

EVM Assessment of West Bengal

5 September 2011- 22 September 2011

Findings and recommendations of assessment team

DRAFT

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Acronyms

Abbreviation	Description
°C	degree centigrade
ACMOH	Assistant Chief Medical Officer of Health
AD	Auto-disable (syringe)
BCG	Bacille Calmette-Guérin (Tuberculosis vaccine)
BDN	Bardhaman
BH&FWS	Block Health & Family Welfare Samity
BPHC	Block Primary Health Center
CC	Cold Chain
CC&VLM	Cold Chain and Vaccine Logistics Management
CMS	Central Medical Stores
DF	Deep Freezer
DMCHO	District Maternal and Child Health Officer
DPHNO	District Public Health Nursing Officer
DRS	District Reserve Store
DTP	Diphtheria, Tetanus and Pertussis vaccine
DVS	District Vaccine Store
Dy. CMOH III	Deputy Chief Medical Officer of Health – III
EEFO	Earliest-Expiry-First-Out
EMP	East Medinipur District
EPI	Expanded Programme on Immunization
EVM	Effective Vaccine Management
FIC	Fully Immunized Child
GAVI	Global Alliance for Vaccines and Immunization
GH	Govt. Hospital
GMSD	Government Medical Store Depot
GOWB	Govt. of West Bengal
GP	Gram Panchayat
Hep B	Hepatitis B vaccine
Hib	<i>Haemophilus influenzae</i> b vaccine
HWH	Haora
ILR	Ice-lined refrigerator
JE	Japanese encephalitis vaccine
KMC	Kolkata Municipal Corporation
KOL	Kolkata
LD	Lowest delivery level store
MoH	Ministry of Health
MSD	Murshidabad District
NPG	North 24 Parganas
OPV	Oral Polio Vaccine
PHC	Primary Health Center

Abbreviation	Description
PP Unit	Post Partum Unit
PR	Primary store
PWD	Public Works Department
RH	Rural Hospital
RI	Routine Immunization
SD	Service Delivery
SDH	Sub Divisional Hospital
SGH	State General Hospital
SHFW	State Health and Family Welfare
SN	Sub-national store
SOP	Standard Operating Procedure
SP	Service point (health facility)
SPG	South 24 Parganas
SVS	State Vaccine Store
UDP	Uttar Dinajpur
UIP	Universal Immunization Programme
ULB	Urban Local Body
UNICEF	United Nations Children's Fund
V & L	Vaccine and logistics
VAR	Vaccine Arrival Report
VLM	Vaccine Logistics Management
VVM	Vaccine Vial Monitor
VVM	Vaccine Vial Monitor
WBSISC	West Bengal State Immunization Support Cell
WHO	World Health Organization
WIC	Walk-in-Cooler
WIF	Walk-in-Freezer
WMP	West Medinipur

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Executive summary

Background

West Bengal is among the most densely populated states of India with total population of 91.3¹ million. The state consists of 19 districts with the zero to one year target population of 16,38,547 for Universal Immunization Program (UIP). The full immunization coverage as per Coverage Evaluation Survey 2009 (CES) is 64.9%, BCG 89.4%, 3 doses of DPT vaccine 72.8%, 3 doses of OPV 74.2% (excluding Pulse Polio) and Measles 77.2%. The dropout rate between BCG and DPT3 was 18.6% and between DPT1 and DPT3 was 14.8% and between DPT1 and Measles was 9.6%². The insufficient vaccine logistic availability is cited as one of the key factorfactors affecting immunization service adversely.

UNICEF has been actively collaborating with Department of Health and Family Welfare (SH&FW)), West Bengal to strengthen its immunization programme through several innovative strategies. Considering the importance of vaccine management and logistics, the assessment of the existing Vaccine and Logistic management system in the state was a joint initiative of Department of Health and Family Welfare, Govt. of West Bengal and UNICEF.

The purpose of this activity was to investigate both the knowledge and practice of cold chain and vaccine-management amongst health staff operating at state, district and service-delivery levels. The field assessment enabled identification of the weak links in the cold chain and logistics management system. It becomes the basis for making immediate and long-term implementable recommendations. All findings and suggestions are substantiated with data. This structured approach also provides the opportunity to train the state and district level programme officers, medical officers and other staff involved in immunization programme planning, implementation and evaluation on good practices of managing vaccine logistics.

Effective Vaccine Management (EVM) tool and methodology as developed by WHO/UNICEF has been adopted for a systematic assessment and capacity building of the health department staffs involved in routine immunization cold chain and vaccine handling and management.

The EVM is guided by nine criteria, focusing comprehensively on management of vaccines and cold chain logistics. These criteria are grouped under a set of specific requirements.

The nine criteria are:

1. Vaccine-arrival procedures

¹Census 2011

²CES 2009

2. Vaccine-storage temperatures
3. Cold-storage capacity
4. Buildings, cold-chain equipment and transport
5. Maintenance of cold-chain equipment and transport
6. Stock management
7. Distribution
8. Vaccine Management Policies
9. Management Information System and supportive functions

As per the standards set by WHO/UNICEF for EVM, the scoring should be at least 80% in each criterion as an indicator of quality services and facilities provided in the UIP program.

Objectives

The primary objective of Effective Vaccine Management assessment is to conduct a formal review cum training on the cold chain and vaccine management system for immunization using EVM tool. It is a globally accepted tool for systematic assessment of cold chain of different level of stores by the national/state/region/district level programme managers to fix the problems of different categories, and priorities. EVM gives the opportunity to assess the state level store down to the lowest cold chain point in order to give true picture of Cold Chain and Vaccine Logistics Management (CC&VLM) and helps state and districts in planning their resources appropriately.

Specific objectives of the assessment to identify the following aspects of CC&VLM:

1. Strengths & best practices.
2. Major knowledge gaps.
3. Major performance gaps.
4. Resource & Training needs.
5. Strategies to strengthen future planning and prepare the system for storage space and management of future vaccines.
6. Strategies to develop internal capacity of the system to conduct similar self-assessment periodically in order to strengthen it and make it self-sustainable.

Methodology

The assessment was carried out in 10 of 19 districts in the month of September 2011. The assessment was done for a period of one year starting from September 2010 to August, 2011.

- Selection of these districts was based on random sampling using the site selection tool of EVM which uses population of districts as the base data.
- The state & district officials, faculties from Department of Community Medicine, Medical College Kolkata and West Bengal State Immunization Support Cell (WBSISC) staff were provided five days of extensive training including field practices in using EVM tool.

- Total of six teams were formed, with minimum of three members in each team. One team visited the SVS at Baghbazar, Kolkata. Other five teams spent six days in field visiting district stores and two blocks of the district visited.
- Field visits were followed by a four days workshop where members of the teams validated and consolidated the findings followed by three days workshop for preparation of recommendations through extensive discussion and consultative process.
- The findings from assessment and recommendations from assessment review group were presented over day long meeting in Kolkata in the presence of MD-NRHM, delegates from State Health and Family Welfare Bureau, partner agencies and representatives from all the assessment districts of the State. The detailed improvement plan based on key recommendations was formulated during the meeting.

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Major Findings

1. Vaccine-arrival procedures *(Only relevant for SVS)*

- Lot release certificate for each vaccine is maintained.
- Vaccine Arrival Report (VAR) documentation & procedure for checking & receiving vaccines supplied by GoI is not prepared for all vaccines

2. Vaccine-storage temperatures

- The recording and reporting of temperature monitoring of cold chain equipment is not done regularly across the state;. The SVS has been recently equipped with computerized temperature monitoring system of WICs/WIFs but the system is not being fully utilized. The trace recorders that records temperature of cold room on hourly basis has not been functioning at any of the WICs or WIFs in the state.

3. Storage capacity

- There is adequate dry storage space for storing diluents, syringes and other immunization supplies at SVS, however. However, the dry storage is inadequate at all the DVS.
- The vaccine storage capacity, for routine UIP vaccine, of SVS, blocks and sub block /sub divisions is adequate. There are total of 1240 cold chain points and 341 blocks in this state. The adequacy of capacity of districts is limited only to those districts that are provided with a Walk-in-Cold room (WIC) for UIP.
- The vaccine storage capacity for campaigns is adequate at blocks and sub block level.

4. Buildings, cold-chain equipment and transport

- The building of State Vaccine Store (SVS) located in Bagbazar, Kolkata is not under direct jurisdiction of SHFW and is managed by Central Medical Stores (CMS). The access of premises to SHFW staff is restricted.
- The store buildings of most of the districts lack minimum required standards such as electrical connections, ventilation, cleanliness, safety, free from cracks, seepage etc.
- The maintenance of buildings is evidently poor except for few districts like Kolkata where the store has recently been renovated.
- There is no vehicle for transportation of vaccines at SVS. The districts pick up the vaccine from SVS in their own vehicle; SVS hires vehicles for bringing vaccine from airport to store. The vaccine that is supplied by GMSD, Kolkata is transported through GMSD vehicle.

5. Maintenance of cold-chain equipment and transport

- The maintenance of cold chain equipment has been outsourced in the state. The breakdown maintenance has been attended promptly at the state and

district level except by YOUTH ENTERPRISE in three districts. However maintenance of the equipment at the sub district level is not satisfactory. The preventive maintenance has been poor throughout the state. This is because is due to lack of clarity of roles between maintenance companies and cold chain handlers at the site.

- Transport vehicles that are supplied for UIP program are poorly maintained; service records are not available for most of the vehicles in the districts.

6. Stock management

- The monthly vaccine and related logistics requirement from blocks to districts is neither based on session plan nor on the basis of target population. Indents are raised based on previous experience. This leads to shortage of vaccine or over stocking of vaccine and logistics.
- The demand from block to district is not consolidated while indenting to state at district level. The demand in form of indent is based on previous experience and remotely connects to sessions planned.
- The demand from state to center is based on target population considering national wastage rates of vaccines.
- The diluents of measles were found to be in excess of vaccines in stock at most levels.
- The physical stock does not match with the entries recorded in stock books.
- Open vials are kept in cold chain (especially t-OPV and b-OPV). Some of the open vials labels were had worn off, the labels while in some VVM had crossed the usable stage and there were few examples of with expiry date reaching shortly.

7. Distribution

- Supply of vaccine from center to state. - The supply of vaccine from center to state is erratic and there were short supplies of the demanded quantities as requested by state.
- Supply from state to districts is based on fixed allocation calculated at state level considering the availability of stock in hand. The vaccine supply is not strictly based on indents and is often influenced by quantity in stock.
- Supply to blocks from districts to blocks is combination of push mechanism (based on available stock) and indent raised by blocks with negligible adjustment of stock in hand at block level.

8. Vaccine Management Policies

- Segregation of UIP & non-UIP vaccine at all storage & delivery points is not followed.
- Biomedical waste management system is not in place for RI.
- Discarding reconstituted freeze-dried vaccines after 4 hours was followed.
- Knowledge, interpretation of VVM was satisfactory at all levels.
- At all the sites visited knowledge & practice of shake test was poor.
- Diluents management was very poor.

- Wastage control mechanism was not in place.

9. Management Information System and supportive functions

- The supply chain of UIP program is managed through the network comprising of state vaccine store, district vaccine stores, sub divisional stores and block/sub block stores. The vaccine is supplied to RI sessions from block and sub block stores. The sub divisional and sub block stores are rarely supervised and many management related problems related to stock management, preventive maintenance and documentation are prevailing at these levels. The stores, especially blocks that are managed by BPHN/PHN are relatively better managed than districts and sub block/divisional stores.
- The stock books are not maintained. The standard stock book format (as per national guidelines) is used only at Kolkata DVS and Boroughs.
- Stock book used at other sites is not adequate for vaccine management but suitable only for medicine supply.
- Supplies such as diluents and syringes are not recorded in stock books.
- Data related to vaccine wastage is neither captured nor reported from session sites. There is no compilation of vaccine wastage at state level.

Findings can further be summarized as:

1. Most of the problems identified are management related (management, practices and training);
2. Infrastructure related issues are primarily of building (permanent room for cold chain and dry storage);
3. Cold chain capacity is inadequate in many DVS as a new WIC is required for each of these DVS each in relation to population/quantum of vaccine supplied;
4. Availability and maintenance of transport facilities are poor;
5. Equipment maintenance through outsourcing is well managed to the extent that sickness rate is kept low, exceptions being the districts which are outsourced to YOUTH ENTERPRISE agency;
6. Maintenance contracts are not focusing adequately on preventive maintenance;
7. Combination of unlinked demand to targets and erratic supply mechanism may have resulted in missed opportunities of vaccination.

Site-specific issues

Key areas of concern	State Vaccine store	District Vaccine stores									
		South 24 Parganas	West Medinipur	East Medinipur	Kolkata	Jalpaigudi/Jalpaiguri	Uttar Dinajpur	Bardhaman	Howrah/Haora	Murshidabad	North 24 Parganas
Vaccine arrival procedures	✘	Not applicable									
Satisfactory temperature monitoring	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Adequate CC capacity for +2 to +8 deg C Storage	✓	✘	✓	✘	✘	✘	✓	✓	✘	✓	✓
WIC for RI	✓	✘	✓	✘	✘	✘	✓	✓	✘	✓	✓
Sufficient Freezing capacity	✓	✓	✓	✘	✓	✘	✓	✓	✓	✓	✘
Sufficient dry storage space	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Electrical standards maintained	✓	✘	✘		✓				✘	✓	✘
Functional generator with adequate fuel capacity	✓	✓	✘	✓	✓	✘	✘	✓	✓	✘	✘
Regular planned preventive maintenance	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Standard stock ledger	✘	✘	✘	✘	✓	✘	✘	✘	✘	✘	✘
Updated manual stock ledger	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Documentation of diluents, wastage, loss, VVM/freeze status	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Planned vaccine distribution schedule with specified quantity	✘	✘	✘	✘	✓	✘	✘	✘	✘	✘	✘
Regular ice pack conditioning	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Correct knowledge & use of shake test	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Local wastage rate calculation & use	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Regular documented supervision	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Evidence based forecasting method	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Adequate storage capacity transport-vehicles	✘	✓	✓	✓	✘	✘	✘	✓	✓	✓	✓
Contingency plan	✘	✘	✘	✘	✓	✘	✘	✓	✘	✓	✘
Internal review of vaccine loss/damage	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Periodical physical inventory	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Adequate knowledge & practice of waste management procedure for expired/damaged vaccines	✘	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘

Legends: ✓ - yes , ✘ - not available.

Recommendations (Global EVM criteria wise):

Criteria 2: Vaccine-storage temperatures

- Ensure availability and calibration of all temperature monitoring devices (thermometers/trace recorders for WIC/WIF/ILR/DF, fridge & freeze tags at all CC points).
- Regular recording of temperature (twice daily), maintenance of records & review of temperature at least once a month should be carried out for each equipment at all CC points.
- In the context that frozen ice packs are used for transport of vaccines with evidently poor conditioning practices, absence of freeze indicators for transportation and storage and poor quality temperature monitoring at different tiers, the in-depth analysis of temperature maintenance may be carried out through a temperature monitoring study.
- For the present and future supplies of WICs, in every district of the state, temperature mapping of every WIC should be carried out and documented to assure safe storage of vaccines.

Criteria 3: Cold-storage capacity

- The shortage of storage capacity at seven districts of Kolkata, Haora, Jalpaiguri, East Medinipur, Nadia, Malda and South 24 Parganas should be addressed by providing the new WICWICs of minimum size of 40 m³ each. Replacement of the non-functioning or more than 20 years old WIC at West Medinipur, Murshidabad, Dakshin Dinajpur and DarjellingDarjeeling should be done as soon as possible.
- Dedicated available dry storage space should be organized by providing marked shelves for storing UIP supplies at all levels. This shall enhance implementation of EEFO in the dry storage also.

Criteria 4: Buildings, cold-chain equipment and transport

- For timely receipt and distribution of vaccines and minimizing the risk of damage during transportation in contracted non-standard vehicles, insulated vaccine vans should be provided at State Vaccine Store, Uttar Dinajpur, Jalpaiguri and Kolkata.
- All DVS should be functioning with cold chain units, adequate dry storage space, packing areas and other standards based on national guideline for DVS. Dry store space for UIP supplies should be earmarked in a secured area at every cold chain point.
- Implement the fire prevention mechanism like water sprinklers and fire extinguishers at cold chain storage and dry storage area of SVS and all DVSs.

Criteria 5: Maintenance of cold-chain equipment and transport

- The sickness rate of cold chain equipment in the state should be less than 2% as per GOIGoI guidelines. The response time of maintenance agencies, repair

and maintenance operations should be reviewed for payment & continuation of AMC. Review of downtime should alert the program managers.

- The Terms of Reference (TOR) for repair & maintenance of CC equipments in the state should include the activities related to preventive maintenance such as leveling of ILR/DF, calibration of temperature sensors and maintenance of hinges & gaskets of ILR/DFs.

Criteria 6: Stock management

- Vaccine storage should be strictly as per GoI guideline guidelines at all CC points.
- Plan & optimize the supply of vaccines at health facilities with quality check to ensure coverage of birth doses at various vaccination sites as well as to reduce vaccine wastage & prevention of AEFI. With inception of open vial policy of OPV-0 and Hep-B birth dose for institutional deliveries, quality assurance must get the highest consideration to ensure vaccine safety.
- The stock control system, preferably computerized, should be maintained and include the practices of updating/maintaining the transactions of UIP supplies transactions, maintaining stock levels and optimized/optimising distribution of supplies.

Criteria 7: Distribution

- The standard conditioned ice-packs (0.4 L) should be used for transportation of vaccine and at session sites using cold boxes and vaccine carrier.
- The optimized annual distribution plan for vaccines, diluents & consumables should be prepared by SEPIO and , shared with SVS & and disseminated to districts for sufficient & timely delivery/collection of UIP supplies.

Criteria 8: Vaccine Management Policies

- The storage of NON-UIP supplies that needs cold storage should be stored separately from UIP vaccines.
- Quality assurance of freeze sensitive vaccines should be supported by documented shake test for every instance of suspected freezing at SVS, district and block CC points.

Criteria 9: Management Information System and supportive functions

- Print & disseminate all standard formats as per GoI guidelines for recording & reporting of temperatures, stock management, issue & indent registers & vouchers.
- Record of supportive/Supportive supervision (alongshould be done with a supervisory plan and checklist) and the findings should be documented in the inspection book, which should be available at all cold chain points and Services/service delivery points. CCO should review the reports of monthly supportive supervisions to identify problems & outcomes.
- V & L manager is required to improve planning, distribution, monitoring, supervision and documentation at SVS and to coordinate between State Officials, SVS and DVS.

State Vaccine Store specific recommendations

Criteria 1: Vaccine-arrival procedures

1. Vaccine arrival report should be used for recording and reporting the vaccine arrival from manufacturer.
2. Manufacturer, SEPIO & Immunization Division (MOHFW) should receive VAR within three days of arrival of vaccines.

Criteria 2: Vaccine-storage temperatures

3. Computerized centralized continuous temperature monitoring system at SVS should be extended to monitor all cold rooms at SVS especially newly installed WIC and WIF.
4. In addition to the online temperature monitoring and twice daily manual temperature recording of cold rooms, formal and documented temperature reviews should be carried out at least once a month by State CCO.
5. Contingency plan & emergency contacts should be reviewed & updated annually; contingency plan should be displayed at the SVS. Plan should be rehearsed at least once in every six months.

Criteria 4: Building, equipment and transport

6. The accountability and safety of vaccines on 24 x7 basis, operation and maintenance of UIP related equipment and storage should be entrusted to store keeper of SVS. This includes access to store building round the clock.

Criteria 6: Stock management

7. The standardized manual stock ledgers should be maintained at SVS (for at least 3 years) & updated within 24 hours of every receipt and issue of vaccine, diluents, syringes, droppers, hub cutters and other immunization related supplies.
8. At SVS, every transaction of receipt & issue of UIP supplies should be recorded including key information of manufacturer details, vial presentation, batch no, expiry date, quantity in doses (including loss/damage) and VVM/FREEZE indicator status.
9. The daily balance of V&L in SVS of V&L should be displayed on a tabulated board indicating the lot number and preferably indicating the quantity of vaccine and diluents lot expiring earliest or aged VVM status to help prioritizing/prioritisation in distribution, prevention of stock out and maintaining/maintenance of maximum and minimum stock.

Criteria 7: Distribution

10. The monthly distribution report at SVS should be submitted to SEPIO quoting the planned/actual quantity of receipt & issue (short shipments and excess supply), timeliness and damage/loss if any during storage or transportation.

Strategies for implementing the recommendations:

Issues that can be resolved through capacity building exercises

- Knowledge on best practices of vaccine management.
- Temperature monitoring at stores and during transportation.
- Correct method of preparing indent for vaccine and related supplies.
- Clarity of roles on preventive maintenance of cold chain equipment
- Knowledge on best practices of stock management.

Issues that can be resolved through intervention of management

- Ensure the staffing is adequate for cold chain and vaccine logistics management especially alternate arrangement for absence and holidays of regular personnel.
- Implementation of standardized reporting of vaccine consumption utilisation, wastage, maintenance of cold chain and vehicles.
- Implement mechanism to for periodic update of cold chain equipment inventory (electric and non-electric).
- Ensure timely condemnation of non-repairable equipment.
- Implement effective stock management through maintenance of stock book (introduce explicit recording of diluents/ syringes, VVM and wastage data)
-).
- Optimize and standardize the frequency of vaccine delivery.
- An effective biomedical waste management system to be in place for RI.

Issues that can be resolved through procurement and supply

- Adequate quantity and timely supply of supplements (thermometers/, temperature log book, stock book/distribution ledgers, indent and issue forms)
- Provide WIC to all the districts
- Provide replacement of aged, CFC and non repairable cold chain equipment.
- Provision of spare parts for repair and maintenance of walk in coolers, ILRILRs and DFs.

Areas where attention to infrastructure is required

- The size of dedicated cold storage area for ILRs, DF and other UIP supplies to be sufficient as per IPHS standard.
- Provide restricted access to cold store facility and cold chain equipment for security of vaccine and related supplies.
- The vaccine packing area to be climate controlled at state and district stores (+15 to +25 °C).
- Improve the electrical wiring to high standards of safety and efficiency (as per IE rules/PWD specification).
- Improve the CC room infrastructure condition as per GoI guidelines.

Way forward

1. The guidelines on various issues as recommended in this report to be disseminated on priority basis.
2. Prepare the action plan to implement the recommendations. The draft action plan has been included in this report.
3. PeriodicPeriodically review (annually) the progress of implementation of recommendations and validate the progress through review assessment after 2 years.
4. Expand the cold chain capacity to required level by procuring the requisite cold chain equipment.

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1. Background

West Bengal is among the most densely populated states of India with total population of 91.3³ million. The state consists of 19 districts with the 0-1 yr target population of 16,38,547 for Universal Immunization Program (UIP). The full immunization coverage as per Coverage Evaluation Survey 2009 (CES) is 64.9%, BCG 89.4%, 3 doses of DPT vaccine 72.8%, 3 doses of OPV 74.2% (excluding Pulse Polio) and Measles 77.2%. The dropout rate between BCG and DPT3 was 18.6% and between DPT1 and DPT3 was 14.8% and between DPT1 and Measles was 9.6%⁴. The insufficient vaccine logistic availability is cited as one of the key factor factors affecting immunization service adversely.

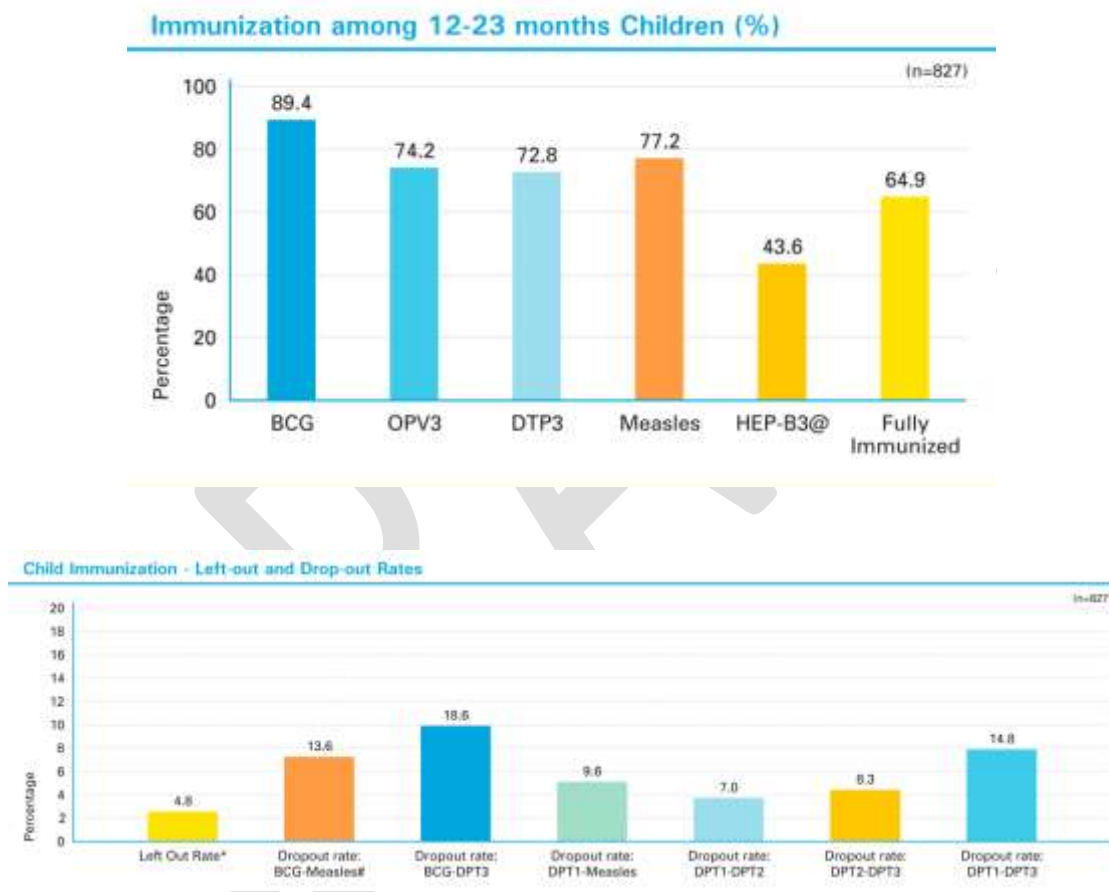


Figure 1: Immunization coverage of westWest Bengal: Coverage Evaluation Survey 2009

The state has total of 19 districts, 341 Block PHCs, 126 ULBs, 6 municipal corporations and few PP units. The vaccination is done through 10356 rural sub centers or session sites and 2140 urban session sites. The list of districts and their populations is listed in table 1 below.

³Census 2011

⁴CES 2009

Table 1: Demographics data of districts of West Bengal

SL. No	District Vaccine Stores (DVS)	Total population Census 2011	Estimated annual target population for UIP -2011 ⁵
1	Bankura	35,96,292	64,608
2	Bardhaman	77,23,663	1,24,018
3	Birbhum	35,02,387	68,441
4	Coochbehar	28,22,780	54,542
5	Dakshin Dinajpur	16,70,931	34,604
6	Darjeeling	18,42,034	29,003
9	Haora	48,41,638	73,049
8	Hoogly	55,20,389	86,237
10	Jalpaiguri	38,69,675	73,035
11	Kolkata	44,86,679	88,736
12	Malda	39,97,970	89,765
13	Murshidabad	71,02,430	1,45,619
14	Nadia	51,68,488	86,093
15	North 24 Parganas	1,00,82,852	1,53,131
19	Paschim Medinipur	59,43,300	1,05,560
7	Purba Medinipur	50,94,238	87,702
16	Purulia	29,27,965	55,286
17	South 24 Parganas	81,53,176	1,47,498
18	Uttar Dinajpur	30,00,849	71,620
Total		913,47,736	16,38,547

1.1 Organization of immunization program and services in the state

The state follows the national immunization schedule of vaccinating children between age of 0 and 1 year for prevention of seven specific diseases namely, Polio, Diphtheria, Pertussis, Tetanus, Tuberculosis, Hepatitis B and Measles. In addition to these some of the districts are providing the JE Vaccine through routine immunization program as these districts have prevalence of Japanese Encephalitis. The routine immunization schedule of the state is included as appendix I.

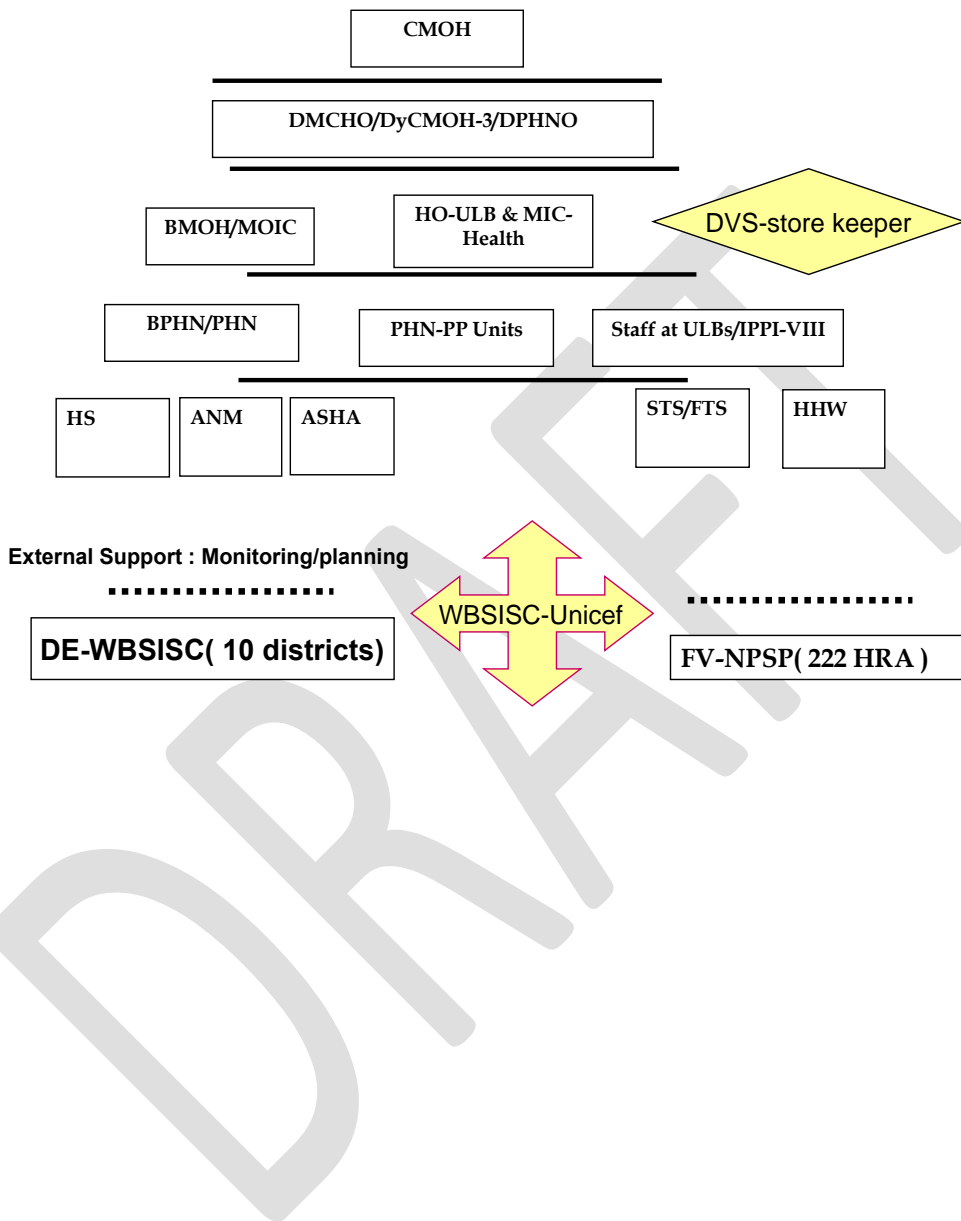
State also conducts the special campaigns of Polio vaccination through Pulse Polio programme of the country.

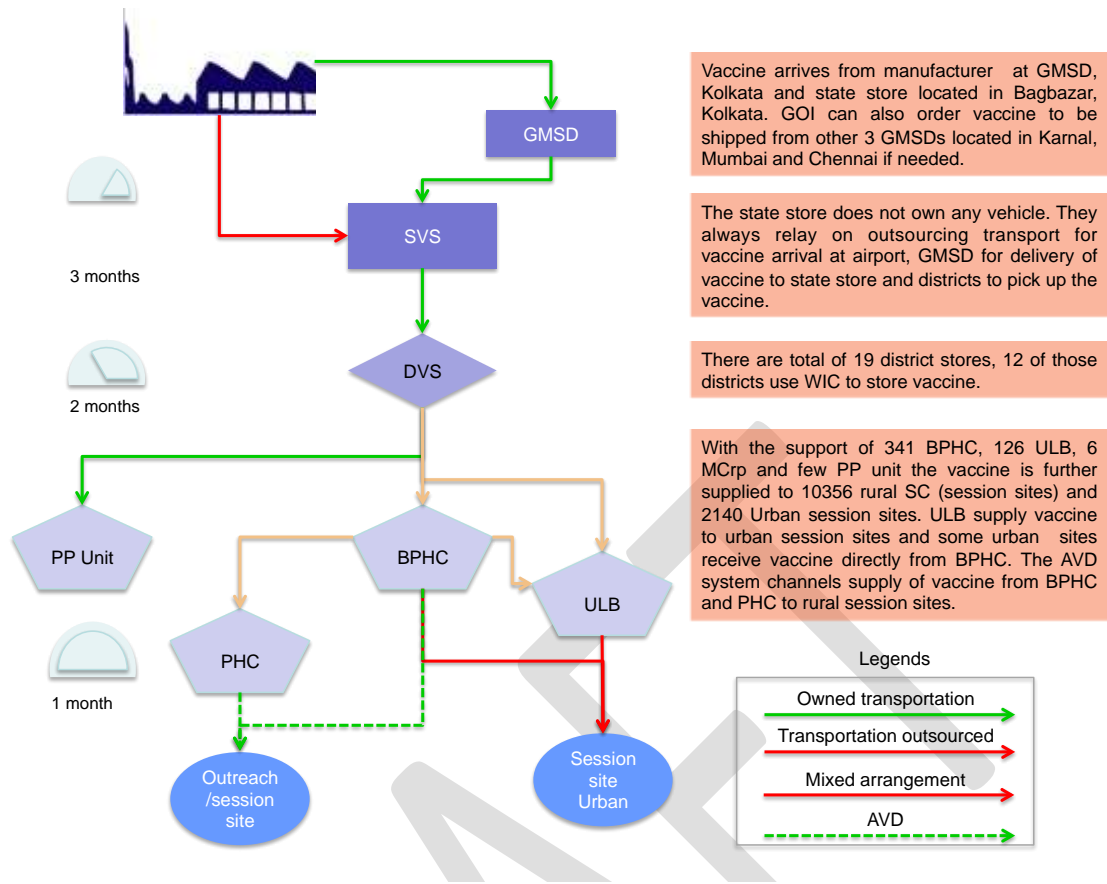
The program management structure for immunization services of Government of West Bengal is shown in figure 2 below.

⁵ Based on CBR of [Census 2011](#).

Figure 2: Program management structure for routine immunization of the state

Programme implementation: (RI)





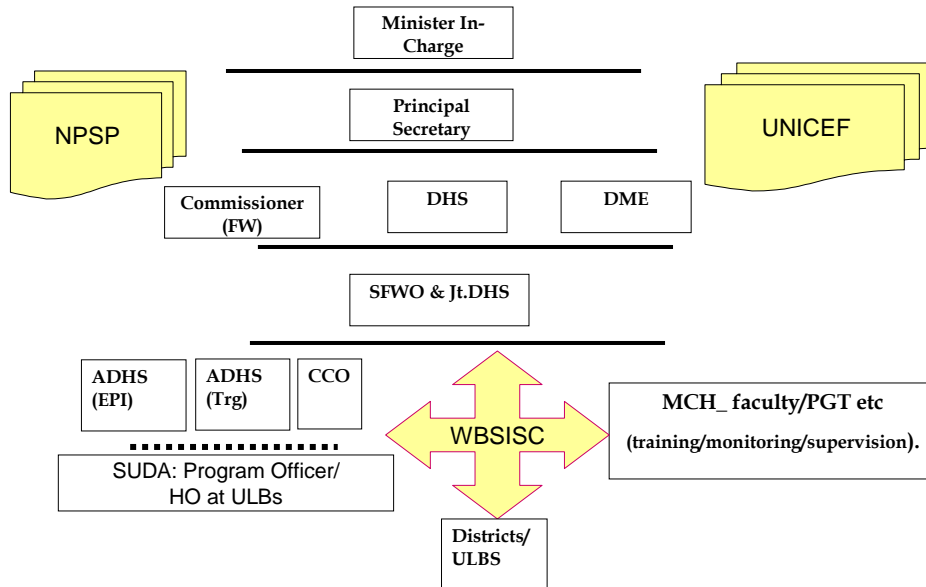
Vaccine arrives from manufacturer at GMSD, Kolkata and state store located in Bagbazar, Kolkata. GOI can also order vaccine to be shipped from other 3 GMSDs located in Karnal, Mumbai and Chennai if needed.

The state store does not own any vehicle. They always rely on outsourcing transport for vaccine arrival at airport, GMSD for delivery of vaccine to state store and districts to pick up the vaccine.

There are total of 19 district stores, 12 of those districts use WIC to store vaccine.

With the support of 341 BPHC, 126 ULB, 6 MCrp and few PP unit the vaccine is further supplied to 10356 rural SC (session sites) and 2140 Urban session sites. ULB supply vaccine to urban session sites and some urban sites receive vaccine directly from BPHC. The AVD system channels supply of vaccine from BPHC and PHC to rural session sites.

Programme Management: (RI)



Programme implementation: (RI)

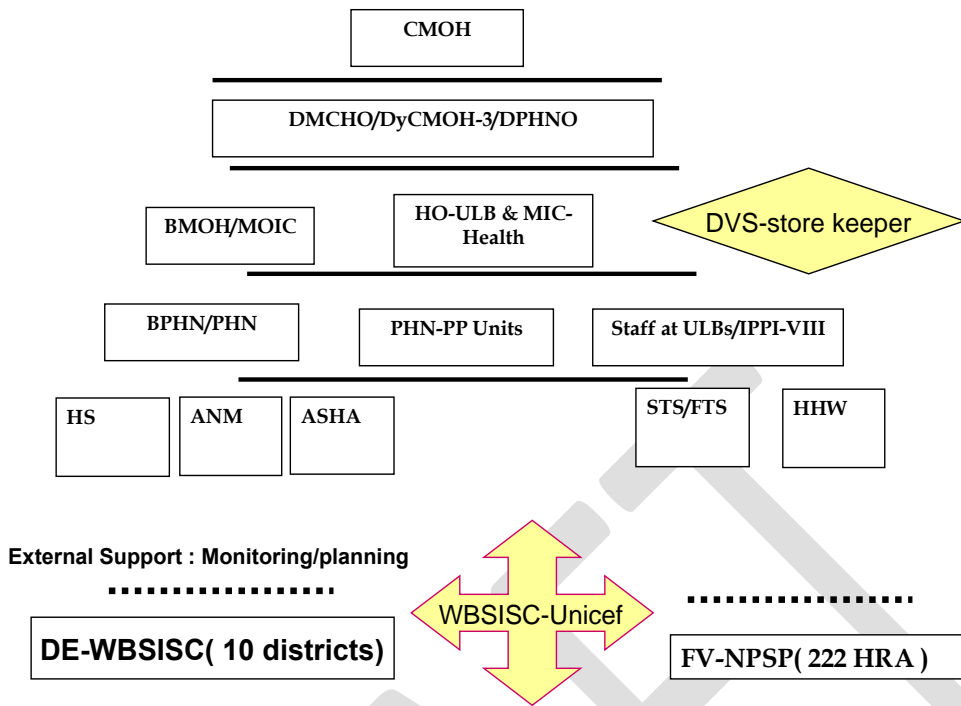
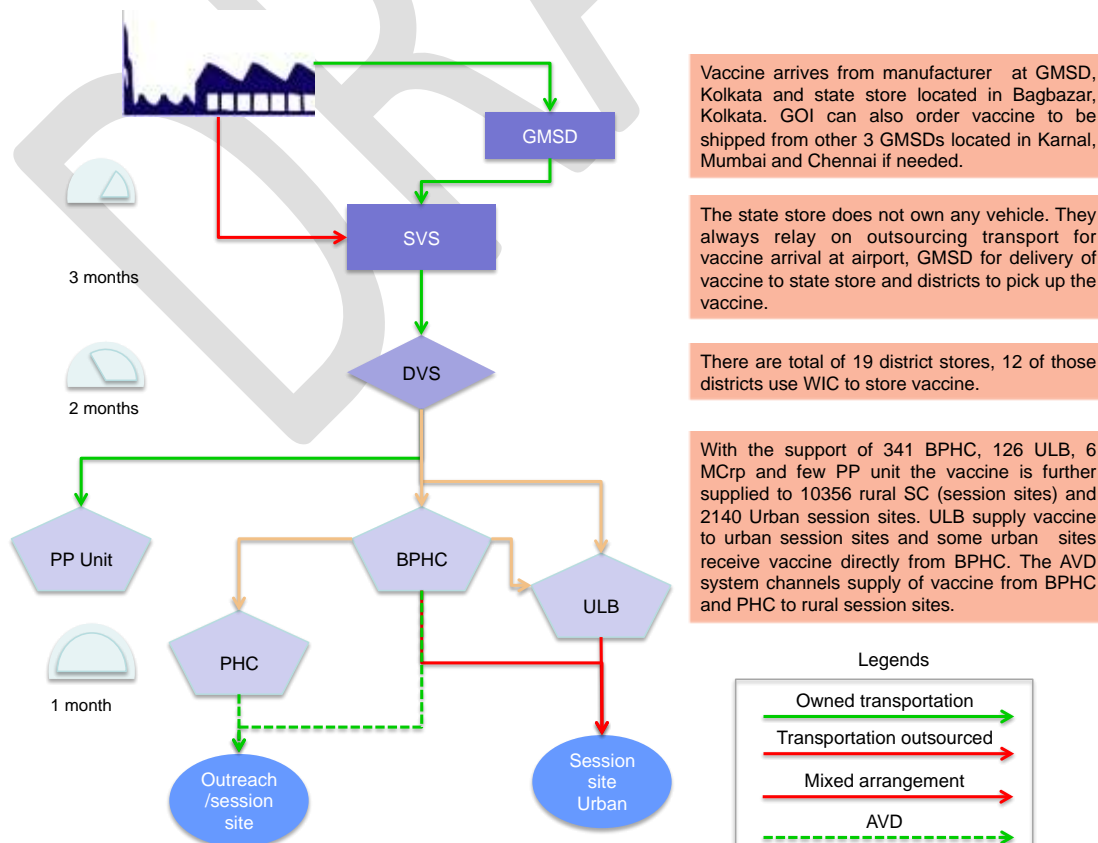


Figure 3: Supply chain network of immunization program in the state



Structure of supply chain in the state

The supply of vaccine and related logistics for RI and campaigns/SIAs is managed through the stores of state, district and block level. There are extended wings of cold chain points of sub district stores and below block level as PHC/GP Sub center cold chain points. The vaccine is also stored at some of the PP units for birth dose and routine sessions. The supply chain of the state is depicted in figure 3 above..

Vaccine presentation and volume

The cold chain storage volume required per Fully Immunized Child (FIC) as per the vaccination schedule is 71.7 cm³ at state and intermediate level of stores. The requirement at the last cold chain point is 79.1 cm³ which includes storage of OPV vaccine and diluents for session requirement. The storage volume for storing OPV in DF or WIF at state and intermediate level is 6.7 cm³. The detailed computation is included in table 2 below.

Table 2: Vaccine volume per FIC for vaccine in immunization schedule

Vaccine Initials	Vaccine Presentation (Doses/Vial)	Packed volume		Wastage rate (National)	Wastage Factor	Doses per child
		Vaccine	Diluents			
BCG	10	1.2	0.7	50	2.00	1.0
Measles	5	5.0	4.0	25	1.33	2.0
DTP	10	3.0		25	1.33	5.0
HepB	10	4.0		25	1.33	4.0
TT	10	3.0		25	1.33	3.5
JE ⁶	5	4.8	4.0	25	1.33	-
OPV	20	1		25	1.33	5.0
Total net storage volume of OPV at -20°C in stores per FIC						6.7 cm ³
Total net storage volume of vaccines without OPV at +5°C in stores per FIC						71.1 cm ³
Total net storage volume of vaccines including OPV at +5°C in stores per FIC						77.7 cm ³
Total net storage volume of vaccines including diluents at +5°C at service delivery per FIC						79.1 cm ³
Number of vaccine doses per FIC						20.5

The list of districts that provide JE as a part of routine immunization services are included below in table 4. Three of these five districts were selected for

⁶JE included in few districts only

assessment. The net storage volume per FIC increases by 6.65 cm³ for these districts.

Table 3: Districts with prevalence of JE

Districts with prevalence of Japanese Encephalitis	Included in Assessment	Estimated annual target population (2011)
Bardhaman	Yes	1,24,018
Birbhum	No	68,441
Hoogly	No	86,237
Haora	Yes	73,049
Paschim Medinipur	Yes	1,05,560

The vaccine is procured centrally by Government of India (GOI) for all the states of India. The annual requisition for vaccine is prepared by Government of West Bengal and submitted to GOI for procurement and supply. The manufacturers are provided with the annual schedule of delivery by GOI indicating the quantity and timeline of vaccine delivery to state vaccine stores. The timeline is generally in slabs of two months with equated quantities for every delivery,; hence the SVS is expected to receive approximately six arrivals per vaccine per year.

Maintenance of equipment and building

The maintenance of cold chain equipments like ILR, DF, WIC, WIF and generators has been outsourced to private agencies in the state. The total of five agencies has been contracted to maintain these equipment in their stipulated districts and cold chain sites. These agencies are contracted either by department through a bidding system with terms of services defined and agreed by state.

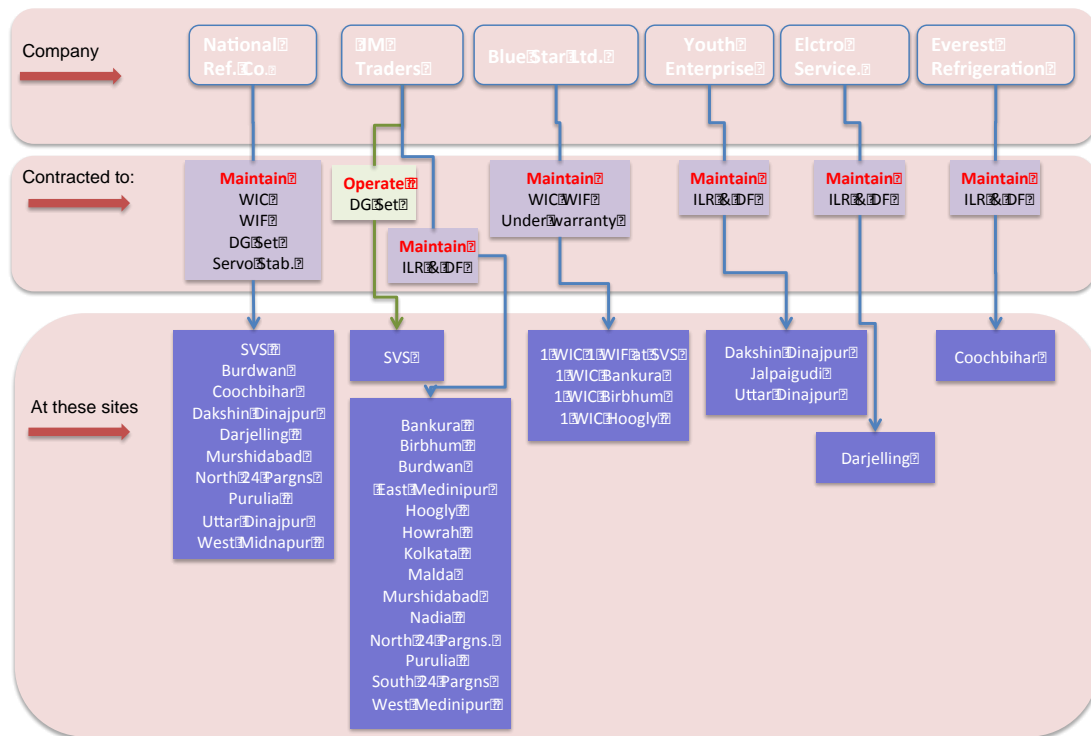


Figure 4: Map of companies managing the maintenance of cold chain equipment

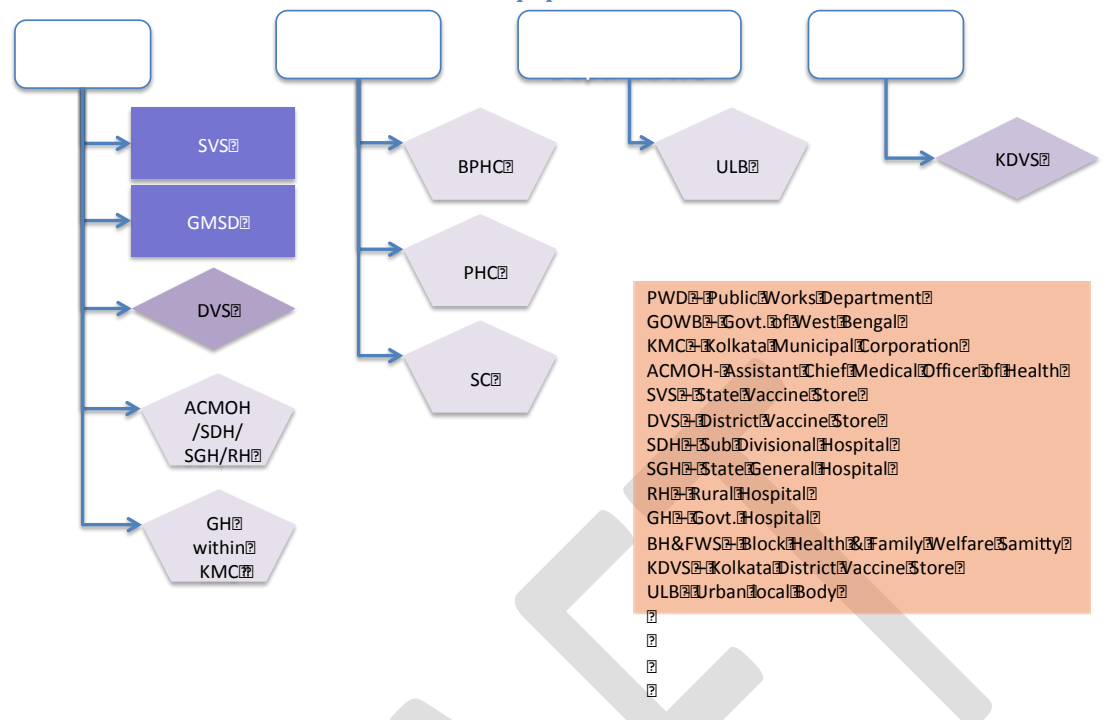
The timeline for validity of contracts with these maintenance companies is listed below in table 4.

Table 4: Timeline of contract with maintenance companies

Company	Activity	Contract expiring on
J.M. Traders	Operation of DG sets at SVS Maintenance of ILR & DF	September 2013 October 2011
National Ref. Co	Maintenance of WIC, WIF with DG sets	August 2012
Youth Enterprise	Maintenance of ILR, DF & VS	June 2012
Electro Service	Maintenance of ILR, DF & VS	September 2011
Everest Refrigeration	Maintenance of ILR, DF & VS	June 2012
Blue Star Ltd	WIC/WIF (under warranty and national level AMC)	2016

Respective departments as depicted in the figure 5 below carry the maintenance of buildings used for UIP program.

Figure 5: Maintenance of buildings with cold chain equipment



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2. Objectives

UNICEF has been actively collaborating with Department of Health and Family Welfare (SH&FW), West Bengal to strengthen its immunization programme through several innovative strategies. Considering the importance of vaccine management and logistics, the assessment of the existing vaccine and logistic management system in the state was a joint initiative of Department of Health and Family Welfare, Govt. of West Bengal and UNICEF.

The objective of Effective Vaccine Management assessment is to assist the state to conduct a formal review cum training on the cold chain and vaccine management system for immunization using WHO/UNICEF tool for vaccine management assessment (EVM). It is a globally accepted tool for systematic assessment of cold chain at different levels of storage to enable the national/state/region/district level programme managers to fix/resolve the problem of different categories, and priorities. It provides evaluation of vaccine management from the state level store to block/borough cold chain points in order to give reliable picture of Cold Chain and Vaccine logistics Management (CC&VLM) and helps state in planning their resources appropriately.

Key objectives of the assessment are to identify the following aspects of CC&VLM:

1. Strengths & best practices
2. Major knowledge gaps
3. Major performance gaps
4. Resource & Training needs
5. Strengthen future planning and prepare the system for storage space and management of future vaccines requirements.
6. Develop internal capacity to conduct similar self-assessment periodically in order to strengthen of the system and make it self-sustainable

3. Methodology

Site selection

The sites for assessment were selected randomly using the EVM site selection tool. The ten districts were selected as Lowest Distribution (LD) points based on 80% confidence level and 15% precision level. The selected districts for assessment are listed in table 5 below.

Table 5: Selected Lowest Distribution (LD) and Service Delivery (SD) for assessment

1	Bardhaman	Bonnabagram BPHC	Srikhanda BPHC
2	Haora	Jhumjhumi BPHC	Kulai BPHC
3	Jalpaiguri	Mongalbari BPHC	Sulka para BPHC
4	Kolkata	Borough V	Borough VI
5	Murshidabad	Hariharpur BPHC	Anupnagar BPHC
6	North 24 Parganas	Nanna BPHC	Sundurpur BPHC
7	Paschim Medinipur	Keshiary BPHC	Changoal BPHC
8	Purba Medinipur	Gangadharbar BPHC	Kaktia BPHC
9	South 24 Parganas	Sarisha BPHC	Chanda Doulatabad BPHC
10	Uttar Dinajpur	Karandighi BPHC	Islampur BPHC

Training of assessors

The state & district officials, faculty from Department of Community Medicine, Medical College, Kolkata and West Bengal State Immunization Support Cell (WBSISC) staff were provided five days of extensive training including field practices in using EVM tool. The list of participants is included in appendix II.

Team formation

Total of six teams were formed, with three members in each team. One team visited the SVS at Bagbazar, Kolkata. Other five teams spent six days in field visiting district stores and two blocks from every district visited. Detailed list of team members and sites visited are included in appendix VI.

Field visits were followed by a four days workshop where all the members of the teams validated and consolidated the findings. The list of participants of consolidation and validation workshop is included as appendix III.

The validation process was followed by three days workshop for preparation of recommendations through extensive discussion and consultative process. The list of participants in the workshop is included as appendix IV.

Finally, a State debriefing meeting was held to apprise the State and District authorities of the findings of the EVM Assessment and to discuss and finalize a draft action plan to be implemented in the State. The list of participants of the debriefing meeting is included as Appendix V.

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4. Introduction to EVM

The process

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

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

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

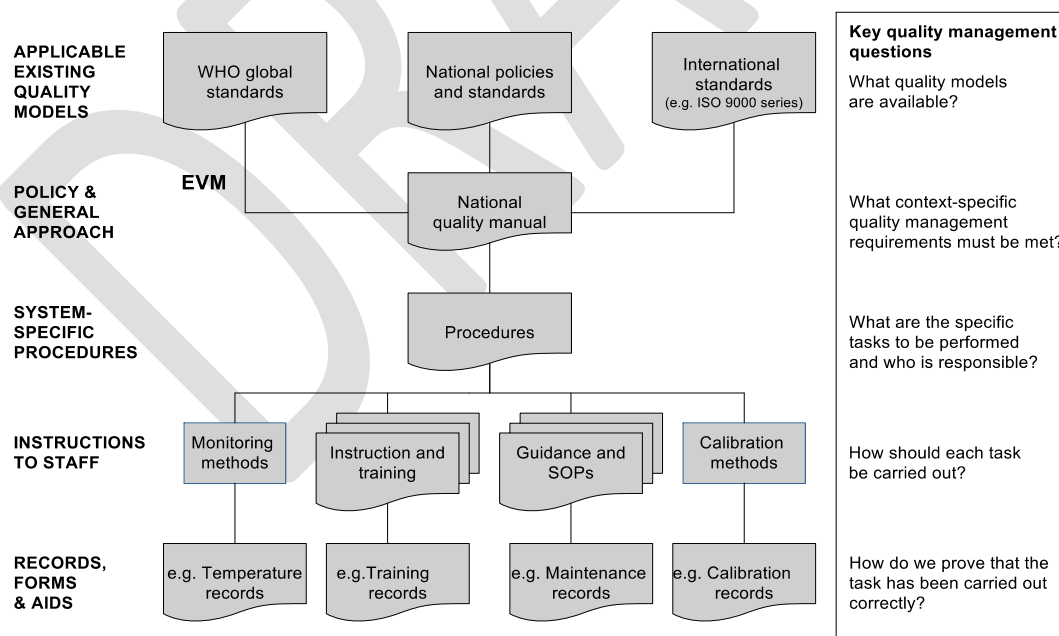


Figure 6: Quality management documentation

The EVM tool is used to assess the quality and sufficiency of the seven component elements of an effective supply chain: buildings; storage and transport capacity; cold chain equipment; vehicles; repairs and maintenance;

training and the management systems needed for the effective operation and control of the system.

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

1. The primary (PR – State Vaccine Store (SVS)) level where vaccine is received directly from the vaccine manufacturer or from an international supplier such as UNICEF Supply Division. Typically vaccine is stored in large cold rooms and freezer rooms. The SVS of West Bengal is located in at Bagbazar, Kolkata. The vaccine is also received from manufacturer at Government Medical Store Depot (GMSD), Kolkata, which is among the four large stores in India for medical supplies. The vaccine and related consumables are supplied to 19 districts of West Bengal directly from SVS.
2. The sub-national (SM) level or regional store level where vaccine is received from the SVS, stored for an agreed period, and then distributed to lower levels stores or to health facilities. These stores may have a cold room and/or a number of vaccine refrigerators and freezers. Though there are no regional stores in West Bengal the population is so large that every district requires one cold room to store and supply the vaccine to lower levels.
3. The lowest delivery level (LD) store where vaccine is received, either from the SVS or from a regional store. From this point it is distributed directly to service delivery points. There are total of 19 districts as LD points. . West Bengal, being amongst the most densely populated states in the country, has large Districts with dense population hence some of these districts have been provided with cold rooms for vaccine storage. Table 1 lists the demographics data of these 19 districts.
4. Service delivery points (SD) such as health centers and health posts, where vaccine is stored for a short time before delivery to the target population – usually in a single ILR, but also, on a very short-term basis, in vaccine cold boxes or vaccine carriers. The SD level in WB comprise of Block Primary Health Centers (BPHC) in rural areas and Boroughs (Urban district of Kolkata). The vaccine is further supplied from BPHC to PHCs that serves and SCs which serve as additional cold chain points.

Assessment criteria

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

1. Vaccine-arrival procedures
2. Vaccine-storage temperatures
3. Cold-storage capacity

4. Buildings, cold-chain equipment and transport
5. Maintenance of cold-chain equipment and transport
6. Stock management
7. Distribution
8. Vaccine Management Policies
9. Management Information System and supportive functions

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.

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

In its current form at the time of assessment, the tool summarizes assessment results in two ways:

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

Assessment types used

Since this is the first EVM assessment in the state, the PR, LD and SD levels were assessed using the full assessment types of forms.

Tool version used

The assessment was carried out using the version 1.0.5 of EVM tool.

5. Findings

5.1 Key findings

The assessment of state vaccine store, ten districts and 20 blocks reflected following findings:

1. The state has focused on cold chain management to improve RI coverage and quality over the past one year. This is evident from ongoing cold chain handlers trainings in the state, focus on cold chain equipment maintenance through decentralized outsourcing mechanism and continuous interventions of WBSISC through their support in monitoring, supportive supervision and trainings. The posters on SOP of using VVM, vaccine arrangement plan, defrosting and contingency plans were visibly available to health workers at block level.
2. Given the largely dense population of districts, each of the 19 districts requires a WIC at DVS level. All the districts except of Purba Medinipur, South 24 Parganas, Haora, Kolkata Jalpaiguri, Nadia and Malda are provided with a WIC for UIP vaccine.
3. The storage capacity is adequate, especially at SVS, block level and districts that are provided with Walk-in-Cooler (WIC).
4. The logistics at block level are better managed compared to district levels. This difference is due to BPHN (Block Public Health Nurse) being given the responsibilities of cold chain handlers and playing an active role in logistic management. The documentation is better maintained at sites where logistics is managed by BPHN.
5. The maintenance of cold chain equipment has been outsourced to private agencies (see fig 4) at district level. Though the breakdowns of equipment are being attended promptly by service providers, except for Youth enterprise in districts of Jalpaiguri, Uttar Dinajpur and Dakshin Dinajpur, there is lack of clarity on local level preventive maintenance. The contractual agreements suggest the mandatory visits by technicians once a quarter to every site but do not cover preventive maintenance in detail.
6. The terms of reference of maintenance agencies does not include the key functions of maintaining the built-in temperature monitoring devices like 24x7 trace recorders of WIC and WIF and calibration of thermostat and temperature monitoring sensors of WIC/WIF.
7. The criteria and category-based result of assessment of entire state strongly suggest that the management of logistics (stock management, MIS and supportive functions and distribution planning) need serious attention. The supportive supervision is generally lacking (except for external support from WBSISC). The key management related issues are:
 - a. The involvement of nodal officers of districts and block in vaccine logistics is sub optimal;
 - b. There have been frequent transfers of staff;
 - c. Qualifying criteria of staff deputed to manage the DVS are variable;

Criteria Scores

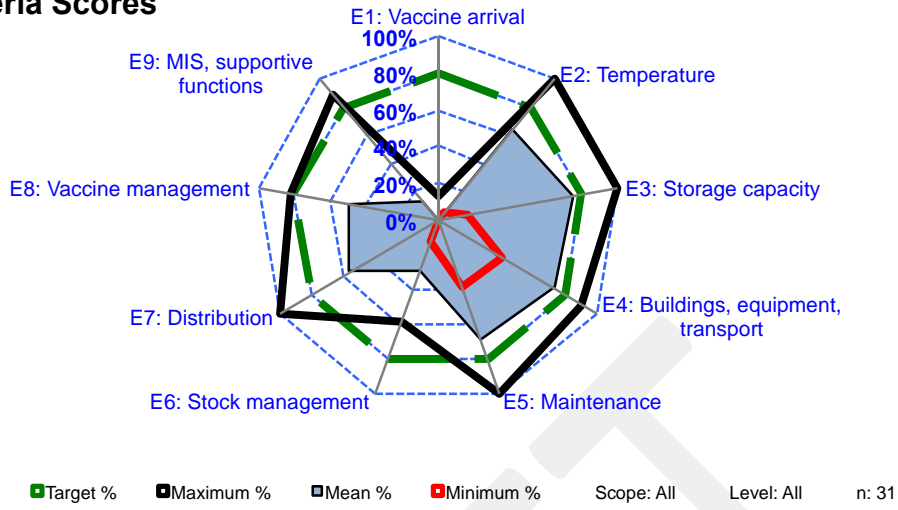


Figure 7: Overall criteria based result of assessment (all levels)

Categories Scores

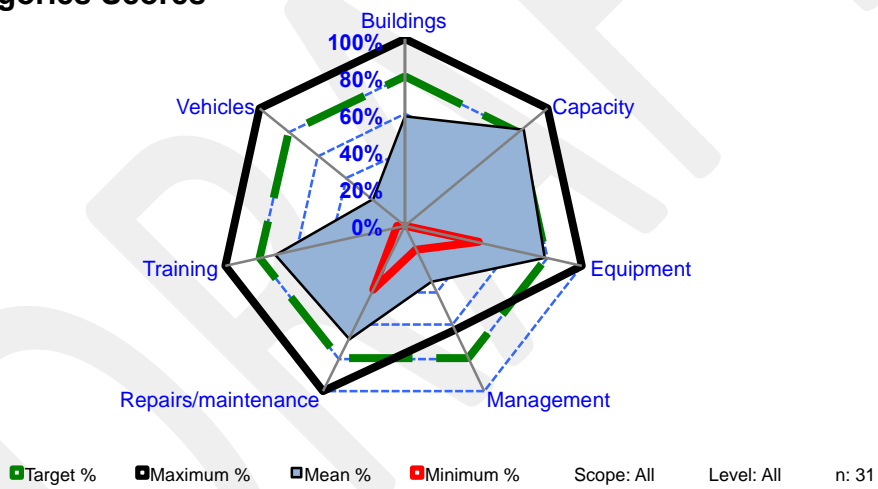


Figure 8: Overall category based result (all levels)

- d. Data managers at various levels (with responsibility of compilation of RI related data and submission of reports) are not fully conversant with RI program;
 - e. No rational distribution plan of vaccine and logistics at district level;
 - f. The storage of UIP vaccine and non-UIP vaccine are not segregated, they are stored together especially in WIC at district level.
 - g. There is a gross mismatch between the stock of Measles/BCG vaccine and its diluent/diluents at all the levels (stock of diluent/diluents is often found to be more than the vaccine).
8. There is no dedicated dry storage space and cold chain room at all cold chain points except in SVS and Kolkata DVS. The cold chain equipment/equipments are kept in open at Murshidabad and Paschim Medinipur.
 9. The distributed cold chain points (below PHC level) are not well managed. The sites are often not manned, temperature monitoring is not done and equipment are is poorly maintained. There is no stock control system for these sites.
 10. Temperature monitoring is not done on continuous basis (no monitoring during weekend/weekends and holidays) at all the levels. This is primarily because the Government of West Bengal order does not explicitly emphasise on visits to stores during off days and alternate cold chain handlers are not entrusted with responsibility of monitoring cold chain during holidays. This is also because the store units are located far from administrative offices of districts, for example the walk-in-cooler of districts Uttar Dinajpur and Paschim Medinipur are far from DFWB and North 24 Parganas store is located physically at three different locations. Temperature records (especially excursions) are also not formally reviewed by supervisors.
 11. Waste management system is poor, the . The waste is not collected from session site for disposal. The national guidelines for disposal of opened, expired or damaged vaccine are not followed.
 12. The vaccine is not packed in accordance with the guidelines during transportation. Often the number of ice packs used are less in numbers (20-30 ice packs in stead of required 42 in 20 litres cold boxes). Ice packs were also not always conditioned always, during transportation.
 13. Documentation is very poor at DVS level. The standard documentation tools required, such as stock book ledgers, indents, loss adjustment forms, computers and E-record keeping, are not used at all the levels (except for Kolkata DVS where they use standard stock book for record keeping is used). There is also lack of capacity to link session plans with computation of vaccine requirement.
 14. There is no stock control system in place. In absence of stock control system, the stock levels are not set at any of the levels and flow of stock of vaccine is not regulated. The quantity received and issued are based on previous experiences and not adjusted through stock control mechanism.

5.2 Findings of state vaccine store

The state vaccine store is located inat Bagbazar, Kolkata. The key findings of state vaccine store are:

1. The building hosting SVS is strong, well maintained and is more then 200 years old. It was originally built by Dutch trading company to store jute products. The building is under jurisdiction of Central Medical Stores (CMS), which is located in Sealdah (seven km and one hour away due to traffic congestion).
2. The state Health and Family Welfare have no control over permanent access to the store as the key of office and store including main gate is kept with the office of CMS. The keys are brought by CMS staff every morning by 10 am and taken back by 5:30 PM. In case of exception (vaccine arrival on weekend for example) the administrative officer has to make a written request for retaining the key. The access to main entrance allowing entry of vehicle in the premises needs additional approval of DDRS (Deputy Director of Regional stores).
3. The store is not manned by anyone during nights and weekends except for three guards who are placed on 24x7 basis to operate the generator as the operation of generators has been outsourced to JM Traders. These guards however have access to generator only and cannot enter the SVS.
4. The cold chain capacity of the store is adequate for storage of routine UIP vaccine. The store is equipped with four WICs and two WIFs with net +2 to +8°C storage capacity of 35,840 liters and 16,640 liters of capacity to store OPV and prepare icepacks.
5. The net dry storage space requirement of the SVS is 445m³and the available space is 987 m³ and out of that 458m³is dedicated for available UIP supplies.

Table 6: Dry storage space at SVS

Store room	Total volume (m ³)	Net volume (m ³)	Available dedicated for UIP
Room 7	307	98	Yes
Room 10	586	188	
Room 13	518	166	
Room 14	549	176	
Transport room	1123	359	Yes
Total	3084	987	
Net available for UIP			458 m³

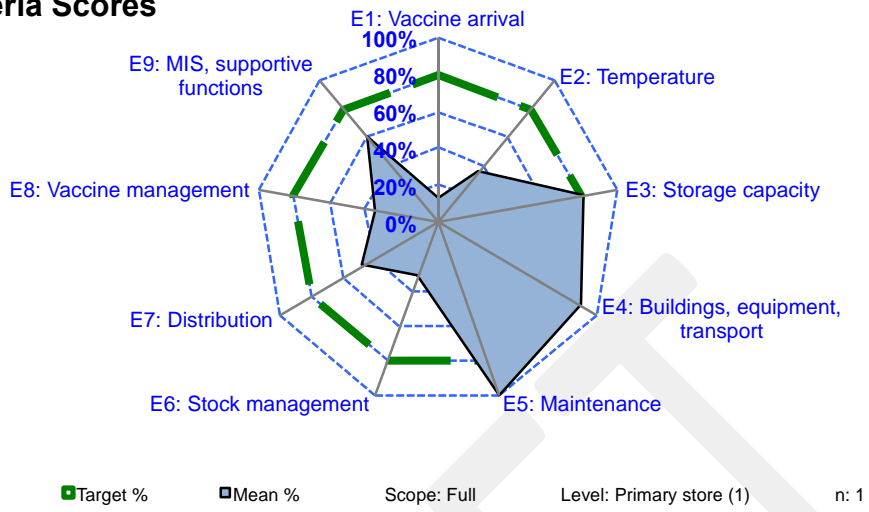
Table 7: Dry storage capacity requirement at SVS

Category	Type	Volume cm ³	Annual Quantity	Storage requirement for minimum quantity ⁷	Total volume m ³
Syringe	0.5 ml	60.6	2,63,72,414	65,93,103	400
Syringe	0.1 ml	35.9	18,18,787	4,54,697	16
Syringe	5 ml Disposable	57.2	10,04,230	2,51,057	14
Diluent	Diluent Measles	10.66	43,58,535	10,89,634	12
Diluent	Diluent BCG	0.93	32,77,094	8,19,274	1
Diluent	Diluent JE	10.66	5,68,161	1,42,040	2
Total volume needed					445m³

6. The documentation at SVS is less than adequate. The transaction records are maintained only on computer (excel based stock book) and key documentation that is required to be maintained for every lot of vaccine arrival is not maintained. The store does not prepare VAR for reporting vaccine arrival. However, lot release certificates were filed for all the 68 lots that were received during the review period. The copies of invoice, packaging list, airway bill are not maintained.
7. Temperature mapping of cold rooms (WIC's/WICs) is very essential for safe storage of the freeze sensitive vaccines. None of the four cold rooms of WIC at SVS are temperature mapped. The temperature sensors were also not calibrated in last two years, which doubles the risk of temperature dropping down to critical levels in cold spots of WICs without being noticed.

⁷based on quarterly requirement

Criteria Scores



Categories Scores

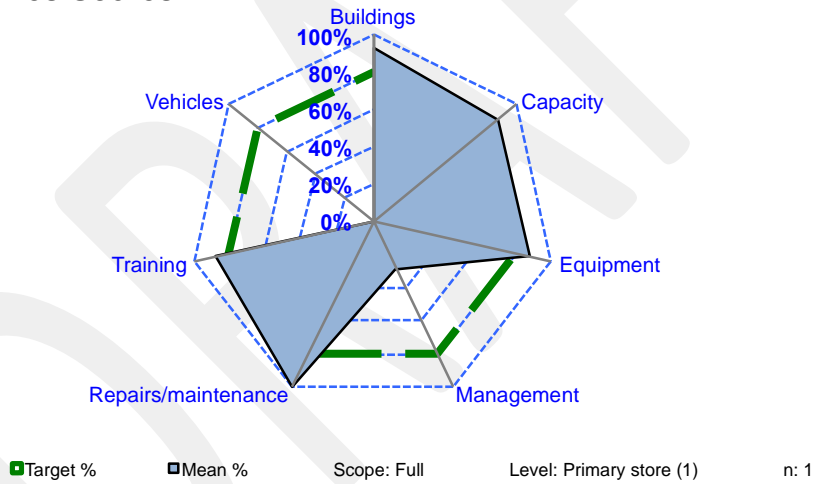


Figure 9: Assessment result (Criteria and category) of state vaccine store

5.3 Findings at district level

1. Despite the availability of thermometers for few refrigeration/freezing units, the temperature recording is not regular/ or erroneous or absent at Haora, Bardhaman, South 24 Parganas, Uttar Dinajpur, North 24 Parganas and Kolkata DVS. One of the ILR ILRs in UDP was found to be operating with temperature of -5.7 Deg C. Murshidabad DVS was using non-standard thermometer and recording was present even for those ILRs without thermometers. There were varying reasons of poor temperature monitoring across districts. Kolkata DVS has only one dedicated staff (with designation of Data Entry Operator) whereas Bardhaman, South and North 24 Parganas District stores demonstrated poor attitude. This is also an indicator of lack of supervision as evidenced by lack of documented supervisory visits to the stores.

Table 8: Means and methods of temperature monitoring

Bardhaman	Few units	Not done on weekends and Holidays	Not done	Contradictory
NPGNorth 24 Parganas	Few units	Not done	Not done	Contradictory
Kolkata	All units	No recording since May 2011	No WIC	-
Haora	All units	Not done	No WIC	Contradictory and erroneous (copied readings)
JLPJalpaiguri	All units	Irregular	No WIC	Contradictory
UDPUttar Dinajpur	All units	Not done daily	Not done	Contradictory
EMPPurba	All units	Not done on weekends and holidays	No WIC	Contradictory
Medinipur	All units	Not done	Not done	Contradictory
WMPPaschim Medinipur	All units	Not done	Not done	Contradictory
MSDMurshidabad	Few units		Not done	Erroneous
South 24 Parganas	Few units	No practice of temperature recording till Aug 2011	No WIC	Does not arise

Contradictory refers to situations where the temperature records conflicts with status of equipment (defrosting). Also includes no mention of defrosting in temperature log book.

2. Local orders have been placed by state to procure the thermometers which will be supplied to sites within three months. The responsibility of placing the thermometers at missing sites will be given to AMC firms and buffer stock will be maintained at district level.

3. The trace recorders of all the WICs in the state are not functional either due to shortage of trace papers or faulty trace recorders.
4. The alarm hooters are either not functional or disconnected from the WIC and WIFs in the state. This is primarily because the alarms are not configured correctly for not allowing the window period of vaccine loading/unloading of the vaccine in cold room. The alarms are programmed to set off at 8 or 10 Deg C without any time delay.
5. There is a shortage of manpower at Kolkata DVS. The entire responsibility of store is vested with one data manager as there are no cold chain handlers at store. This has badly impacted the performance of very well established, model store of Kolkata DVS, especially regarding temperature monitoring and stock management.
6. The WIC of Paschim Medinipur is located in separate building away from rest of DVS. The DFWS has been receiving notices to vacate the dilapidated premises of Medinipur Medical College housing the 20 years old WIC.
7. Some of the districts are provided with cold room to store non-UIP vaccine (specifically ARV). Referring to table below, the storage of UIP and Non UIP vaccine is not segregated.

Table 9: List of districts with WIC (UIP and non UIP)

District	Number of WIC for UIP vaccines	Number of WIC for Non UIP vaccines	UIP - Non UIP vaccine MIXED Stored
Bankura	1	1	Yes
Bardhaman	1	1	Yes
Birbhum	1	1	Yes
Coochbehar	1	1	Yes
Dakshin Dinajpur	1	1	Yes
Darjeeling	1	1	Yes
Purba Medinipur	-	1	-
Haora	-	1	-
Hugli	1	1	Yes
Jalpaigudi/Jalpaiguri	-	1	-
Kolkata	-	-	-
Malda	-	1	-
Murshidabad	1	1	Yes
Nadia	-	1	-
North 24 Parganas	1	1	Yes
Purulia	1	1	Yes
South 24 Parganas	-	1	-
Uttar Dinajpur	1	1	Yes

Paschim Medinipur	1	1	Yes
Total	12	18	

8. The cold room of Bardhaman DVS is not utilized as the vaccine is often stored in the non-UIP WIC. At Jalpaiguri and Purba Medinipur, vaccines are stored in non-UIP WIC of DRS as there is no WIC for storing UIP vaccines.
9. The WIC/WICs at Paschim Medinipur, Murshidabad, Dakshin Dinajpur, and Darjeeling are old (more than 20 years old) and need to be replaced.
10. There is a shortage of capacity at districts which are not provided with WIC for vaccine storage. Table below reflects the capacity analysis of sites visited. Among the districts of EMP, Haora, Kolkata and SPG where a WIC is required, the DVS of Kolkata and SPG do not have space to accommodate new WIC.
11. The DVS is located in split locations at NPG (divided into three stores about two kilometers apart), WMP (1 km apart) and UDP (8 kilometers apart). The storekeeper at UDP is placed in CMOH office and Deputy CMOH office in NPG.
12. The dry storage capacity of all the vaccine stores except SVS is inadequate due to no dedicated allocated space in the building. A separate building is being constructed at Haora DVS to resolve the dry storage and vaccine storage shortage (space constraints for required WIC is not prominently addressed). The DVS stores of MSD, EMP, JLP, NPG Murshidabad, Purba Medinipur, Jalpaiguri and North 24 Parganas have two rooms each allotted for dry storage but it is shared with DRS. This shortage of space for dry storage makes it difficult to manage inventory and follow principles like EEFO.
13. The DVS of WMP, MSD and EMP Paschim Medinipur, Murshidabad and Purba Medinipur have severe shortage of building space to the extent that the cold boxes and new ILRs/DFs and generator room lie in the open. This has a risk of damage to cold chain equipment and poses theft risk.
14. The calibration of thermostat and alarm sensors in WIC and WIF has not been done except for WIC of Murshidabad. This is because the AMC contract does not specifically mention annual calibration/replacement of faulty sensors.
15. ILRs and DFs were not leveled when installed at most districts except for DVS of MSD and Kolkata. At Kolkata DVS, the ILRs were installed on wooden crates as recommended and they were leveled.
16. Gaskets were not cleaned and hinges not lubricated at most districts except MSD and Kolkata. There is a lack of clarity regarding responsibilities of preventive maintenance between AMC agencies and cold chain handlers.
17. Defrosting of ILRs is irregular and undocumented at most of the districts.

18. The stock of diluents and corresponding vaccine was found to be mismatching at most the sites assessed. Table 11 shows the irregularity in stock quantities at all the sites assessed.

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Table 10: Computation of cold chain capacity at sites assessed

LIST OF VACCINE STORAGE POINTS	Annual birth* 2011	Maximum stock (months)	Net volume required for vaccines in +2°C to +8°C (litres)			Net volume OPV to kept at -20°C	Available cold chain capacity at		Required additional cold chain capacity ⁸ at	
			Scheduled vaccines	ARV, insulin, other vaccines etc	Total storage		+2°C to +8°C	-20°C	+2°C to +8°C	-20°C
Bagbazar SVS	16,38,547	4.0	29,112	2,911	32,023	2,731	35,840 ⁹	16,640 ⁹	- 3,817	13,909
Bardhaman DVSBardhaman DVS	1,24,018	3.8	2,933	733	3,666	258	11,650	1,128	- 7,984	- 870
<i>Bonnabagram BPHC</i>	3,173	1.3	27	3	30	0	135	144	- 105	- 144
<i>Srikhanda BPHC</i>	2,580	1.3	22	2	24	0	135	144	- 111	- 144
PurbaPurba Medinipur DVS	87,702	3.8	1,948	195	2,142	183	180	336	1,962	- 153
<i>Gangadharbar BPHC</i>	3,109	1.3	25	3	28	0	90	348	- 62	- 348
<i>Kaktia BPHC</i>	3,500	1.3	28	3	31	0	135	296	- 104	- 296
Haora DVS	73,049	3.8	1,727	173	1,900	152	261	752	1,639	- 600
<i>Jhumjumi BPHC</i>	3,322	1.3	28	3	31.3	0	135	144	- 104	- 144
<i>Kulai BPHC</i>	4,401	1.3	38	4	41.5	0	153	144	- 111	- 144
Jalpaiguri DVS	73,035	3.8	1,622	405	2,027	152	6,528	560	- 4,501	- 408
<i>Sulkapara BPHC</i>	2,907	1.3	24	2	26	0	90	72	- 64	- 72
<i>Mongalbari BPHC</i>	2,039	1.3	17	2	18	0	180	216	- 162	- 216
Kolkata DVS	88,736	3.8	1,971	197	2,168	185	585	797	1,583	- 612
<i>Borough V</i>	5,916	1.3	48	5	53	0	180	224	- 127	- 224
<i>Borough VI</i>	5,916	1.3	48	5	53	0	90	751	- 37	- 751
Murshidabad DVS	1,45,619	3.8	3,234	808	4,042	303	4,735	1,056	- 693	- 753
<i>Anupnagar BPHC</i>	11,614	1.3	94	9	103	0	135	224	- 32	- 224
<i>Hariharpur BPHC</i>	6,155	1.3	50	5	55	0	225	164	- 170	- 164
North 24 Parganas DVS	1,53,131	3.8	3,401	850	4,251	319	9,257	1,392	- 5,006	- 1,073
<i>Nanna BPHC</i>	2,348	1.3	19	2	21	0	45	72	- 24	- 72
<i>Sundurpur BPHC</i>	5,357	1.3	43	4	48	0	90	224	- 42	- 224
South 24 Parganas DVS	1,47,498	3.8	3,276	328	3,603	307	648	744	2,955	- 437
<i>Sarisha BPHC</i>	3,384	1.3	27.4	3	30	0	90	144	- 60	- 144
<i>Chanda Doulatabad BPHC</i>	3,355	1.3	27.2	3	30	0	90	144	- 60	- 144
Uttar Dinajpur DVS	71,620	3.8	1,591	398	1,988	149	4,891	860	- 2,903	- 711
<i>Islampur BPHC</i>	6,988	1.3	57	6	62	0	135	72	- 73	- 72
<i>Karandighi BPHC</i>	10,038	1.3	81	8	89	0	135	368	- 46	- 368
PaschimPaschim	1,05,560	3.8	2,496	250	2,746	220	5,465	528	- 2,719	- 308

⁸Negative numbers indicate excess of capacity to requirement and positive numbers reflects the shortage of capacity

⁹ Based on 32% of gross capacity

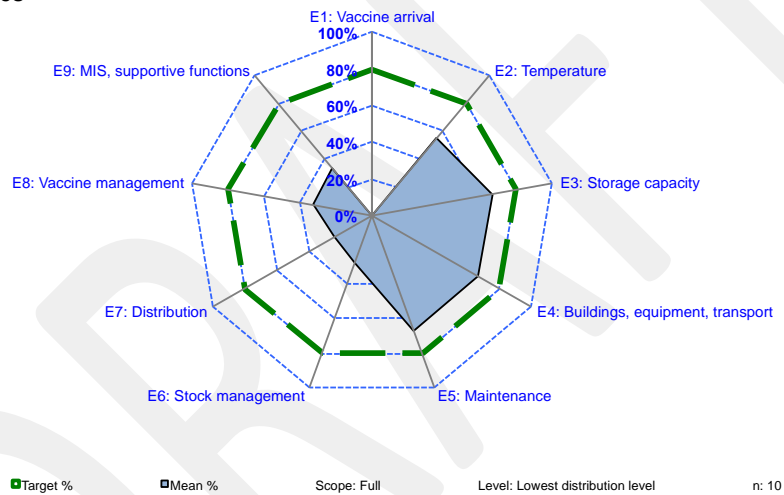
LIST OF VACCINE STORAGE POINTS	Annual birth* 2011	Maximum stock (months)	Net volume required for vaccines in +2°C to +8°C (litres)			Net volume OPV to kept at -20°C	Available cold chain capacity at		Required additional cold chain capacity ⁸ at	
			Scheduled vaccinesV accines	ARV, insulin, other vaccines etc	Total storageStora ge		+2°C to +8°C	-20°C	+2°C to +8°C	-20°C
Medinipur DVS										
<i>Keshiary BPHC</i>	2,472	1.3	21	2	23	0	45	144	- 22	- 144
<i>Changoal BPHC</i>	3,114	1.3	27	3	29	0	108	224	- 79	- 224

Table 11: Mismatch of stock between diluent and corresponding vaccine

Site name	Level	Name of selected vaccine	Stock of vaccine	Stock of diluent	Difference	% difference
<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F (E-D)</i>	<i>F/D</i>
Burdhhaman DVS	DVS	BCG	36000	43500	7500	21%
<i>Bonnambagam BPHC</i>	BPHC	BCG	1660	1420	-240	-14%
<i>SRICHANDA BPHC</i>	BPHC	Measles	150	150	0	0%
Haora DVS	DVS	Measles	540	5450	4910	909%
<i>Jhumjumi BPHC</i>	BPHC	Measles	60	590	530	883%
<i>Kulai BPHC</i>	BPHC	Measles	40	100	60	150%
Jalpaigudi DVS	DVS	Measles	17250	17700	450	3%
<i>Mongalbari BPHC</i>	BPHC	BCG	840	900	60	7%
Kolkata DVS	DVS	Measles	15250	18250	3000	20%
<i>Borough V (Kolkata District)</i>	BPHC	Measles	1785	1855	70	4%
<i>Borough VI</i>	BPHC	Measles	220	200	-20	-9%
Murshidabad DVS	DVS	Measles	31440	18200	-13240	-42%
<i>Hariharpur BPHC</i>	BPHC	BCG	1070	760	-310	-29%
<i>Anupnagar BPHC</i>	BPHC	BCG	380	490	110	29%
NPGNorth 24 Parganas	DVS	Measles	2000	15500	13500	675%
<i>Nanna BPHC</i>	BPHC	BCG	460	140	-320	-70%
<i>Sundurpur BPHC</i>	BPHC	Measles	750	0	-750	-100%
Paschim Medinipur	DVS	Measles	12750	12750	0	0%
<i>Changol BPHC</i>	BPHC	BCG	1550	2120	570	37%
<i>Keshiary BPHC</i>	BPHC	BCG	970	1140	170	18%
Purba Medinipur	DVS	Measles	3875	22250	18375	474%
<i>Gangadarbhar BPHC</i>	BPHC	Measles	1065	1135	70	7%

<i>Kaktia BPHC</i>	BPHC	Measles	440	600	160	36%
SPGSouth 24 Parganas	DVS	BCG	74160	79120	4960	7%
<i>Chanda Doulatabad BPHC</i>	BPHC	Measles	140	165	25	18%
<i>Sarisha BPHC</i>	BPHC	BCG	1220	1990	770	63%
Uttar Dinajpur	DVS	BCG	36000	36000	0	0%
<i>Karandighi BPHC</i>	BPHC	Measles	2380	2775	395	17%
<i>Islampur BPHC</i>	BPHC	BCG	780	1190	410	53%
SVS	SVS	Measles	379750	429750	50000	13%

Criteria Scores



Categories Scores

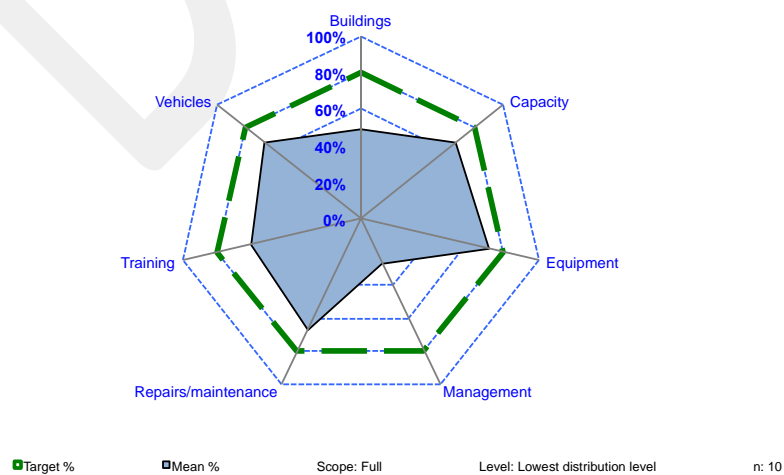
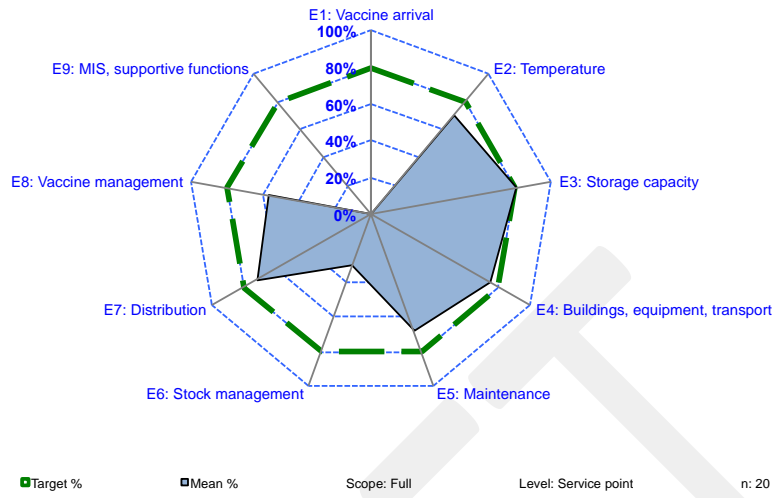


Figure 10: Consolidated assessment result of district level

Criteria Scores



Categories Scores

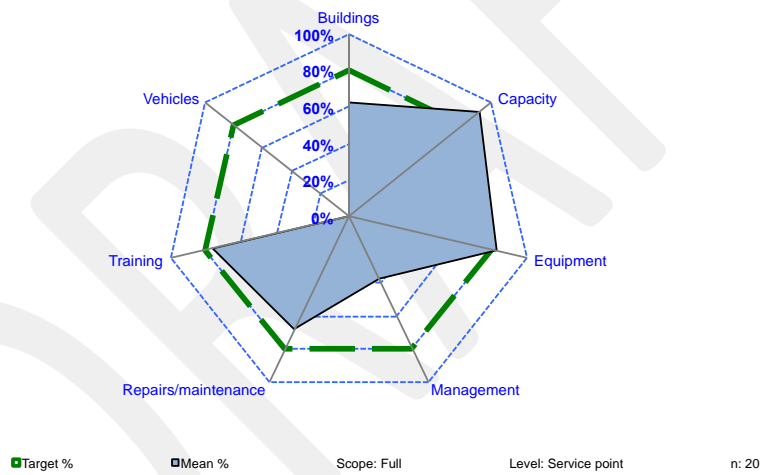


Figure 11: Consolidated assessment result of block level

5.4 Norms and practices

Following norms and respective practices were observed during the assessment, which have been compiled in tabular format as table 12.

Table 12: Norms and practices followed in the state

Activity	Principle and practice	Levels	Recording format	Reporting /Review	Recording frequency	Reporting frequency
Manual temperature monitoring	In principle	All levels	Standardized printed booklet	Supervisor countersign the log sheets	Twice daily	Weekly
	<i>In practice:</i>	<i>All levels</i>	<i>Loose sheets used</i>	<i>No documented temperature reviews and irregular Supervision</i>	<i>Irregular (especially not happening during weekends and holidays)</i>	<i>Non-existent</i>
24x7 monitoring of WIC/WIF	In Principle:	All WIC and WIF in state	24x7 temperature trace plotter	Weekly filing, review by supervisor	Hourly	Weekly
	<i>In Practice:</i>		<i>Trace recorders not functioning</i>	<i>No documentation</i>	<i>None</i>	<i>None</i>
Computerized temperature monitoring round the clock	In Principle:	All WIC and WIF at SVS	Data in soft files on centralized server computer	Graphs, summary reports, online	Hourly	Weekly
	<i>In Practice:</i>	<i>1 WIC and 1 WIF not connected</i>	<i>Routine recording</i>	<i>Graphs & reports not printed and Not reviewed</i>	<i>Hourly</i>	<i>None</i>
Equipment breakdown reporting	In Principle:	All levels	No standard format for reporting failure	Directly reported to AMC firm	Within 24 hours of breakdown	Attend within 72 hours of reporting
	<i>In Practice:</i>	<i>All levels</i>	<i>reporting happening over phone only</i>		<i>Not Happening within 24 hours</i>	<i>Delay in attending and repairing equipment (sometimes over 30 days)</i>
Stock books	In Principle:	All levels	No standard record book except for Kolkata DVS	No standard vaccine arrival and distribution reports	Within 24 hours of transaction	Monthly
	<i>In Practice:</i>	<i>All levels</i>	<i>Registers are used with many vital columns missing</i>	<i>Distribution report not prepared</i>	<i>Stock books not updated. At SVS and Kolkata DVS: Stock</i>	<i>None</i>

Indent forms	In Principle:	All levels except SVS	<i>Standard record books used only at Kolkata DVS</i> Standard indent forms	Prepare for every vaccine requirement (pull mechanism)	<i>transactions updated in excel sheets</i> For every shipment	Monthly
	<i>In Practice:</i>	<i>Practiced at few levels</i>	<i>No indent form used (Push mechanism at Hoara DVS)</i>	<i>Generally prepared</i>	<i>For every shipment</i>	<i>As and when needed (sometimes twice a month)</i>
Coverage reporting	In Principle:	Health facility (reporting) District (Consolidation)	NRHM Return formats	Monthly coverage analysis by DMCHO	Weekly	Monthly
	<i>In Practice:</i>	<i>District level consolidation happening</i>	<i>All formats used</i>	<i>Analysis not done regularly; discussion in monthly meeting is not done regularly</i>	<i>Never done weekly</i>	<i>Monthly through HMIS</i>

5.5 Summary of assessment (scores of EVM)

Criteria	SVS level	DVS level	Block level
Vaccine arrival procedures	13%	Not applicable	
Vaccine Arrival Report (VAR) form	<i>Not maintained</i>		
Lot release certificate	<i>Copy maintained</i>		
Procedures for checking and receiving	<i>Not satisfactory</i>		
Temperature maintenance	35%	55%	80%
Temperature monitoring study	<i>Not done in past 5 years</i>		
Temperature mapping of cold rooms	<i>Not done in past 5 years</i>		<i>Not applicable</i>
Knowledge of storage temperature range of vaccines	<i>Adequate</i>	<i>Good except Haora, Paschim Medinipur and JalpaigudiJalpaiguri</i>	<i>Good except Boro V and Boro VI</i>
Knowledge of damage to vaccine by freezing	<i>Adequate</i>		<i>Good except for Boro VI and Changoal BPHC</i>
Formal review of temperature records and excursions and remedial actions	<i>Not done</i>	<i>Not done effectively in most districts</i>	<i>Not done effectively in most PHC</i>
24x7 temperature monitoring system in place for WIC/WIF	<i>Trace recorders are not working but fitted with computerized monitoring system</i>	<i>Trace recorders not working</i>	<i>Not applicable</i>
Storage capacity	81%	67%	80%
Net storage capacity of vaccine storage (2 to 8 Deg C) for RI	<i>Adequate with 4 WICs</i>	<i>Lacks cold room at Nadia, Purba Medinipur, Japlaiguri, South 24 Parganas, Haora and Kolkata</i>	<i>Adequate</i>
Dry storage space	<i>Adequate</i>	<i>Shortage at most DVS</i>	<i>Shortage at most PHCs</i>
Storage capacity of vehicles during transportation	<i>No vehicle available</i>	<i>Sufficient except for no vehicles at Kolkata, JalpaigudiJalpaiguri, Uttar Dinajpur, Birbhum and CoochbiharCoochbehar</i>	<i>Not needed</i>
Freezing capacity to prepare ice packs	<i>Adequate with 2 WIF and 4 DFs</i>	<i>Sufficient except for JalpaigudiJalpaiguri, NPG and Purba Medinipur</i>	<i>Sufficient except for Islampur BPHC</i>
Sufficient cold boxes	<i>None</i>	<i>Sufficient except NPG, SPG, Purba Medinipur and Murshidabad</i>	<i>Sufficient except Nanna, Sundurpur, Anupnagar and Hariharpur BPHC</i>
Standard SOP setting contingency plan	<i>Inadequate (Emergency contacts available)</i>	<i>Acceptable only at Kolkata, BardhhannBardhaman, NPG and Murshidabad</i>	<i>Poor</i>
Building, Equipment	91%	67%	76%

and transport

Vehicle easy access to store and store secure	Yes	Mostly	Mostly
Quality of vaccine store building	Good	Lacks basic standards at most of the DVS (Score :49%)	Lacks few standards (Fire extinguishers, drainage) Score: 62%
Adequate space for packing Store keeper office large enough and close to packing area	Adequate Yes	Not critical Not applicable	
WIC/WIF comply with minimum standards	Comply except for inadequate shelving	Comply except for temperature trace recorder not functioning and inadequate shelving	Not applicable
Refrigerators and freezers comply with minimum standards	No refrigerators. Deep freezers temporarily installed belonging to Kolkata DVS, they comply	Deep freezers locally procured do not qualify PQS at Kolkata DVS. No Fridge-tag used. No baskets at most of the sites	No Fridge-Tag used.
Standby generator commissioned at site	Yes	Available at all except SPG and Haora	Not required
Generator operational, with required capacity and sufficient fuel	Yes	Shortage fuel supply at JalpaigudiJalpaiguri, NPG, Uttar Dinajpur and Murshidabad. Murshidabad generator has low capacity (cannot start all equipment)	Not required
Reliable and sufficient transport facilities	No vehicle. Vaccine picked by districts in their own vehicle. Transportation of arrived vaccine from airport in hired vehicle	no vehicles at Kolkata, JalpaigudiJalpaiguri, Uttar Dinajpur, Birbhum and CoochbiharCoochbehar	Not required
Maintenance	100%	67%	68%
Planned preventive maintenance	Maintenance well followed	Preventive maintenance not done generally. No clarity of roles between outsourced company and cold chain handlers	
Sickness rate of equipment	0% sickness rate	Evaluated sickness rate 4%	
Stock management	31%	27%	30%
Standard stock book format used (including all necessary columns for recording)	No. Though there is a column for recording information like Batch number, expiry date, vaccine name and it is followed generally, there are no columns for recording Freeze status/ VVM status, manufacturer name and vaccine vial size. Quantity is often recorded in doses but also seen in vials at various places.	Only at Kolkata DVS	No
All stock transactions recorded and updated at the end of the day	Electronic stock book well maintained. Physical stock book not updated.	Stock books not updated at Kolkata, BDM, WMP, SPG, UDP and Murshidabad	Not updated at 11 of 20 sites visited
DiluentDiluents information recorded	With the exception of Kolkata DVS and two blocks of Mongalbari and Nanna BPHC, diluents are not recorded anywhere.		
Documentation: Issue vouchers maintained and	Issue vouchers not maintained.	Not critical	

correctly used			
Safely dispose of damaged or expired vaccine in accordance with standing orders	<i>Staff not aware of procedure for safe disposal. . No system to record and report damages</i>		
Internal reviews of vaccine loss/damages	<i>None, except at KakatiaKaktia BPHC.</i>		
Establish stock levels (Maximum, reorder and safety stock)	<i>Stock levels not set at any level</i>		
No stock outs of any vaccine	<i>There were stock outs of at least one vaccine at all levels during past one year</i>		
Physical inventory of vaccine (counting and reconciliation at least once in 3 months)	<i>Physical counting of vaccine done regularly</i>	<i>Not done at any district</i>	<i>Physical counting done only at 20% of blocks</i>
Physical stock of vaccine and diluent/diluents matches the recorded stock in stock book	<i>Diluent Diluents stock found to be in excess of vaccine at most of the sites (75% of sites assessed. Diluents are not recorded in stock book.</i>		
	<i>Vaccine physical stock and book balance match</i>	<i>Vaccine physical stock and book balance match only at 3 of 10 districts</i>	<i>Vaccine physical stock and book balance match only at 30% sites</i>
Store all vaccine, diluents and droppers securely and correctly in the vaccine store	<i>Vaccine not stored in shelves (also stacked on floor)</i>	<i>Stored safely at 4 of 10 districts</i>	<i>60% of sites stored correctly</i>
Distribution	47%	24%	73%
Maintain a program for distribution of vaccine from issuing store to each receiving store	<i>SVS do not have any distribution plan</i>	<i>Only Kolkata DVS has a planned distribution schedule with quantity listed</i>	<i>None</i>
Conditioning of ice packs during transportation	<i>Yes, but only the standard ice packs</i>	<i>Conditioning done only at Kolkata, Purba Medinipur and Murshidabad DVS</i>	<i>Conditioning followed at 80% sites but packing of vaccine carrier/cold box not done in accordance.</i>
Only standard (GOI supplied) ice packs used for transportation of vaccine?	<i>Gel packs are used often in cold boxes that cannot be conditioned</i>		
Contingency planning during transportation (emergency contact points, contact numbers with drivers)	<i>There is no contingency plan during transportation. Drivers (from districts) are well updated with mobile contact numbers</i>	<i>Not applicable</i>	
Vaccine management	34%	33%	57%
Health workers correctly use the shake test when needed	<i>The frontline staff did not know the correct procedure of conducting shake test</i>	<i>The frontline staff at Kolkata, BurdhamanBardhaman and JalpaigudiJalpaiguri DVS could demonstrate the correct procedure and implementation methodology</i>	<i>Only 15% of staff knows the correct methodology. Vaccine is generally discarded on any suspicion.</i>
Health workers know how to read, interpret and use VVM	<i>Yes, at all the levels</i>		
Health workers always use diluent/diluents and vaccine from same manufacturer and with matching presentations	<i>Not applicable</i>		<i>Only 40% of sites do.</i>
Diluent/Diluents always kept in cold chain before and during immunization	<i>Not applicable</i>		<i>Yes, at all the sites</i>

session?			
Open vials of freeze dried vaccine discarded within 4 hrs	<i>Not applicable</i>		<i>Yes except at Boro VI.</i>
Correct wastage rates are used for estimation	<i>National wastage rates are used for estimation. Wastage data neither recorded nor reported.</i>		
Facility receive regular supervision	<i>Negligible</i>		
MIS, supportive functions	60%	34%	0%
Use an evidence based method to forecast the need for vaccines and consumables	<i>Census data is used for estimation</i>		<i>Session planning not taken into consideration for estimation. Vaccine is supplied through push mechanism</i>
State level cold chain inventory available and updated	<i>Available but no mechanism of updating</i>	<i>Not applicable</i>	
All contracted and outsourced services (transport, maintenance) have effective and enforceable contract and service response is acceptable	<i>Equipment maintenance contract does not cover elements of preventive maintenance</i>		<i>Not applicable</i>

5.6 Good practices

1. The copy of lot release certificates of every lot received by state was maintained at SVS.
2. The standardized stock book format was used at Kolkata DVS.
3. The logistics at block level is better managed as the BPHN are given the responsibility of cold chain handlers.
4. The Kolkata district vaccine store emerged as one of the good stores of the state and can be referred to as model store for other districts.
5. The temperature readings of WICs and WIFs at SVS are routinely recorded on computer through computerized temperature monitoring system. This documents the evidence of temperature maintenance at SVS.
6. Knowledge of storage temperature range of vaccine and damage to vaccine by freezing was good at most of the sites assessed with few exceptions.

5.7 Areas needing attention

1. All the districts require a WIC each to store UIP vaccine, however only few districts are provided with WIC for UIP program.
2. The segregated storage of UIP and Non UIP vaccine is not followed at district stores. Few districts have been provided separate WICs for Non-UIP and UIP vaccines; however, despite having dual units of WICs, they continue to store both UIP and Non-UIP vaccines in the same WIC..
3. Though equipment breakdown is well attended in most of the districts, with one exception, the preventive maintenance of CCE is poorly managed.

4. Key management issues which need attention are involvement of nodal officers of districts and blocks in managing vaccine logistics, human resources, distribution plan of vaccines and related supplies.
5. There is no dedicated storage space for diluents and immunization related supplies.
6. Temperature monitoring is not done on regular basis. Temperature records are not reviewed.
7. Documentation is poor at district level and has to be improved (including use of standardized stock/indent books temperature monitoring record book and timely update of these books).

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6. Recommendations Global EVM criteria wise

Criteria 2: Vaccine-storage temperatures

1. Ensure availability and calibration of all temperature monitoring devices (thermometers/trace recorders for WIC, ILRs, Fridge-Tag & Freeze-Tags at all CC points).
2. Regular recording of temperature, maintenance of records & review of temperature at least once a month should be carried out for each equipment at all CC points.
3. Temperature monitoring study in the State - In the context that frozen ice packs are used for transport of vaccines with evidently poor conditioning practices, absence of freeze indicators for transportation and storage and poor quality temperature monitoring at different tiers, the in-depth analysis of temperature maintenance may be carried out through a temperature monitoring study.
4. With the presence and additional need of WICs, in every District of the State, WIC temperature mapping should be carried out and documented to assure safe storage of vaccines.

Criteria 3: Cold-storage capacity

5. The shortage of storage capacity at seven districts of Kolkata, Haora, Jalpaiguri, EMPPurba Medinipur, Nadia, Malda and SPGSouth 24 Parganas should be addressed by providing the new WIC of minimum size of 40 m³ each. Replace the non-functioning or more than 20 years old WIC at WMP, MSD, DDPPaschim Medinipur, Murshidabad, Dakshin Dinajpur and Darjeeling. The additional WIC should be within the close proximity of DVS.
6. Dedicated available Dry Storage Space should be organized by providing marked shelves for storing UIP supplies at all levels. This shall enhance implementation of EEFO in the dry storage also.

Criteria 4: Buildings, cold-chain equipment and transport

7. For timely receipt and distribution of vaccines and minimizing the risk of damage during transportation (by contracting non-standard vehicles), insulated vaccine vans should be provided at SVS, Uttar Dinajpur, Jalpaiguri and Kolkata.
8. All DVS should be functioning with CC units, adequate dry storage space, packing areas and other standards based on national guidelineguidelines for DVS. Dry store space for UIP should be earmarked in a secured area at every CC point.
9. Implement fire prevention mechanism like water sprinklers and fire extinguishers in cold chain storage and dry storage areaareas of SVS and DVSs.

Criteria 5: Maintenance of cold-chain equipment and transport

10. The sickness rate of cold chain equipment in the state should be less than 2% as per GOI guidelines. The response time of maintenance agencies, repair and maintenance operations should be reviewed for payment & continuation of AMC. Review of downtime should alert the program managers.
11. The Terms of reference (TOR) for repair & maintenance of CC equipments in the state should include the activities related to preventive maintenance such as leveling of ILR/DF, calibration of temperature sensors and maintenance of hinges & gaskets of ILRs/DFs.
12. Based on assessment findings and national guidelines, West Bengal should have cold chain technician in each district so that cold chain equipment performance is good/optimized at the sub district level. The technician can also work as a member of district immunization team.

Criteria 6: Stock management

13. Vaccine Storage strictly should be as per GoI guidelines at all CC points.-
14. Plan & optimize the supply of vaccines at health facilities to ensure coverage of birth doses at various levels, to reduce vaccine wastage & to prevent of AEFI. With inception of open vial policy of for OPV/Hep-B for institutional deliveries, quality assurance must be of highest importance/standards for vaccine safety.
15. The stock control system should be in place (preferably computerized) including the practices of updating/maintaining the UIP supplies transactions, maintaining stock levels and optimizing distribution of supplies.

Criteria 7: Distribution

16. The standard conditioned ice-packs (0.4 L) should be used for transportation of vaccine and at session sites using cold boxes and vaccine carriers.
17. The optimized annual distribution plan for vaccines, diluents & consumables should be prepared by SEPIO and shared with SVS & disseminated to districts for sufficient & timely delivery/collection of UIP supplies.

Criteria 8: Vaccine Management Policies

18. The storage of NON-UIP supplies that needs cold storage should be stored separately from UIP vaccines.
19. Quality Assurance of freeze sensitive vaccines should be supported by documented shake test for every instance of suspected freezing at SVS, District and Block CC points.

Criteria 9: Management Information System and supportive functions

20. Print & disseminate all standard formats as per GoI guidelines for recording & reporting of temperatures, stock management, issue & indent registers & vouchers.

21. Supportive supervision should be strengthened through a supervisory plan, checklist and documentation in the inspection book available at CC point/ Service delivery point. Reports of monthly supportive supervisions should be reviewed to identify problems & outcomes.
22. V & L manager is required to improve planning, distribution, monitoring, supervision and documentation at SVS and to coordinate between State Officials, SVS and DVS.

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State Vaccine Store specific recommendations

Criteria 1: Vaccine-arrival procedures

1. Vaccine arrival report should be used for recording and reporting the vaccine arrival from manufacturer.
2. Manufacturer, SEPIO & Immunization Division (MOHFW) should receive VAR within three days of arrival of vaccines.

Criteria 2: Vaccine-storage temperatures

3. Computerized centralized continuous temperature monitoring system at State Store should be extended to monitor all Cold Rooms at SVS specially newly installed WIC and WIF.
4. In addition to the online temperature monitoring and twice daily manual temperature recording of Cold Rooms, formal and documented temperature reviews should be carried out at least once a month by State CCO.
5. Contingency plan & emergency contacts should be reviewed &, updated annually; should be and displayed at the SVS. Plan should be rehearsed at least once in every six months.

Criteria 4: Building, equipment and transport

6. The accountability and safety of vaccines on 24 x7 basis, operation and maintenance of UIP related equipment and storage should be entrusted to Store Keeper of SVS. This includes access to store building round the clock.

Criteria 6: Stock management

7. The standardized manual stock ledgers should be maintained at SVS (for at least 3 years) & updated within 24 hours of every receipt and issue of vaccine, diluents, syringes, droppers, hub cutters and other immunization related supplies.
8. At SVS, every transaction of receipt & issue of UIP supplies should be recorded including key information of manufacturer details, vial presentation, batch no, expiry date, quantity in doses (including loss/damage) and VVM/FREEZE indicator status.
9. The daily balance in SVS of V&L should be displayed on a tabulated board and preferably indicating the lot and quantity of vaccine and diluents lot expiring earliest or vaccines with aged VVM status to help prioritizing prioritisation of distribution, prevention of stock out and maintaining Maximum maintenance of maximum and minimum stock.

Criteria 7: Distribution

10. The monthly distribution report at SVS should be submitted to SEPIO quoting the planned/actual quantity of receipt & issue (short shipments and excess supply), timeliness and damage/loss if any during storage or transportation.

Appendix I: Immunization Schedule of West Bengal

Vaccine	When to give	Dose
<i>For Pregnant Women</i>		
TT-1	Early in pregnancy	0.5 ml
TT-2	4 weeks after TT-1	0.5 ml
TT- Booster	If pregnancy occurs within three yrs after last TT vaccination	0.5 ml
<i>For Infants</i>		
BCG	At birth or along with DPT-1	0.1ml (0.05ml for infant up to 1month)
OPV-0	At birth or within 15 days after birth	2 drops
OPV 1, 2 & 3	At 6 weeks, 10 weeks & 14 weeks	2 drops
DPT 1, 2 & 3	At 6 weeks 10 weeks & 14 weeks	0.5 ml
Hep B 0,1, 2 & 3	At birth, 6 weeks, 10 weeks & 14 weeks	0.5 ml
Measles 1 & 2	At 9-12 months & 16-24 months	0.5 ml
<i>For Children</i>		
DPT booster	16-24 months 5-6 years	0.5 ml
OPV Booster	16-24 months	2 drops
TT	10 years & 16 years	0.5 ml

Appendix II: Participants attended the EVM training

List of participants attended EVM training held from 6th to 10th September 2011 at Hotel Hindustan International, Kolkata.

S. No.	Districts	Name	Designation
1	Swasthya Bhawan	Dr. P.S. Chaudhuri	ADHS-EPI
2	Swasthya Bhawan	Dr. Adhip Ghosh	ADHS (Training)
3	Swasthya Bhawan	Amalesh Biswas	State Cold Chain Officer
4	Swasthya Bhawan	Koushik Paul	DAM,WBSRTH
5	Unicef-Kolkata	Dr. Kaninika Mitra	Health & HIV Specialist Unicef
6	Unicef-Kolkata	Santhi Krishna	Consultant
7	Unicef-Kolkata	Dr. Prabir Chatterjee	Consultant
8	Unicef, Jharkhand	Vivek Mudgal	State Cold Chain Consultant
9	Unicef – Delhi	Ranjit Dhiman	Consultant, Cold Chain & VM
10	Unicef – Delhi	Dr. Srihari Dutta	Immunization Specialist
11	MOHFW	Paritosh Panigrahi	Consultant, Immunization (V&LM)
12	Medical College Kolkata	Dr. Pankaj Kr. Mandal	Associate Professor
13	Medical College Kolkata	Dr. Jhuma Sarkar	Assistant Professor
14	Medical College Kolkata	Dr. Nirmalya Manna	Assistant Professor
15	Medical College Kolkata	Dr. Amal Kr.Sinha Roy	Assistant Professor
16	Medical College Kolkata	Dr. Debadatta Chakrabarty	Assistant Professor
17	Medical College Kolkata	Dr. Pramit Ghosh	Assistant Professor
18	Bankura	Mihir Chaudhury	Store Keeper
19	Bardhaman	Manabendra Mukherjee	Store Keeper
20	CFWS, Bagbazar	David Murmu	Store Keeper
21	CFWS, West Bengal	Bimal Chakraborty	Administrative Officer
22	Cooch Behar	Abhishek Banerjee	Store Keeper
23	Jalpaiguri	Dr. Sandeep Kr. Paul	Dy. CMOH-III
24	Jalpaiguri	Smita Mitra	Pharmacist, Store In charge

S. No.	Districts	Name	Designation
25	North 24 Parganas	Dr. Rashochari Dutta	Dy. CMOH-III
26	Purba Medinipur	Dr. Tapan Kr. Das	Dy. CMOH-III
27	Paschim Medinipur	Dr. Mantu Maity	DMCHO
28	Paschim Medinipur	Sanjay Seth	WIC Store Keeper
29	Purulia	Sakti Pada Mondal	UDC, DFWB
30	South 24 Parganas	Dr. Tushar Acharyya	Dy. CMOH-III
31	Uttar Dinajpur	Gour Bandhu Chakraborty	WIC In-charge
32	WBSISC	Dr. Suresh Thakur	Project Manager
33	WBSISC	Sasanka Majumder	District Extender
34	WBSISC	Tapas Chatterjee	District Extender
35	WBSISC	Kaushik Kr. Bhandari	District Extender
36	WBSISC	Pritam Shaw	District Extender
37	WBSISC	Mir Rafikul	District Extender
38	WBSISC	Md. Mosaraf Hossain	District Extender

Appendix III: Participants attended EVM data consolidation workshop

List of participants at Workshop on EVM Data consolidation and Validation from 19th to 22nd September 2011 held at the office of Unicef – Kolkata.

S. No.	Districts	Name	Designation
1	Medical College Kolkata	Dr. Pankaj Kr. Mandal	Associate Professor
2	Medical College Kolkata	Dr. Pramit Ghosh	Assistant Professor
3	Swasthya Bhawan	Dr. Adhip Ghosh	ADHS (Training)
4	Swasthya Bhawan	Amalesh Biswas	State Cold Chain Officer
5	Swasthya Bhawan	Koushik Paul	DAM,WBSRTH
6	Unicef	Ranjit Dhiman	Consultant, Cold Chain & VM
7	Unicef	Dr. Kaninika Mitra	Health & HIV Specialist Unicef
8	WBSISC	Dr. Suresh Thakur	Project Manager
9	WBSISC	Mir Rafikul	District Extender
10	WBSISC	Md. Mosaraf Hossain	District Extender
11	WBSISC	Pritam Shaw	District Extender
12	WBSISC	Sasanka Majumder	District Extender
13	WBSISC	Tapas Chatterjee	District Extender

Appendix IV: Participants attended meeting on analysis of result and recommendation formulation

List of participants at meeting for Analysis of results and preparation of Recommendations of EVM Assessment held on 28th to 29th September 2011at Hotel Sonnet, Kolkata

S. No.	Districts	Name	Designation
1	Swasthya Bhawan	Dr. P.S. Chaudhuri	ADHS(EPI)
2	Swasthya Bhawan	Dr. Adhip Ghosh	ADHS(Training)
3	Swasthya Bhawan	Amalesh Biswas	State Cold Chain Officer
4	Swasthya Bhawan	Koushik Paul	DAM,WBSRTH
5	Unicef	Ranjit Dhiman	Consultant, Cold Chain & VM
6	Unicef	Dr. Srihari Dutta	Immunization Specialist
7	Unicef	Dr. Kaninika Mitra	Health &HIV Specialist Unicef
8	Unicef	Santhi Krishnan	Consultant
9	Medical College Kolkata	Dr. Pankaj Kr.Mandal	Associate Professor
10	Medical College Kolkata	Dr. Pramit Ghosh	Assistant Professor
11	Kolkata	Dr. Sukumar Dey	DFWO
12	Haora	Khusi Banerjee	DPHNO
13	Murshidabad	Dr.Tapas Kr. Roy	Dy. CMOH-III
14	Paschim Medinipur	Dr. Mantu Maity	DMCHO
15	Purba Medinipur	Arati Mondal	DPHNO
16	Purba Medinipur	Dr. S. Kirtania	DMCHO
17	South 24 Parganas	Dr. Tushar Acharyya	Dy. CMOH-III
18	WBSISC	Dr. Suresh Thakur	Project Manager
19	WBSISC	Mir Rafikul	District Extender
20	WBSISC	Md. Mosaraf Hossain	District Extender
21	WBSISC	Kaushik Kr. Bhandari	District Extender
22	WBSISC	Pritam Shaw	District Extender

S. No.	Districts	Name	Designation
23	WBSISC	Sasanka Majumder	District Extender
24	WBSISC	Tapas Chatterjee	District Extender
25	WBSISC	Sandip Paul	District Extender
26	WBSISC	Motieur Rahaman Shaikh	District Extender
27	WBSISC	Md. Samaun Hoque	District Extender
28	WBSISC	Samir Roy	District Extender

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Appendix V: Participants attended the debriefing meeting

List of participants at EVM Assessment Debriefing meeting held on 9th November 2011 at CII-Suresh Neotia Centre of Excellence for Leadership, Kolkata.

S. No.	Districts	Name	Designation
1	Swasthya Bhawan	Dilip Ghosh	MD-NRHM, Commissioner(FW) & Secretary, Dept. of H&FW, GoWB
22		Dr. J. Chaki	State Family Welfare Officer & Addl. DHS, GoWB
33		Dr. P.S. Chaudhuri	ADHS (EPI)
4		Dr. Adhip Ghosh	ADHS(Training)
5		Amalesh Biswas	State Cold Chain Officer
6		Dr. P. Bhattacharya	SFWB
7		Koushik Paul	DAM, WBSRTH
8		Jayanta Das	WBSRTH
9	UNICEF/UNICEF	Lori Calvo	State Representative, WB
10		Ranjit Dhiman	Cold Chain Consultant
11		Dr. Srihari Dutta	Immunization Specialist
12		Dr. Kaninika Mitra	Health & HIV Specialist Unicef
13		Dr. Prabir Chatterjee	Consultant
14		Santhi Krishnan	Consultant
15	WHO-NPSP	Dr. N.K. Mitra	SRTL-WB
17	Medical College Kolkata	Dr. Pankaj Kr.Mandal	Associate Professor
18		Dr. Pramit Ghosh	Assistant Professor
19	Bankura	Dr. Kartick Chandra Mondal	DMCHO
20	Bankura	Dr. B.C.Mondal	Dy. CMOH-III
21	Birbhum	Dr. G.D.Patra	Dy. CMOH-III
22	Bardhaman	Dr. Subhas Chandra Ghosh	DMCHO

S. No.	Districts	Name	Designation
23	CFWS, West Bengal	Bimal Chakraborty	Administrative Officer
24	Cooch Behar	Dr. Manik Lal Das	CMOH
25	Dakshin Dinajpur	Dr. P.K.Barai	DMCHO
26	Dakshin Dinajpur	Dr. A.K.Mondal	CMOH
27	Darjeeling	Dr. Bijay Prasad Mukhopadhyay	DMCHO
28	Kolkata	Dr. Sukumar Dey	DFWO
29	Kolkata	Dr. Dipankar Das	CMHO, KMC
30	Hooghly	Dr. J. Barman	DMCHO
31	Hooghly	Dr. Unmesh Basu	CMOH
32	Haora	Dr. Prabha Bhakta	DMCHO
33	Haora	K. Banerjee	DPHNO
34	Jalpaiguri	Dr. V.K.Sandip Kr Paul	Dy.CMOH-III
35	Malda	Namita Biswas	DPHNO
36	Murshidabad	Dr. Syed S. Siraj	CMOH
37	Nadia	Dr. (Mrs.) Bhabani Das	Dy.CMOH-III
38	Nadia	Dr. Amit Kumar Halder	CMOH
39	North24Paraganas	Dr. R.B.Dutta	Dy.CMOH-III
40	North24Parganas	Dr. Sukanta Seal	CMOH
41	Paschim Medinipur	Dr. Mantu Maity	DMCHO
42	Paschim Medinipur	Dr. Sabitendra Patra	CMOH
43	Purba Medinipur	Dr. Sukumar Das	CMOH
44	Purba Medinipur	Dr. Tapan Kumar Das	Dy.CMOH-III
45	Purulia	Dr. A. Rahaman	DMCHO
46	South 24 Parganas	Dr. Sikha Adhikari	CMOH
47	South 24 Parganas	Dr. Tushar Acharyya	Dy.CMOH-III
48	Uttar Dinajpur	Dr. Ajay Kumar Chakraborty	Dy.CMOH-II & III

S. No.	Districts	Name	Designation
49	WBSISC	Dr. Suresh Thakur	Project Manager
50	WBSISC	Mir Rafikul	District Extender
51	WBSISC	Md. Mosaraf Hossain	District Extender
52	WBSISC	Kaushik Kr.Bhandari	District Extender
53	WBSISC	Pritam Shaw	District Extender
54	WBSISC	Sasanka Majumder	District Extender
55	WBSISC	Tapas Chatterjee	District Extender
56	WBSISC	Sandip Paul	District Extender
57	WBSISC	Motiur Rahaman Shaikh	District Extender
58	WBSISC	Md. Samaun Hoque	District Extender
59	WBSISC	Samir Roy	District Extender
60	WBSISC	Pradipta Kumar Saha	Admin & Data Manager

Appendix VI: Members of EVM assessment facilitation and assessment team and sites visited by teams

A-Facilitation & report writing team		
Facilitators	Dr. Srihari Dutta, Health specialist	UNICEF
	Mr. Ranjit Dhiman, Cold chain consultant	
s	. , ProgramProject Manager	WBSISC
	. Amlesh Amalesh s, Cold Chain Officer	State Government

B- - Assessment teams

1	1	Dr Adhip Ghosh, ADHS (Team leader)	State
22		Mr Sasanka Majumdar	WBSISC
33		Mr David Murmu	State
4	2	Mr AmleshAmalesh Biswas, CCO	State
55		Mr Kaushik Bhandari	WBSISC
66		Mr Manab MukherjeeMr Mosaraf	WBSISC
7	3	Dr Pankaj Mondal, Asso. Prof (Team	CMCH
88		Mr Tapas Chatterjee	WBSISC
99		Mr Sanjoy Seth	State
10	4	Dr Pramit Ghosh (Team leader)	WBSISC
1111		Mr Mir Rafikul	WBSISC
1212		Mr Abhishek Banerjee	State
13	5	Dr Suresh Thakur (Team leader)	WBSISC
1414		Mr Pritam Shaw	WBSISC
15		Mr Mosaraf Hossain	

Sites visited by teams

Team number	District Vaccine Stores (DVS)	Service Delivery (BPHC)	
Team 1	JalpaigudiJalpaiguri	Mongalbari	Sulka para
Team 2	Uttar Dinajpur Kolkata	Karandighi Borough V	Islampur Borough VI
Team 3	East MidnapurMedinipur BardhamanBardhaman	Gangadharbar Bonnabagram	Kaktia Srikhanda
Team 4	Haora North 24 Parganas Murshidabad	Jhumjumi Nanna Hariharpur	Kulai Sundurpur Anupnagar
Team 5	South 24 Parganas West MidnapurMedinipur	Sarisha Keshiary	Chanda Doulatabad Changoal

Team 6: State vaccine store (facilitators)

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