxes inspected (this should equal the total number in the shipment);
- b) the type of coolant used;
- c) details of any temperature exposure detected.

V.2 Photocopy or scan LCD screens in electronic devices that show alarm status and attach to the report.

V.3 Clearly identify vaccines in boxes in which the indicator shows exposure to temperatures that risk damage and keep them in the cold room for further assessment of their condition. Do not discard vaccines until the assessment is completed.

PART VI – General conditions of shipment

VI.1 Indicate if the shipping boxes were received in good condition and if all necessary labels on the outside of the shipping boxes were present; add any comments.

PART VII – Name and signature

VII.1 The authorised person responsible for the inspection and the Central Store Manager or the EPI Manager should sign this report.

VII.2 Send the form, completed and signed, to the procuring agency (UNICEF country office, Ministry of Health, or WHO country office) within three days of arrival of the vaccine.

Reporting ALARM details in international vaccine shipments

A special form has been designed for the purpose of reporting alarm details displayed in electronic devices. This form should ONLY be filled in if any alarms have occurred, and should be attached to the Vaccine Arrival Report (VAR). A clear photocopy and/or printed copy of the scanned image of the electronic devices displaying alarm status should be attached to this form.

Electronic device alarm report form

Country		Date of report	
Type of device	Q-tag 2 plus ☐ Spytemp II OMS ☐ 3M TX01/02 ☐	Type of vaccine	

Box no	Serial number	Time stopped	Elapsed transit time	>=450C 1 hour		>=300C 10 hrs		>=100C 20 hrs		<=-0.50C 1 hr	
				Time	oC	Time	oC	Time	oC	Time	oC

Use additional pages if necessary.

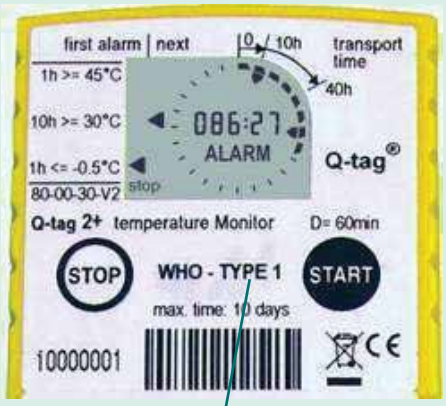
Guidelines for completing the Electronic Device Alarm Report Form

Country	Enter name of the country.
Date of report	Enter date of report.
Type of device	Mark the type of device by ticking the appropriate box.
Type of vaccine	Enter the type of vaccine, e.g., BCG, OPV, measles or DTP-HepB.
Box number	Write the number of the box (carton) that the electronic device was taken out of, e.g., 001, 002, … 099.
Serial number	Write down the serial number of the electronic device from the bar code /serial number, e.g. 10000001 for Q-tag 2 plus, S1-OMS1/ 1860 for Spytemp II OMS, and TX01-0000149 for 3M TX01/02. Note that the serial numbers of the devices can be found on the front surfaces of the Q-tag 2 plus and 3M TX01/02 devices, and on the reverse of the Spytemp II OMS attached to the backing card.
Time stopped	Enter the local time you stopped this particular device in 00hrs:00min format.
Elapsed transit time	Enter elapsed transit time.
Time	Enter time displayed in HISTORY mode for each alarm. For the Q-tag 2 plus and Spytemp II OMS devices, the trigger time of the alarm is displayed as 000 hrs. 00 mins., e.g. 62:40 or 067:32. In 3M TX01/02 devices the day is separately displayed as 00 and time is given only in 00 hrs. and 00 mins. For all 3M devices enter the time as 00(day):00(hr.):00(min.), e.g. 01:12:15 would mean that the alarm was triggered 1 day 12 hours and 15 minutes following activation.
oC	Enter minimum or maximum temperatures displayed for each alarm, e.g. 34.7oC, 13.5oC, or -4.5oC.

If any of the alarms are repeated in the same electronic device, enter this information in a new row.

Simulation

You have received a DTP-HepB shipment accompanied by electronic devices. In box Number 5 the device displayed ALARM status. Different alarm situations will be given in the following pages with explanations on how to carry this information on to the reporting form.



Country	<enter name of the country>	Date of report	<enter date>
Type of device	Q-tag 2 plus ☒ Spytemp II OMS ☐ 3M TX01/02 ☐	**Type of vaccine**	DTP-HepB

HISTORY mode displaying the time of alarm triggering.

HISTORY mode displayingtheminimum temperature recorded during violation.

HISTORY mode displaying the time of alarm triggering.

HISTORY mode displaying the maximum temperature recorded during violation.

Example of completed reporting form with repeating alarms in the same device

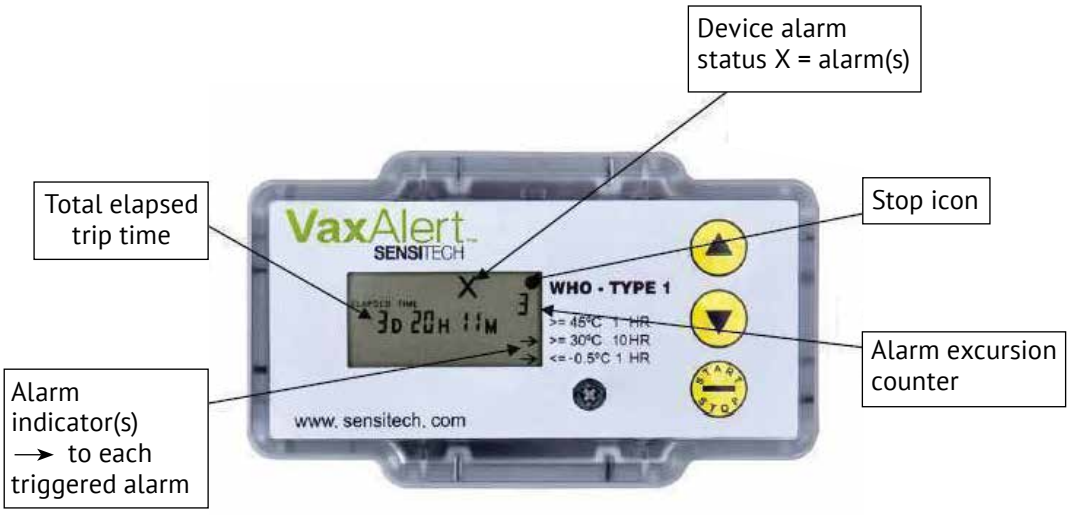
Country	<enter name of the country>	Date of report	<enter date>
Type of device	Q-tag 2 plus ☒ Spytemp II OMS ☐ **VaxAlert** ☐	**Type of vaccine**	DTP-HepB

Step-by stap user guide for the VaxAlert™

Stopping the VaxAlert:

1. Press and hold the start/Stop button for 3 seconds. The VaxAlert will emit an audible tone and display the stop mode screen as shown below (stop icon () is displayed)

Note: The VaxAlert is programmed to automatically stop after 10 days of elapsed trip time.

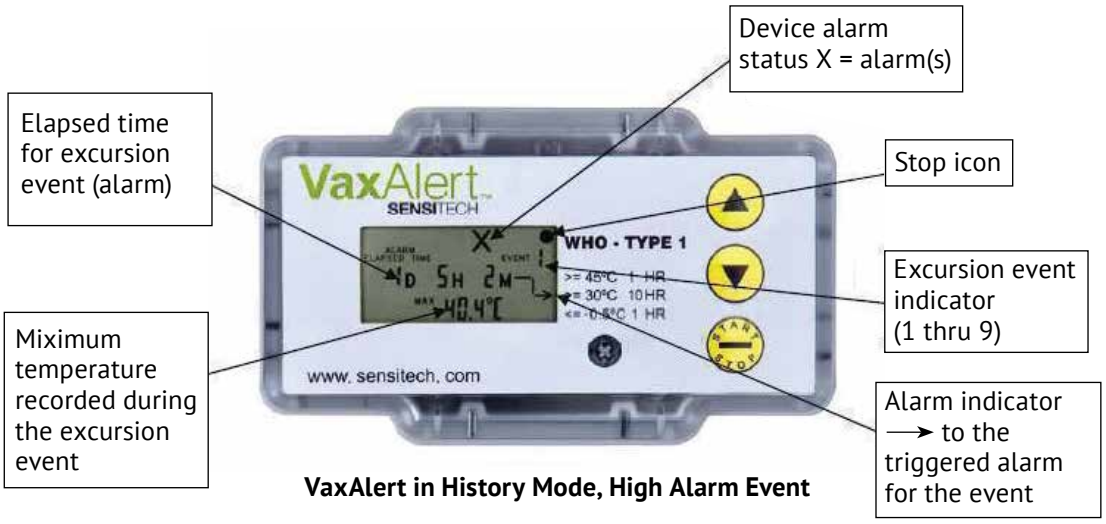


VaxAlert in Stop Mode with Alarms

VaxAlert in Stop Mode without Alarms

Retrieving alarm event information from the VaxAlert (HISTORY mode):

1. If the VaxAlert experiences alsrm events (excursions), the device will record detailed information for up to nine total alarm events (three for each of the alarm settings). The alarm history information will be retained in the VaxAlert and can be viewed for a minimum of six months after stopping the device.
2. To view the alarm event history, press the ▲ or ▼ scroll buttons (in stop or measurement mode). The VaxAlert will emit an audible tone and display a history mode screen as shown below. Repeated presses of the ▲ or ▼ scroll buttons will cycle the alarm event history screens through all recorded alarm events (up to 9 maximum events).
3. During history mode operation, the screen will return to the stop or measurement mode screen if on additional button presses are initiated within 15 seconds. If the VaxAlert has not recorded any alarms, activating the ▲ or ▼ scroll buttons will not impact the display.

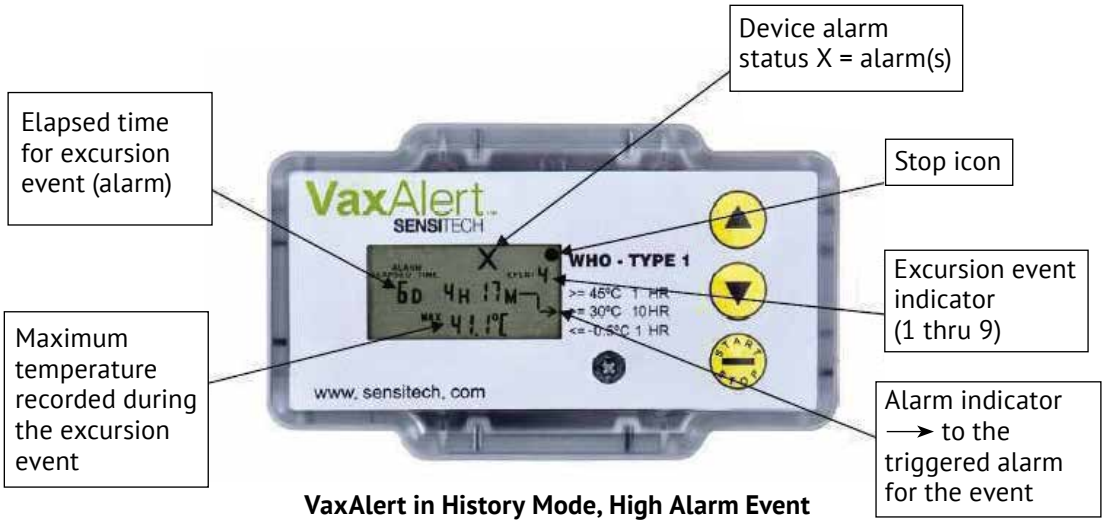


VaxAlert in History Mode, High Alarm Event

In the example above, the first alarm event for this trip is a >=30^{0}C, 10 HR alarm at 1 day, 5 hr and 2 minute elapsed time. The maximum temperature recorded during the >=30^{0}C 10 HR alarm event is 40.4^{0}C.

VaxAlert in History Mode, Low Alarm Event

In the example above, the first alarm event for this trip is a <=-0.5^{0}C, 1 HR alarm at 0 day, 1 hr and 6 minute elapsed time. The minimum temperature recorded during the <=-05^{0}C 1 HR alarm event is -18.9^{0}C.



VaxAlert in History Mode, High Alarm Event

In the example above, the fourth alarm event for this trip is a >=30^{0}C, 10 HR alarm at 6 day, 4 hr and 17 minute elapsed time. The miximum temperature recorded during the >=30^{0}C 10 HR alarm event is 41.1^{0}C.

Annexure L: Prototype for Regional and District Vaccine Stores

(Architectural, Civil, Electrical, Plumbing and Interiors)

A. Green guidance to use:

i. Natural light (large sized double paned windows, direction in relation to sun),
ii. Prevent heat loss (thermal insulation-walls, floors and roof, double pane windows, appropriate ventilation, direction of sunset),
iii. Water re-cycle through charge pits using rainwater, waste water (standard charge pits/trenches[1]).

B. Site location and accessibility

i. Well-connected area and roads, where long trucks could reach,
ii. Not a low lying, flood or water logging prone area,
iii. Secured perimeter (walls)/gates, security point for access control.

A. Layout and space arrangement (Refer figure 2)

i. Design should allow least possible movement of vaccines/diluents/ droppers/ syringes.
ii. Generator to be designed in a manner that noise and smoke does not affect vaccine handling and the CC repair area.
iii. Water harvesting/ground water recharge pit/trenches are 10 feet away from the building, in an area which is not frequented, and connected through an underground pipe.

A. **Loading, unloading** (concrete/ iron dust reinforcement to make the surface durable, at a height that provides comfortable movement of goods when the truck/van is loaded/ unloaded)

B. Electrical supply, control panel, UPS

i. Electrical switchboards, next to doors, and power sockets/outlets as per layout.
ii. Control panel/switchover in easy-to-reach location in the office/ computer room to help switch off easily when needed.
iii. "Earthing" confirms ISI standard (IS:3043 – 1987/2001 or later) and is linked to the water supply through a valve to maintain the moisture of soil at earth point.

C. **Communication & internet connection** (Availability of a landline phone and broadband internet connection with static IP address, to connect with data-loggers. The data-logger receiver should have sufficient range to maintain signal strength in the computer in the office room)

D. Light & ventilation

i. Energy efficient lights, which allows evening/night time loading/unloading, including illumination of canopy, passage and all rooms.
ii. All rooms should have appropriate ventilation, using energy efficient fans/exhausts with air

[1] http://www.ecacwb.org/editor_upload/files/Concepts%20and%20Practices%20for%20Rainwater%20Harvesting.pdf (pages 25-27)

displacement capacity equivalent to displacement volume of the room every hour.

iii. Provide low height air inlet points and outlet points at some height. Inlets/outlets to have hardened steel grills for safety.

E. Water supply, overheads storage and drainage

i. Overhead tank – 500 -1000 litres to provide water in packing room sink and toilet.

ii. All rooms to have drainage, with the floor level maintained to lower down to drainage point(s).

iii. Roof catchment/drainage water to empty into charge pits/trenches.

F. Security & protection from elements

i. No doors on external walls other than the steel grill at the passage/ main entrance.

ii. All rooms have their doors opening into the passage.

iii. Rooms with vaccines, CC equipments, other supplies and the generator to have wide doors (6-8 ft), while the office/computer room and doors connecting to the WIC room and packing room are normal 4ft wide doors.

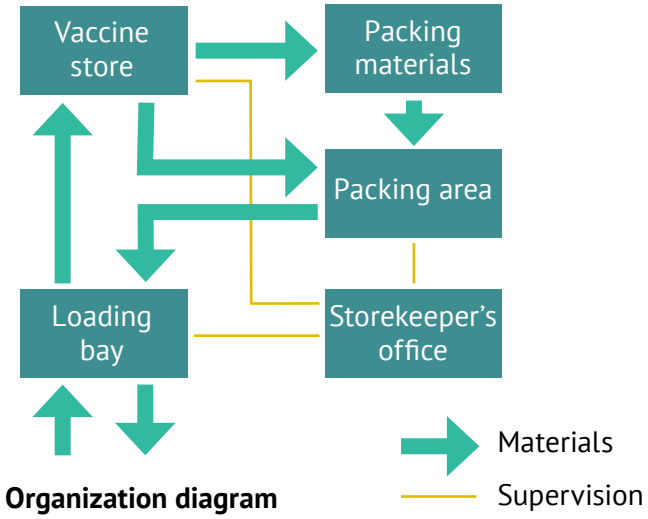
iv. Canopy (steel truss) extends out to cover loading bay and parking area, to provide protection from sun/rain.

v. Fire extinguishers are fitted at appropriate locations, to manage fire class A,B & E (Wood/paper, petrol/diesel/oil, and electrical equipments).

G. **Pest Control** (rodents, insects, bats, other local types) measures taken at all drainage points, stairs (overhang type stairs) and doors (maintaining minimum clearance between floor and door, long life chemical deterrence, fine wire-nylon mesh.)

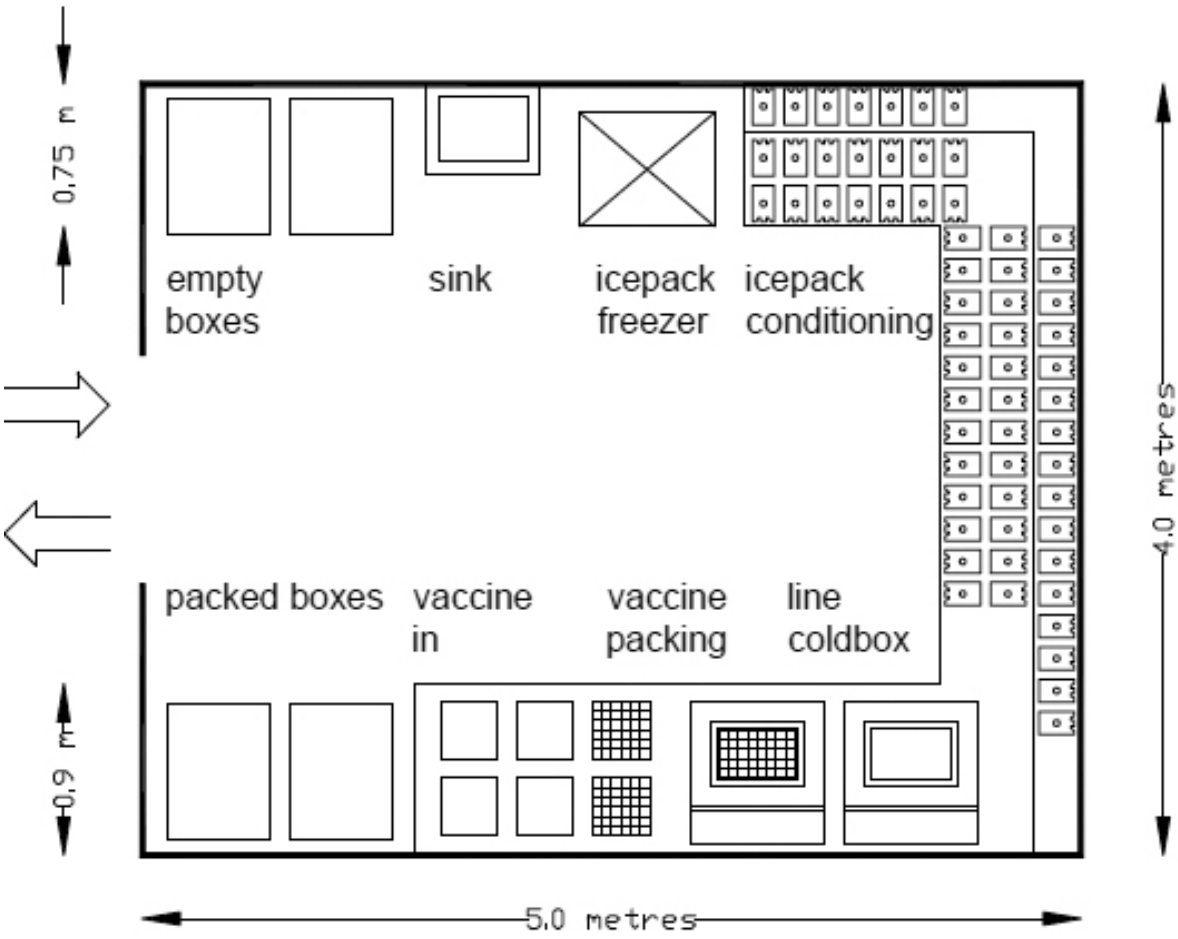
WHO references for Vaccine Store Prototype design

1. WHO Vaccine Storage guidance[2]
2. Designs of GoI supported Vaccine Stores in Orissa and Andhra Pradesh.



Organization diagram

Figure 1- Organisation Diagram, showing movement of Vaccines/Supplies and Supervision



[2] http://www.who.int/vaccines-documents/DocsPDF02/www715.pdf

Figure 3- Supervisor's Office/Communication Room Adjustable Shelves

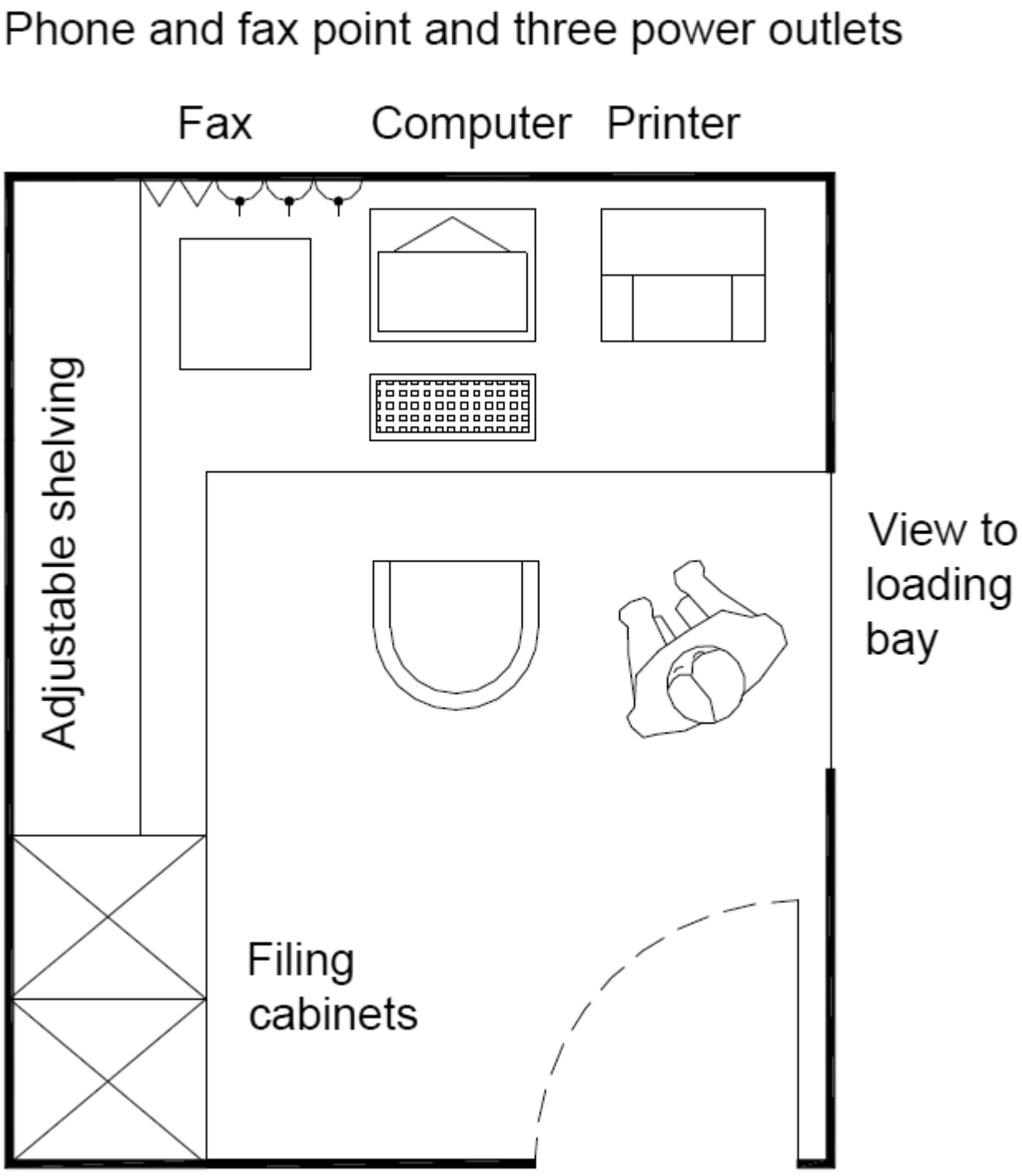
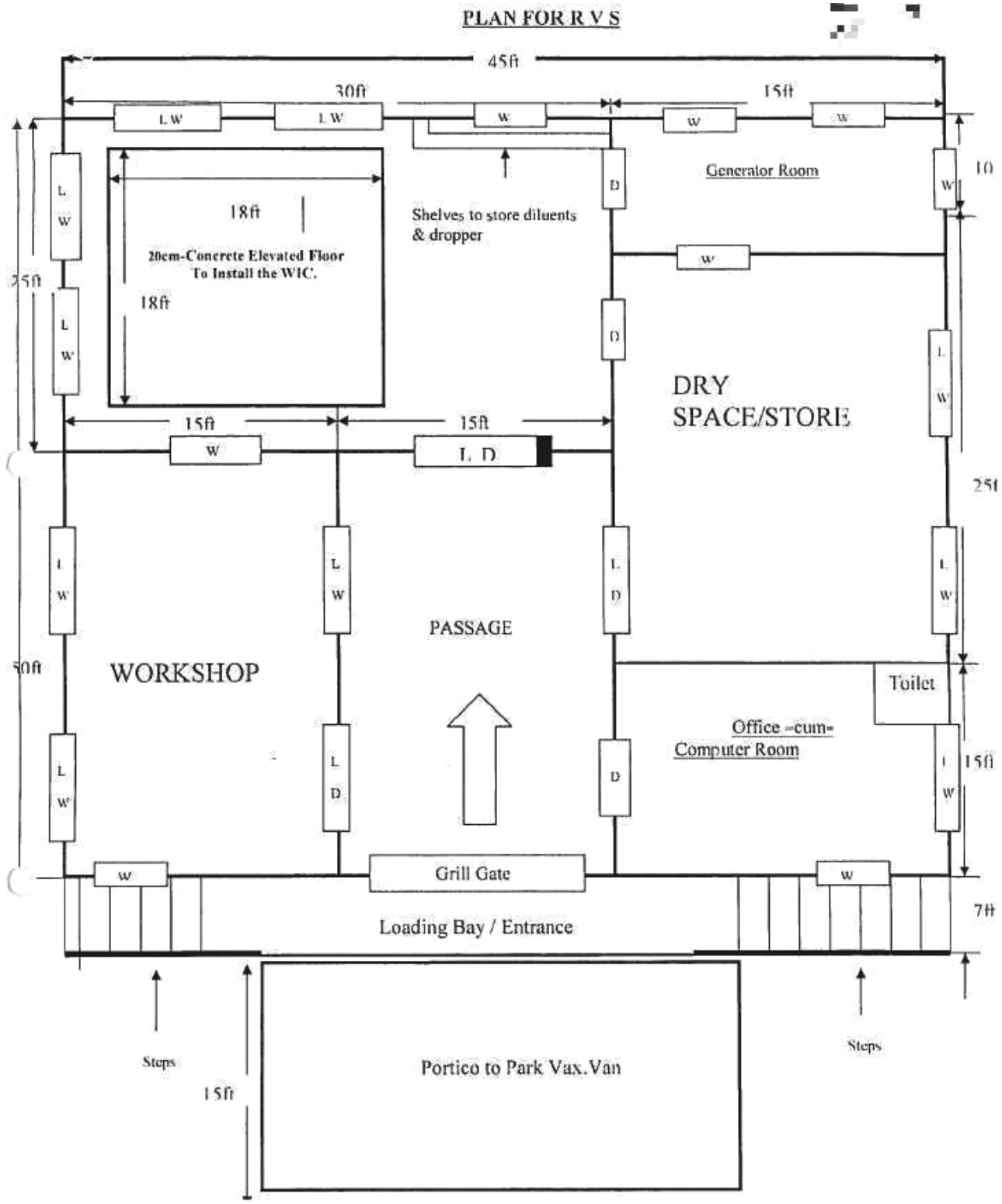
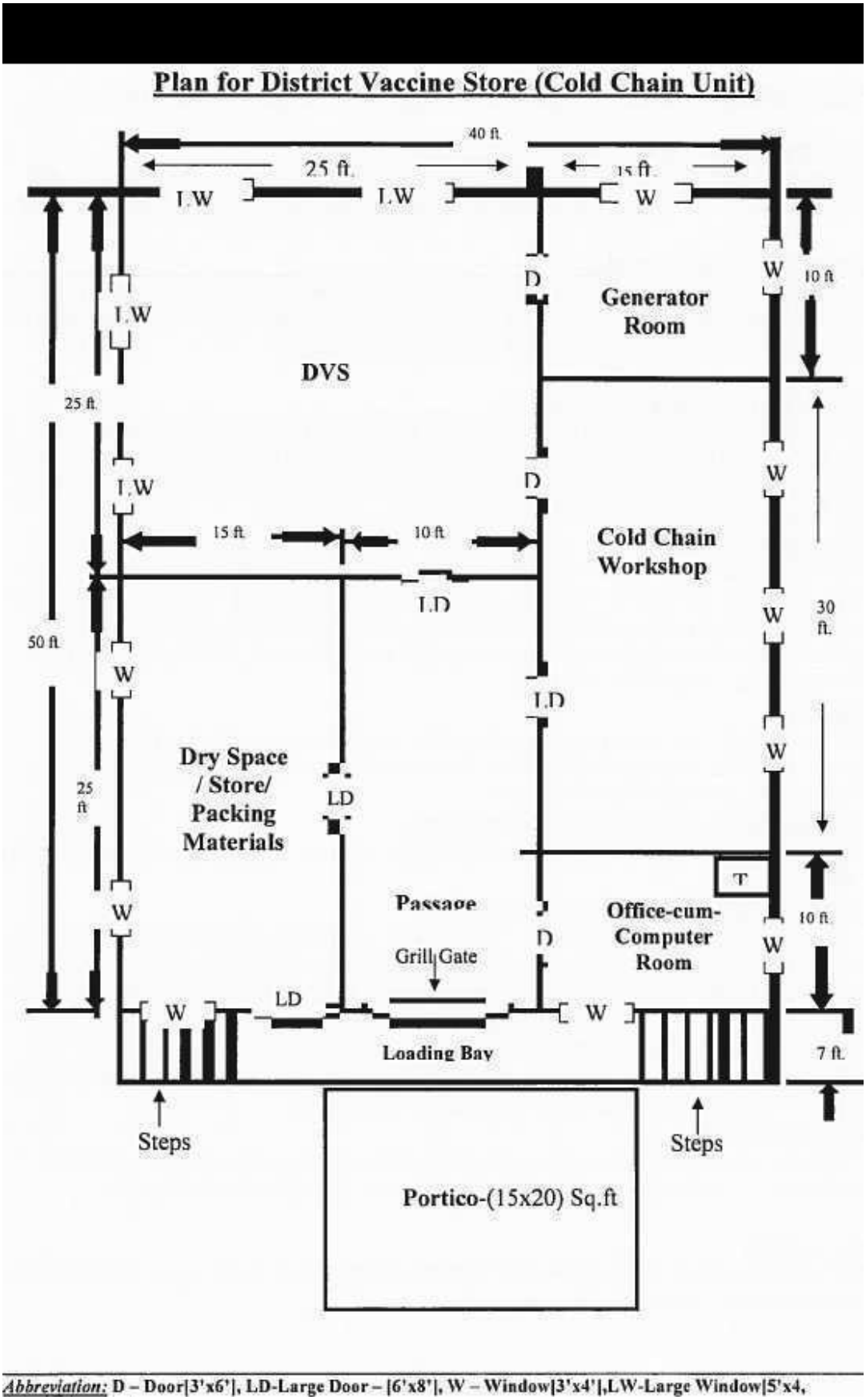


Figure 4 - For districts with Census population of 1.5 million or more

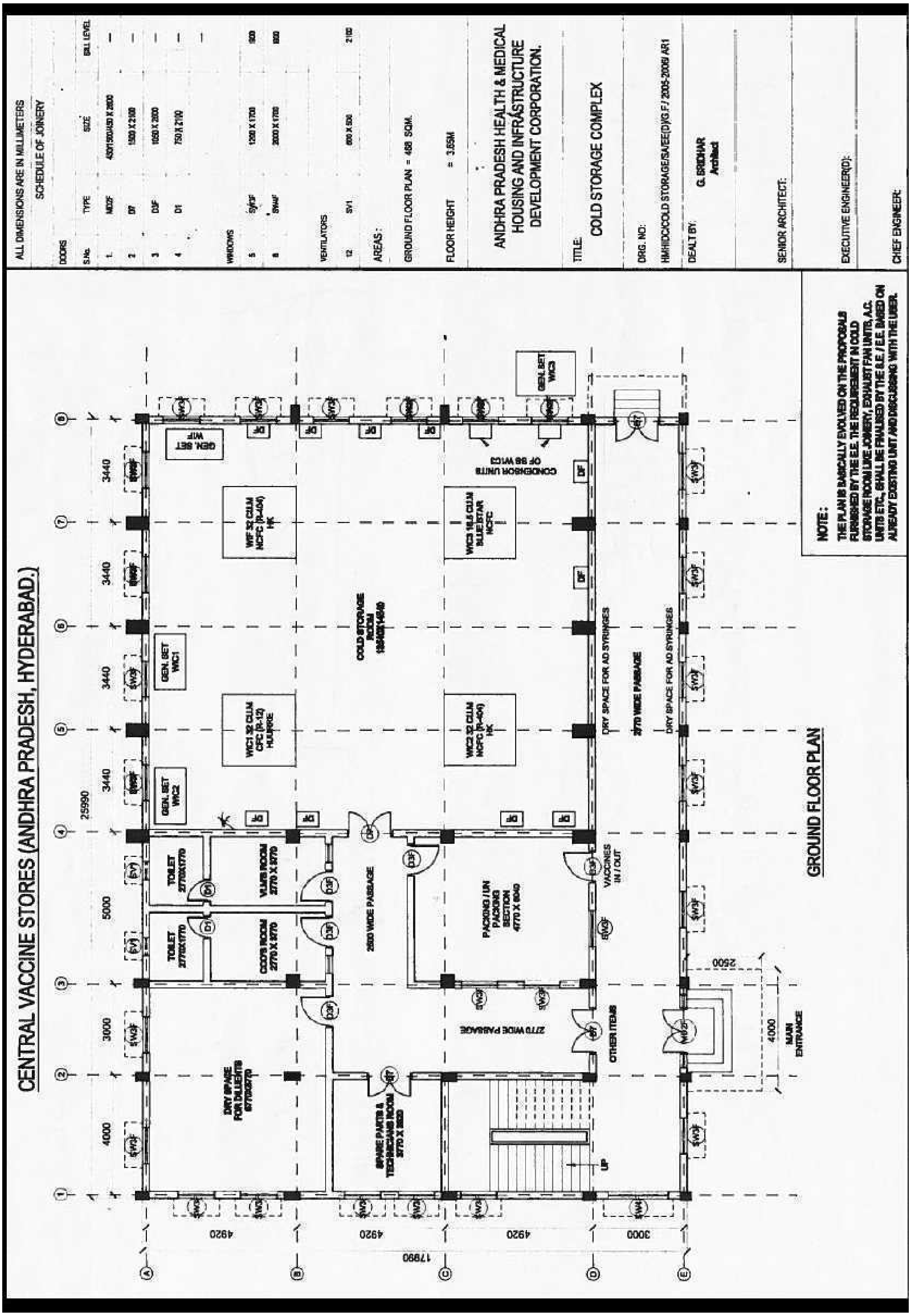


*Abbreviation-Door[3'x6'],LD-Large Door[6'x8'],W-Window[3'x4'],LW-Large Window[5'x4']

Figure 5 - Regional Vaccine Store prototype for region's Census population of 7.5 million or more In fig 6, use small s for sq. ft.



Abbreviation: D – Door[3'x6'], LD-Large Door – [6'x8'], W – Window[3'x4'],LW-Large Window[5'x4,


CENTRAL VACCINE STORES (ANDHRA PRADESH, HYDERABAD.)
GROUND FLOOR PLAN
COLD STORAGE ROOM
2500 WIDE PASSAGE
2770 WIDE PASSAGE
MAIN ENTRANCE
OTHER ITEMS
VACCINES IN / OUT
DRY SPACE FOR AD SYRINGES
CONDENSOR UNITS OF 88 WIC3
NOTE :
THE PLAN IS BASICALLY EVOLVED ON THE PROPOSALS FURNISHED BY THE E.E. THE REQUIREMENT IN COLD STORAGE ROOM LIKE JOINERY, EXHAUST FAN UNITS, A.C. UNITS ETC., SHALL BE FINALISED BY THE S.E. / E.E. BASED ON ALREADY EXISTING UNIT AND DISCUSSING WITH THE USER.
ALL DIMENSIONS ARE IN MILLIMETERS
SCHEDULE OF JOINERY
ANDHRA PRADESH HEALTH & MEDICAL HOUSING AND INFRASTRUCTURE DEVELOPMENT CORPORATION.
TITLE:
COLD STORAGE COMPLEX
SENIOR ARCHITECT:
EXECUTIVE ENGINEER(D):
CHIEF ENGINEER:

Training for National Assessment of Effective Vaccine Management (EVM) - 4th to 8th March, 2013 at NIHFW, New Delhi

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4	Maharashtra	Mr. Sanjve Kumar Malayya Mittapelli, Pharmacist	Govt. Medical Store Depot, Mumbai Central, Mumbai-400008	sanju31164@yahoo.com, 203072091, 92
5	Rajasthan	Dr. Manisha Chawla, Health Officer, UNICEF	9, Bhawani Singh Lane, C-Scheme, Jaipur	mchawla@unicef.org, 09828072697
6	Maharashtra	Dr. D. Gangadhar, CMO (SAG), I/c GMSD	Govt. Medical Store Depot (GMSD), Mumbai Central, Mumbai-400008	gdevolla@yahoo.com, 9967654207
7	Uttar Pradesh	Mr. Shashank Pathak, Cold Chain Officer	Directorate of Family Welfare, 9-Jagat Narain Road, Lucknow, UP	coldchainup@gmail.com, 7800317959, 0522-2253069
8	Rajasthan	Mr. Surendra Vyas, State Cold Chain Officer	Directorate of Medical & Health Services, Jaipur	sccoraj@rediffmail.com, 9414289789, 0141-2222417
9	Rajasthan	Dr. Rajesh Chavada, FM (Immunisation)	Room No-223, Swasthya Bhawan, Directorate of Medical Health Services, Jaipur, Rajasthan	rajesh_chavada@rediffmail.com, 9829124615, 7877766687, 0141-2222417
10	Tamil Nadu	Mr. C. S. Suri Babu, Asstt. Director	GMSD, Chennai	surics@yahoo.com
11	Tamil Nadu	Mr. P. Kayamani, Pharmacist	GMSD, 37 Naval Hospital Road, Periamet, Chennai	sai26568@gmail.com, 9962864367
12	Madhya Pradesh	Er. Vipin Kumar Shrivastava, State Cold Chain Officer	Directorate of Health Services, Satpura Bhawan, Bhopal, MP	vipincoldchain@ytahoo.com, 09893471926
13	Himachal Pradesh	Mr. Rakesh Sharma, State Cold Chain Officer	Directorate of Health & Family Welfare, SDA Complex, Kasumpathi, Shimla-171009	rakeshsharmacco@gmail.com, 09418051424
14	Uttarakhand	Dr. Saroj Naithani, SEPIO	JD/NP, DG, MH&FW, Uttarakhand	stateimmunizationuk@gmail.com, 9411511720

S. No.	State	Name & Designation	Office Address	Phone, Mobile and Email ID
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16	Haryana	Mr. Subhash Kumar, UDC	GMSD, Karnal, Haryana	sk.kumar3258@gmail.com, 09034113258
17	New Delhi	Mr. Muzammil Cone, RA	ITSU-PHFI, Pancheel Park Community Centre, New Delhi	muzammillone@gmail.com, 09953060897
18	New Delhi	Dr. Bhupendra Tripath, National Technical Officer (Imm)	MCHIP Office, 2nd Floor, 221 Okhla Phase-3, New Delhi	docbtirupathi@gmail.com, 8826790925
19	West Bengal	Sri Sanjeev Ch. Das, Sr. CMO (SAG)	GMSD, 9 Clyde Row, Hastings, Kolkata-22	sanjivdas16@yahoo.co.in, 9433072306
20	West Bengal	Sri Sandip Khan, UDC	GMSD, 9 Clyde Row, Hastings, Kolkata-22	sc.sankhan@gmail.com, 8697502676
21	New Delhi	Dr. Raveesha R. Mugali, National Imm Consultant	73, UNICEF House, Lodhi Estate, Delhi	raveesha.nmc@gmail.com, 9560414999
22	Chattisgarh	Dr. Nilanjan Mitra, State Routine Imm Officer	Room No-6&7, RCH Building, Directorate of Health Services, Old Nursing Hostel, DK Campus, Raipur, Chhattisgarh	riochaltishgaru@npsuindia.org, 9993177333
23	Odisha	Dr. Ajit Basanta Ray, State Programme Coordinator (Routine Imm)	State Maternal Child Survival, Odisha	ajit4ihmr@gmail.com
24	Jharkhand	Dr. Maheshwar Prasad, Medical Officer	CHC Jharkhand	drmaheshwarprasad@yahoo.co.in, 09431186123
25	New Delhi	Mr. Panitosh Panigrahi, Consultant (Imm)	MoHFW, Nirman Bhawan, New Delhi	paritoshpanigrahi@hotmail.com, 9868248788
26	Odisha	Dr. Jyoti Prakash Samal, State Consultant (Routine Imm)	SMCS Cell, Directorate of Family Welfare, Odisha	jyoti.samal@gmail.com, 8895221859
27	Odisha	Dr. Byomakesh Mishra, District RCH Consultant	CDMO Office, Kandhamal, Odisha	drbyomakesh@gmail.com, 9438665692
28	Bihar	Mr. Ram Ratan, State Programme Officer (RI & Polio)	SHS Patna	rraiims@gmail.com, 9431005943
29	West Bengal	Dr. Mukund Galagali, SMO	WHO-NPSP, Kavaligate, Bijapur, Karnataka	smobijapur@npsuindia.org, 09448122172
30	Kerala	Dr. Asha Raghavan, SMO	NHO-NPSP, State TB Cell, Ghroad, Trivandrum, Kerala	smotrivandrum@npsuindia.org, 09447191299

S. No.	State	Name & Designation	Office Address	Phone, Mobile and Email ID
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32	Uttar Pradesh	Dr. Kanupriya Singhal, RRIO, Meerut, UNICEF	O/o AD, H&FW, LLRM Medical College, Meerut	rrio.meerut@unicefup.org, 9837085385
33	Uttar Pradesh	Mr. Abhimanyu Saxena, Cold Chain Consultant	O/o AD, H&FW, Rampur Garden, Bareilly, UP	coldchain@unicefup.org, 9650448821
34	Haryana	Dr. Jagdish Chander, Senior CMO, I/c GMSD	GMSD Karnal	gmsdkarnal@gmail.com, 941600388
35	Haryana	Dr. Suresh Dalpath, DDCN/ SEPIO	DDCN/ DEPIO, Haryana	sureshdalpath@yahoo.com, 9501650700

Facilitators				
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2	New Delhi	Manish Gangal	UNICEF India Country Office, 73 Lodhi Estate, Delhi	mgangal@unicef.org
3	New Delhi	Dr. Srihari Dutta, Imm Specialist & Emergency Focal Point	UNICEF India Country Office, 73 Lodhi Estate, Delhi	sdutta@unicef.org

Annexure – N: National EVM - Team & Location

State	State Vaccine Store/ Regional Vaccine Store	Divisional	District	Health Facility 1	Health Facility 2	National Assessors		Dates of visits
						Team Leader	Members	
GMSD - Mumbai						1. Dr. Kshem Prasad	2. Mr. Manish Gangal	12-14 March 2013
Chhattisgarh	Raipur	X	Sarguja	PHC Pratapgarh	PHC Narmadapur	1. Dr. N. K. Mitra	2. Dr. Ajay Trakroo	18-21 March 2013
MP	Gwalior	X	Morena	PHC Nithara	PHC Mauha	1. Mr. Ram Ratan	2. Dr. Mital Shah	18-23 March 2013
	Indore	X	Sahajpur	PHC Bholai	PHC Polay kalan	1. Dr. Ajit Basanta Ray	2. Dr. Saroj Naithani	12-16 March 2013
	Jabalpur	X	Narsinghpur	PHC Paloha Bada	PHC Barha Bada	1. Dr. Bhrigu	2. Mr. Dheeraj Bhatt	10-15 March 2013
Rajasthan	(Jaipur)	Bikaner	Churu	PHC Binadesar	PHC Lalgarh	1. Dr. Suresh Dalpat	2. Dr. Lokesh	01-05 April 2013
	(Jaipur)	Ajmer	Nagaur	PHC Chhotiberi	PHC Jakhali	1. Dr. Kamaljit Singh	2. Mr. Dheeraj Bhatt	19-21 March 2013
	Jaipur	Jaipur	Kota	PHC Mandana	PHC Sultanpur	1. Mr. Vipin K Shrivastava	2. Dr. Manisha 3. Dr. Francois Gasse (International Observer)	10 -14 March 2013
GMSD – Kolkata						1. Dr. Kshem Prasad	2. Dr. S Dutta	20-21 March 2013

State	State Vaccine Store/ Regional Vaccine Store	Divisional	District	Health Facility 1	Health Facility 2	National Assessors		Dates of visits
						Team Leader	Members	
Tripura	Agartala	X	Gomati	PHC Silachari	PHC Kakraban	1. Dr. Byomakesh Mishra	2. Mr. Ram Ratan	10-14 March 2013
Bihar	Patna	East Champaran (Motihari)	West Champaran	PHC Lauriya	PHC Sikta	1. Dr. Jyoti Prakash Samal	2. Dr. Tapaswi Puwar 3. Dr. S Dutta	12 -16 March 2013
	(Patna)X	Purnia	Katihar	PHC Amdabad	PPC Katihar Sadar	1. Dr. Byomakesh Mishra	2. Mr. Vivek Mudgal	20-22 March 2013
	(Patna)X	X	Vaishali	PHC Hajipur	PHC Jandaha	1. Mr. Hitesh	2. Dr. Maheshwar Prasad	18 -23 March 2013
	(Patna)X	X	Bhojpur	PHC Agion	PHC Koilwar		3. Dr. Kumar Tarachand (NIHFW)	
GMSD - Chennai						1. Dr. Kshem Prasad	2. Dr. Jagdeesan Murugesan	25-27 March 2013
Kerala	Trivandrum	X	Pathanamthitta	CHC Chathenkery	PHC Anicad	1. Dr. Asha Raghavan	2. Dr. Tapaswi Puwar	19-22 March 2013
Karnataka	Bengaluru	X	Bengaluru	PHC Chikkabanavara	PHC Abbigere	1. Dr. Raveesha	2. Dr. B. P. Mohapatra	13-17 March 2013
	Bagalkot	Bagalkot	Bijapur	PHC Ukkali	PHC Lachyan	1. Dr. M. Galagali	2. Mr. R. K. Sharma	14-16 March 2013
	(Bengaluru) X	X	Ramnagara	PHC Sankighatta	CHC Bidadi	1. Dr. Raveesha	2. Mr. R. K. Sharma	12-13 March 2013

State	State Vaccine Store/ Regional Vaccine Store	Divisional	District	Health Facility 1	Health Facility 2	National Assessors		Dates of visits
						Team Leader	Members	
GMSD – Karnal						1. Dr. Kshem Prasad	2. Shashank Pathak	16-18 March 2013
J&K	Jammu	X	Jammu	PHC Jourian	PHC Sai RS Pura	1. Dr. Kamlesh	2. Dr Ajit Basant Ray	09-12 March 2013
	Srinagar	X	Srinagar	PHC Harwana	NPHC Pathanchowk	1. Mr. Paritosh Panigrahi		13-16 March 2013
Haryana	Kurukshetra	Kurukshetra	Panipat	PHC Chulkana	PHC Pattikalyana	1. Dr. Renu Paruthi	2. Dr. Jagdish Chander 3. Dr Sanjeev Khichi (NIHFW)	12-15 March 2013
	Gurgaon	X	Gurgaon	PHC Gurgaon	X	All team members by rotation during training	All team members by rotation during training	05-07 March 2013
	X	X	Faridabad	X	X	All team members by rotation during training	All team members by rotation during training	05-07 March 2013

State	State Vaccine Store/ Regional Vaccine Store	Divisional	District	Health Facility 1	Health Facility 2	National Assessors		Dates of visits
						Team Leader	Members	
UP	Agra	Agra	Agra	PHC Jagner	PHC Kheragarh	1. Mr. Surendra Vyas	2. Dr. Pramit Ghosh 3. Dr. Arun K. Tiwari (NIHFW)	12 -16 March 2013
	(Varanasi)X	Basti	Basti	PHC Bhanpur	PPC Basti	1. Dr. Deepak Polpakara	2. Mr. Abhimanyu Saxena	18 -20 March 2013
		Azamgarh	Ballia	PHC Vaina	PHC Siar	1. Dr. Deepak Polpakara	2. Dr. Manoj Kumar Singh	21 -23 March 2013
	Varanasi	Allahabad	Allahabad	PHC Mega	PHC Bahariya	1. Dr. Bhupendra Tripathi	2. Mr. Muzzammil	11-16 March 2013
	Meerut	Moradabad	Rampur	PHC Tanda	PPC Rampur Urban	1. Dr. Kanupriya	2. Mr. Vipin K Shrivastava 3. Dr Ravinder Singh (NIHFW)	16-20 March 2013
	(Lucknow)X	Kanpur	Kanpur-Nagar	PHC Kakwan	PHC Patara	1. Dr. Anil Pattanaik	2. Mr. Abhimanyu Saxena	01 - 04 April 2013
	Lucknow	Lucknow	Sitapur	PHC Sanda	PHC Mishrikh	1. Mr. Abhimanyu Saxena	2. Dr. Suresh Thakur 3. Mr. Kshem Prasad	09-13 March 2013
Delhi	Delhi	X	X	X	X	All team members by rotation during training	All team members by rotation during training	05-07 March 2013