Vaccine Management Assessment in Jharkhand – A Report

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Acronyms

Acronym	Description
^0C	Degree Celsius
ACMO	Additional Chief Medical Officer
AD	Auto Disable
ARS	Anti Rabies Serum
ARV	Anti Rabies Vaccine
ASV	Anti Snake Venom
BCG	Bacille Calmette Guerin
CC	Cold Chain
CCL	Cold Chain and Logistics
CCO	Cold Chain Officer
CES	Coverage Evaluation Survey
CFC	Chloro Flouro Carbon (refrigerant)
CHC	Community Health Centre
CI	Critical Indicator
cm^3	Cubic Centimetre
CMO	Chief Medical Officer
DF	Deep Freezer
DH&FW	Department of Health and Family Welfare
DLHS	District-Level Health and Facility Survey
DPT	Diphtheria, Pertussis, Tetanus
DRCHO	District Reproductive and Child Health Officer
DT	Diphtheria Tetanus
EAG	Empowered Action Group
EPIO	Expanded Programme of Immunization Officer
EVSM	Effective Vaccine Store Management
FIC	Fully Immunized Child
GoJ	Government of Jharkhand
HepB	Hepatitis B
HSC	
ILR	Ice-Lined Refrigerator
IPHS	Indian Public Health Standards
KVA	Kilo Watt Ampere
m^3	Cubic Meter
MCHIP	Maternal and Child Health Integrated Program
MDVP	Multi Dose Vial Policy
MIS	Management Information System
ml	Millilitre
MoHFW	Ministry of Health and Family Welfare
MOIC	Medical Officer In-Charge
NPSP	National Polio Surveillance Program

Acronym	Description
NRHM	National Rural Health Mission
OPV	Oral Polio Vaccine
CHC	Primary Health Centre
PIP	Programme Implementation Plan
POL	Petrol Oil and Lubricant
RCH	Reproductive Child Health
RIMS	Routine Immunization Management System
SEPIO	State Expanded Program of Immunization Officer
TA/DA	Travelling Allowance/Dearness Allowance
ToR	Terms of Reference
TT	Tetanus Toxoid
UIP	Universal Immunization Programme
UNICEF	United Nations Children's Fund
VAR	Vaccine Arrival Report
VLMIS	Vaccine Logistic Management Information System
VMAT	Vaccine Management Assessment and Training
VMTN	Vaccine Management Training Network
VVM	Vaccine Vial Monitor
WHO	World Health Organization
AFRO	WHO Regional Office for Africa
WIC	Walk-in-Cooler
WIF	Walk-in-Freezer

Acknowledgment

Vaccine management training and assessment was carried out successfully in collaboration with the Department of Health and Family Welfare, Government of Jharkhand, Government of India and our partner agencies WHO- NPSP, and IMMUNIZATIONbasics. We are thankful to SRCHO, SEPIO, the State cold chain consultant and DRCHOs (GoJ), from the 24 districts for their active participation and valuable contribution.

Executive Summary

Background

Jharkhand, which was earlier part of Bihar [a state that is categorized among the Empowered Action Group (EAG) states], achieved statehood on November 15, 2001. Though rich in natural resources like minerals and forests, it inherited the low indices on all development criteria from the parent state.

Jharkhand consists of 24 districts and has a total population of 32,966,238 (Census 2011) of which 5,237,582 are children under six –years of age (Census 2011). Annually, 8,27,000 infants (PIP 2011-12) come under the Universal Immunization Programme (UIP). The District-Level Health and Facility Survey (DLHS 3), 2008 indicates that 54.1% infants are fully immunized, which is a commendable achievement from a meagre 8% infants in 2002 (DLHS 2).

United Nations Children's Fund (UNICEF) is actively collaborating with Department of Health and Family Welfare (DH&FW), Jharkhand to strengthen its immunization programme through several innovative strategies. Considering the importance of vaccine management and logistics, UNICEF and DH&FW, Government of Jharkhand jointly undertook an assessment of the existing vaccine and logistic management system in five regions of Jharkhand. This assessment was conducted in two phases: twelve districts were assessed in Phase I in 2009 and subsequently the remaining twelve districts were assessed in Phase II in 2010.

The assessment sought to identify the level of knowledge and evaluate the practices related to vaccine-management among health staff at the state, district and service-delivery levels. The field assessment enabled identification of the weak links in the cold chain and logistics management system. The assessment became the basis for making immediate and long-term recommendations. The structured approach that the study adopted, involving extensive fieldwork and an analytical review of the data, provided a hands-on vaccine logistics learning resource, for District Immunization Officers (DIOs).

Objectives

The vaccine management assessment was carried out for a retrospective period of six months with the following objectives:

1. Improve vaccine-management systems and procedures;
2. Identify the levels of knowledge and practices related to vaccine-management among the health staff operating at the state, district and service-delivery levels, including the Primary Health Centres (CHCs);
3. Document the good practices and gaps in vaccine management for corrective action;
4. Develop a capacity building package for relevant programme staff for improved vaccine management.

Criteria of assessment and tool used

The World Health Organization (WHO)/UNICEF Vaccine Management Assessment Tool (VMAT)[1] was adopted to systematically assess and build capacity of the health department staff involved in routine immunization vaccine handling and management.

The assessment was guided by eleven criteria, eight of which were derived directly from the WHO–UNICEF Effective Vaccine Store Management (EVSM) initiative. Grouped under each criterion is a set of specific requirements.

The eleven criteria are:

1. Vaccine-arrival procedures

[1] WHO/IVB/ 05.02 April 2005, Vaccine Management Assessment, Geneva

2. Vaccine-storage temperatures
3. Cold-storage capacity
4. Buildings, cold-chain equipment and transport
5. Maintenance of cold-chain equipment and transport
6. Stock management
7. Effective vaccine delivery
8. Correct diluent use for freeze-dried vaccines
9. Effective use of vaccine-vial monitors (VVM)
10. Multi-dose vial policy
11. Vaccine-wastage control

WHO's scoring criteria for qualifying as a quality vaccine store

The minimum acceptable scoring to be designated as a quality vaccine store, as per the WHO standard for EVSM and VMAT, is 80% in each criterion. This is a benchmark that assures that quality services and facilities are being provided at the immunization service point being assessed.

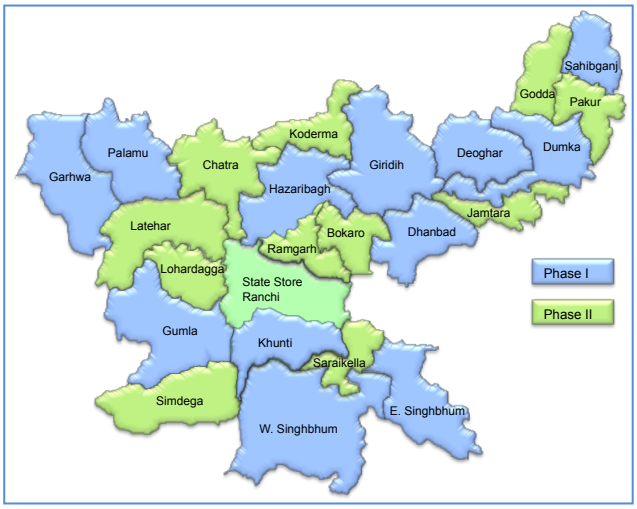
Methodology of training and assessment

The DIOs were provided three days of extensive training during each phase in vaccine management and assessment using VMAT. Six teams were formed, consisting of four members each. The teams spent a week in the field assessing the district stores and two CHCs from each selected district. The field visit was followed by a three-day workshop, where the data was compiled and the group formulated recommendations through a consultative process. The districts assessed during the two phases are listed in Table 1.

Table 1: List of districts assessed

Phase I (2009)	Phase II (2010)
Deoghar	Bokaro
Dhanbad	Chatra
Dumka	Godda
East Singhbhum	Jamtara
Garhwa	Koderma
Giridih	Latehar
Gumla	Lohardaga
Hazaribagh	Pakur
Khunti	Ramgarh
Palamu	Ranchi
Sahibganj	Saraikela
West Singhbhum	Simdega

Figure 1: Map of Jharkhand indicating districts assessed in Phase I & II



Major Findings

At the State level

The state vaccine store at Namkum Ranchi is the first level of vaccine storage in the state. The initial delivery of vaccine sourced through Indian manufacturers is accepted at this level. It is critical that the quality of the vaccine and sufficient stocks be maintained at the central store so that the facilities down

the chain (regional, districts and CHCs) receive the required quantities of well-preserved vaccine in time through the recommended cold chain.

The assessment of the state store revealed that the following key areas needed substantial improvement:

1. Vaccine arrival procedures are not followed as per the WHO protocol. The gaps that were identified were primarily at the documentation end:
    a. The Vaccine Arrival Report (VAR) was not prepared and submitted to the Ministry of Health and Family Welfare (MoHFW), GOI on a routine basis;
    b. The key documents, including the lot release certificates, inspection notes and invoices, were missing or irretrievable as they were filed separately in a non-uniform manner.
2. The store did not effectively follow up on the vaccine delivery schedule as planned by the immunization division of MoHFW, GOI, often resulting in shortage of cold chain space or stock-outs due to inconsistent supply.
3. The store does not have ice-pack freezers for preparing ice packs. The Walk-in-Freezer (WIF) is used for making ice packs. Further, the OPV vaccine is also stored in the same WIF, which is contrary to WHO's recommendation of not storing OPV in the ice-pack making unit.
4. The store does not have a vaccine delivery van. All the districts visit the state store to collect the vaccine on a periodic basic, sometimes without a prior notice. The erratic schedule leads to inefficient handling of stock, including errors in bundling, improper packaging, etc.
5. The cold rooms were equipped with manual-start generators. The national norms and WHO recommendations state that the generators should be auto-start.
6. The physical stock books were poorly maintained. They were not updated and several entries were missing. The stocks were entered in parallel in an excel-based worksheet; however, the format was non-standard and data retrieval (such as stock balance and basic enquiries of stock in and out) was difficult.

At the District level

Districts are at the second level in the vaccine supply chain. Stocks are stored here for an average of two months before being sent to CHCs.

The key findings from the assessment of the district stores are:

1. Though the staff at the district stores was familiar with the VVM guidelines, the VVMs are often not checked for prioritizing vaccine shipment down the chain.
2. Although the cold chain equipment or transport facilities had never broken down, little attention is being given to vehicle maintenance.
3. Cold chain equipment temperature is effectively monitored only in a few districts (The performance of Ice-lined Refrigerators (ILR) and Deep Freezers should be monitored twice a day by recording temperature in a logbook. This process ensures that corrective action can be taken on time). Though the temperatures were recorded, the frequency of recording was erratic. Monitoring and recording was not done on holidays and there was no alternate mechanism in place to monitor the cold chain equipment in the absence of the cold chain personnel.
4. Programme managers (medical officers, DIOs) often do not monitor the temperature logbook, the stock book and the physical stock of vaccine. Due to the lack of supervision, monitoring of cold chain and stock management was poor.
5. Vaccine storage capacity needs to be upgraded at most of the districts stores.
6. Delivery of vaccine to CHCs was not standardized as the storekeeper was untrained in computing vaccine requirements. The indents raised by CHCs were not verified.
7. There were instances of vaccine stock-outs.
8. Vaccine wastage was not recorded. There was no mechanism of conscious monitoring of vaccine wastage.

Service delivery level

CHCs are the last cold chain point in the vaccine supply chain. The success of an immunization programme is directly proportionate to the effective implementation of procedures and standards at this level. The assessment showed that most of the CHCs scored much lower than the desired level on the various parameters, indicating a high risk to the immunization programme.
The key findings are:

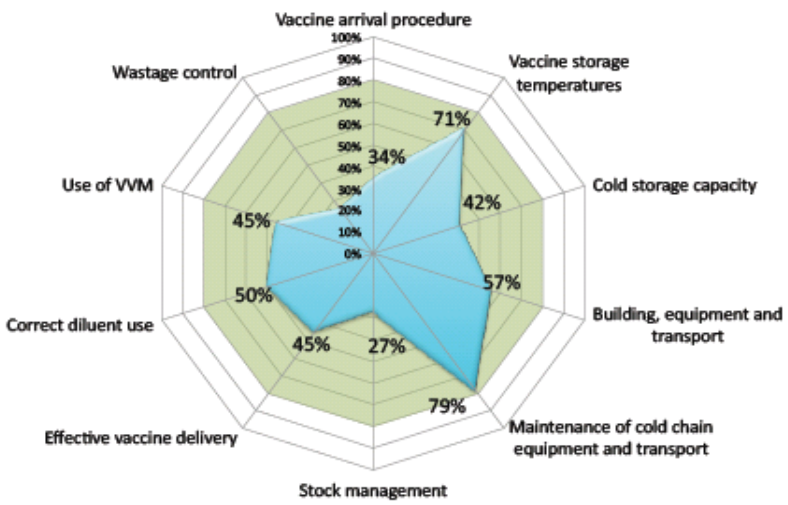
1. Despite frequent training programmes,, the the cold chain system at the CHCs is not manned by trained staff, mainly because of staff turnover, with old staff being relocated to new locations and new untrained staff being deputed at CHCs.
2. The indenting procedure followed by CHCs and districts does not include the buffer stock requirement, which is needed as cushion against unforeseen delays in receipt of vaccine stocks.
3. CHCs indent insufficient quantities, leading to vaccine stock-outs.
4. Vaccine requirement estimates are often based on quantities indented for the previous month and had poor linkage to target beneficiaries or the number of sessions planned.
5. Stock books of vaccine and related supplies, including diluents, are not maintained.

Improvements observed since phase I assessment in 2009

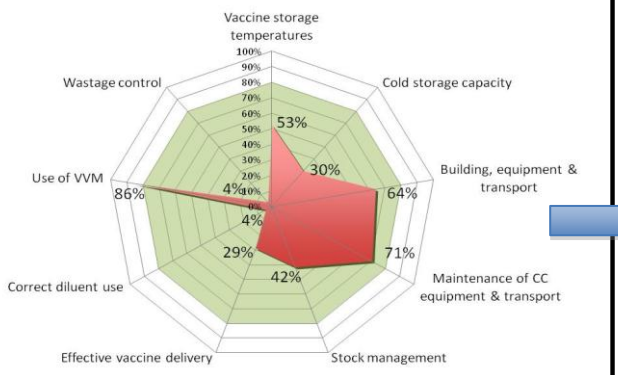
There have been substantial improvements at the district and CHC levels after the first round of VMAT assessment in 2009. Most of these improvements are attributed to action taken by the management at the state level. Some of the key improvements are:

1. Temperature logbooks are now available in the district stores and CHCs.
2. There has been shift in the number of staff aware of the thermo sensitivity of vaccines (from 50% in 2009 to 92% in 2010).
3. A new Walk-in-Cooler (WIC: 32 m^3) and a Walk-in-Freezer (WIF 16 m^3) have been installed at Deoghar. The district will now serve the regional vaccine store and will supply vaccine to the five adjacent districts of Godda, Pakur, Sahibganj, Jamtara and Dumka. This will ease the transportation problem of shipping vaccine to the extreme eastern districts from Ranchi. This will also increase the cold storage capacity of the region.
4. Two new WICs (16 m^3) and one WIF (16 m^3) have been installed at the state vaccine store. MoHFW, GOI, supplied these cold rooms. Installation of these cold rooms at the state store and the regional store of Deoghar were timely and supported the measles campaign.
5. New 160 small DFs, 147 large DFs and 110 large ILRs have also been supplied by MoHFW, GOI, which has helped fulfilling the gaps in ice-pack making capacity and vaccine storage capacity in the state.
6. A cold chain consultant has been deputed to provide technical assistance to the Reproductive and Child Health (RCH) programme supported by UNICEF.
7. 124 data loggers have been purchased by UNICEF, which will be used to monitor vaccine temperature throughout the supply chain, starting from the state vaccine store down to the last cold chain point.
8. The bundling of vaccine along with supplies (syringes, droppers and diluents) has now been initiated in the state.
9. 13 district cold chain technicians have been appointed in the state and technicians are being recruited for the remaining districts.

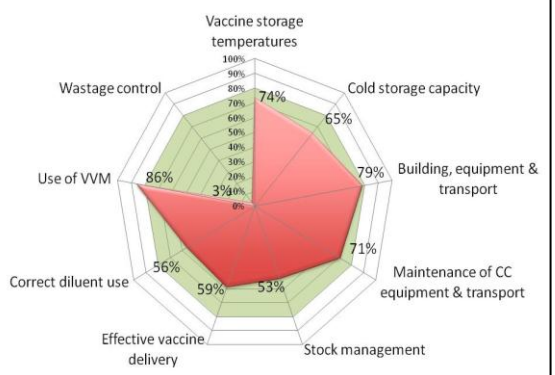
Figure 2: Scoring on criteria at the State, District and CHC Levels



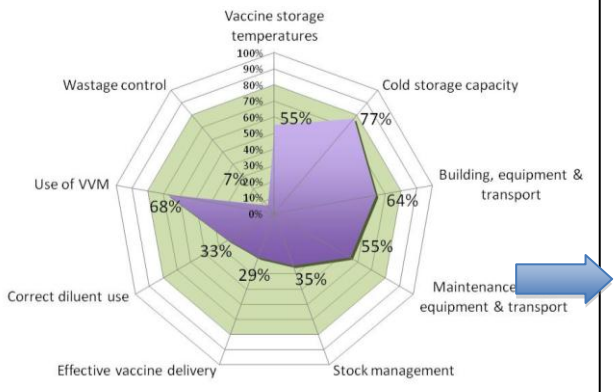
State Vaccine Store: 2009



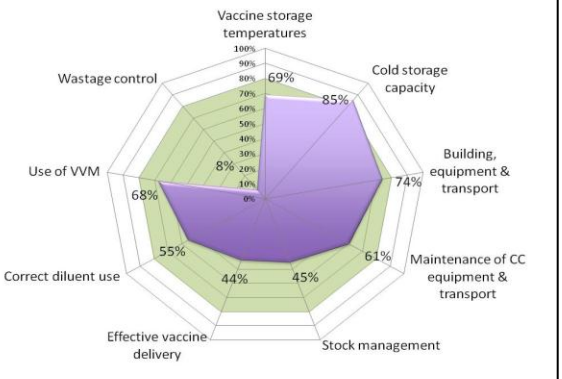
District stores - 2009



District stores - 2010



CHC - 2009



CHC - 2010

The key issues emerging out from the assessment that require immediate attention are listed below.

Capacity building exercises

- Knowledge of vaccine management best practices.
- Temperature monitoring at stores and during transportation.
- Accurate method of preparing indent for vaccine and related supplies.
- Proper handling and maintenance of cold chain equipment.
- Knowledge of stock management best practices.

Management intervention

- Ensure adequate staff for immunization programmes.
- Implement standardized reporting formats for vaccine consumption, wastage, maintenance of cold chain and vehicles.
- Implement mechanism for periodically updating the cold chain equipment inventory (electric and non-electric).
- Ensure timely maintenance of cold chain equipment and transport.
- Ensure timely disposal of non-repairable equipment.
- Ensure usage of vaccine van for UIP and Programme Implementation Plan (PPI) purposes only.
- Implement effective stock management through maintenance of stock books (introduce explicit recording of diluents, VVM).
- Optimize and standardize the frequency of vaccine delivery.

Procurement and supply

- Adequate quantity and timely supply of supplementary tools like thermometers, temperature log books, etc.
- Strengthen the cold chain capacity to freeze ice-packs during campaign rounds.
- Provide generators of required capacity at the various cold chain facilities.
- Replace aged and non-repairable cold chain equipment with new equipment for expansion of programme (to new CHCs) and fill any gaps of cold chain capacity based on the updated cold chain inventory.
- Provide tool kits for refrigerator mechanics.
- Provide spare parts of cold chain equipment.

Infrastructure requirement

- Ensure that the size of the dedicated cold storage area for ILRs and other UIP supplies is as per Indian Public Health Standards (IPHS).
- Provide restricted access to the cold store facility and to cold chain equipment to ensure secure storage of vaccines and related supplies.
- Control the temperature in the vaccine packing area in the in the state and district stores at 15 to 25 ^{0}C.
- Improve the electrical wiring to high standards of safety and efficiency.

Recommendations: three major areas

1. Guidelines to be issued to District Reproductive and Child Health Officers (DRCHOs) and medical officers in charge of immunization to implement and routinely report on cold chain maintenance, vaccine storage and transportation practices.
2. Well-designed vaccine management report format should be used for periodic reporting on the key performance areas (from CHC to DRCHO, DRCHO to the State Expanded Program of Immunization Officer (SEPIO) to SRCHO and SRCHO to MoHFW).
3. Financial provisions need to be made for procurement of equipment and infrastructure maintenance.

Key recommendations emerging out of the assessment

1. Vaccine Logistic Management Information System (VLMIS) to be implemented for effective stock management and timely supply of adequate immunization supplies to district stores.
2. The 24-hours computerized temperature monitoring system of cold rooms to be implemented.
3. Standards of any new vaccine store facility to be in line with WHO guidelines of establishing a vaccine store.
4. UNICEF's VAR format should be adopted for reporting arrival of vaccine at the state vaccine store.
5. Correct mapping of diluents for each freeze-dried vaccine should be maintained from the time of arrival of vaccine to shipment of vaccine to the district stores.
6. Based on the staffing pattern and the respective ToRs for each cold chain facility, staff should be recruited or deputed to fill the recommended positions on a high priority.
7. The administrative and financial authority with regard to timely implementation of UIP and PPI programmes should be delegated to SEPIO, CCO and DRCHOs.
8. Shelves to be procured and installed for storing diluents and syringes at all cold chain points.
9. The freeze tag (freeze indicator) to be included in every packed unit of vaccine during shipment.
10. The fridge tag (30-days temperature monitor) to be provided for every ILR to effectively monitoring the temperature.

Way forward

1. Issue guidelines on various aspects as recommended in this report on a priority basis.
2. Prepare the action plan to implement the recommendations. The draft action plan has been included in this report.
3. Periodically review (annually) the progress of implementation of recommendations and validate the progress through a review assessment after two years.
4. Expand the vaccine store facilities (building) to accommodate the additional cold chain equipment.
5. Expand the cold chain capacity to fill the gap by procuring the requisite cold chain equipment.
6. Equip the cold chain technicians with tool kits for repair and maintenance of the cold chain equipment.

Summary Sheet of Vaccine Management Assessment
(The ideal scoring, as per the WHO standard for EVSM and VMAT, is 80%)

Criterion	State	District		CHC	
	Phase I*	Phase I	Phase II	Phase I	Phase II
Vaccine-arrival procedures	34%	Not applicable			
	Calls for documentation of quality and quantity of vaccine received				
Vaccine-storage temperatures	71%	53%	74%	55%	69%
	The storekeeper is aware of the thermo-sensitivity of vaccines; 24-hour records of cold room temperature missing	Recordings of temperature are not taken when the particular cold chain staff is on leave and during holidays. The recorded temperature is not monitored by the store programme manager.			
Cold-storage capacity	42%	30%	65%	77%	85%
	Shortage of cold chain capacity at the time of assessment, though new cold rooms have been added subsequently. Shortage of ice-pack-making capacity.	Improvement in cold chain capacity with fresh supply of equipment. Shortage of ice-pack making capacity continues.			
Buildings, cold-chain equipment and transport	57%	64%	79%	64%	74%
	Vaccine store warehouse has excellent infrastructure; lacks transportation facilities.	No dedicated space for vaccine and related supplies. Lack of space for packing of vaccine, storing of diluents. Available space often occupied by other supplies.			
Maintenance of cold-chain equipment and transport	79%	71%	71%	55%	61%
	No transport facilities at state vaccine stores.	Little attention is being given to vehicle maintenance.		Despite frequent old chain training programmes, trained staff does not man the cold chain stores at the different levels mainly because of relocation to new locations with different job responsibilities.	
Stock management	27%	42%	53%	35%	45%
	Handling and shipments of diluents along with lyophilized vaccine, was found to be a high- risk area, as the details were not recorded, leading to chances of mismatched shipment with either insufficient quality of diluents or incorrect bundling with vaccine.	Poor stock management resulting from improper quantities indented, leading to instances of vaccine stock outs.		The indenting procedure followed does not include the buffer stock required in case of transit delay of vaccines.	
Effective vaccine delivery	45%	29%	59%	29%	44%
	Erratic schedule of vaccine issued to districts. Pull mechanism in place with no cross-checking mechanism of quantities indented with district requirement.	Delivery of vaccine to CHCs was not standardized and staff needs training on estimating vaccine requirements and verifying indents raised by CHCs.			
Correct diluent use for freeze-dried vaccines	50%	4%	56%	33%	55%
	Separate stock book for diluents not maintained. Diluent matching with respective				

Criterion	State	District		CHC	
	Phase I*	Phase I	Phase II	Phase I	Phase II
	batch of vaccine not done.				
Effective use of vaccine-vial monitors (VVM)	45%	86%	86%	68%	68%
	Though the staff is knowledgeable about VVMs, the labels are often not checked for prioritizing the vaccine for shipment down the chain.				
Vaccine-wastage control	25%	4%	3%	7%	8%
	No measures in place to control vaccine wastage				

* The state store was assessed only during phase I since re-assessment is recommended only after 2 years.

1 Introduction

Immunization is an essential part of a child's right to the highest attainable state of health. Protection against disease is delivered through vaccines. For a vaccine to be effective, it must have two important qualities—potency and safety. Vaccines have to be stored and transported at recommended temperatures to retain their efficacy. The cold chain system is hence the cornerstone of any immunization programme.

In Jharkhand, previous assessments have identified the cold chain as a bottleneck in improving immunization coverage. This assessment of vaccine management, by the Government of Jharkhand, with the technical support of UNICEF, WHO-NPSP (National Polio Surveillance Program) and MCHIP (Maternal and Child Health Integrated Program), aims at a formal and comprehensive review of the cold chain system for immunization in the entire state . This assessment will facilitate the identification of gaps in the cold chain, evaluate existing equipment and identify future requirements. It will also examine existing practices recommendations and action plans to manage immunization programme logistics in the state. A well-managed cold chain holds the key to efficient service delivery—it will increase the proportion of effective vaccines that are administered and reduce vaccine wastage.

2 Background

Public health infrastructure in the state

Jharkhand was carved out of erstwhile Bihar on 15 November 2000. The logistics of the UIP programme in the state is managed through the network of 24 districts, 212 CHCs and 3980 sub-centres. Vaccine and related supplies arrive at the state vaccine store in Namkum and from there it is shipped to the district stores. Public health infrastructure in Jharkhand is inadequate to provide even basic healthcare services to the people. As many as 37% of HSCs, 64% CHCs and 82 % CHCs had not been built. Regular maintenance of existing equipment and replacement of outdated equipment pose additional burdens on national programmes. The challenge is not only with regard to state vaccine storage but also the transportation and management of vaccines at the district and block levels. The high cost of the new vaccines increases the need to reduce wastage without compromising levels of coverage. Improving vaccine management and developing innovative approaches to handling logistics would reduce the need for additional cold chain equipment. Further, the vaccine vial monitor (VVM) offers an opportunity to go beyond the cold chain.

Status of UIP in the state

In Jharkhand, the existing vaccine supply chain and logistics system is adversely affected by a virtually non-existent demand forecasting system, inadequate and/or improper storage conditions, lack of trained manpower, non-existent transportation facilities, poor management information system, wastage, irregular supplies, low motivation of health workers along with their perceived burden about available and/or potential resources, etc. However, the coverage of the UIP has improved significantly from 31% in 2000 to 59.7% in 2008-09.

NCP 2000	CES 2004	NFHS 3 2006–07	CES 2006–07	DLHS 3 2007–08	CES 2009
31	45	38.9	52.1	54.1	59.7

Status of the cold chain in the state

Due to the lack of reliable information about the cumulative capacity of cold chain equipment (both electrical & non-electrical) vis-à-vis the requirement to provide quality immunization services to the masses, it is difficult to gauge whether the existing equipment can meet the state's needs, but the data that has been collated related to equipment gives us some insight into the issues faced by the state when it comes to the cold chain. A comprehensive assessment of the cold chain was carried out in 2005. The 2005 assessment revealed that all the cold chain equipment belonged to erstwhile Bihar and that no machine had been replaced since the state's inception.

The data collated suggested that almost 16% of the electrical cold chain equipment was non-functional (15% of the DFs and the ILRs were beyond repair). The state had no system to undertake repair of cold chain. With regard to the non-electrical equipment, about 10% of the cold boxes were unusable and almost 26% needed repair. Similarly, almost 5% of the vaccine carriers and ice-packs were unusable and close to 3% needed repair. Again, the state had no established mechanism to repair and/or replace this equipment. Out of the 250 generator sets, about 35% needed repair and the state had no regular budget for fuel to run them. Similarly, almost 4% of the voltage stabilizers were beyond repair, while 26% need to be repaired. The poor condition of the cold chain equipment could be attributed to the fact that a major proportion of the equipment was fairly old and had been mishandled or poorly maintained.

Cold chain inventory in the state, in 2010, indicates that the number of equipment has definitely increased with 5 WICs, 2 WIF, 872 DFs (571 of 300 lt. and 301 of 140 lt.), and 460 ILRs (179 of 300 lt. and 281 of 140 lt.) but maintenance remains a challenge. As for non-electrical cold chain equipment, the state has about 5,832 cold Boxes (723 large and 1110 small), 32,649 vaccine carriers and around 1,17,843 ice-packs. The state also has about 250 diesel generator sets to provide power back-up and about 757 voltage stabilizers

3 Objectives

The objectives of the vaccine management assessment of Jharkhand using the VMAT were to:

1) Identify the strengths of and good management and handling practices in vaccine stores;
2) Train the staff responsible for handling the state, intermediate and primary health vaccine stores in vaccine management practices;
3) Identify major knowledge and performance gaps;
4) Identify resource and training needs of the various cadres of the cold chain staff;
5) Strengthen the system to be able to conduct similar assessments periodically.

4 Expectations from Vaccine Management Assessment

There are five standardized steps to improve the quality of vaccine and logistics management:

1. Set a quality standard: Establish a national quality standard based on national programme policy guidelines and national /global standards, as recommended by WHO and UNICEF.
2. Establish a general approach: Prepare and adopt *standard operating procedures* (SOP).
3. Establish standard procedures: Identify the specific task and procedure and assign these tasks to specific persons responsible for maintenance of cold chain, vaccine and logistics upkeep.
4. Instruct and train staff on specific tasks of monitoring methods, instructions and training, equipment servicing and testing to perform them proficiently.
5. Keep good records of temperature charts, VVM training, cold room service report and cold room specifications.

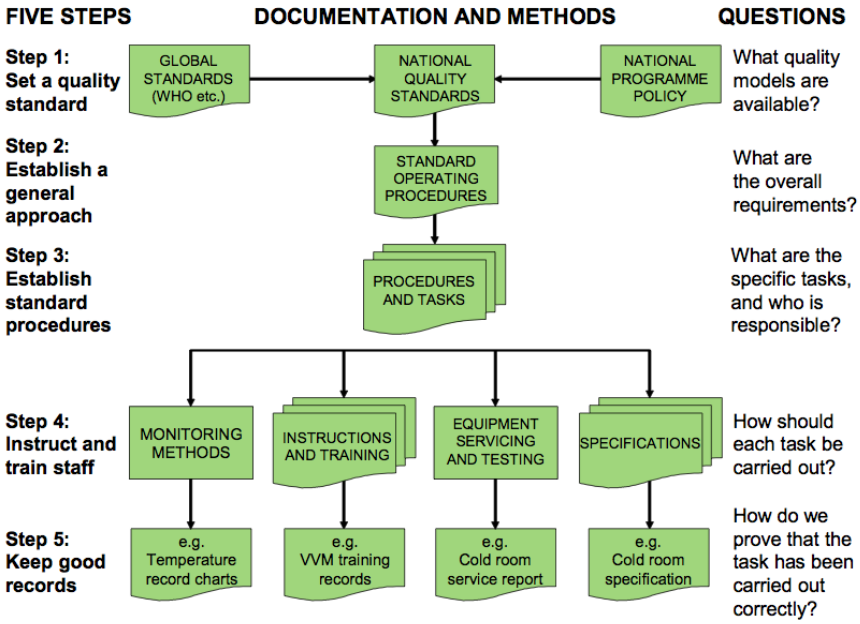


Figure 3: The five steps for VMA along with the documentation and methods that should be available to validate completion of processes at each step.

5 The Tool

VMAT was developed by the Vaccine Management Training Network team to help countries to improve the quality of their vaccine management system down to the service delivery level. This is a spreadsheet-based tool and includes a set of structured questions, which are posed by national and external assessors. Using the tool the qualified team can carry out a rapid assessment of the vaccine-management procedures in a national store, followed by a similar assessment of the sub-national stores (state) and the service delivery points (CHCs). The assessment results are displayed in graphical form and should be supplemented by written comments. The modules complement the EVSM package,, which focuses on vaccine management at the national and sub-national (state) primary stores.

The tool is based upon eleven global criteria listed below. Criterion 1—Vaccine Arrival Procedures—is applicable only for the state store. Criterion 8, 9 & 11 are an indigenous part of EVSM, but have been identified as separate indicators for assessment at periphery levels. The eleven global criteria are as follows:

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

There are 17 broad Critical Indicators (CI) with 35 questions under the criterion 1, 2, 5, 6, 7, 8, 9 and 11. These questions are intended to evaluate the most important aspects of vaccine- management. Therefore each question attracts a weighted score. A low score against a critical indicator provides strong evidence that an aspect of vaccine-management is hazardously weak and that significant improvements are needed. The critical indicators of the assessment are included in Appendix 1.

The collated scores are depicted graphically on a spider web showing the strengths and weaknesses of vaccine management in a given immunization programme. A minimum score of 80% is recommended for each criterion.

NB. Criteria 1 - Vaccine arrival procedures applies more to a national store receiving vaccines from overseas or directly from the manufacturer. Hence, only the state store is assessed against this criterion. The Govt. of India has not adopted MDVP in routine immunization (Indicator 10). MDVP is only applicable during Polio mass immunization campaigns and is not applicable during routine sessions in any state of India.

6 Methodology*

The assessment involved the following steps:

- Selection of sites
- Training of DIOs
- Assessment of vaccine stores using the VMAT tool
- Compilation of assessment result
- Formulation of recommendations
- Outlining plan of action

Selection of sites:

There are five divisions in Jharkhand: Kolhan, South Chottanagpur, North Chottanagpur, Palamau and Santhal Pargana. The district sampling was done based on performance: one optimal and one sub-optimal ranked district were chosen for the smaller divisions of Kolhan, South Chottanagpur and Palamau for phase I assessment based on the DLHS-3 survey data. In the larger divisions of North Chottanagpur and Santhal Pargana, one sub-optimal performing and two better-performing districts were selected for assessment. Two CHCs were randomly selected from each district for assessment. The remaining 12 districts, including two CHCs per district, were covered during phase II.

Districts selected for VMAT assessment

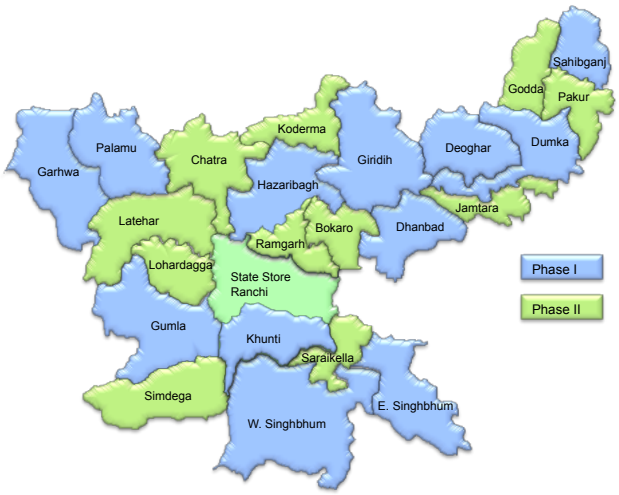


Figure 4: Districts selected for VMAT assessment

* The composition of the team and the assessment schedule is included in Appendix 2.

Training

The training focused on the essentials of good vaccine management, followed by an introduction to VMAT. All the criteria were discussed in detail and the participants undertook field visits to the cold chain points, where they recorded their observations after interviewing the field staff.

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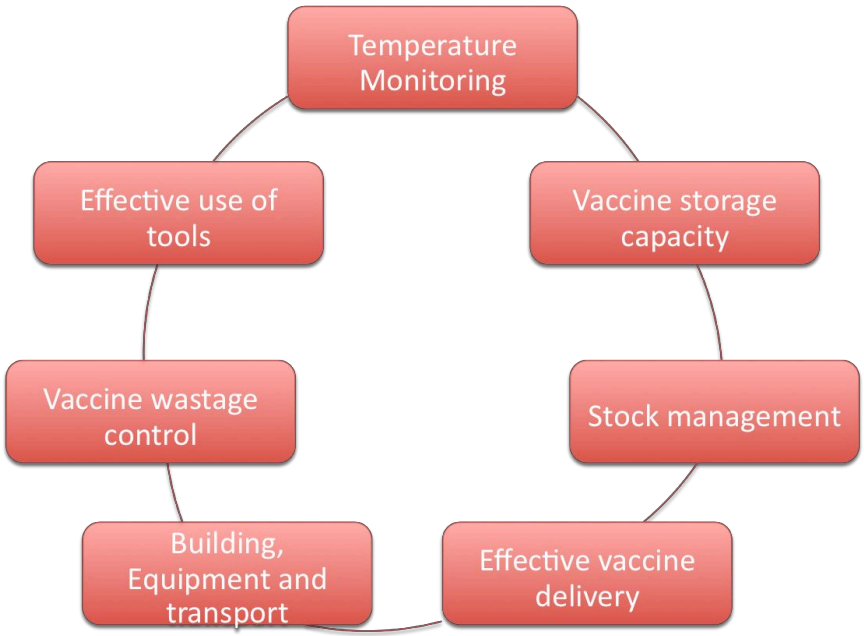


The agenda of the training programme is included in Appendix 2.

Field assessment: The quantitative and qualitative assessment was conducted over a span of six days. Six teams covered 12 districts and 24 CHCs during each phase. The assessment teams assessed the infrastructure, cold chain and vaccine distribution logistics and interviewed field staff responsible for handling cold chain and logistics. The teams were equipped with hard copies of the assessment questionnaires and gathered data and information as required.

Compilation and discussion: After the assessment the teams reassembled at the state headquarters and compiled the reports and the commentary for all the assessed sites. The data collected during the field exercise was entered in the *Excel* version of tool, which contains values assigned respectively to the questions.

Formulation of recommendations: All the members of the assessment teams studied the results based on the VMAT criteria and two days were spent collectively brainstorming to spell out the recommendations.

7 Vaccine Management Assessment

The following actions were taken to achieve the objectives of the programme:

1) Existing strengths and good practices of the vaccine stores were identified

All the 24 districts were assessed against the VMAT criteria and the following strengths and good practices were identified during the programme:

a. The infrastructure (building) of the state vaccine store is at par with the required standard.
b. The regional store at Deoghar was equipped to be operational; it was expected to ease the supply to six districts, i.e. to Deoghar, Jamtara, Gumla, Godda, Pakur and Sahebganj.
c. The state has a vaccine logistics manager, who is responsible for inbound and outbound logistics at Namkum.
d. The state has recruited 13 cold chain technicians; recruitment is underway and the remaining vacancies are likely to be filled soon.
e. The central government has enhanced the state's cold chain capacity by supplying 160 small DFs, 110 large ILRs and 147 large DFs.
f. Jharkhand will be the first state to introduce data loggers (124) for temperature monitoring through out the cold chain cycle.

2) Staffs responsible for handling the state, intermediate and primary health vaccine stores were trained in vaccine management practices.

a. DIOs from the 24 districts, participants from development partners, logistic managers of the state, cold chain officer, and medical officers from the sample CHCs were trained during the workshop.
b. District-level trainings is planned to train the stakeholders of concerned areas.

3) Major knowledge gaps were identified.

The following are the major knowledge gaps that were identified during the assessment, which will be the focus of future training programmes:

a. The Cold chain personnel demonstrated incorrect method of recording temperature:
    i. A few could not read the thermometer correctly.
    ii. Positioning of the thermometer while reading was also incorrect.
    iii. They were unaware of the importance of maintaining a temperature log-book.
b. No contingency plan seemed to exist or, even if it existed, i was not implemented.
c. Practically no recording and tracking of diluents supplied with the vaccine was followed.
d. Many districts prepared indents based on the previous month's requirement; actual needs were not computed.
e. There was no concept of safety stock management. .

4) Major performance gaps were identified.

The following performance gaps were identified during the assessment:

a. General maintenance of cold chain equipment and utilities (i.e. diesel generator sets) was lagging due to non-deployment of cold chain technicians.
b. Stock books were not standardized.
c. The building layout in most of the districts was not as per IPHS norms.
d. Cold chain personnel are appointed at the CHC level without an induction programme.
e. Vehicle maintenance is negligible.
f. There is no inventory of spare parts.
g. The technicians do not have a tool kit.
h. There is no inventory of cold chain equipment either and a total absence of replacement and expansion plans.

5) Resource and training needs were identified.

The knowledge gaps that were identified give us a road map for planning the training programmes.

6) Internal capacity was developed to conduct similar self-assessment for the remaining districts and to undertake training and assessment periodically.

The participants who were selected during phase I assumed leadership during phase II to assess the system.

7.1 Overall assessment of phase I

Phase I covered the districts of Deoghar, Dhanbad, Dumka, East Singhbhum, Hazaribagh, Garwha, Giridih, Gumla, Khunti, Palamu, Sahibganj and West Singhbhum. The state vaccine store was also assessed during this phase.

State level: The assessment of the state, districts and CHCs showed that there were implementation gaps and that there was substantial scope for improvement on most of the criteria.

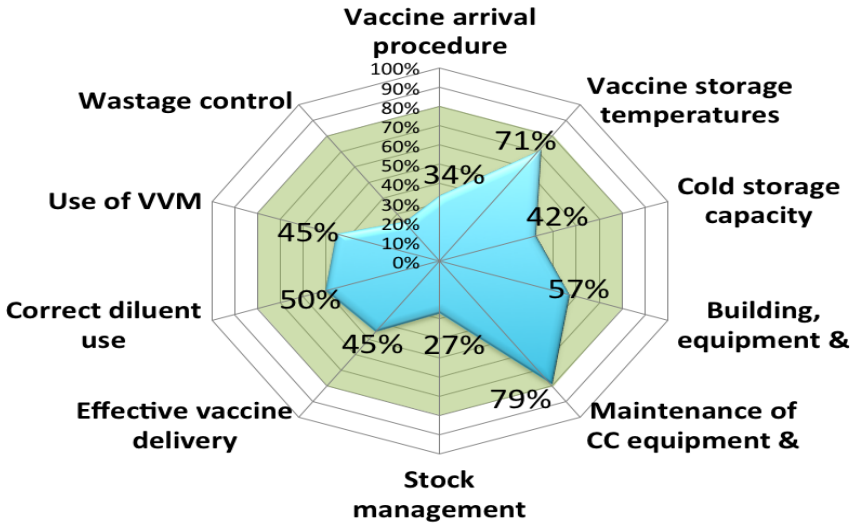


Figure 5: Spider chart to represent the findings of the assessment of state vaccine store

The logistics support to the immunization programme at the state vaccine store level is at high risk when it comes to implementing the WHO-recommended standards pertaining to vaccine arrival procedures (which ensures the documentation of quality and quantity of vaccine received and ensures required procedures are followed to rectify short supplies and report receipt of inadequate quality of vaccine), ice pack making capacity (required for shipping of vaccine to district stores). The state store also needs to improve on effective vaccine delivery plans to ensure timely and adequate supplies are made available to lower levels down the supply chain. Handling and shipment of diluents along with lyophilized vaccine was at high risk as the stock details were not recorded, leading to high risk of mismatched shipment with either insufficient quality of diluents or incorrect bundling with vaccine. Prioritized shipment of potent vaccine with aged VVM ahead of scheduled batches (on Early Expiry First Out principle: EEFO) can substantially reduce wastage. The state store needs to establish the procedures to effectively use the VVMs for their stock management.

At the district level: Districts are the second level in the supply chain. Vaccines are typically stored here for an average period of two months before it is sent to CHCs. The assessment shows that the staff was using VVM effectively at this level.

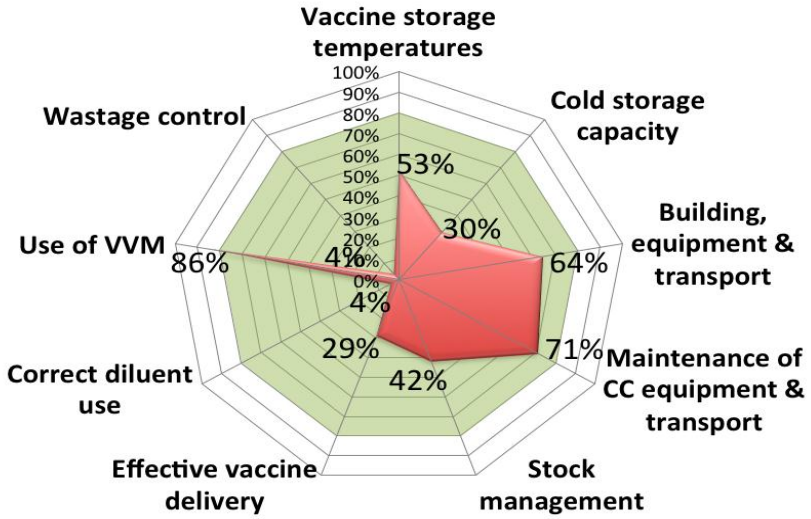


Figure 6: Spider chart to represent the findings of the assessment of district vaccine stores

Although there was no major breakdown of cold chain equipment or transport facilities at this level, vehicle maintenance receives little attention. Temperature monitoring was effective only in a few districts. It was undertaken but the frequency and periodicity of the recordings were variable and corresponded with the office-opening time. Record keeping was given a skip when the cold chain personnel was on leave and on gazetted, national and festival holidays. The programme managers did not monitor the recorded temperatures of their respective stores. Vaccine storage capacity needed to be upgraded at most of the districts. Delivery of vaccine to CHCs was not standardized and staff required training on forecasting vaccine requirements and verifying indents raised by CHCs. Also, there were instances of vaccine stock out.

Service delivery level: CHCs are the final destination in the vaccine supply chain. The success of an immunization programme is directly proportionate to the effective implementation of procedures and standards at this level.

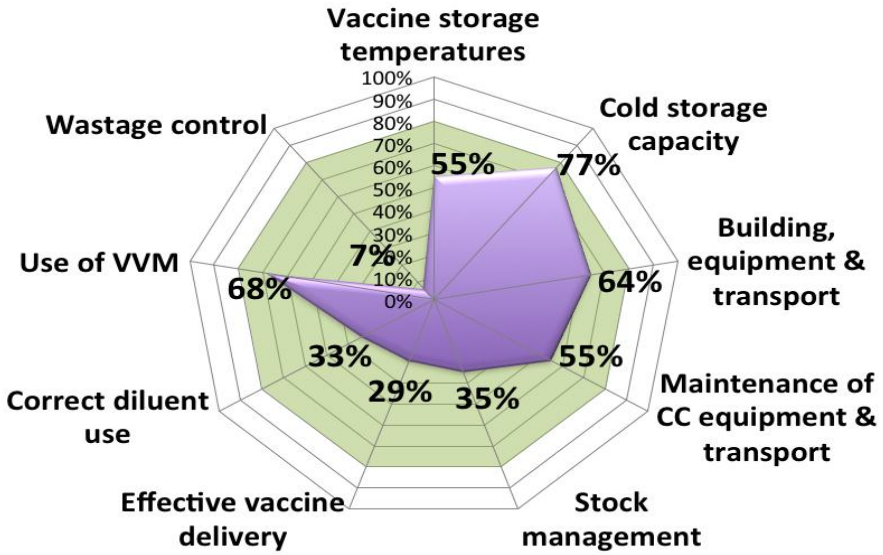


Figure 7: Spider chart to represent the findings of the assessment of CHC level stores

The assessment reflected that these facilities scored much lower than the desired level on most of the criteria, indicating high risk to the immunization programme. In spite of frequent training programmes, untrained staff manned the cold chain at this level because of relocation of trained staff to newer locations or because they were assigned new jobs. . The indenting procedure practiced by

CHCs and districts did not make provision for the buffer stock that is required when there is a transit delay.
There was frequent break down of the electrical cold chain due to non-adherence to maintenance guidelines and improper handling by untrained staff.
There were instances of vaccine stock-outs. Indents were prepared with no evident linkage to target beneficiaries and stock books were poorly managed. There were no measures in place to control vaccine wastage, leading to high-risk performance status.

7.1.1 Assessment based on VMAT Criteria

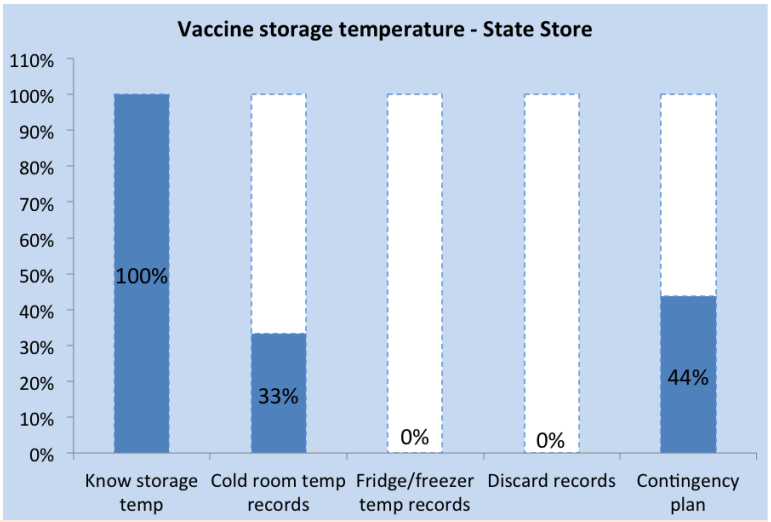
Criterion 1: Vaccine Arrival procedures (applicable only at the state vaccine store level)

The state vaccine store was assessed during Phase I of the assessment: There were 49 vaccine arrivals in the state vaccine store during the six-month period prior to the date of assessment. Only half of the arrivals had VARs. The VARs, inspection reports, invoices and delivery challans were filed separately, which made it difficult to retrieve and review the documents in as a complete set. Though, the store received the vaccines largely from national suppliers, there were no evident set procedures for the clearance of vaccine through the customs for international shipment arrivals.

The store did not effectively demonstrate the follow-up of vaccine delivery against the DH&FW procurement division's schedule.

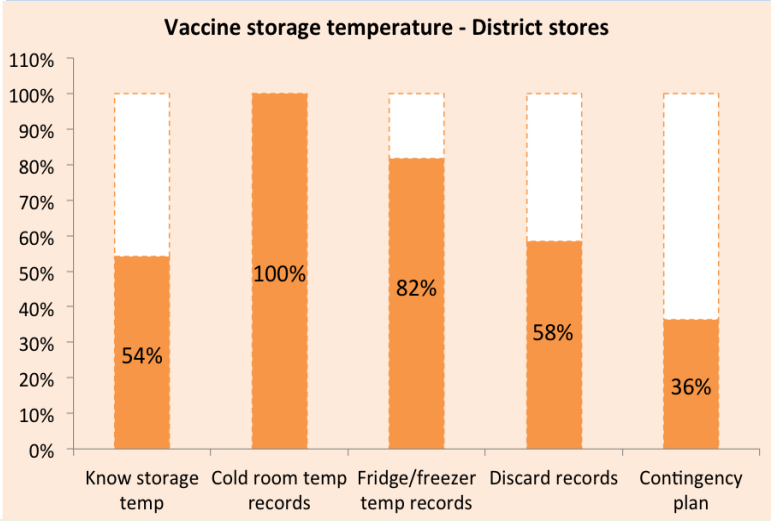
The state store scored 34% against the seven sub-criteria of this section.

Criterion 2: Vaccine storage temperatures

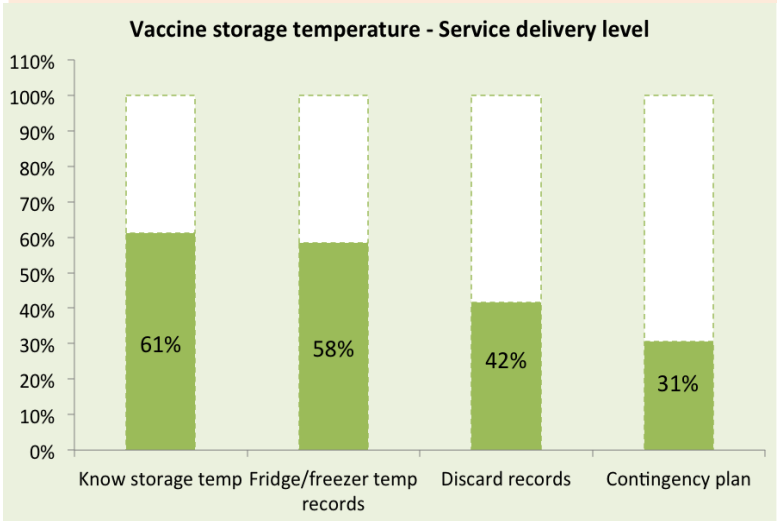


State vaccine store: The state store scored an overall aggregate of 71% on the 10 sub-criteria of this section. It scored primarily on the criteria that the staff is well aware of temperature sensitivity of the vaccine.

The temperature monitoring at this level was regular though done manually, since the temperature trace recorder had not been functioning in all the cold rooms for the past six months. The person responsible for recording the temperature knew the correct temperature range for all the vaccines. Since the store has four cold rooms, alternate cold storage reachable within two hours and 24-hours of power supply, with separate power back-up for each cold room, it is at low risk if a cold chain failure occurs. There is, however, no written contingency plan or SOP in the event of a cold chain failure and no formal training or orientation of staff on how to handle an emergency.



District stores: The storekeepers from only half of the sample districts knew the storage temperature range for all the vaccines. Contingency planning and set procedures in the event of an emergency were found to be less than satisfactory in a majority of the districts.

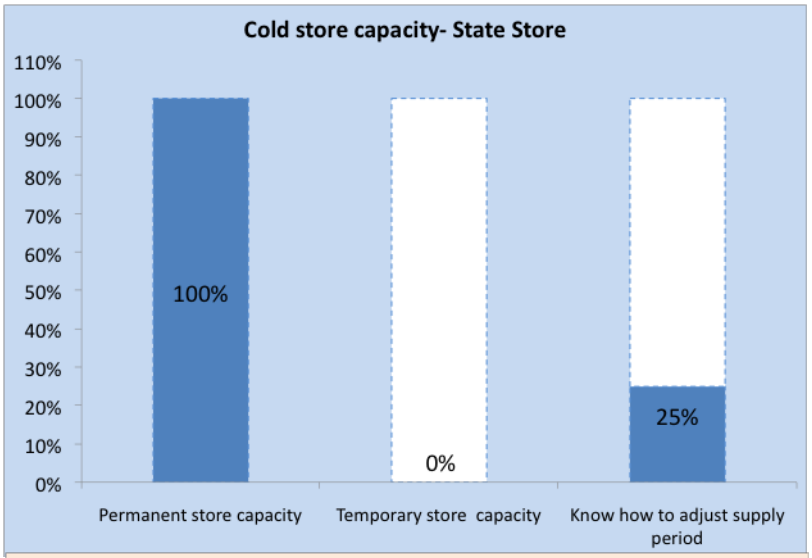


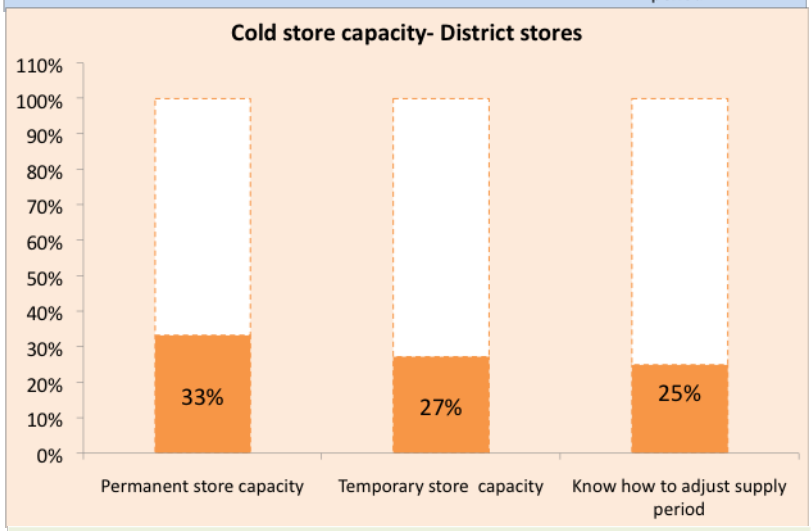
Service delivery level: The temperature was recorded twice daily in the sample CHCs. However, there was a shortage of temperature log-books at a few sites. Though the staff at the sites knew what to do in case of an emergency, there was no formal contingency plan.

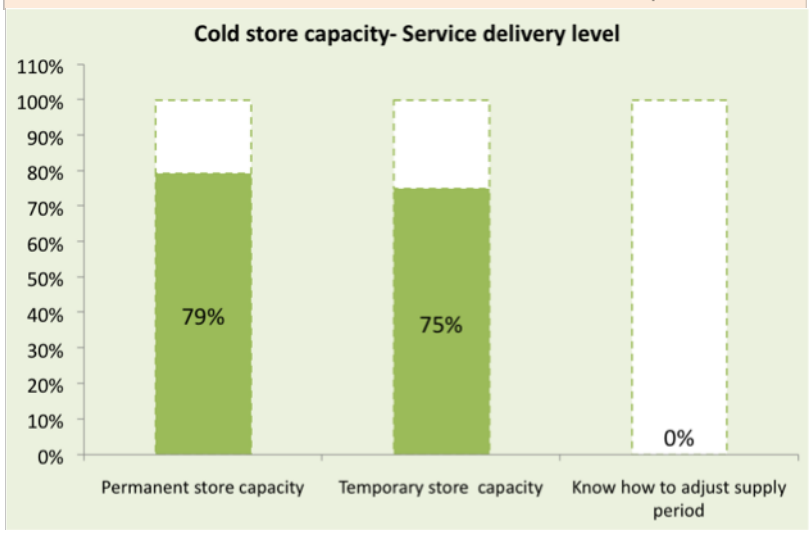
Criterion 3:
Cold storage capacity

State vaccine store: All the cold rooms at the Namkum state vaccine store were over stocked with vaccine at the time of assessment.
The store's vaccine storage capacity is sufficient given the supply of vaccine is in line with forecast quantities and on scheduled time.
The state vaccine store scored 42% on this criterion, assuming that the frequency of vaccine supply can be improved.

District stores: The vaccine storage capacity at the district stores was found to be insufficient in 8 out of the 12 districts assessed. Only two of the districts had enough storage capacity to accommodate the campaign volume requirement. Though the quantity of indented vaccine was issued by the state, very few could correlate and adjust the vaccine supply frequency to the vaccine storage capacity. There were instances of overstocking of vaccine and stock-outs and yet the stores could not adjust the indented quantity and the vaccine supply schedules.
The districts stores scored 40% across the three sub-criteria in this section.



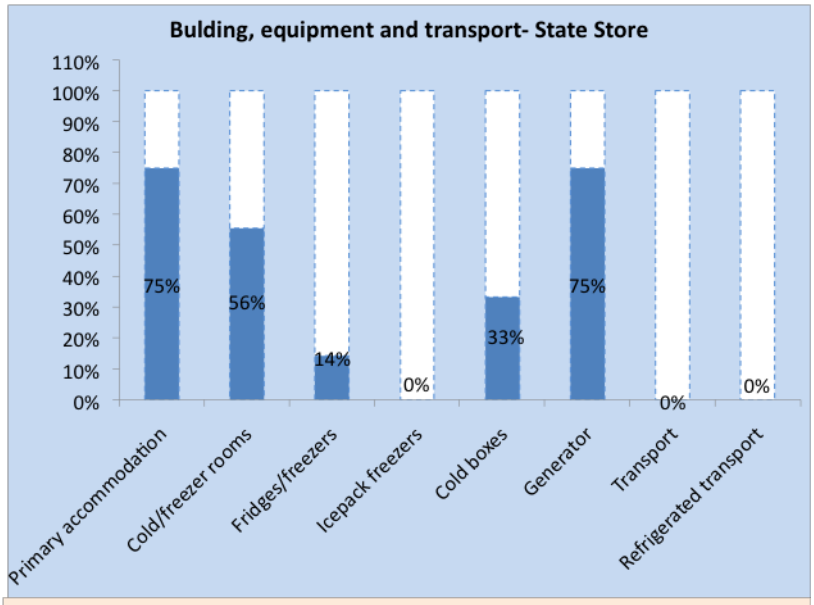




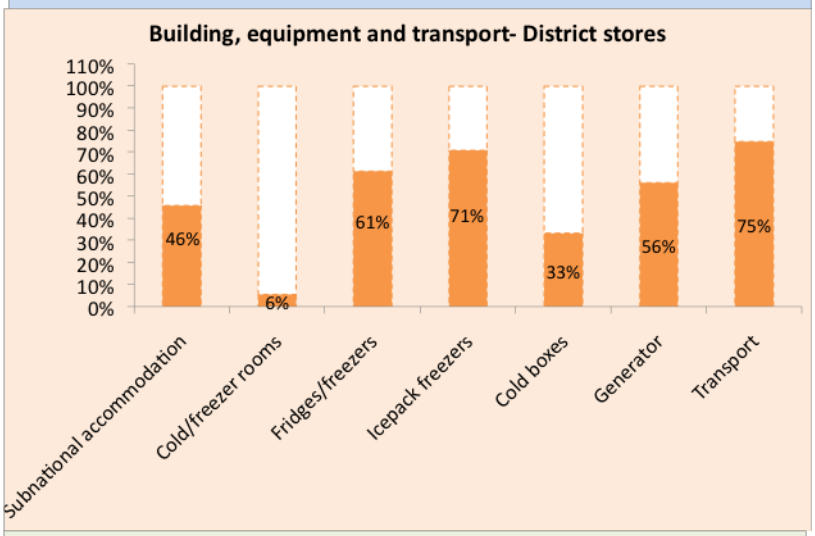
Criterion 4:

Buildings, cold chain equipment and transport

State store: The state vaccine store was re-located to a new state-of-the-art warehouse facility at the Government Vaccine Institute, Namkum campus. The two-storey warehouse has been allocated for vaccine and related supplies, with the entire ground floor being reserved for installation of cold rooms and the basement for dry storage.

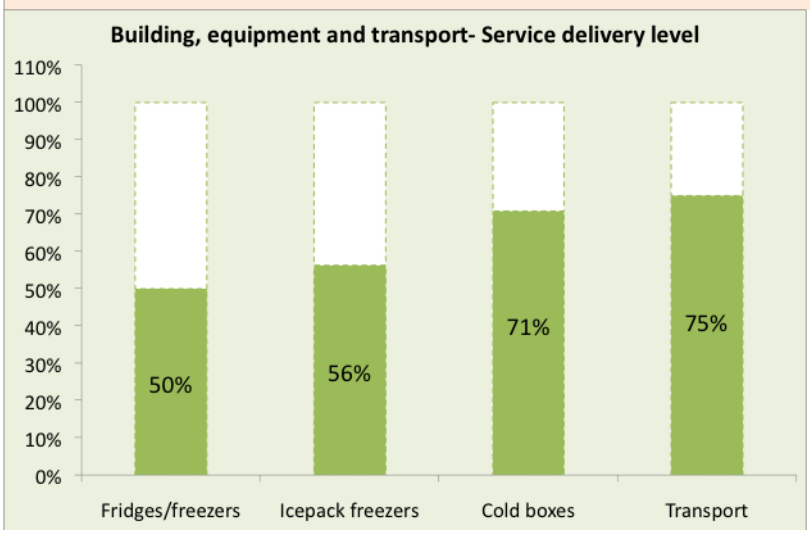


All refrigeration units of the cold rooms were operational but none of them had continuous temperature recorders that functioned. UNICEF had provided one Tiny Tag each for each of the cold rooms, and the 8115 reading capacity data logger for monitoring temperature at the state vaccine store. The WIF was not maintaining the required temperature. The store did not have adequate ice-pack freezing capacity. The district stores often sent frozen ice packs when their vehicles went to collect vaccine. The store did not have its own vaccine van. Transportation of vaccine was either outsourced to private vehicle owners or, more often, vehicles from other programmes (ambulance) were used.



District stores: Palamau, Jamshedpur and Deoghar are foreseen as the future regional vaccine stores.

The Deoghar vaccine store was housed in a recently constructed building and had one WIC and one WIF. Most of the other district stores do not have adequate infrastructure for vaccine storage.

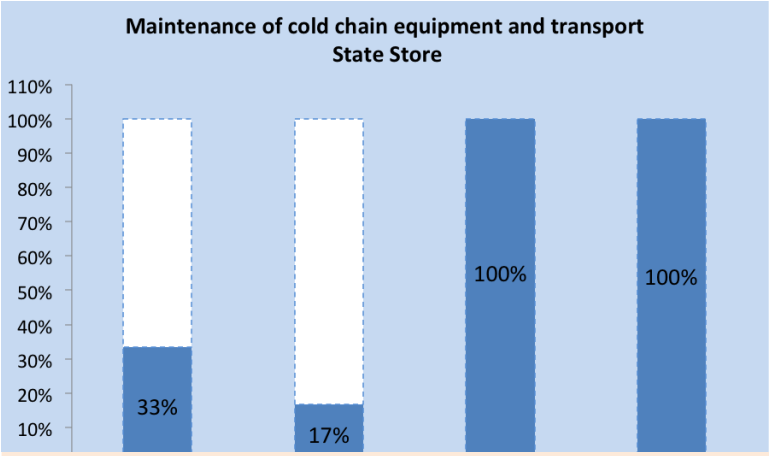


The only other cold room apart from the state vaccine store and the Deoghar regional store was the Giridih WIC, which had been non-functional for a long time.

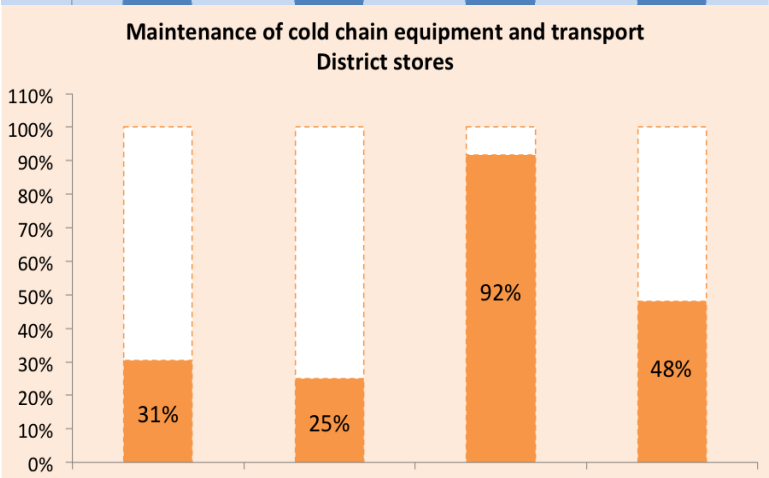
Criterion 5:

Maintenance of cold chain equipment and transport

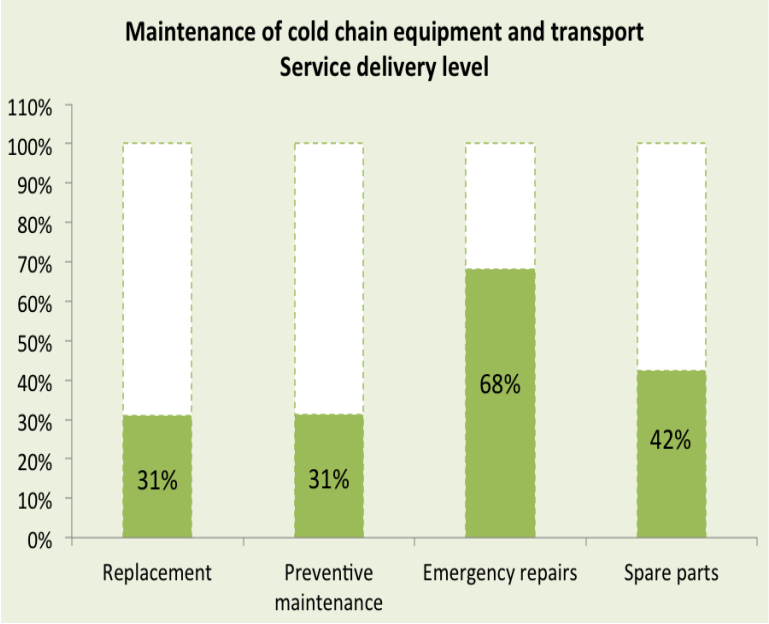
State store: There was no formal itemized replacement plan for the cold chain equipment. Though maintenance has been outsourced to a private agency, there is no planned preventive equipment maintenance. There were no instances of expired vaccine vials / or vial damage due to malfunction of the cold rooms during the six months preceding the assessment. Similarly, there were no instances of vaccine wastage due to gaps in vehicle availability.



District stores: The state had a cold chain equipment inventory, which was part of the UNICEF assessment done in 2005. Based on the national cold chain assessment done in 2008, MoH&FW has procured new ILRs and DFs for the state. The inventory database is being updated with new supplies from GoI. However, there is no systematic replacement plan for aged or faulty equipment.



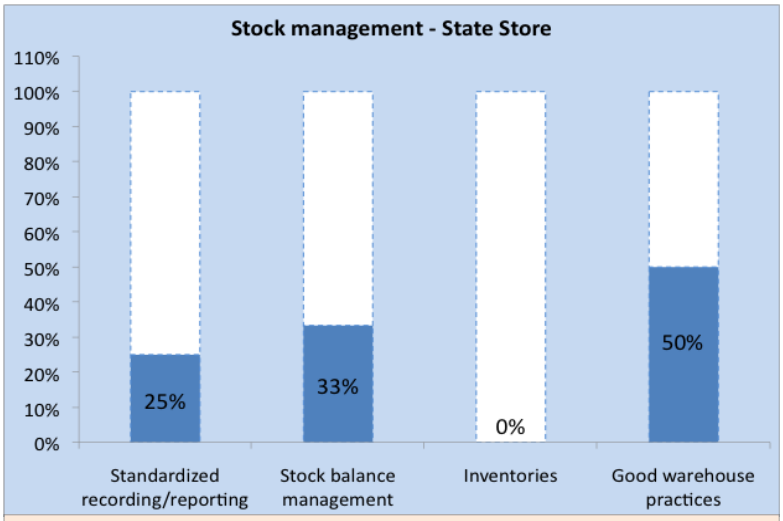
Preventive maintenance of cold chain equipment and transport was extremely poor.

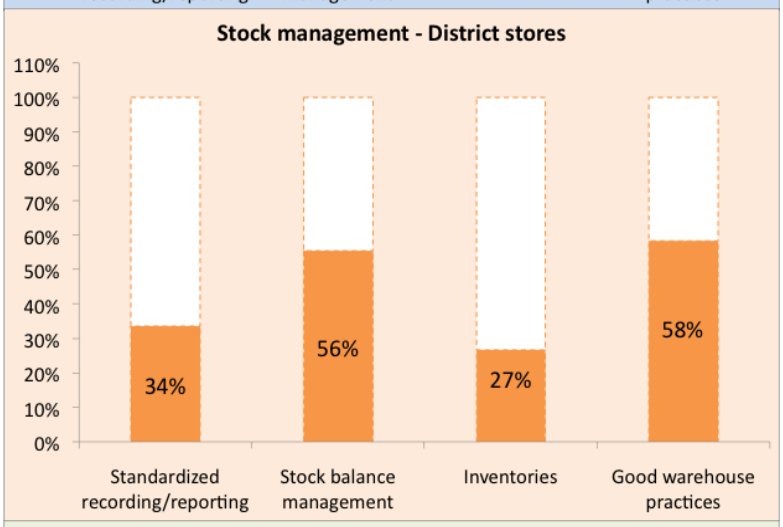


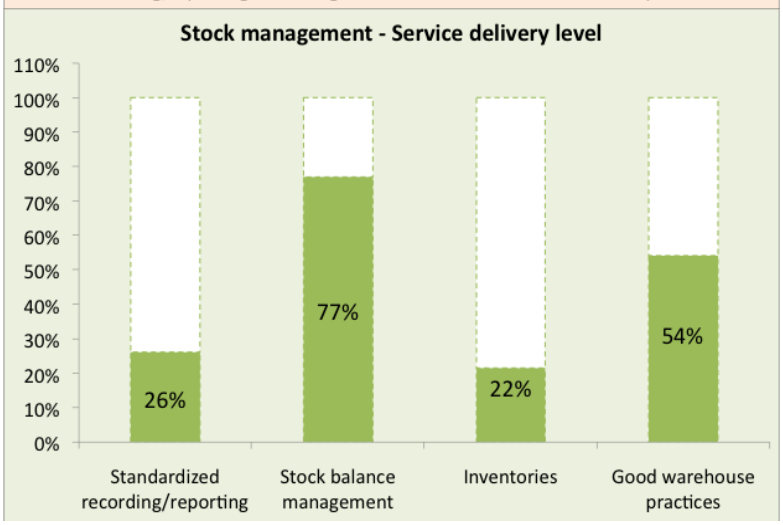
Criterion 6:

Stock management

The recording of diluents is not practiced across the state. There were clear evidences of shipping random batch of diluents with vaccine. This practice of not bundling diluent with vaccine begins from the state vaccine store, leaving no scope for correction at the district stores., Neither did the district stores show any evidence of cross-checking the diluent batch nor of requesting the state store to correct this discrepancy.







State level: The state vaccine store scored 27% on this parameter. The record books for vaccine arrivals were available, but due to the lack of a standardized reporting format were poorly maintained. Though vaccine stock figures were maintained in an excel-based spreadsheet, the format and recording method was inadequate. The digital copy of the stock book was primarily used for periodic report generation, which was often off track and prepared retrospectively. The physical count of the vaccine stock did not tally with the records; disparities were found particularly with the OPV vaccine. The store was also over-stocked with vaccine; this was primarily due to the bulk (resulting from not following the scheduled dispatch) supply of vaccine from the manufacturers.

District level: Sahebganj and Palamau districts scored the highest in this section with 53% and 52% respectively. Dumka was the poorest performer, scoring only 18%. The remaining districts scored an average of 25% to 30%. The stock books at the districts stores do not include critical information related to vaccine manufacturer, diluent , vial size, etc. In most of the districts, the physical stocks did not match with the figures in the record books.

Criterion 7:

Effective vaccine delivery

State level: The receipt and delivery of vaccine did not follow any planned schedule. Manufacturers shipped vaccine in bulk , not complying with the procurement department's delivery schedule note . Shipments to the districts were made according to the indent prepared by the districts, which did not reflect the standardized quantities in accordance with their required needs for the period of shipment.

There were stockouts, which affected the delivery of vaccine to the districts (there was no stock of TT, DPT vaccines for few months). The stores did not set safety stock limits for any of the vaccines. The state vaccine store scored 45% on this criterion.

District level: Delivery of vaccine to the next level was affected because of two key reasons:

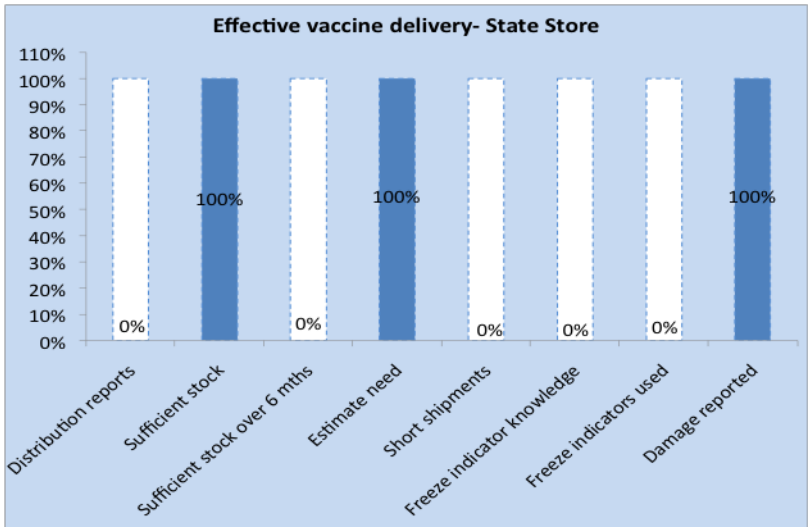
- Poor stock management; and
- Absence of a vaccine distribution plan;

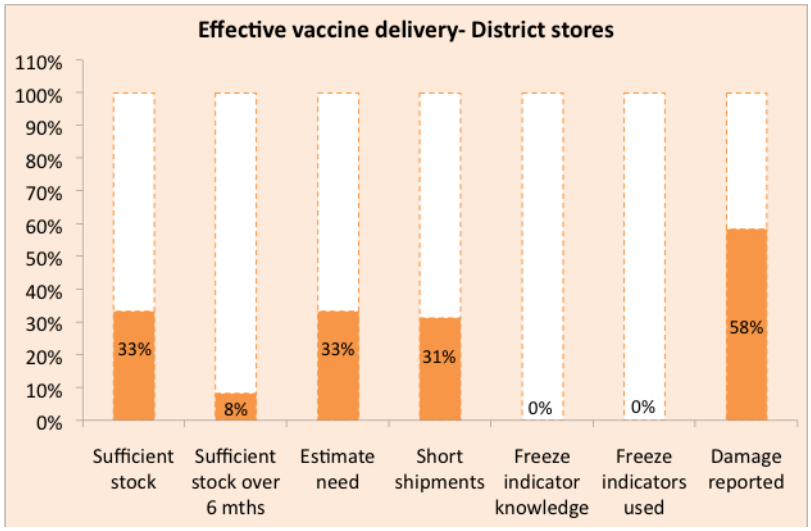
In fact, all district stores assessed had experienced vaccine stock outs during the six months preceding the assessment.

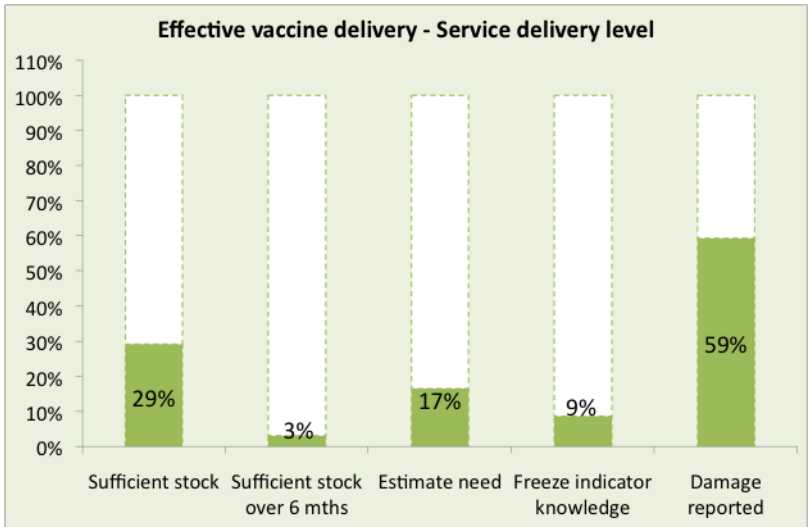
CHCs took delivery of their vaccine; but they neither had a vaccine delivery plan nor did they submit their requirements or schedule in advance. The vaccine was issued based on an indent brought by the CHC representative.

While the Dumka vaccine store scored nil on this parameter.

Khunti, Dhanbad and West Singhbhum scored the maximum with 54%, 47% and 45% respectively.







Criterion 8
Correct diluent used for freeze-dried vaccine

State store: The diluents were stored in a room adjacent to the cold room. The physical count of diluents matched with the quantity of freeze-dried vaccine stocks. However, the mapping of the right batch of diluent with the right vaccine was not done.

District stores: In all the sample districts, the stock of diluents did not match with the vaccine stock and no separate stock book was maintained for diluents.

Criterion 9:
Effective VVM use

VVM has been introduced only on a few vaccine vials (OPV and HepB) in the state, though MoHFW plans to introduce the VVM on all vaccines by 2010.
State level: The staff responsible for handling vaccine stocks was well aware of VVM; however there was no established procedure to use it for stock management and for shipment of vials displaying an advanced stage of VVM ahead of vials displaying VVM in stage I.

District level: Except for a few districts, most of the staff demonstrated a good understanding of VVM and its use in stock management. Written instructions were also available at a majority of the

Criterion 10:
Multi dose vial policy

MDVP has been adopted only for the OPV campaign vaccine. This criterion is therefore not applicable.

Criterion 11:
Vaccine wastage control

The staff at all the three levels was mostly aware of the factors leading to vaccine wastage. However, the wastage was rarely estimated and equally scarcely used for estimating vaccine requirement. With the focus on increasing immunization coverage, this poses a high risk of underestimating vaccine quantities.

There were instances of frozen DPT vaccine in ILRs. This could be during transit or due to storage of the vaccine in a malfunctioning ILR. A comprehensive temperature monitoring evaluation is required to identify the cause of such instances. For the above reasons, the facilities scored very low on this criterion.

7.1.2 Key observations from sites

Based on these field observations, a consultative process was adopted to identify the causes for these performance gaps. This process guided the formulation of recommendations for each level.

Observation	Cause identified	Effect
Human resource		
Activities and reporting related to routine immunization is often carried out by cold chain handlers without supervision	CHCs of Torpa and Murhu (Khunti district), Raidih and Dumri (Gumla district), Ormanjhi (Ranchi) do not have a focal medical officer assigned with the task supervising of routine immunization	No accountability
State EPIO, CCO & DRCHO felt that they do not have the essential administrative and financial authority and flexibility with regard to UIP and PPI.	All the financial and administrative powers lie with the civil surgeons	Programme co-ordination suffers
The roles and responsibilities overlap across the appointed staff.	Dedicated staff at the state and district level was insufficient. .	This poses a high risk of a break down occurring in the cold chain system and damage to vaccine due to improper handling. It also leads to poor vaccine management (over stock or stockouts).
Some of the cold chain handlers did not receive any formal or on-the-job training.	The staff assigned the responsibility of handling cold chain does not receive induction training in vaccine handling and cold chain maintenance.	The staff takes on the responsibilities without adequate knowledge of vaccine and cold chain management.
The supervisors who provide on-the-job training did not receive any formal training.	No TOT conducted for a long time.	The recommended practices and new developments in vaccine management and cold chain logistics do not reach the staff handling the cold chain.
Observation	Cause identified	Effect
Stock management		
PIP preparation at the state level is carried out based on annual target estimates and not based on requirements at the CHC level.	Vaccine estimation method has not been uniformly adopted.	This leads to incorrect vaccine forecasting.
There have been instances of vaccine stock outs at the CHC and district levels.	There is no track of vaccine in stock at the district and CHC levels.	Stock outs and over stocking of vaccine occurs. The routine immunization programme suffers due to non-availability of vaccine
Vaccine is pushed to CHCs from districts.	The pull mechanism based on requirement and stock level at the CHC level is not practised.	
Indent not adjusted according to stock in hand	Vaccine indenting is based on earlier indents and the	Results in over estimation and over stocking of

	column for stock-in-hand is either left unfilled or not taken into account.	vaccines. Available cold chain capacity is constrained.
Vaccine consumption reports from CHC to district and district to state are not submitted	Immunization coverage and vaccine consumption is not analysed.	Quantitative analysis of immunization coverage and vaccine consumed cannot be done. Cannot accurately estimate the vaccine wastage rates.
Stock book and physical stock of vaccine do not tally.	Physical stock verification is not practised	Difficult to implement EEFO. Demonstrate the practices of poor stock management
VVM status and diluents are not recorded in the stock books.	No record of diluents. The record book does not have any provision for recording the VVM status of the vaccine.	Status of VVM cannot not be traced for vaccine received and shipped. No track of matching batch of diluent with its respective vaccine.
Damaged or expired vaccine is neither recorded in the registers nor moved out of the cold chain.	No separate register and forms are in place for recording damaged vaccine and these vials are not removed from the stocks either.	Risk of issuing expired or damaged vaccine. Non-usable vaccine is not being replaced Non-usable vaccine piles up in the cold storage.
Quantity indented and quantity supplied, and the schedule and frequency are not standardized.	Vaccine is often picked up from the state vaccine store on a monthly basis; however, the quantity indented or supplied depends on the capacity of the vehicle sent by the district.	Supply of vaccine often does not meet the requirement and this affects the immunization coverage rate.
Vaccine, diluents and syringes are not bundled together.	Diluent supplies are not recorded anywhere. Syringes are shipped separately every two months.	High wastage rate of vaccine due to mismatch of diluent supply. Higher chances of AEFI due to reconstitution of vaccine with non-standard diluent.
Temperature monitoring		
Cold chain handlers do not know how to read the thermometer correctly. Also some of them cannot interpret the thermometer reading.	No SOPs for reading and interpreting the thermometer.	High risk of vaccine damage as the temperature is not monitored.
The temperature is not recorded on Sundays and holidays.	The temperature is not recorded twice daily on all weekdays.	
The record books reveal a recurrent pattern of temperature reading. Since sometimes the thermometer reading itself is incorrect, these records are unreliable.	Lack of effective supervision by MOIC. The temperature records were not countersigned by MOIC or DRCHO.	

The cold chain handlers do not know what to do in the event of a cold chain failure except to inform the MOIC.	No SOP son what to do if there is a cold chain failure.	High risk of damage to vaccine in the absence of an effective contingency plan.
Infrastructure		
Inadequate dry space to store diluents, syringes and other supplies.	The infrastructure for the cold chain equipment and dry storage area is not in accordance with the national norms.	Bundling of vaccine with supplies is difficult. High chances of supplies being damaged due to improper storage.
Facilities in terms of conditioning ice-packs, ventilation, and water sanitation are inadequate at most of the levels.		Ice-packs are not conditioned for transportation of vaccine, posing a high risk of freezing freeze-sensitive vaccines
The standards of electrical fittings are inadequate (improper earthing, loose wirings and extension plugs are used).		Staff are exposed to hazardous working conditions.
Power supply backup in form of a generator was found to be either inadequate or in operational.	Generators are either too old and perform sub optimally or under-capacity generators have been provided.	There is a risk of the cold chain breaking in the event of prolonged electricity failure.
Cold chain capacity		
No authentic inventory of the cold chain equipment across the state.	No mechanism (MIS) to record the inventory.	Cannot forecast adequately the requirement of cold chain equipment.
Reporting of faulty equipment was not timely (not reported to CCO within 48 hrs).	Repair of non-functioning equipment is carried out centrally at Ranchi as there are no refrigerator mechanics posted in the state.	Risk of breaking the cold chain in the event of equipment failure.
Faulty cold chain equipment not repaired within a reasonable time span.		
No tool kit for the newly recruited refrigerator mechanics.		
No inventory of spare parts for the repair and maintenance of the cold chain equipment.		
There are no SOPs for handling and maintaining the cold chain equipment.		
Non-functioning stabilizers are often not repaired.		High risk of breakdown of refrigeration equipment.
Shortage of freezing capacity for making ice-packs during campaigns in a few districts	Most of the districts rely on ice factories for freezing ice packs during campaigns. These factories often cannot produce the required quantities of ice packs on time.	Running the risk of exposing the vaccine to high temperatures during campaigns.
Condemned equipment is	No authority at the district	Dead equipment occupying

kept in the store, occupying the scarce store area and is not auctioned.	level to condemn and auction the non-repairable cold chain equipment.	scarce space
ILRs are used to store non UIP and PPI supplies (ARV and AVS).	No separate refrigeration equipment available to store non-UIP vaccine.	Possibility of shortfall of cold storage space for routine and campaign supply of vaccine. Risk of mistaking anti-snake venom or anti-rabies vaccine for UIP vaccine and vice versa.
Transport		
Vaccine vehicles are not maintained (no routine servicing).	Manufacturer support for the model of vehicle used for vaccine van is negligible in the state.	Non-availability of vehicle for transportation of vaccine to the extent of risking short supply for the programme.
A dedicated vaccine van is not available for UIP and PPI (also being used for other purposes).	Since there is no insulated van, other vehicles are used for transportation of vaccine.	
	No plan for replacement and expansion of vaccine delivery vans.	Risk of exposing the vaccine stocks to high temperatures for long and distant destinations.
Procurement and supply		
ILR/DF thermometers are not available at some of the cold chain points.	Broken thermometers are not replaced. Also no buffer stock of thermometers exists at the district stores,	Risk of late diagnosis of malfunctioning refrigeration equipment, exposing vaccine to extreme temperatures.
Temperatures are recorded at all.	Temperature record books have not been supplied.	No trace of systematic temperature monitoring.
The newly supplied vaccine carrier could not be packed with the standard sized ice-packs.	Non-standardized procurement of vaccine carriers.	Risk of vaccine carriers not being effectively used for vaccination sessions.
Vaccine storage baskets were missing in most of the ILRs	Newly supplied ILRs did not include vaccine storage baskets. Also the staff does not use the basket because of lack of space to store the vaccine.	Risk of not storing the vaccine in an orderly fashion and exposing freeze-sensitive vaccine to below zero degree temperatures.

7.2 Assessment result – Phase II

The assessment of the remaining 12 districts of Bokaro, Chatra, Godda, Jamtara, Koderma, Latehar, Lohardega, Pakur, Ramgarh, Ranchi, Saraikela and Simdega, was carried out during phase-II in February 2010. The following are the key findings of the assessment:

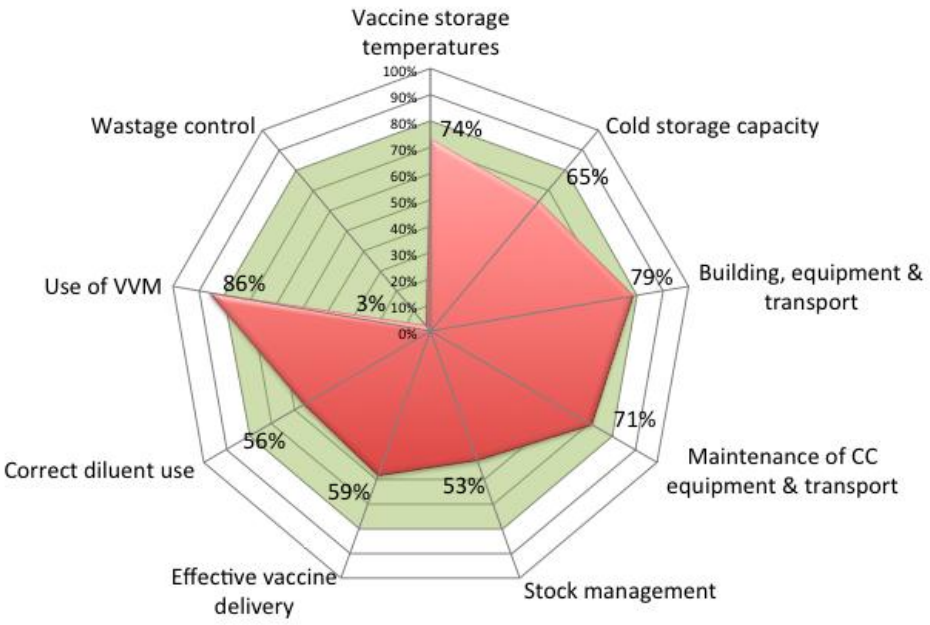


Figure 6: Spider chart to represent the findings of the assessment of district vaccine stores Phase II, 2010

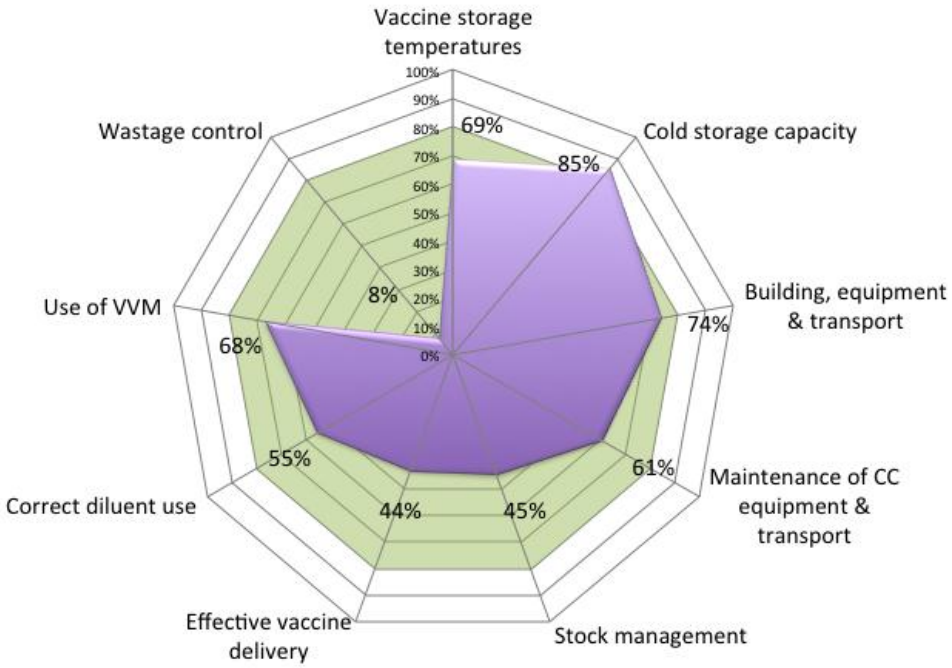


Figure 7: Spider chart to represent the findings of the assessment of CHC vaccine stores Phase II, 2010

Generic findings:

- The recording of diluent in stock register is not followed across the state. This was however initiated at state vaccine store after the first round of VMAT.
- The temperature monitoring, especially at the CHC level, was ineffective as there were many instances the thermometers either not being available or damaged but not being replaced. The reporting on the absence of thermometers was poor.
- Key fields of information, including diluent information, manufacture information and vaccine presentation, were not recorded in the stock books. This is primarily because the stock book format is not standardized across the state.
- The scheduled preventive maintenance of cold chain equipment across state was not adhered to. The Table below lists the basic checkpoints of preventive maintenance, responsibility for which is shared between the cold chain technician and the cold chain handler. In the absence of cold chain technicians, there was very little preventive maintenance.

Cold chain technician	Cold chain handlers
- To check the power input–output voltage, earthing leakages and conditioned monitoring of cables and wires. - To avoid the deposition of carbon on relays and contactors and regular polishing of the same.	- To monitor the functioning of the stabilizer. - Thermostat setting of equipment. - To ensure the proper cleaning of the inside chamber and the area near the compressor and the electrical equipment. - Timely defrosting of equipment.

Ranchi District

- The contingency plan at the district store did not assure the security of vaccine in emergency situations. Further, no emergency contacts were posted on the premises. Since the state store is nearby, the staff relied on it to resolve any emergency situation.
- Though the store had the required storage capacity, for the same reason as above, the vaccine supply frequency was irregular and the quantities varied at random.
- The staff did not follow any preventive maintenance schedule for the equipment. The outbound logistics of effective vaccine delivery lagged in terms of estimation, short shipments, knowledge of freeze indicators and damage reporting.
- There were instances of damage to vaccine during transportation.
- The Silli CHC of the district lacked sufficient cold chain capacity to cater to the routine immunization needs of its population.

Ramgarh District

- The building accommodating the store was not large enough. There was shortage of space for packaging of vaccine and no space for conditioning of ice-packs.
- The permanent cold storage capacity of the district store was inadequate and the staff had insufficient knowledge of how to adjust supply frequency. The store was often overstocked with vaccine and there were short shipments that were not corrected.
- The indents prepared were based on previous requirements and the computation for vaccine requirement was inappropriate.

Seraikela District

- The overall performance was satisfactory except for the absence of a generator. Also, the staff did not know how to estimate vaccine requirements.

Chatra District

- The permanent and temporary cold storage capacity was inadequate for routine and campaign vaccine. This has affected the vaccine stock management of the district.
- The district cold chain room was housed in Sadar Hospital, an old dilapidated building... In the room, the plaster of the ceiling was falling off from many places. The window panes were broken and the windows had no grills. The store had a generator connected to the cold chain room. But there was no separate room for the generator; instead it was kept in the verandah leading to the cold room. The frequent power cuts posed a challenge to the district.

Latehar District

- The storekeeper at the district store was untrained in vaccine management. He was unaware of the safe temperature ranges for vaccine. Apart from the store infrastructure, which was somewhat unsatisfactory, the knowledge gap affected stock management, diluent handling and effective use of VVMs.

Pakur District

- The cold chain capacity and building standards were satisfactory at district store. There were also knowledge gaps in vaccine estimation and inventory management.

Koderma District

- No preventive maintenance of the cold chain equipment was undertaken. Further, there was a shortage of ice-pack-making capacity. There were knowledge gaps in stock management and vaccine estimation needs.

Jamtara District

- The preventive maintenance of cold chain equipment and vehicles was inadequate. There were knowledge gaps in temperature maintenance, vaccine estimation and adjusting the vaccine supply period.

Godda District

- The vaccine van of the Godda store was non-functional after it was burnt during a public outrage. It needs to be replaced urgently.
- There were knowledge gaps in terms of contingency planning, vaccine estimation and adjusting the vaccine supply period.

Simdega District

- The district store scored satisfactorily except in stock management, where the inventory management of supplies needed attention.

Lohardega District

- The temperature records were not maintained for the cold chain equipment at the district store.
- There were knowledge gaps in stock management and estimation needs.

Bokaro District

- The diluent inventories were poorly managed in the district store. There were no records of diluents.
- The store had insufficient ice-pack making capacity
- The staff did not know how to manage stocks and estimate vaccine requirements.

The problems observed, its causes, its effects and solutions were discussed during the workshop and have been tabulated below (see Table 2).

Table 2:

S. No	Observation	Cause	Effect	Solution
Temperature monitoring				
1	*Temperature recording not based on temperature reading.*	No effective supportive supervision. Non-replacement of broken thermometers;	No quality assurance. No corrective action to control wastage.	To include the status of working thermometers in vaccine indent and other routine reporting Routine supervision.
2	*Temperature recorded from an external digital thermometer.*	Lack of knowledge. Absence of internal thermometer.		
3	*Contingency plan either does not exist or is not followed.*	No personnel responsible for executing the contingency plan;	High risk to vaccine.	Prepare and routine test the contingency plan.
Cold Chain				
4	*Refrigerator mechanics not utilized*	Unavailability of tool Kits.	Faulty equipment is not repaired on time.	Procurement of tool kits and spares.
5	*Inventory database of cold chain equipment incomplete or unreliable.*	*Reporting of cold chain equipment status to CCO not happening.*	Replacement does not happen and replacement plan cannot be prepared.	Standardized reporting formats to be prepared. Increase the reporting frequency. Prepare the database at the state level and implement the update mechanism.
6	*Cold chain equipment functioning without stabilizers.*	No stabilizer	High risk of equipment failure.	Procure locally with standard specifications to fill the gaps.
7	*Out-of-order electrical cold chain equipment lying at the districts and CHCs are not condemned and auctioned.*	Condemnation and auction process lengthy and not adopted.	Scarce storage area occupied by dead equipment. Dead equipment still figures in active usable inventory.	Form the committee to auction the condemned equipment.
8	*Broken down solar equipment at many CHCs and districts.*	Solar panels are stolen or battery worn out.	Loss of cold chain storage as solar refrigerators not utilized . Occupying dead space in the cold chain stores.	Conduct a professional assessment to review and draw roadmap of revamping the broken systems.
Stock Management				

S. No	Observation	Cause	Effect	Solution
9	*Vital information such as expiry date, VVM status, diluent quantities not captured in standard formats.*	Standard formats do not include columns for vital information.	Tracing information is difficult. High chances of stock mismanaged.	Adopt the standard stock book for record keeping
10	*When it comes to handling of diluents, no replacement of broken ampoules.*	No provision for extra supply of diluents.	Wastage of vaccine. Mismatch of vaccine and diluent.	Keep provision of 10% of excess supply of diluent. Diluent should be handled with similar care as of vaccine
11	*Stock books and indent register not supervised*	The MO does not see the importance of supervising the stock book.	Mismanagement of vaccine stock, resulting in stock outs. Mismatch of vaccine and diluent. Poor estimation of vaccine requirement.	Include the topic in the training programme for MOs and for supervisors and cold chain handlers. MO to be accountable for stock book maintenance.
12	*Estimation of indent not based on requirement and target beneficiary.*	Micro plans not referred to for estimations. The cold chain personnel does not know the computation method. Indent quantity repeated.	Risk of stock outs and over stocking leading to vaccine wastage.	Micro-plan should be referred to as a baseline for estimation of requirement.
13	*VVM not used in stock management*	Not included in the standard stock management practices. VVM is often taken as a tool of importance at vaccination site only;	Leads to wastage of vaccine.	A different training strategy needs to be adopted: train store managers in prioritizing the vaccine stocks using VVM; train frontline staff to categorise vaccines based on VVM stages into: Usable and unusable;
14	*No record of returned vials.*	No accountability of ANM/vaccinators regarding issued and utilized vaccine.	Possibility of accidental issue of vials returned more then 3 times.	Record the returned vials in stock registers. .
15	*Increased frequency of vaccine arrival and delivery.*	Short supply of required quantities. Erratic power supply leads to low or no stock at CHC.	Risk of stock outs. Increased transportation costs.	Provide power supply backup through generator and POL provision.

S. No	Observation	Cause	Effect	Solution
16	*Unopened vials not returned.;*	AVD not effectively implemented. Unaware of the importance of returning the vial the same day.	Increased wastage.	AVD and ANM need to be made accountable. AVD incentives to be based on complete cycle of "pickup-drop-return". If there is a recurrence of "vials not (being) opened" at the session site, then revise: 1) Micro plan and vaccine requirement 2) Review AVD's ToR
17	*Stock piling of opened vials at cold chain points.*	Open vials not discarded at the end of the day.	Accidental use of possibly contaminated open vial	Follow the current GOI policy of discarding the open vials at the end of the day.
Waste management				
18	*Unsafe disposal of open vials.*	*Lack of knowledge of disposal methods and no awareness of the adverse effects of improper waste disposal.*	*Accidental infections and a hazard to the community*	Training on bio-medical waste disposal. Disposal should happen on a fixed day. Follow the guidance on handling used and expired vials (unopened). STRICT adherence to safe waste disposal management.
Infrastructure (Building, power supply, generator)				
19	*Supplied generators not installed.*	*Lackof coordination between the state supplier and the site.*	*Inadequate power supply back-up.*	*Enter into contractual arrangements with the suppliers on commissioning generators.*
20	*Inadequate fuel fund to operate generator in regions with poor power supply.*	*Blanket distribution of fund. Lack of monitoring and log book maintenance.*	*Inadequate or no power supply back-up.*	*Rational distribution based on supportive evidence from the site (log book of genset and Jharkhand State Electricity Board (JSEB) power supply record).*
Transport				
21	*Vaccine van not available.*	*Vehicles are not in there inadequate numbers and the existing ones are obsolete models.*	*Cold chain not ensured during transit and insufficient stocks are transported.*	*Planning has to happen at the state level. Procurement of vans with time-tested after-sale service.*
Human resource				
22	*Dedicated cold chain personnel not available.*	*There is no dedicated post for a cold chain handler.*	*Sub-optimal cold chain and vaccine management*	*Create a defined cadre for cold chain handlers with their ToRs. Plan for imparting induction training immediately to a new appointee.*

Recommendations

Human Resources

1. Based on the staffing pattern as per the IPHS norms pertaining to UIP, the vacant positions of DRCHO, storekeeper, cold chain handler and refrigerator mechanic should be filled.
2. The refrigerator mechanic should be trained in repairing the cold chain equipment through a training cell identified by MoHFW (GoI).
3. The state should review the present administrative and financial authorities (of SEPIO, CCO and DRCHO) and revise if necessary for timely implementation of UIP and PPI programmes.
4. DRCHO and medical officers should be trained in vaccine management and cold chain logistics at least once in two years.
5. The DRCHO/Medical Officer should train all new staff appointed to manage the cold chain and vaccine logistics within seven days of appointment.

Infrastructure

1. All new allocation/construction of vaccine store at all levels should be approved based on adequacy of size, location and facilities as per IPHS norms and WHO guidelines.
2. All existing infrastructure for vaccine storage at the district level should be approved and renovated in compliance with the IPHS norms and WHO guidelines.
3. Electrical fittings (electrical connections, apertures, wires, socket and earthing), wherever required, should be refurbished in accordance with the IPHS norms at all the levels.
4. All the district stores and CHCs should be provided with operational and adequate capacity generators to support ILR and DFs.
5. Where the room size is smaller than 3.5 x 3 m, the room should be dedicatedly used to store only the ILR and the DF and a separate dry storage area should be provided to store other supplies.
6. Access to ILR, DFs, records, and the dry storage room should be restricted to authorized persons. Storerooms, ILRs and records cabinets should have locking facilities.

Stock Management

1. The vaccine requirement at the CHC and sub-centre levels should be computed based after taking into consideration the number of sessions and the target population (whichever is higher). The annual requirement of vaccine across the state should be based on these micro-level computations.
2. A protocol should be established, whereby each CHC submits its annual requirement of immunization-related supplies to the respective district store and the district store to the state store well ahead before the State PIP is prepared.
3. Supervisors should ensure that the standardized stock book is implemented as per MoHFW, GOI recommended format for recording the transactions of vaccine and diluents at all the levels of the cold chain.
4. Implement the Vaccine Logistic Management Information System (VLMIS) to track the stock situation at the district stores. The MIS should intimate the designated authorities about alarming stock levels, quantities to be indented and cold chain capacity constraints. It should also facilitate information flow pertaining to the consumption of vaccine at the cold chain points.
5. The SEPIO, vaccine logistics manager and storekeeper should have access to VLMIS and data pertaining to the districts for timely decisions and receive advance intimation related to adequate quantities to be supplied to each district.
6. VLMIS should be able to compute the estimated wastage rate of each vaccine based on the total vaccine quantity supplied and the immunization coverage data.
7. SOPs pertaining to maintenance of cold chain equipment, stock management practices, temperature monitoring and supervision should be issued to the state and district vaccine stores and all other cold chain points.

Monitoring

1. The cold chain supervisor should ensure seven-days-a-week monitoring of the temperature and submit a monthly review report to the State CCO. The format of the monthly temperature review is attached to this report.
2. The Freeze Tag should be mandatorily included with freeze-sensitive vaccine during transportation.
3. Temperature monitoring using transportable data loggers should be in place, and the monitoring should be initiated from the state level. It should cover transportation, storage at all the district stores and randomly selected blocks and outreach sessions.
4. All the ILRs should be equipped with a 30-day digital temperature indicator (Fridge-Tag). Supervisors and cold chain handlers should be trained in reading the device and use it for effective temperature monitoring.
5. All the cold rooms in the state should have a 24-hour computerized temperature monitoring system (Multilog-wired device or Cobalt Wireless device). The data should be analysed every week.

Procurement and supply

1. All vaccine carriers that have been in use for five years or more should be scheduled for replacement and a request should be placed with MoHFW for new equipment.
2. Adequate thermometers and temperature record books should be provided for each ILR and DF at the installed sites. The state and district stores should have buffer stock and be able to provide replacements or additional stocks within seven days of indent.
3. The cold chain asset register should be maintained at all the cold chain points and intermediate stores. The CCO should maintain an authentic and updated inventory of the cold chain assets. Based on an analysis of the requirements and available equipment, an annual equipment replacement plan should be drawn up.

Cold chain

1. The refrigerator mechanics should undertake cold chain equipment assessments and prepare a status report of the cold chain in their respective districts. Based on this assessment, the CCO should prepare a list of spare parts required to build a buffer stock. The requirements should then be submitted to MoHFW.
2. Each appointed refrigerator mechanic should be provided with one recommended set of functional toolkit for repair and maintenance of the equipment (including cold rooms). The CCO should requisition the MoHFW for toolkits as a priority.
3. The CCO should draft a crash-repair and maintenance programme plan for all the cold chain equipment in the state. This plan should indicate the travel plan of the technicians, the spare parts required, and the financial requirements to cover the TA/DA of technicians and include the advance intimation procedure to sites to ensure onsite preparedness.
4. The state central warehouse should establish the spare-part depot with standard coding of all the spare parts, shelves for storing the parts, asset and issue register and the procedure for issuing the parts to the cold chain technicians.
5. Faulty equipment should be reported from the cold chain point to the refrigerator mechanic within 48 hrs and the down time should not exceed seven days.
6. A reporting mechanism should be established for the refrigerator mechanic to report to the CCO so that the latter can compile the repair and maintenance activities of the cold chain units. This data should support the annual cold chain equipment requirement estimate.
7. A technical committee should be formed at the district level for condemnation and auction of non-repairable equipment.

Transportation

1. All district stores should have dedicated and suitable vehicles to transport \ vaccine stocks.
2. A standardized financial and administrative form for servicing and repairing the vaccine vans allotted for UIP and PPI should be provided to the DRCHOs.

3. The state vaccine store should have a refrigerated van to transport vaccine to far off districts like Sahebganj, Godda, Pakur, Dumka, Deoghar, Palamau and Garhwa.

Improvements observed since phase I

The following improvements were observed since the phase I assessment was conducted in 2009:

- The district stores and the CHCs now have temperature log books.
- More staff are now aware of the thermo-sensitivity of vaccines (from 50% in 2009 to 92% in 2010).
- The new WIC (32 m^3) and WIF (16 m^3) have been installed at Deoghar, and the district will now serve as the regional vaccine store and will supply vaccine to the five adjacent districts of Godda, Pakur, Sahibganj, Jamtara and Dumka. This will make transportation of stocks to the extreme eastern districts easier. This will also increase the cold storage capacity of the region.
- Two new WICs (16 m^3) and one WIF (16 m^3) have been installed at the state vaccine store. These cold rooms were supplied by MoHFW. Installation of these cold rooms at the state and the Deoghar regional stores were in time to support measles campaign.
- MoHFW has supplied 160 new, small DFs, 147 large DFs and 110 large ILRs, which has helped fill the gaps in ice-pack making capacity and vaccine storage capacity in the state.
- A cold chain consultant, supported by UNICEF, has been deputed to provide technical assistance to the RCH programme.
- Totally, 124 dataloggers have been purchased by UNICEF, which will be used to monitor the vaccine temperature throughout the supply chain, starting from the state vaccine store down to the last cold chain point.
- The practice of bundling the vaccine along with other supplies (syringes, droppers and diluents) has now been initiated in the state.
- Thirteen cold chain technicians have been appointed in the state and the recruitment of technicians for the remaining districts is in progress.
-

CRITICAL INDICATORS

Vaccine Arrival Procedures

1. The requirements set out in the vaccine arrival report have been complied with for all shipments
   1.1 Does the VAR form includes all key procedures from UNICEF VAR parts I to VII?
   1.2 Record the number of vaccine arrivals over the past six months.
   1.3 There should be a VAR to accompany each individual vaccine; how many were there?
   1.4 How many of these received VARs were completed substantially correctly by the "Inspection Supervisor"?

Vaccine Storage Temperatures

1. Storekeeper must the correct storage temperature for every vaccine
   1.1. Can storekeeper give the correct storage temperature range for each of the vaccines on the RI schedule?
   1.2. Can storekeeper give the freezing temperature of each of the freeze-sensitive vaccines on the RI schedule?
2. Maintain a contingency plan
   2.1. Is there a satisfactory contingency plan in the event of an equipment failure?
   2.2. Are emergency contact details posted in the vaccine store?
   2.3. Interview staff. Do they know what to do in the event of an emergency?

Maintenance of Cold Chain Equipment

1. Planned replacement of cold chain equipment is carried out.
   1.1 Is there an itemized equipment replacement plan, and is this being followed?
2. Planned preventive maintenance to cold chain equipment and transport is carried out.
   2.1 Is there a planned preventive maintenance, overhaul and replacement plan, and is this plan is being followed?
3. Emergency repairs to equipment and transport are conducted in a timely manner and are reported
   3.1 During the past six months did any cold room, vaccine refrigerator or freezer fail to the extent that vaccine was damaged?
   3.2 During the past six months did any vehicle fail to the extent that vaccine was damaged?

Stock Management

1. Standardized recording and reporting of all stock transactions is carried out. Preferably this is computerized at the national and sub-national stores
   1.1. Are vaccine and diluent quantities (doses) recorded?
   1.2. Are vaccine and diluent type recorded?
   1.3. Are vaccine and diluent manufacturer details recorded?
   1.4. Are vaccine and diluent vial size recorded?
   1.5. Are vaccine and diluent batch/lot numbers recorded?
   1.6. Are vaccine and diluent expiry dates recorded?
   1.7. VVM status recorded?
   1.8. Is freeze-indicator status recorded?

2. Periodic physical inventories have been conducted
   2.1 Carry out a sample physical count of the vaccine stock to establish whether stock records are accurate. Choose a freeze-dried vaccine, preferably one with a separately packed diluent.

Effective vaccine delivery

1. A sufficient stock of each vaccine and diluent has been available throughout the past six months
   1.1 No stockouts?
   1.2 No instances where low stock levels affected deliveries to lower level stores?
   1.3 No instances where safety stock levels were breached?

2. In case of failure, damage has been reported and vaccine has been replaced on time.

2.1 During the past six months period, was less than 1% vaccine lost due to incorrect transport conditions from the supplying store?

Correct diluent use for freeze-dried vaccines

1. Freeze-dried vaccines are always ordered, received and distributed with their original diluent
   1.1. Inspect vaccine and diluent stocks and check stock records. Are correct diluents, in the correct quantities and correct lots, being distributed with each batch of vaccines?
2. The stock of diluent corresponds with the stock of freeze-dried vaccine
   2.1 Does the diluent stock for each freeze-dried vaccine correspond with the stock of each vaccine?
3. Health workers use the correct diluent with each freeze-dried vaccine (i.e. same manufacturer and same number of doses as the vaccine)
   3.1 Do health workers always use matching diluent and vaccine?
4. Diluents for immunization sessions are stored and used at the correct temperature (cooled to 2-8^0 C before and during use)
   4.1 Are diluents always kept in the cold chain before and during every immunization session?

Effective VVM use

1. The VVM policy is correctly used by national EPI.
   1.1 Do storekeepers/health workers know how to read VVMs? (Use dummy VVMs and/or sticker samples to check knowledge?
   1.2 VVM vaccines are used outside the cold chain, during routine, outreach or campaign sessions, are they used correctly?
   1.3 Do vaccine managers/health workers use VVM for vaccine management purposes (e.g. do they use Stage 2 vaccines first)?

Vaccine wastage control

1. Vaccine managers/health workers know how to calculate the wastage
   1.1 Assess whether staff understands the principles involved in calculating vaccine wastage?
2. When vaccines are ordered, wastage rate information is used to establish the quantities required

2.1 Establish whether wastage rate data have been used to estimate vaccine needs before ordering vaccine?

Phase I

TEAM COMPOSITION

1. Coordinating Team Members

1) Dr Ajit Prasad, Assistant Supdt. Cum State EPI officer, Govt. of Jharkhand
2) Dr Sumant Mishra, State Representative, ImmunizationBasics
3) Mr Ranjit Dhiman, National Cold Chain Consultant, UNICEF
4) Dr Madhulika Jonathan, Health officer, UNICEF
5) Dr Dhananjay Singh , State RI consultant, UNICEF

Training of trainers: The VMAT group consisted of six teams and included members from developmental partner institutions, state-level officers from DH&FW, DRCHOs of the twelve assessment districts, national and Jharkhand field office consultants and staff from UNICEF. A three-day programme for training of trainers (TOT) was held at Ranchi for all participants from 16 to 18 February 2009, with field visit for observation and documentation from 19 to 28 February 2009.

Teams	Team Members
Team 1	*Mr Ranjit Dhiman, National cold chain consultant, UNICEF* Dr B P Sinha, DRCHO, Hazaribagh Chandra Uday, Logistics manager, RCH, Namkum
Team 2	*Dr Ashfaq Bhat, State RIO, NPSP-WHO* Dr Ambika Prasad Mandal, DRCHO Dhanbad Mr Nandji Dubey, Regional coordinator, UNICEF, Hazaribagh
Team 3	*Mr Neel Ranjan Singh, State cold chain consultant, RCH, Namkum* Dr Nand Kishore Razak, DRCHO Garwha Dr Awadhesh Kumar, DRCHO Palamu Mr Sharat Pandey, Regional coordinator, UNICEF, Palamu
Team 4	*Dr SumantMishra, State Representative, ImmunizationBasics* Dr K P S Gond, DRCHO West Singbhum Dr Kundan Kumar Sehgal, DRCHO, East Singbhum Mr Sriprakash Mishra, District Extender, UNICEF, Jamshedpur Mr Shakeel Najmi, District Extender, UNICEF, West Singbhum
Team 5	*Mr Sunil Saxena, National cold chain consultant, UNICEF* Dr Rajeev Ranjan Sharma, DRCHO Dumka Dr Chandrashekhar Prasad, DRCHO Sahibganj Mr Mirtunjay Rathore, District Extender, UNICEF, Sahebganj Mr Rupak Dixit, District Extender, UNICEF, Pakur
Team 6	*Dr Dhananjay Singh, State RI consultant, UNICEF* Dr A D N Prasad, DRCHO Gumla Dr Mukesh Kumar, RI consultant, UNICEF, Ranchi Mr Pankaj Kumar Gupta, M&E consultant, UNICEF

Phase II

TEAM COMPOSITION

1. Coordinating Team Members

1) Dr Ajit Kr Prasad, SEPI Officer, GoJ
2) Dr Sumant Mishra, State Representative, MCHIP
3) Dr Debashish Roy, RTL, NPSP-WHO
4) Dr Ashfaq Bhat, State RIO, NPSP-WHO
5) Mr Neel Ranjan Singh, , State CC Consultant, RCH, Namkum
6) Mr Ranjit Dhiman, National CC Consultant, UNICEF, Delhi
7) Dr Dhananjay Singh , State RI consultant, UNICEF
8) Dr Madhulika Jonathan, Health Officer, UNICEF

Training of trainers: The VMAT group consisted of six teams and included members from developmental partner institutions, state-level officers from DH&FW, DRCHOs of the twelve assessment districts, national and Jharkhand field office consultants and staff from UNICEF. A three-day programme for training of trainers (TOT) was held at Ranchi for all participants from 15 to 17 February 2010, with field visit for observation and documentation from 18 to 27 February 2009.

Team Numbers	*Assessment Team Leaders*
Team 1	2 DRCHO of concerned districts Chandra Uday, Logistics manager, RCH, Namkum Mr Amarendar Kumar Singh, District Extender, Deoghar Mr Mirtunjay Rathore, Regional Coordinator, Deoghar Mr Rupnarayan Sharma, District Extender, Seraikella
Team 2	*Dr KPS Gond, DRCHO, West Singbhum* 1 DRCHO of concerned district Mr Rupnarayan Sharma, District Extender, Seraikella Mr Shakeel Najmi, District Extender, West Singbhum
Team 3	*Mr Ranjit Dhiman, National CC Consultant, UNICEF, Delhi* 2 DRCHO of concerned districts Mr Shanker Kumar, District Extender, Ranchi Mr Ajay Sharma, District Extender, Dumka
Team 4	*Dr Dhananjay Singh , State RI consultant, UNICEF* 2 DRCHO of concerned districts Mr Nandji Dubey, Regional Coordinator, Hazaribagh Mr Sriprakash Mishra, Regional Coordinator, Dhanbad
Team 5	3 DRCHO of concerned districts Mr Pawan Kumar, District Extender, Godda Mr Rupak Dixit, District Extender, Pakur
Team 6	*Dr Awadhesh Kumar, DRCHO, Palamau* 2 DRCHO of concerned districts Mr Manish Priyadarshi, Regional Coordinator, Palamau Mr Kumar Manoj, District Extender, Sahebganj

Schedule of the Workshop - Day 1

Starting time	Topic
9.00	Registration
10.00	Welcome address
10.10	Inauguration – Lamp lighting
10.20	Inaugural speech by Chief Guest
10.40	Introduction of participants
10.50	Overview of VMAT
11.10	Routine Immunization – Integration with VHND
11.30	*Tea Break*
11.45	Origin of assessments
12.15	Introduction to VMAT
12.30	Questionnaires 1 to 3
1.30	*Lunch*
2.00	Details of field work
2.15	**Field work - Collection of data at Ranchi District Store**
5.00	**Return to Venue** **Submission of data & discussion of the results**
6.00	Evaluation of the day
6.15	Closing

Schedule of the Workshop - Day 2

Starting Time	Topic
9.00	Programme of the day
9.05	Discussion on the experience of the previous day - Q 1-3
9.45	Questionnaires 4-6
10.30	*Tea break*
11.00	Questionnaires 4-6 Continued
12.00	*Lunch break*
1.00	**Field work at Ratu, Kanke and Namkom PHC Store**
5.00	**Return to Venue** **Submission of data & discussion of field work**
6.00	Evaluation of the day
6.15	Closing

Schedule of the Workshop - Day 3

Starting time	Topic
9.00	Programme of the day
9.05	Discussion on the experience of the previous day Q 4-6
9.45	Questionnaires 7-9 & 11 in role play
10.30	*Tea break*
11.00	Questionnaires 7-9 & 11 in role play
12.30	Evaluation of the Day
1.30	*Lunch*
	Departure for Field visit

Annexure 3 – Action plan

S No	Recommendation / Activity	Primary responsibility	Subject of focus	Type of activity	Scope of field work	Timeline
1	*Based on the staffing pattern as per IPHS, pertaining to UIP program - the vacant positions of DRCHO, store keeper, Cold chain handlers and refrigeration mechanic should be filled.*					
1.1	Identify the gaps of posted personnel across the state against the recommended organization structure as per IPHS	SEPIO	Personnel	Desk assessment	None	Within 1 year
1.2	Ensure the financial means are secured to fulfill the vacant positions	Secretary of Health	Budget	Planning and budgeting	None	Within 1 year
1.3	Plan the phased recruitment /relocation of staff to fill the vacant positions.	Secretary of Health	Personnel	Recruitment	None	Within 1 year
2	*Appointed refrigerator mechanic should be trained in repairing the cold chain equipment through MOHFW (GOI) identified training cell.*					
2.1	Train cold chain technicians within 30 days of appointment in repair and maintenance of cold chain equipment for duration of 7 days at State Health and Transport Office (SHTO) Pune (designated technician training center by UNICEF and MOHFW)	CCO	Capacity building	Training	Travel out of state	Within 6 months
3	*State to review the present administrative and financial authorities (of SEPIO, CCO and DRCHO)and revise if necessary with regard to timely implementation of UIP and PPI program.*					
3.1	Prepare the table of financial and administrative authorities of SEPIO,CCO, and DRCHO with regard to UIP and PPI program.	Mission director	Procedures	Desk assessment	None	Within 6 months
3.2	Prepare the list of recommended and approved administrative and financial authorities for each of the officers listed above.	Mission director	Procedures	Guidelines preparation	None	Within 6 months
3.3	Implement the revised administrative and financial authorities for all concerned officers.	Secretary of Health	Procedures	Implementation	None	Within 6 months
3.4	Issue the Directive of revisions in administrative and financial authorities to all concerned officers.	Secretary of Health	Procedures	Directive	None	Within 6 months
4	*DRCHO and Medical officers from all levels should be trained in vaccine management and cold chain logistics at least once in two years.*					
4.1	Prepare the vaccine management course framework for DRCHO and medical officers. (Refer to vaccine management course currently being prepared by UNICEF and MOHFW and adopt as suitable).	SEPIO	Capacity building	Technical documentation	None	Within 6 months

S No	Recommendation / Activity	Primary responsibility	Subject of focus	Type of activity	Scope of field work	Timeline
4.2	Develop the trainers(identified from within the spectrum of officers responsible for UIP program and partners agencies) by conducting the Training of Trainers (TOT) program	SEPIO	Capacity building	Training	Travel districts to venue	Within 6 months
5	*All appointed staff at cold chain point responsible for managing cold chain and vaccine logistics should be trained by their DRCHO/medical officer within 7 days of appointment.*					
5.1	Prepare the induction program of 2 days for DRCHO, medical officers, cold chain technicians and cold chain handlers.	SEPIO	Capacity building	Technical documentation	None	Within 6 months
5.2	Issue directive to respective officers to conduct induction program within 7 days of assignment.	Secretary of Health	Procedures	Directive	None	Within 6 months
5.3	Conduct the vaccine management training programs for DRCHOs and medical officers as per schedule	SEPIO	Capacity building	Training	Travel from districts to venue	Continuous
6	*All new allocation/constructions of vaccine store at all levels should be approved for its adequacy of size, location and facilities as per IPHS and WHO guidelines.*					
6.1	Prepare the standard operating procedures for selection of site for the purpose of establishing a vaccine store or cold chain points	SEPIO	Procedures	Technical documentation	None	Within 6 months
6.2	Prepare the standard construction plan for cold storage facility and dry storage area to store diluents, syringes and other UIP/PPI program related supplies. Include the financial estimates, area requirement estimates and power supply requirements for each type of store facility separately (Regional store, district store, blocks and cold chain points at primary health centers)	SEPIO	Procedures	Technical documentation	None	Within 6 months
6.3	all identified sites for the purpose of establishing the vaccine store or cold chain point should be reviewed and approved against the SOP and construction plan.	Secretary of Health	Procedures	Field assessment	Travel to vaccine stores	Continuous
7	*All existing infrastructure facilities of vaccine storage at district levels should be approved and refurbished in compliance with IPHS and WHO guidelines.*					
7.1	Review the existing vaccine storage facilities against the standard construction plan and assess the possible extension/refurbishment of facilities	SEPIO	Infrastructure	Field assessment	Travel to vaccine stores	Within 1 year
7.2	prepare the plan for refurbishing and extending the store facilities	SEPIO	Infrastructure	Desk	None	Within 1 year

S No	Recommendation / Activity	Primary responsibility	Subject of focus	Type of activity	Scope of field work	Timeline
	wherever required and possible to extend.			assessment		
7.3	Secure budget for refurbishment or extension of vaccine store facilities	Secretary of Health	Infrastructure	Planning and budgeting	None	Within 2 years
7.4	Identify the civil contractor and reward the contract for refurbishing or extending the vaccine store facilities as per the plan	Secretary of Health	Infrastructure	Implementation	None	Within 2 years
8	*Electrical fittings (electrical connections, apertures, wires and earthing) at all the levels wherever required should be refurbished in accordance with the IPHS*					
8.1	Prepare the guidelines and standard operating procedures for repairing and maintaining the electrical system of cold chain facilities	CCO	Infrastructure	Technical documentation	None	Within 6 months
8.2	CCO with the technical support from refrigerator mechanics and electrical engineers to review randomly selected blocks and PHCs (include all district stores). Prepare the estimate of work for crash electrical systems repair program including estimate budget for procurement of items and labor costs.	CCO	Infrastructure	Field assessment	Travel to vaccine stores	Within 6 months
8.3	Prepare a plan for crash repair program for electrical system in the state for all the cold chain facilities. Form a team of technical staff including cold chain technicians, electrical engineers from state and sub-contractors.	CCO	Infrastructure	Desk assessment	None	Within 6 months
8.4	Secure the financial budget for crash repair and maintenance program for electrical system.	Secretary of Health	Infrastructure	Planning and budgeting	None	Within 1 year
8.5	Execute the crash repair and maintenance program for electrical systems of cold chain storage facilities	CCO	Infrastructure	Implementation	Travel to vaccine stores	Within 1 year
8.6	Include the financial means for routine repair and maintenance of electrical system at cold store facilities (based on SOP) in the annual PIP	Secretary of Health	Budget	Planning and budgeting	None	Within 1 year
9	*All the district stores and PHCs to be provided with operational and adequate capacity generators to support ILR and DFs.*					
9.1	Prepare the inventory of diesel generators with the help of refrigerator mechanic and electrical engineers at all the cold chain storage facilities. Include the operational status, rated capacity, age, and operational capacity .	CCO	Equipment	Field assessment	Travel to vaccine stores	Within 6 months

S No	Recommendation / Activity	Primary responsibility	Subject of focus	Type of activity	Scope of field work	Timeline
9.2	Procure the required number of generators of adequate capacity based on gaps as per inventory	Secretary of Health	Equipment	Planning and budgeting	None	Within 6 months
9.3	Prepare a plan for crash repair and maintenance program for generators in the state for all the cold chain facilities.	CCO	Infrastructure	Desk assessment	None	Within 6 months
9.4	Secure the financial budget for crash repair and maintenance program for power supply backup	Secretary of Health	Budget	Planning and budgeting	None	Within 6 months
9.5	Execute the crash repair and maintenance program for power supply backup of cold chain storage facilities	CCO	Equipment	Implementation	Travel to vaccine stores	Within 6 months
10	*Where the room size is smaller than 3.5X3 m per set of ILR & DF at PHC cold chain point, the room should be dedicatedly used to store only ILR & DF and separate dry storage area should be provided to store other supplies.*					
10.1	Issue directive to all the cold chain points to follow this procedure. Cold chain points should either implement this or reply back by giving details of constrains	SEPIO	Infrastructure	Directive	None	Within 6 months
10.2	Address the constrains of those sites where is not possible to dedicatedly use the small room only for storing the ILR and DF. Allocate large area for cold storage	SRCHO	Infrastructure	Administrative	Travel to vaccine stores	Within 1 year
10.3	Monitor the implementation of directive	SEPIO	Procedures	Administrative	None	Within 1 year
11	*Access to ILR, D/Fs, records, Dry storage room should be restricted to authorized persons. Store rooms, ILRs and records cabinets should be lockable.*					
11.1	Issue directive to cold chain points to restrict the access of cold store area to authorized personnel only.	Secretary of Health	Procedures	Directive	None	Within 6 months
11.2	Medical officers to limit the access to cold chain points to selected personnel	SEPIO	Procedures	Administrative	None	Within 6 months
11.3	Issue a log book for entry of names and signatures of visitors at cold chain points	SEPIO	Procedures	Administrative	None	Within 6 months
12	*The vaccine requirement at block and sub center level should be computed based on combination of number of sessions and target population (whichever is higher). The annual requirement of vaccine across state should be based on these micro level computations*					

S No	Recommendation / Activity	Primary responsibility	Subject of focus	Type of activity	Scope of field work	Timeline
12.1	Conduct a desk analysis of target population and number of sessions per year consolidated to each block in the state	SEPIO	Procedures	Desk Assessment	None	Within 6 months
12.2	Establish a software template to compute the annual requirements of the state using the micro data from each block in the state	SEPIO	Management Information System	Software Development	None	Within 6 months
12.3	Include the annual vaccine requirement in state PIP based on the computation done through the software	SEPIO	Budget	Planning and budgeting	None	Within 1 year
13	*Establish the protocol of submitting annual requirement of immunization related supplies by each block to their respective districts and districts to state well ahead in time for preparation of state program implementation plan (PIP).*					
13.1	Conduct a training program for all DRCHO to do such analysis and submit the annual requirements to SEPIO	SEPIO	Capacity building	Training	Travel districts to venue	Within 1 year
13.2	Issue a directive to all DRCHO to submit the annual requirement to SEPIO for inclusion in PIP.	Secretary of Health	Procedures	directive	None	Within 1 year
14	*Implement the Vaccine and Logistics Management Information System (VLMIS) to track the stock situation of vaccine at district store levels. MIS should intimate the designated authorities about alarming stock levels, quantities to be indent and cold chain capacity constrains. MIS should also facilitate the information flow pertaining to the consumption of vaccine at cold chain points.*					
14.1	Develop and deploy a model Vaccine Management Information System at state and district vaccine stores. The MIS should have both on-line update mechanism (through internet) and offline USB key based mechanism where the transaction and stock data should be updated and synchronized with state vaccine stores.	SEPIO	Management Information System	Software Development	None	Within 6 months
14.2	Train the staff at state and district vaccine store in using the model software	Vaccine logistics manager	Capacity building	Training	Travel districts to venue	Within 6 months
14.3	Health MIS which is being developed through JRHM, to adopt the vaccine management information system as a part of standard package	SEPIO	Management Information System	Software Development	None	Within 2 years

S No	Recommendation / Activity	Primary responsibility	Subject of focus	Type of activity	Scope of field work	Timeline
15	*SEPIO, vaccine logistics manager and store keeper should have access to VLMIS and data pertaining to districts for timely decisions and advance intimation related to adequate quantity to be supplied to each district.*					
15.1	Parallel to deployment of VLMIS, issue directive to storekeepers at district stores to promptly update MIS and ensure send data to state vaccine store along with indent challans	SEPIO	Procedures	directive	None	Within 6 months
15.2	Include updating VLMIS and referring the stock in hand situation at districts and comparison of required quantity to requested as a part of standard operating procedure at state vaccine store	SEPIO	Management Information System	Technical documentation	None	Within 6 months
16	*VLMIS should be able to compute the estimated wastage rate of each vaccine based on total supplied vaccine quantity and total immunization coverage data.*					
16.1	Include the module in VLMIS to compute the wastage rate of each vaccine based on consumption data	SEPIO	Management Information System	Software Development	None	Within 6 months
16.2	SEPIO, DRCHOs to be trained in using the feature of VLMIS to arrive at wastage rate of vaccine	SEPIO	Capacity building	Training	Travel districts to venue	Within 6 months
16.3	VLMIS to produce the report on wastage rate computation which goes as a supporting document in Annual vaccine requirement in PIP.	SEPIO	Management Information System	Software Development	None	Within 6 months
17	*Standard operating procedures pertaining to maintenance of cold chain equipment, stock management practices, temperature monitoring and supervision to be issued to state, district vaccine stores and all other cold chain points*					
17.1	Prepare the standard operating procedures pertaining to temperature monitoring at ILR Points	Vaccine logistics manager	Procedures	Guidelines preparation	None	Within 6 months
17.2	Print and issue the SOP in poster format and install at all the ILR points	Vaccine logistics manager	Procedures	Administrative	None	Within 1 year
18	*Supervisor of cold chain point should ensure seven days a week monitoring of temperature and submit monthly review report to State CCO. The format of monthly temperature review is attached with this report as annexure.*					

S No	Recommendation / Activity	Primary responsibility	Subject of focus	Type of activity	Scope of field work	Timeline
18.1	Prepare and provide the temperature review template to Medical officers at cold chain points	Vaccine logistics manager	Temperature monitoring	Technical documentation	None	Within 1 year
18.2	Prepare a temperature review mechanism to be used by DRCHO where in they review and file the temperature review reports from all the blocks of district on monthly basis	Vaccine logistics manager	Temperature monitoring	Guidelines preparation	None	Within 1 year
18.3	Prepare quarterly certification process where all the districts certify the quality of temperature maintenance of their respective stores and submit the certificate to SEPIO and made available as archive for reference by blocks	SEPIO	Temperature monitoring	Technical documentation	None	Within 1 year
19	*Freeze tag should be mandatorily included with freeze sensitive vaccine during transportation.*					
19.1	Estimate number of freeze tags required to be deployed in the state during transportation considering one freeze tag to be included in every packed box of each of the freeze sensitive vaccine	CCO	Temperature monitoring	Planning and budgeting	None	Within 6 months
19.2	Procure and issue the freeze tags to state vaccine store		Temperature monitoring	Planning and budgeting	None	Within 1 year
19.3	Prepare the SOP including reporting of changes in freeze tag status and issue it to each of district stores	CCO	Procedures	Guidelines preparation	None	Within 1 year
19.4	Prepare a mechanism of reverse shipment of good freeze tags to re use the tags for new shipments considering maximum age of 5 years of each freeze tag or until the status change)	CCO	Procedures	Guidelines preparation	None	Continuous
19.5	Prepare a mechanism to re-order the additional required quantity (minimum of 20% of annual requirement)	CCO	Procedures	Planning and budgeting	None	Continuous
19.6	Issue a directive to mandatory include freeze tags in every shipment and record the status of freeze tag in delivery challans and stock books upon arrival of vaccine	Secretary of Health	Temperature monitoring	Directive	None	Within 1 year
20	*Temperature monitoring using transportable data loggers should be in place whereby the monitoring to be initiated from state level and covers transportation, storage at all the district store and randomly selected blocks and outreach sessions.*					
20.1	Prepare a protocol to monitor the temperature during transportation using tiny tags	CCO	Temperature monitoring	Guidelines preparation	None	Within 6 months
20.2	Initiate the temperature monitoring such that at least 4 complete cycles of cold chain (from state to outreach session) are monitored in a year. Initiate these complete cycles every quarter to expect	Vaccine logistics manager	Procedures	Implementation	None	Within 6 months

S No	Recommendation / Activity	Primary responsibility	Subject of focus	Type of activity	Scope of field work	Timeline
	results every quarter of year					
20.3	Randomly monitor the temperature of districts including transportation from state to district and one month period of storage at district store	Vaccine logistics manager	Temperature monitoring	Implementation	None	Within 6 months
20.4	Review and Submit the half yearly monitoring report to SEPIO/MOHFW presenting the findings of 2 complete cycles and at least 2 half cycles to random districts	Vaccine logistics manager	Temperature monitoring	Desk Assessment	None	Within 1 year
21	*All the ILRs should be equipped with a 30 days digital temperature indicator (FridgeTag). Supervisors and cold chain handlers should be trained in interpreting the device and use it for effective temperature monitoring.*					
21.1	Prepare and schedule the training program and reporting formats to use the 30 days temperature indicator	Vaccine logistics manager	Temperature monitoring	Technical documentation	None	Within 6 months
21.2	Prepare the quarterly temperature review report template to be filled by MO of each ILR point	Vaccine logistics manager	Temperature monitoring	Guidelines preparation	None	Within 1 year
21.3	Based on the inventory of ILRs in the state and adding 10% buffer, issue request to UNICEF to provide 30 days temperature indicator	Secretary of Health	Equipment	Planning and budgeting	None	Within 6 months
21.4	Conduct the TOT training program of all the DRCHO to use the 30 days temperature indicator	CCO	Capacity building	Training	Travel districts to venue	Within 1 year
21.5	Conduct the TOT in each district of all the MO's to use the 30 days temperature indicator	CCO	Capacity building	Training	Travel Blocks to District HQ	Within 1 year
21.6	Conduct the training program for all the cold chain handlers at ILR point by MO's on how to use 30 days temperature indicator	CCO	Capacity building	Training	None	Within 1 year
21.7	Issue directive to review and file temperature readings on monthly basis at all the ILR points. Submit the quarterly temperature review report to CCO		Temperature monitoring	directive	None	Within 1 year
22	*All cold rooms in the state should have 24 hours computerized temperature monitoring system (Multilog or Cobalt) . The data should be analyzed every week.*					
22.1	Issue the request to install the wireless computerized temperature monitoring system to MOHFW for state vaccine store and Multilog	SEPIO	Equipment	Planning and budgeting	None	Within 6 months

S No	Recommendation / Activity	Primary responsibility	Subject of focus	Type of activity	Scope of field work	Timeline
	(wired) temperature monitoring system for all other regional cold rooms					
22.2	Install Tiny tags in each of the cold rooms in the state till the wireless and wired temperature monitoring system is not installed.	Vaccine logistics manager	Temperature monitoring	Implementation	Visit to cold rooms	Within 6 months
22.3	Monitor the tiny tag on daily basis (look for alarms) and download the temperature records every week.	Store keeper	Temperature monitoring	Implementation	None	Within 6 months
22.4	Review the temperature record of each cold room every week and file the temperature review report along with the supporting temperature records	Vaccine logistics manager	Temperature monitoring	Desk Assessment	None	Within 6 months
23	*All vaccine carriers with age of 5 years or more should be planned for replacement by placing a request with MOHFW*					
23.1	Prepare a form to collect the status of vaccine carrier in the state. Send the form to each district where district are required to collect information from each block and submit it to state	CCO	Procedures	Technical documentation	None	Within 6 months
23.2	Prepare the inventory of all vaccine carriers in the state. Classify the inventory based on location, age and operational status.	CCO	Equipment	Field assessment	None	Within 1 year
23.3	Identify the gaps and include the projections of future requirements (additional health posts) and referring to micro plan, prepare and submit the requirement to ministry of health.	CCO	Equipment	Desk Assessment	None	Within 1 year
24	*Adequate quantity of thermometers and temperature record book for each ILR and D/F at installed sites should be provided. State and district stores should have buffer stock and replacement or additional booklets should be provided within 7 days of indent.*					
24.1	DIO to identify and submit the list of ILR points without thermometers and record book.	Vaccine logistics manager	Equipment	Field assessment	None	Within 6 months
24.2	State to provide the required quantities of thermometers and record books as identified above including the 10% extra supply to each district	SEPIO	Equipment	Implementation	None	Within 6 months
24.3	DIO to supply thermometer and record book as per the requirement within their district and ensure that the adequate buffer stock is maintained at district store	SEPIO	Equipment	Implementation	None	Within 6 months

S No	Recommendation / Activity	Primary responsibility	Subject of focus	Type of activity	Scope of field work	Timeline
25	*Cold chain asset register should be maintained at all cold chain points & intermediate stores. CCO should maintain the updated inventory of cold chain assets. Annual replacement plan of cold chain equipment should be made with the analysis of requirement and available quantities.*					
25.1	Make provision to include the history of repair and maintenance of each of the units in the register	CCO	Equipment	Technical documentation	None	Within 6 months
25.2	Prepare and supply cold chain asset register and issue to all the cold chain points.	CCO	Equipment	Implementation	None	Within 6 months
25.3	DIO to submit the half yearly inventory of equipment with operational status to CCO	CCO	Equipment	Implementation	None	Within 1 year
26	*Refrigerator mechanics should prepare the status report of cold chain equipment within their respective districts. CCO should prepare the list of spare parts required based on field assessment by cold chain technicians and adding the buffer stock of spare parts. The requirements should be submitted to MOHFW*					
26.1	CCO to draft an on site assessment plan of each of the ILR points and respective technicians	CCO	Equipment	Planning and budgeting	None	Within 6 months
26.2	Refrigerator mechanics to submit the status report of cold chain equipment to their respective DIO	CCO	Equipment	Field assessment	Travel to vaccine stores	Within 6 months
26.3	Based on the assessment report CCO to procure the required quantity of spare parts	CCO	Equipment	Implementation	None	Within 6 months
27	*Each appointed refrigerator mechanic should be provided with one recommended set of functional toolkit for repair and maintenance of cold chain equipment (including cold rooms) . CCO should submit the requirement of toolkit to MOHFW on priority*					
27.1	SEPIO to submit request for 24small toolkits and 5 large for all cold room locations for repair and maintenance of CC equipment.	SEPIO	Equipment	Planning and budgeting	None	Within 6 months
27.2	Issue the toolkits to cold chain technicians	CCO	Equipment	Implementation	None	Within 6 months
27.3	Replace the broken/lost tools every 6 months	CCO	Equipment	Implementation	None	Continuous

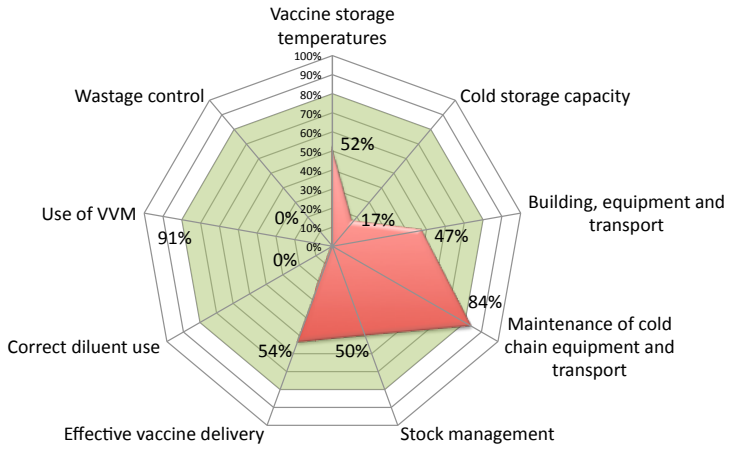
S No	Recommendation / Activity	Primary responsibility	Subject of focus	Type of activity	Scope of field work	Timeline
28	*CCO to draft the plan of crash repair and maintenance program for all the cold chain equipment in the state. This plan should indicate the travel plan of technicians, spare parts required, financial requirements to cover the TA/DA of technicians and advance intimation procedure to sites for the preparedness of on site repair of cold chain equipment*					
28.1	Based on the assessment by the refrigerator mechanics, prepare the crash maintenance program giving high priority to district stores followed by Blocks.	CCO	Equipment	Field assessment	Travel to vaccine stores	Within 1 year
29	*The state central warehouse should establish the spare part depot with standard coding of all the spare parts, shelves for storing the parts, asset and issue register and procedure of issuing the parts to refrigerator mechanics*					
29.1	Identify the suitable storage space for spare part depot under direct supervision of CCO	CCO	Equipment	Field assessment	None	Within 1 year
29.2	Establish the store by preparing the storage area	CCO	Equipment	Implementation	None	Within 1 year
29.3	Prepare the standard operating procedures for issue and receipts of spare parts covering all aspects of stock management (including replenishment)	CCO	Equipment	Guidelines preparation	None	Within 1 year
30	*Reporting of faulty equipment from cold chain point to refrigeration mechanic should be within 48 hrs and down time should not exceed 7 days*					
30.1	Prepare and issue guidelines for all cold chain handlers to identify the problems with cold chain equipment	CCO	Equipment	Guidelines preparation	None	Within 6 months
30.2	Prepare and issue guidelines for reporting of faulty cold chain equipment	CCO	Procedures	Guidelines preparation	None	Within 6 months
30.3	Allocate financial provisions and define soft approval procedures for cold chain technicians to attend to a site within 7 days of reporting of problem	Secretary of Health	Budget	Planning and budgeting	None	Within 6 months
31	*A reporting mechanism should be established for refrigeration mechanics to report to CCO to compile the repair and maintenance activities of cold chain units. This data should be supporting the annual cold chain equipment requirement estimate.*					

S No	Recommendation / Activity	Primary responsibility	Subject of focus	Type of activity	Scope of field work	Timeline
31.1	Prepare a reporting template for cold chain technicians where the details of repair / spare parts used for cold chain equipment is reported to CCO on semi annual basis	CCO	Procedures	Guidelines preparation	None	Within 6 months
31.2	Issue the reporting template to cold chain technicians along with guidelines of reporting to CCO	CCO	Procedures	Guidelines preparation	None	Within 6 months
31.3	Include a module in MIS to input the reported information and based on WHO rationale of repair or replace (cost of repair and anticipated life) the module should project the expected number of new equipment required per year	CCO	Management Information System	Software Development	None	Within 1 year
32	*A technical committee should be formed at district level for condemnation & auction of non-repairable equipments*					
32.1	Form a technical committee at district level which should include Civil Surgeon, CCO, Cold chain technician and focal person from finance.	SEPIO	Equipment	Guidelines preparation	None	Within 6 months
32.2	Issue directive to identify and auction all condemned equipment within 6 months	Secretary of Health	Equipment	directive	None	Within 6 months
32.3	Prepare a mechanism to auction the condemned equipment annually	SEPIO	Equipment	Implementation	None	Within 6 months
33	*Dedicated and suitable vehicles for the purpose of transportation of vaccine should be made available to all districts*					
33.1	Review the status of all the vehicles provided to districts for the purpose of vaccine transportation	SEPIO	Transportation	Desk Assessment	Travel to vaccine stores	Within 1 year
33.2	Make financial provision for procurement of vehicles for vaccine transportation for those districts where there is no vehicle allotted for this purpose	Secretary of Health	Budget	Planning and budgeting	None	Within 2 years
33.3	Procure and issue the vehicles to respective districts.	Secretary of Health	Budget	Implementation	None	Within 2 years
34	*Standardized financial and administrative provision for servicing and repairing the vaccine vans allotted for UIP and PPI program should be provided to DRCHOs*					
34.1	Review and identify the key gaps in present administrative and financial provisions for repair and maintenance of vaccine vans in	SEPIO	Transportation	Desk Assessment	None	Within 1 year

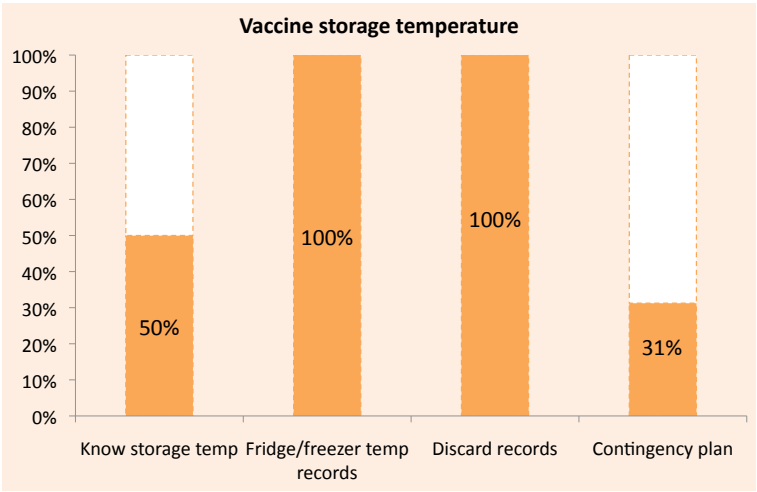
S No	Recommendation / Activity	Primary responsibility	Subject of focus	Type of activity	Scope of field work	Timeline
	state					
34.2	Based on the operational status of vaccine vans, financial provisions should be made for crash repair and maintenance of vaccine vans	Secretary of Health	Budget	Planning and budgeting	None	Within 2 years
34.3	Prepare the mechanism of repairing and servicing all the vaccine vans in the state	SEPIO	Transportation	Guidelines preparation	None	Within 2 years
34.4	Identify the service agency (government or private) for routine servicing of vehicles	SEPIO	Transportation	Implementation	None	Within 2 years
34.5	Establish MOU and service contract with suitable agency for routine servicing of vehicles	Secretary of Health	Transportation	Implementation	None	Within 2 years
35	*Provide the refrigerated vaccine van at state vaccine store for shipment of vaccine to far reach districts of Garwa, Palamu and Deogarh.*					
35.1	Make financial provisions to procure the refrigerated vans for these districts	Secretary of Health	Transportation	Planning and budgeting	None	Within 2 years
35.2	Procure and issue the refrigerated vaccine vans to these districts	SEPIO	Budget	Implementation	None	Within 2 years
35.3	Make financial and administrative provision of repair and maintenance of these vehicles	Secretary of Health	Budget	Implementation	None	Within 2 years
35.4	Make the provision of electric charging stations of these vans at loading/unload bay at state and district stores	SEPIO	Infrastructure	Implementation	None	Within 2 years

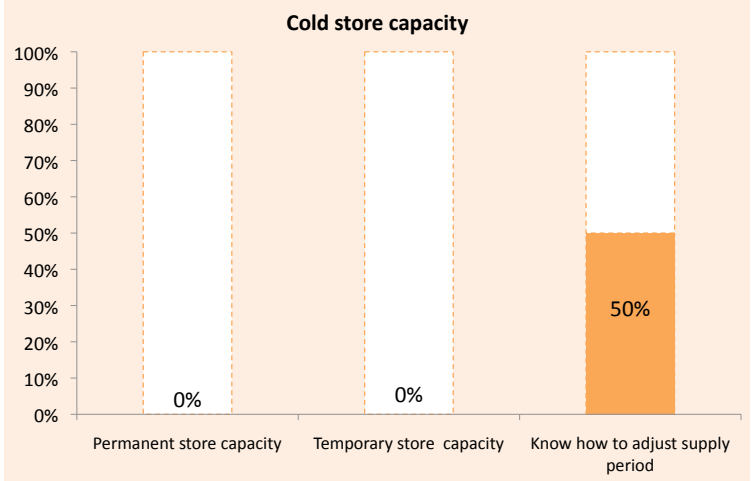
KHUNTI DISTRICT STORE

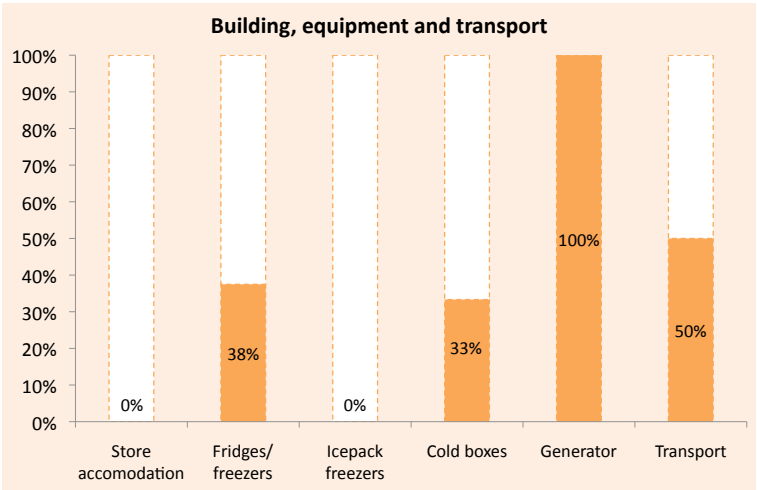
STATUS - VACCINE MANAGEMENT ASSESSMENT 2009

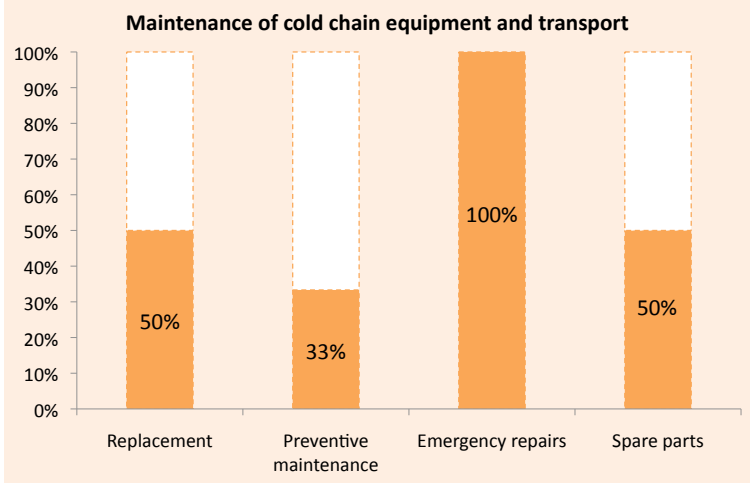


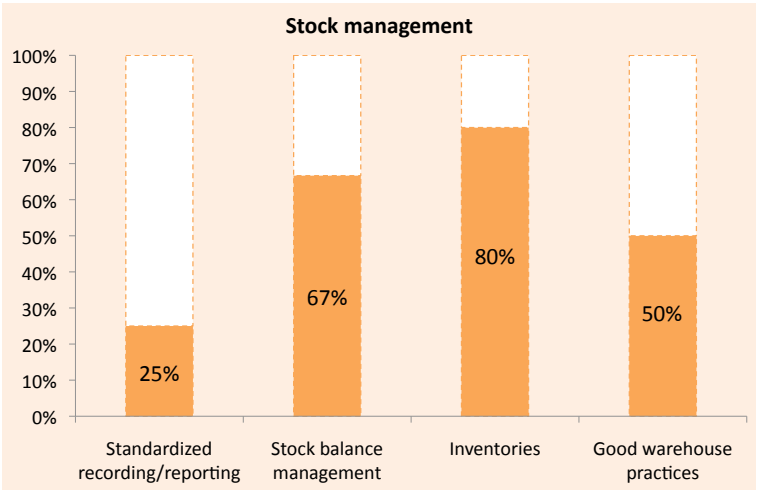
Total population:	5,38,049
Target population:	19,239
Number of PHC served:	
Number of sub centers:	
RI Coverage rate (2008):	78.8%

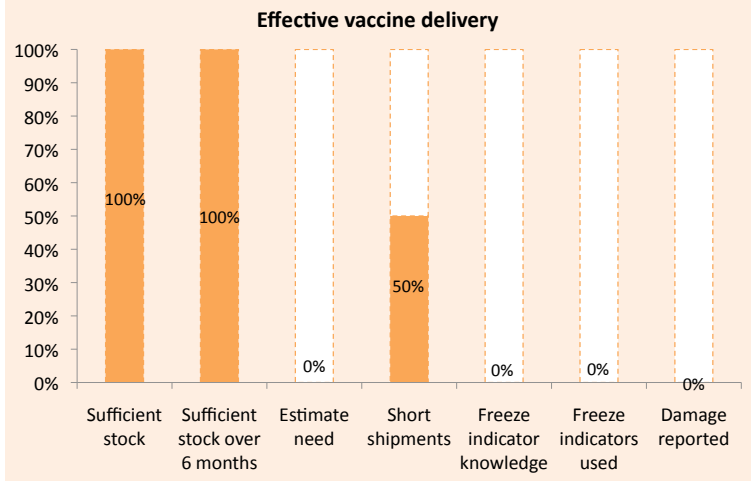






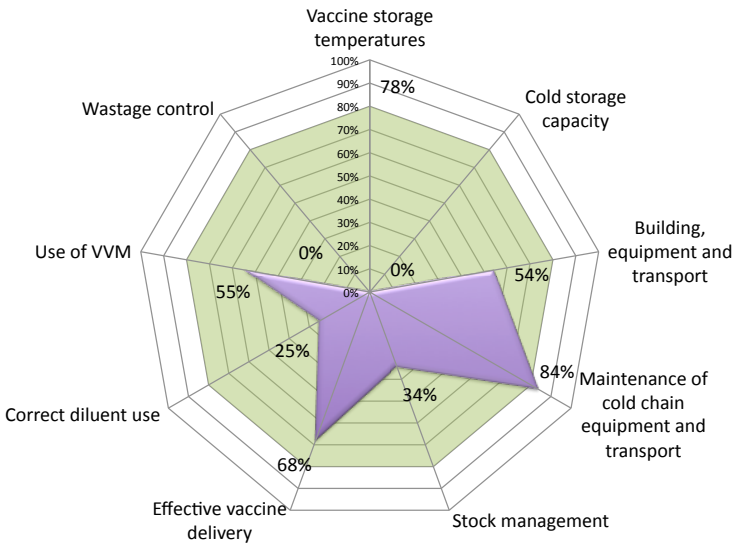






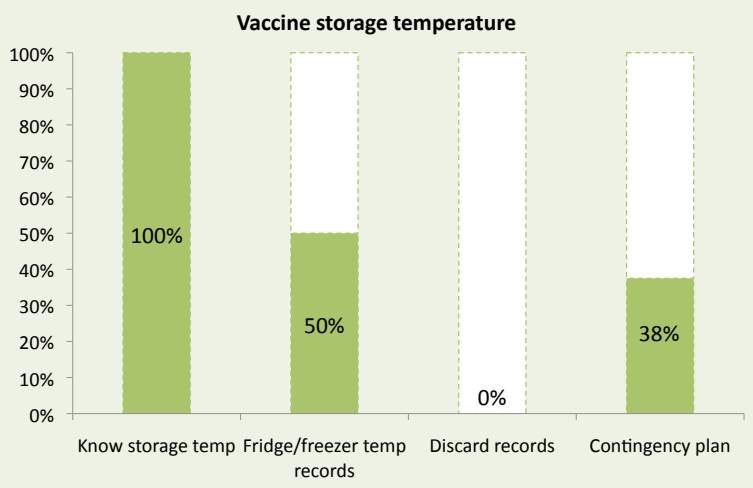
KHUNTI - PRIMARY HEALTH CENTERS

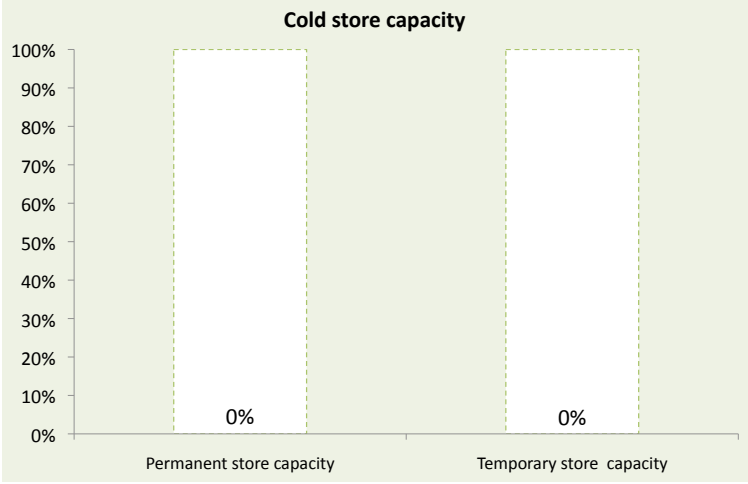
STATUS - VACCINE MANAGEMENT ASSESSMENT 2009

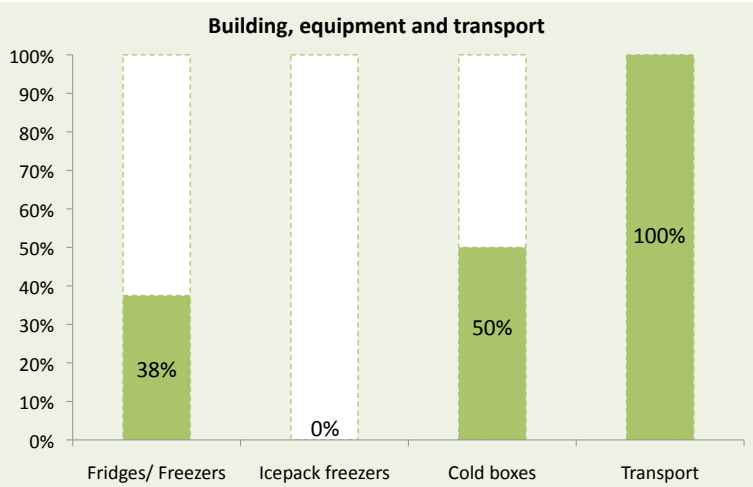


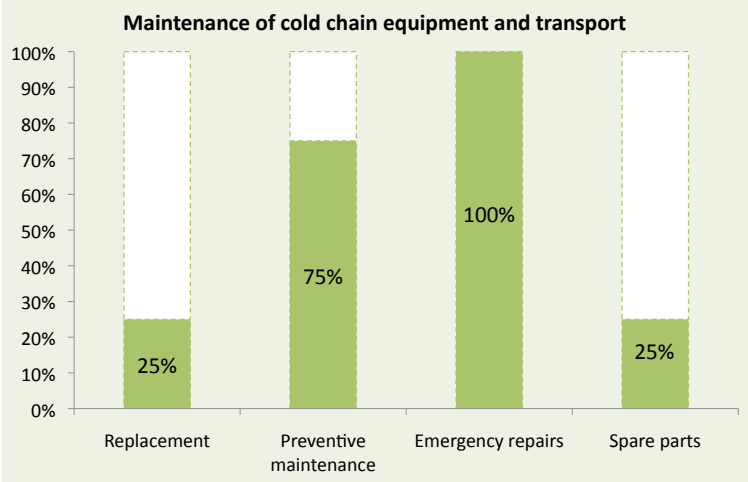
PHC assessed:	Murhu
Total population:	87,890
Target population:	2,812
Number of sub centers:	
RI Coverage rate (2008):	69%

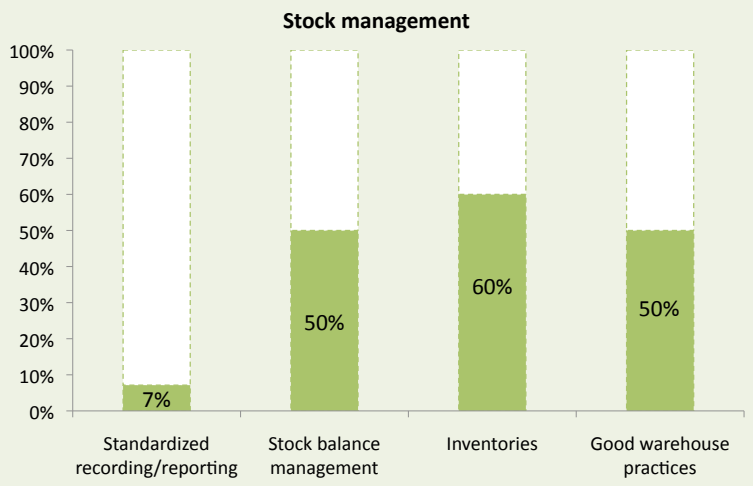
PHC assessed:	Torpa
Total population:	89,000
Target population:	2,561
Number of sub centers:	
RI Coverage rate (2008):	98%

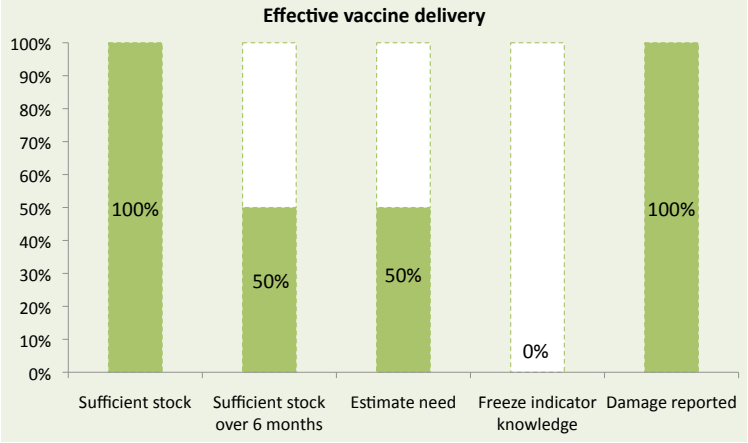






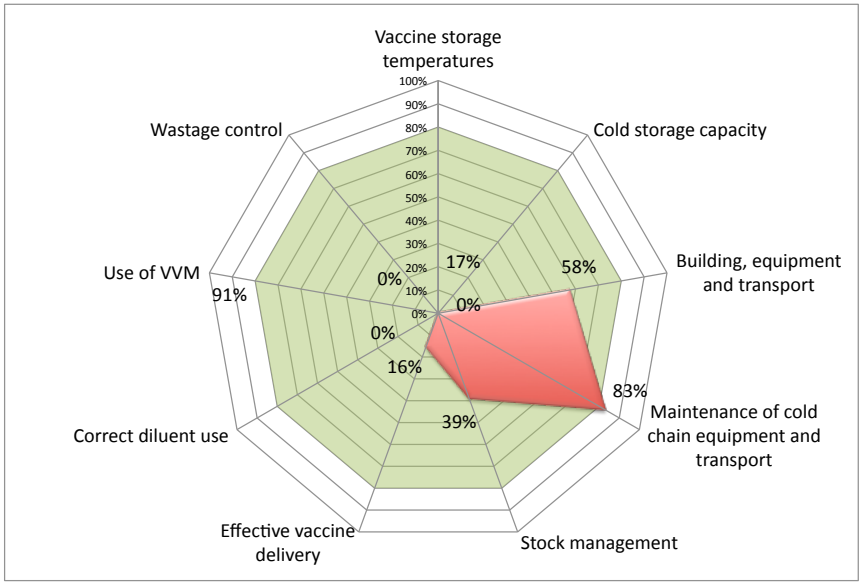




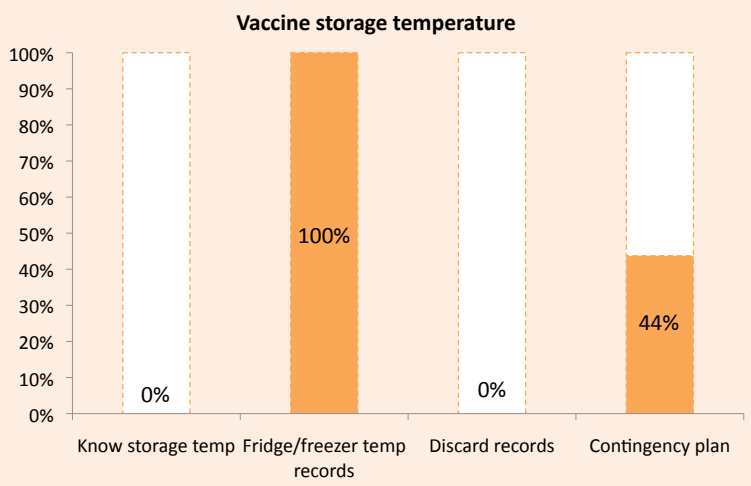


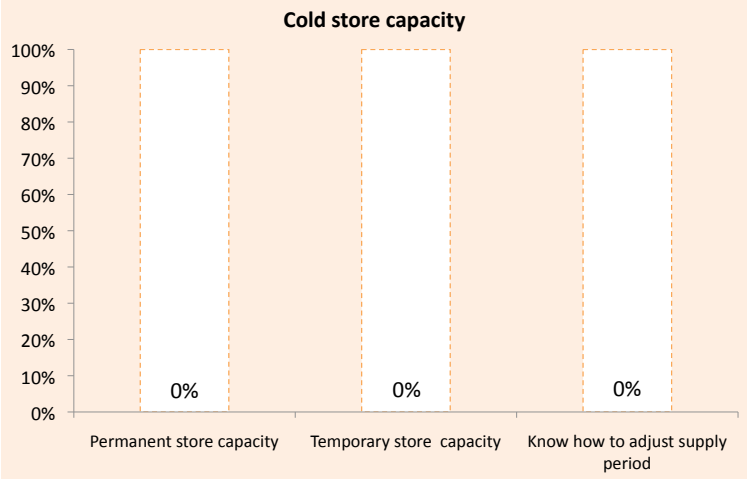
GUMLA DISTRICT STORE

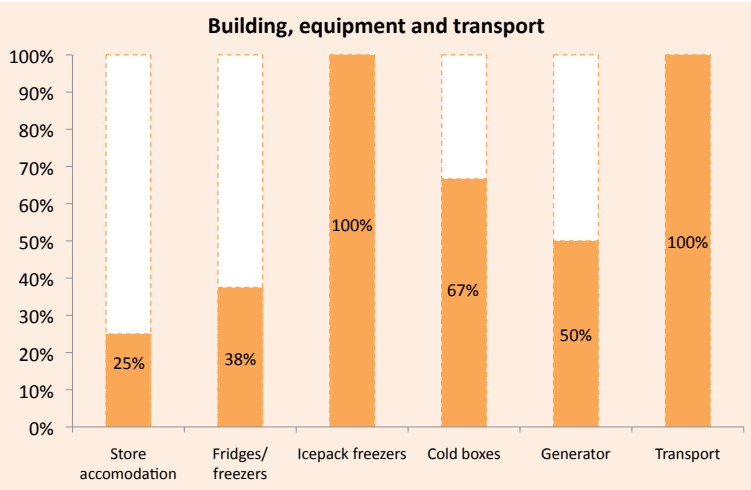
STATUS - VACCINE MANAGEMENT ASSESSMENT 2009

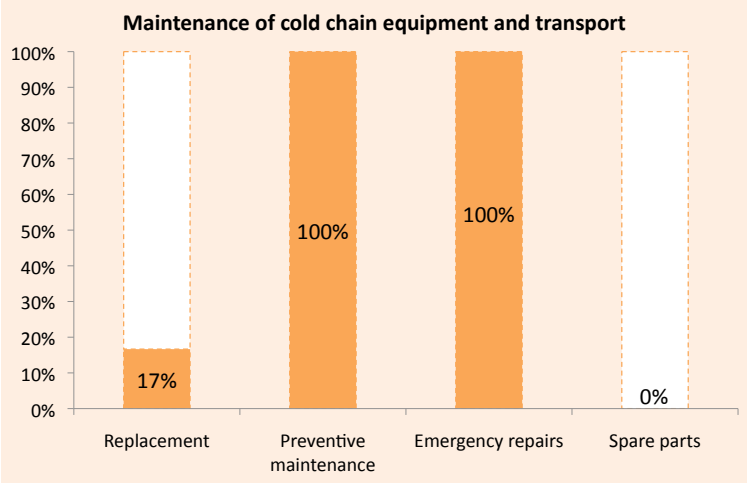


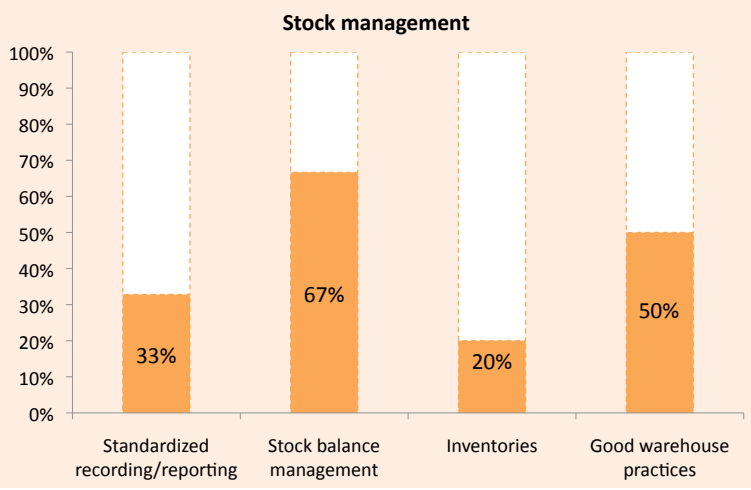
Total population:	9,74,031
Target population:	30,000
Number of PHC served:	
Number of sub centers:	
RI Coverage rate (2008):	68.6%

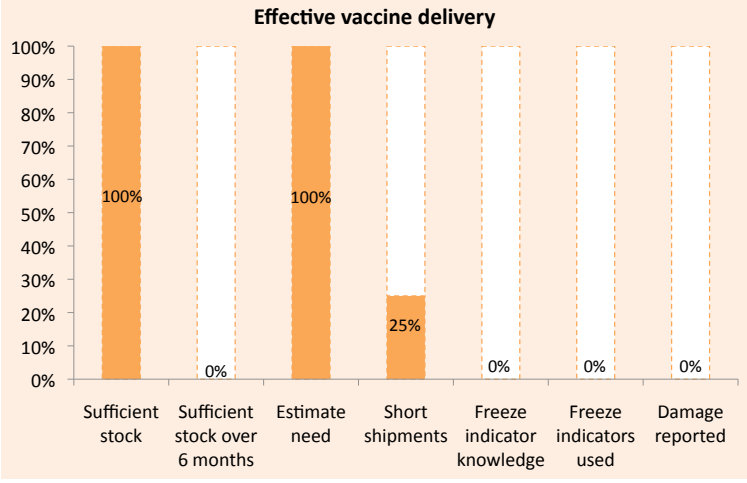






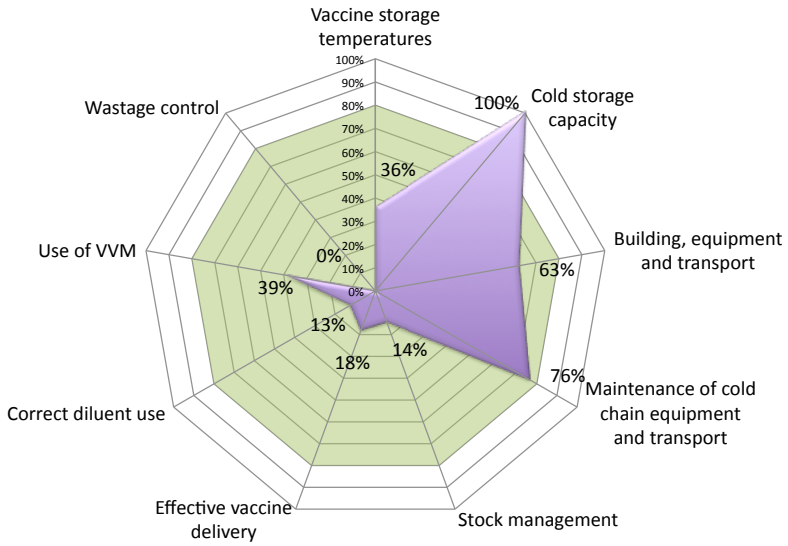






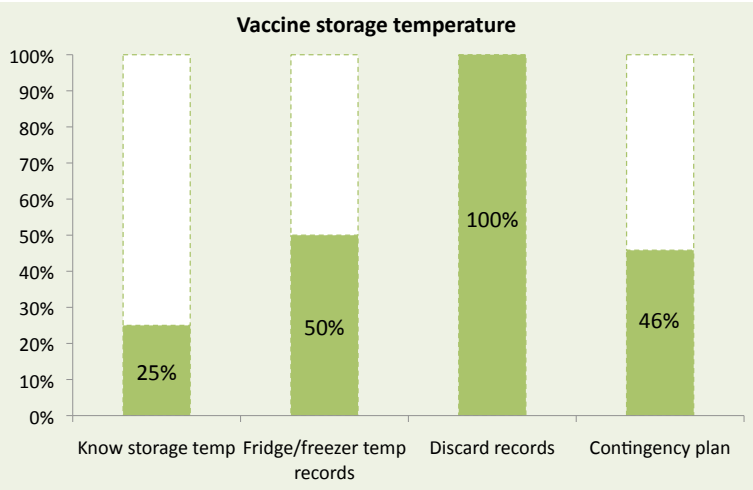
GUMLA - PRIMARY HEALTH CENTERS

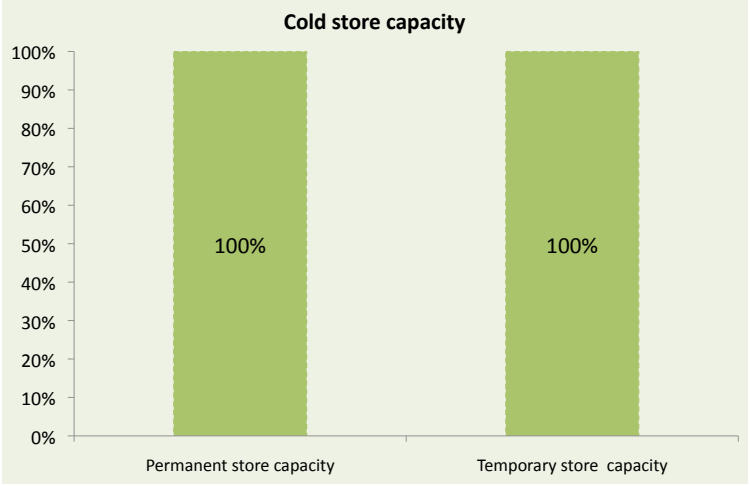
STATUS - VACCINE MANAGEMENT ASSESSMENT 2009

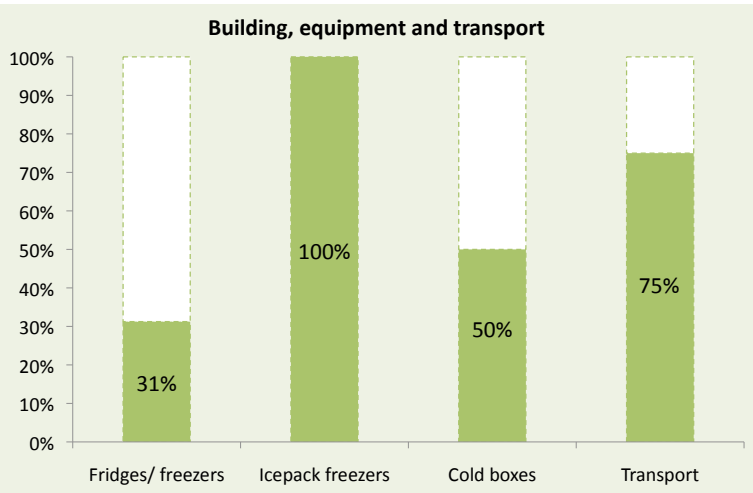


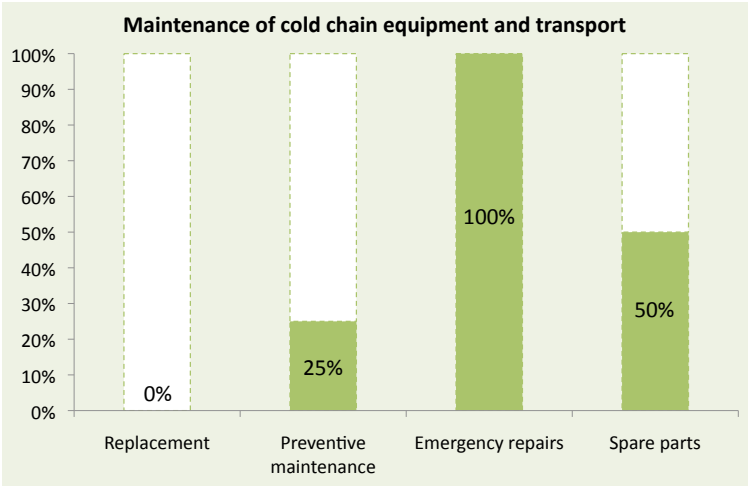
PHC assessed:	Raydih
Total population:	70,500
Target population:	2,108
Number of sub centers:	
RI Coverage rate (2008):	85%

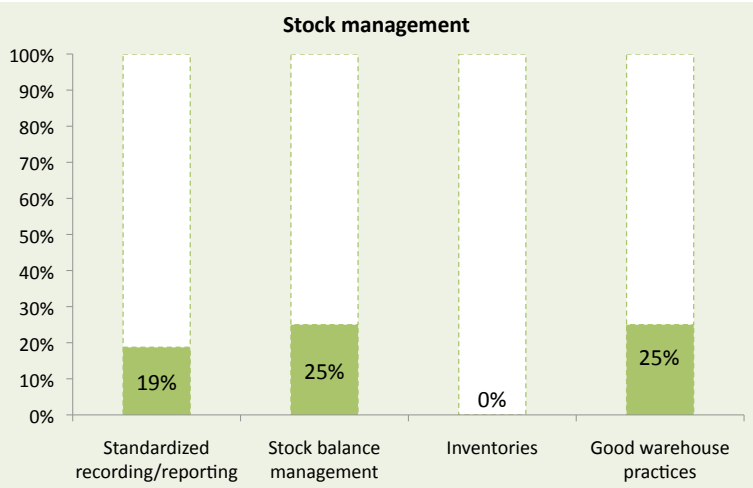
PHC assessed:	Dumri
Total population:	77,110
Target population:	2,318
Number of sub centers:	
RI Coverage rate (2008):	82%

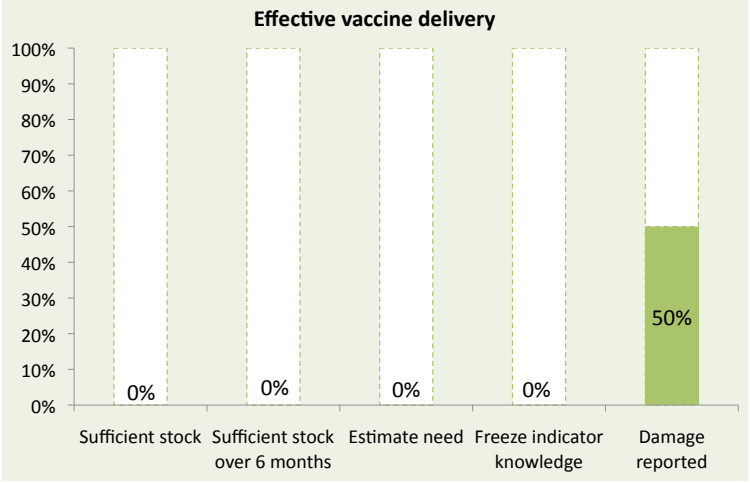






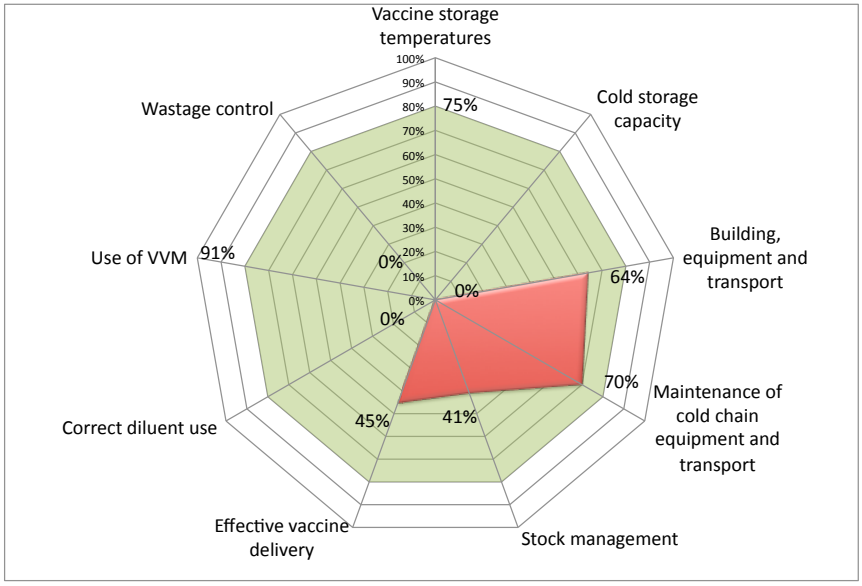




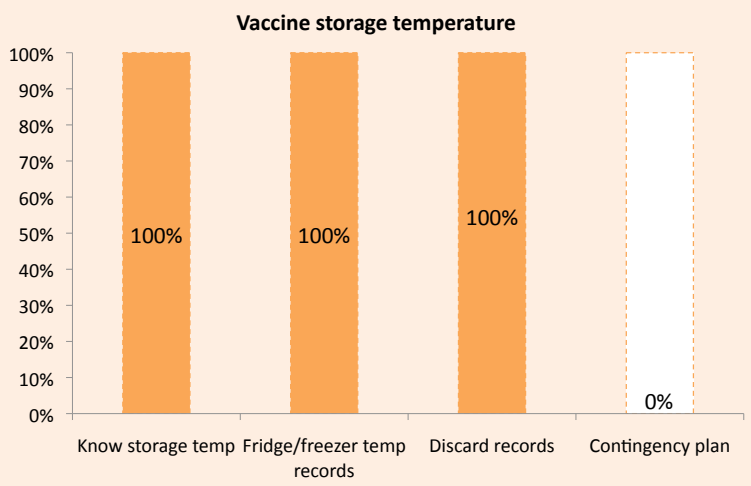


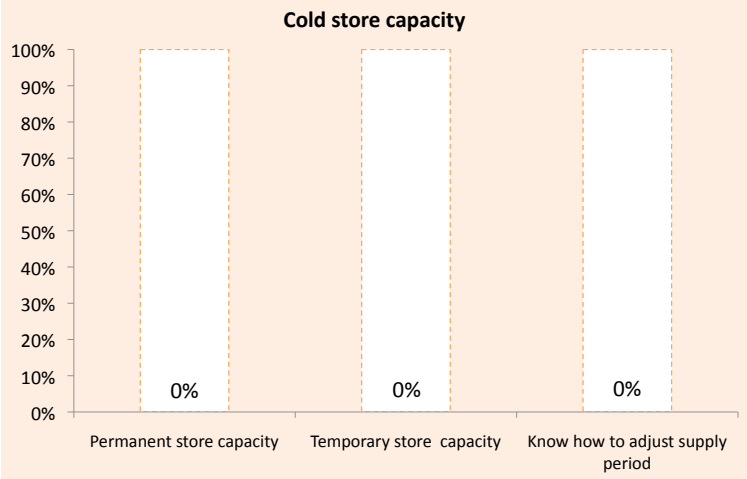
WEST SINGHBHUM DISTRICT STORE

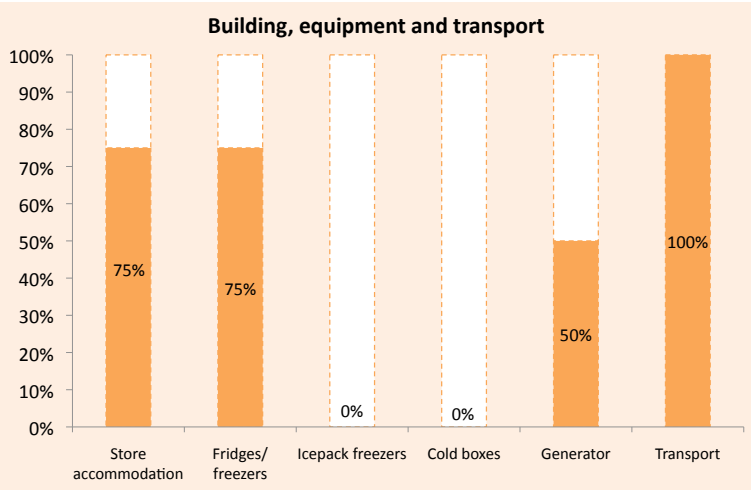
STATUS - VACCINE MANAGEMENT ASSESSMENT 2009

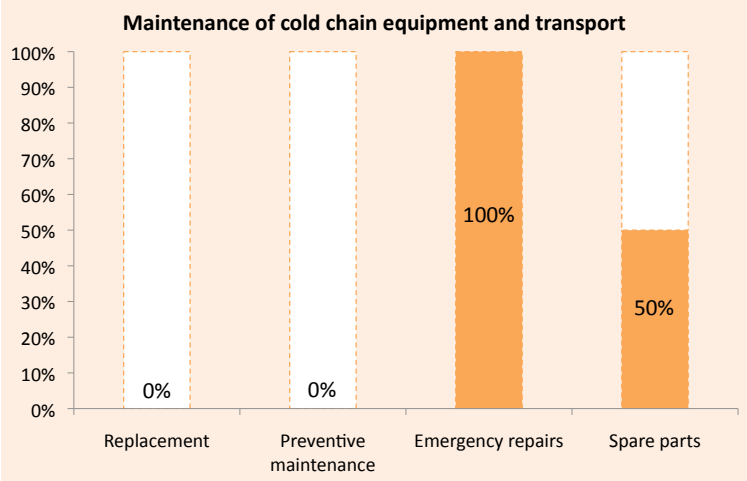


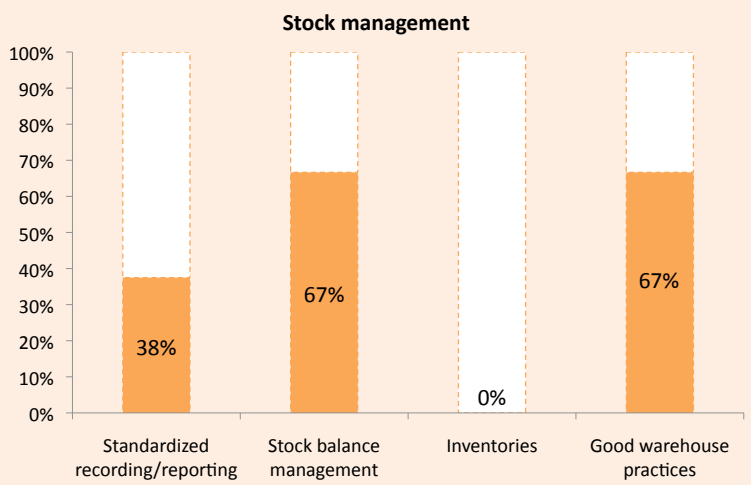
Total population:	14,10,700
Target population:	40,200
Number of PHC served:	
Number of sub centers:	
RI Coverage rate (2008):	59.1%

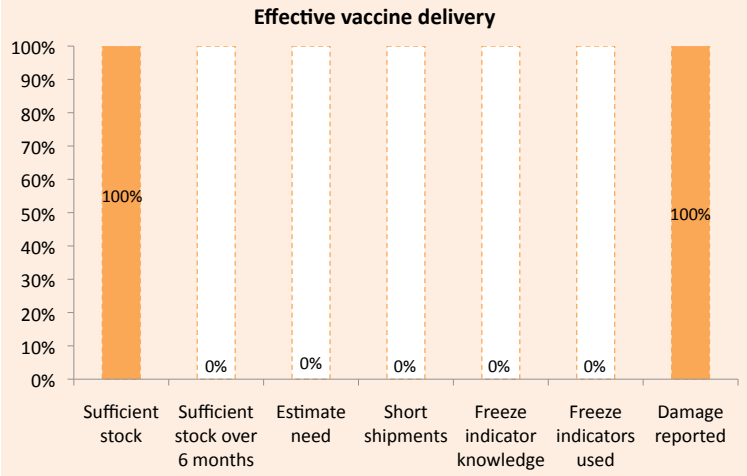






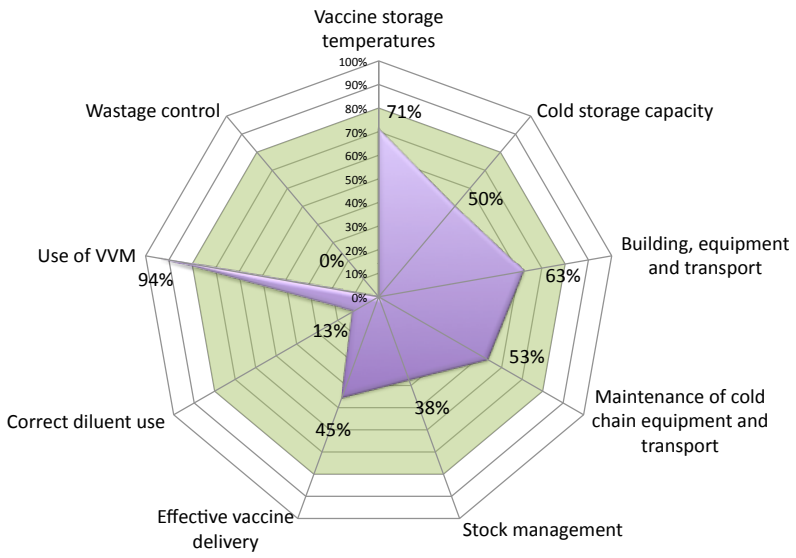






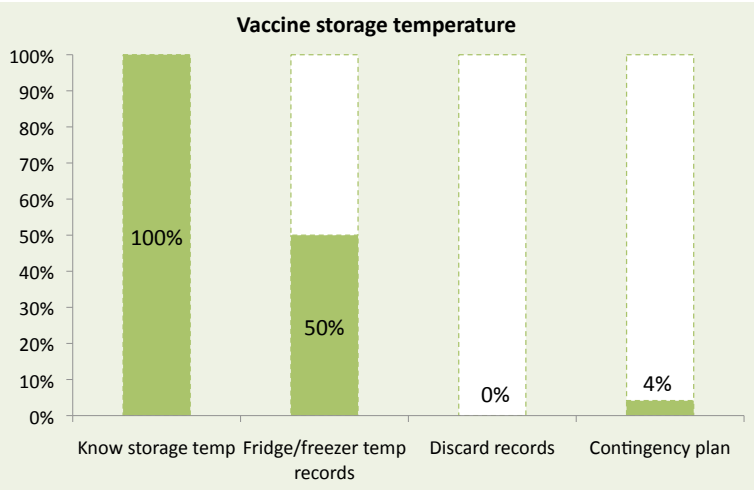
WEST SINGHBHUM - PRIMARY HEALTH CENTERS

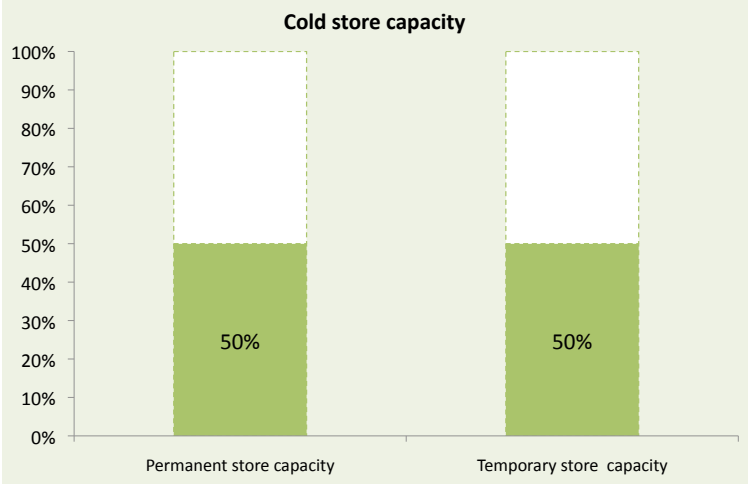
STATUS - VACCINE MANAGEMENT ASSESSMENT 2009

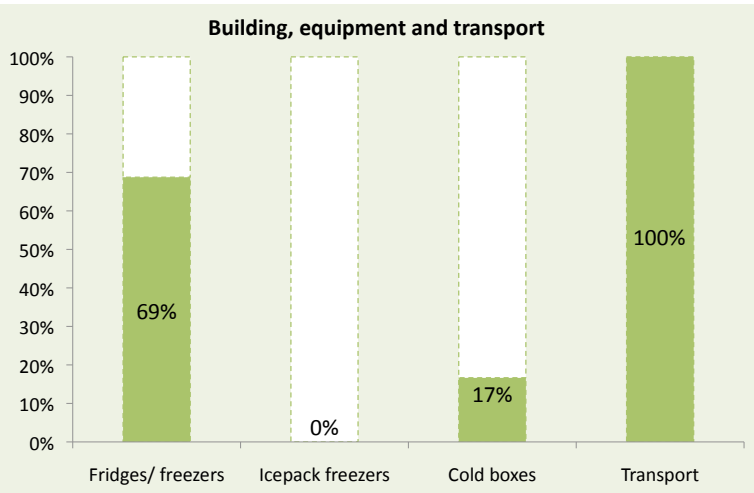


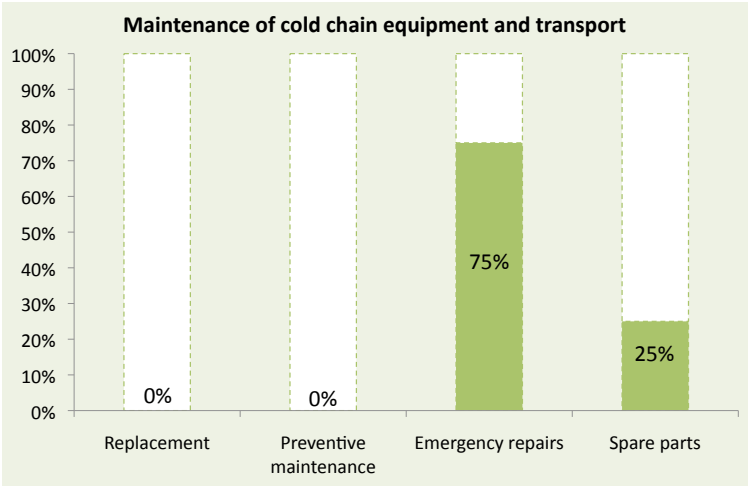
PHC assessed:	Chakradharpur
Total population:	1,89,259
Target population:	4,884
Number of sub centers:	
RI Coverage rate (2008):	64%

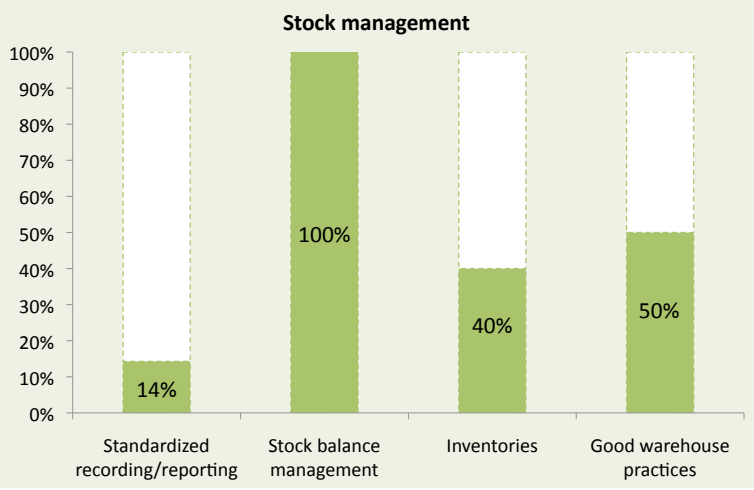
PHC assessed:	Sadar
Total population:	1,56,063
Target population:	3,777
Number of sub centers:	
RI Coverage rate (2008):	62%

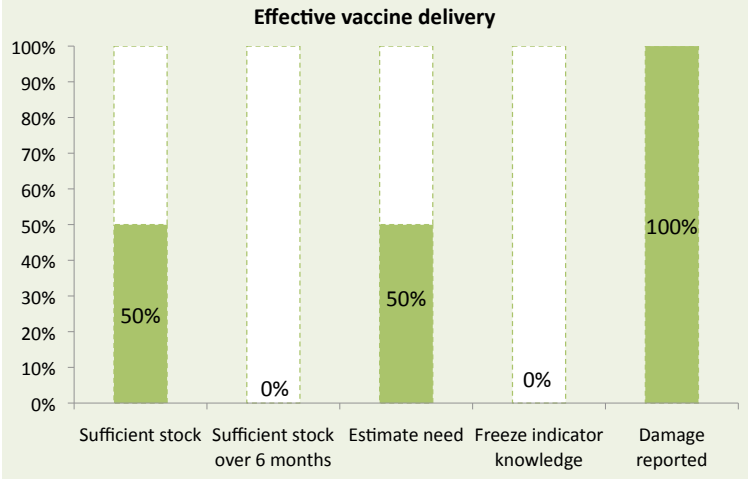






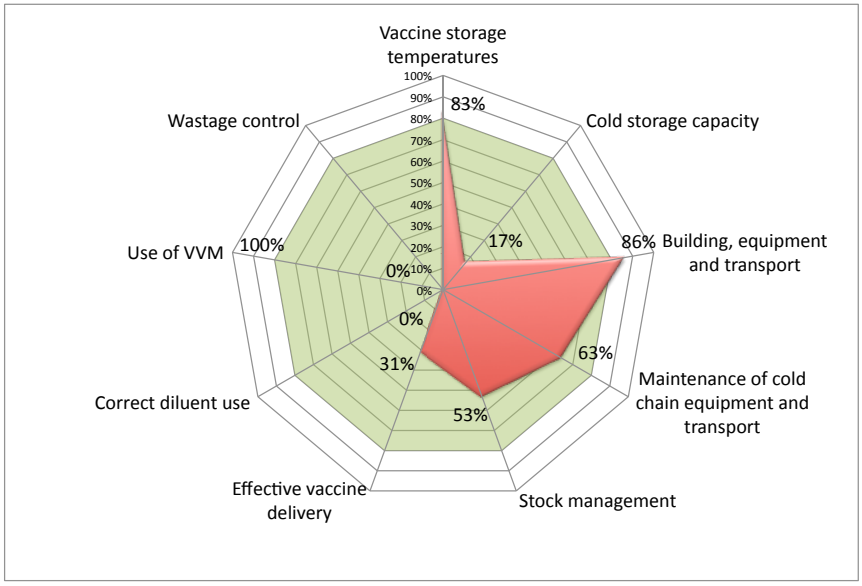




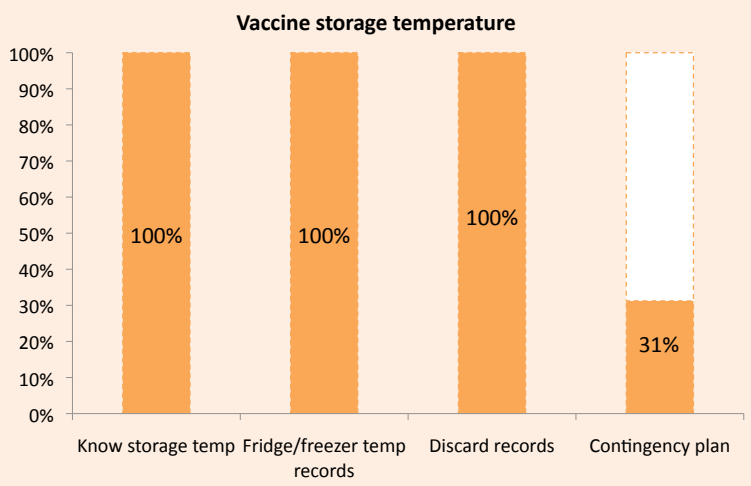


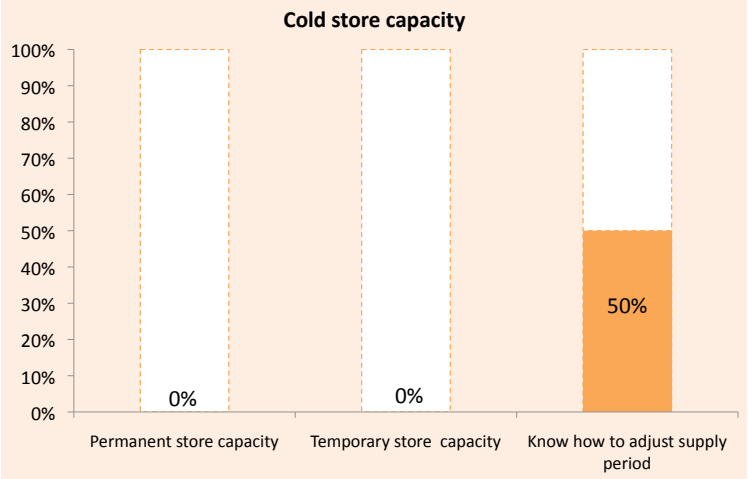
SAHIBGANJ DISTRICT STORE

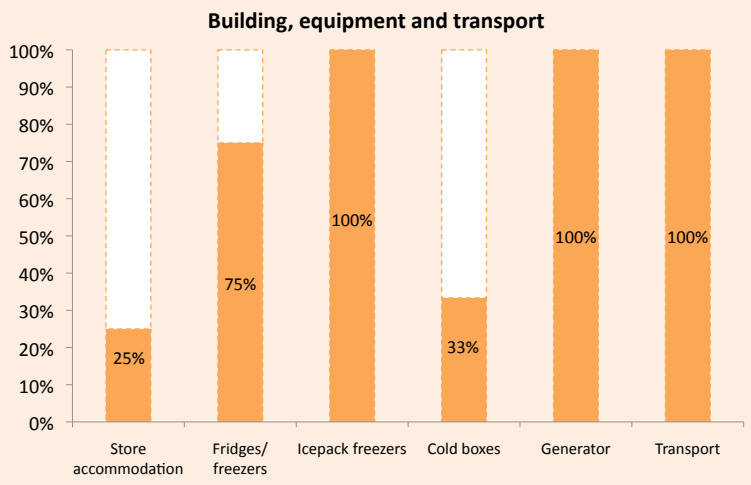
STATUS - VACCINE MANAGEMENT ASSESSMENT 2009

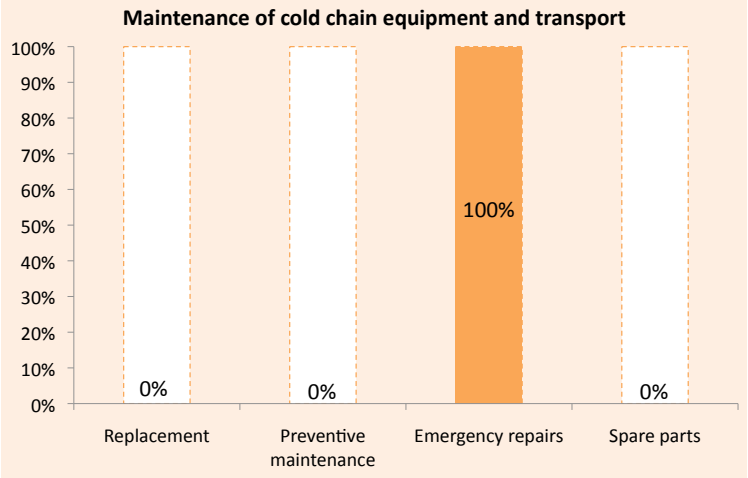


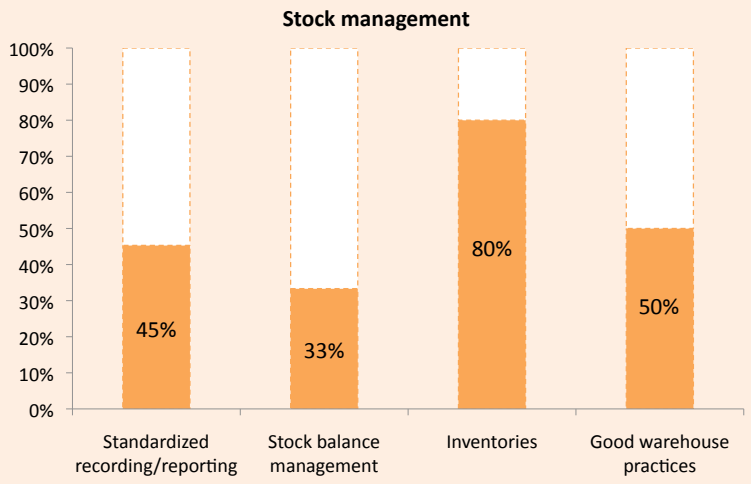
Total population:	11,22,822
Target population:	41,544
Number of PHC served:	
Number of sub centers:	
RI Coverage rate (2008):	33.6%

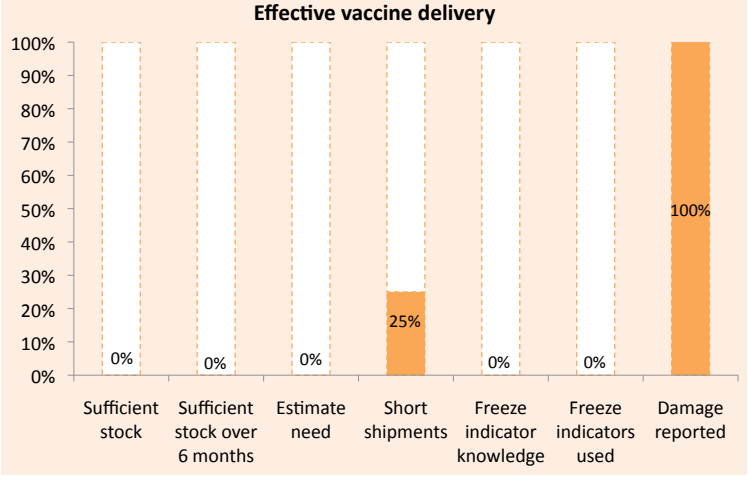






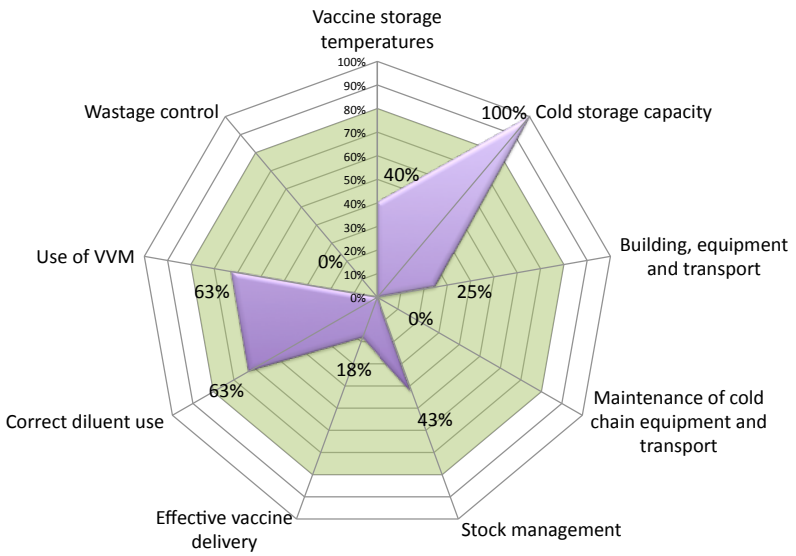






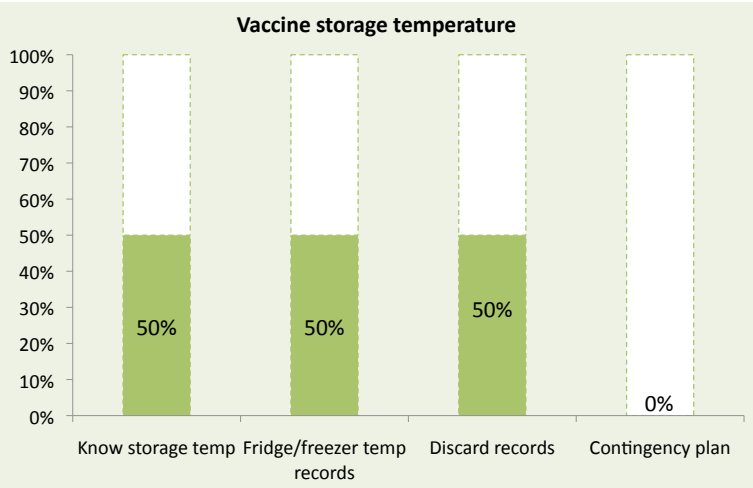
SAHIBGANJ - PRIMARY HEALTH CENTERS

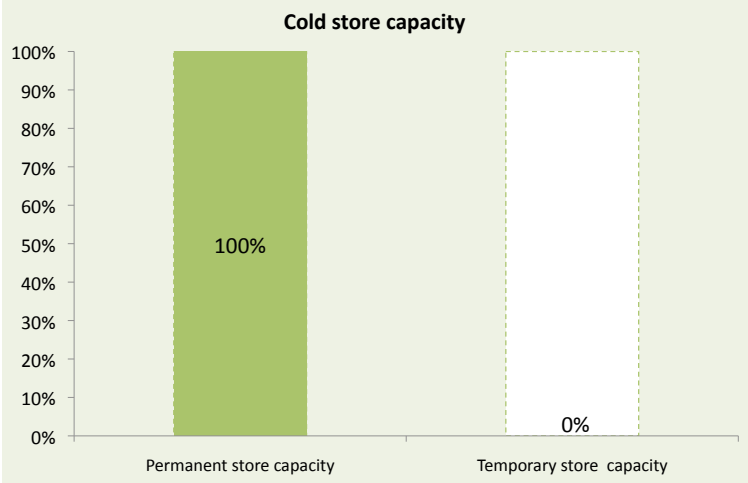
STATUS - VACCINE MANAGEMENT ASSESSMENT 2009

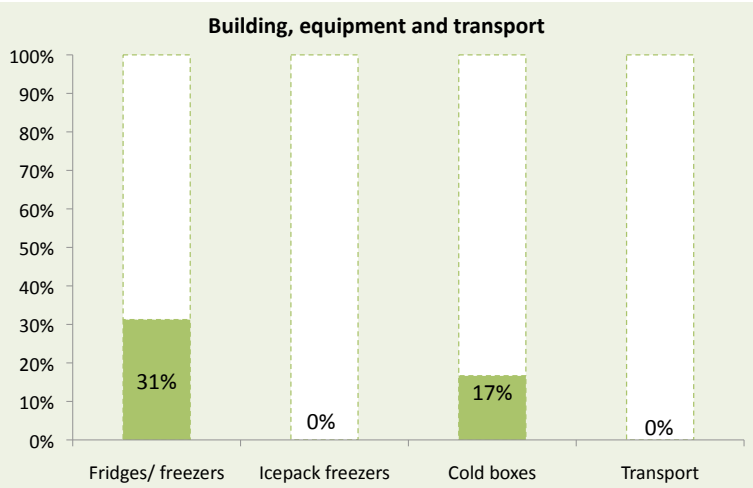


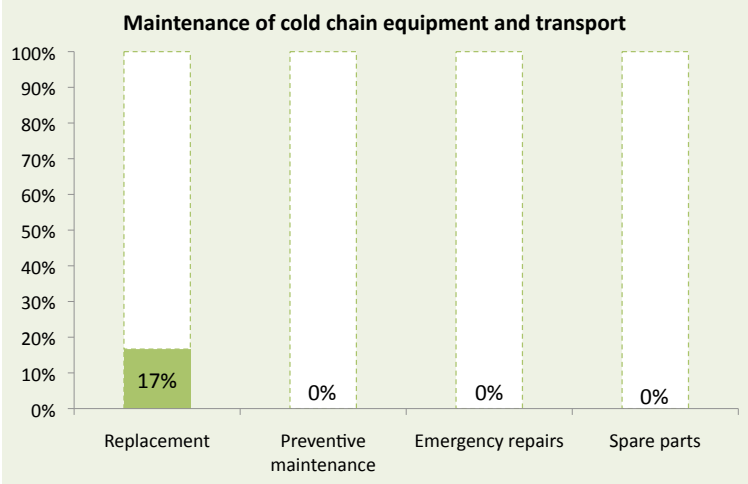
PHC assessed:	Baharwa
Total population:	1,73,588
Target population:	6,422
Number of sub centers:	
RI Coverage rate (2008):	62.47%

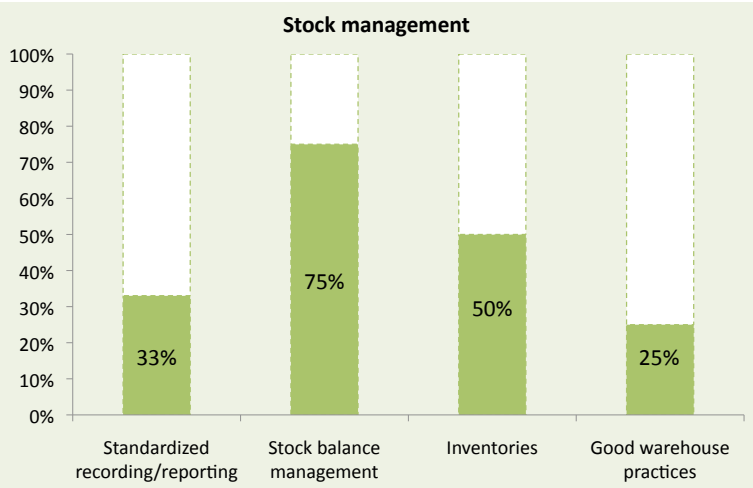
PHC assessed:	Barhait
Total population:	1,32,424
Target population:	4,899
Number of sub centers:	
RI Coverage rate (2008):	66.69%

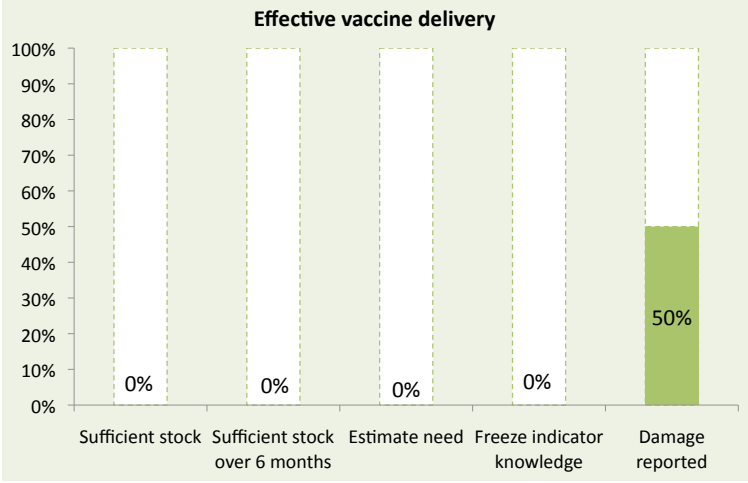






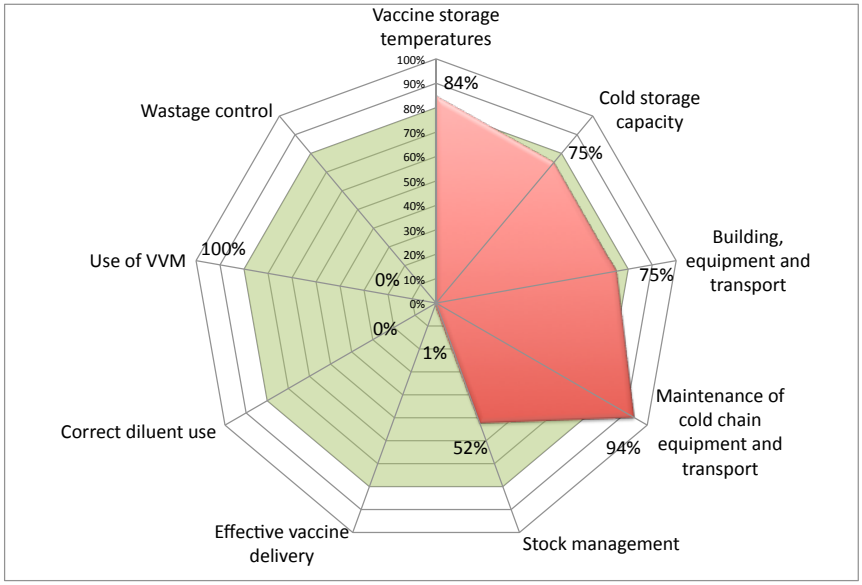




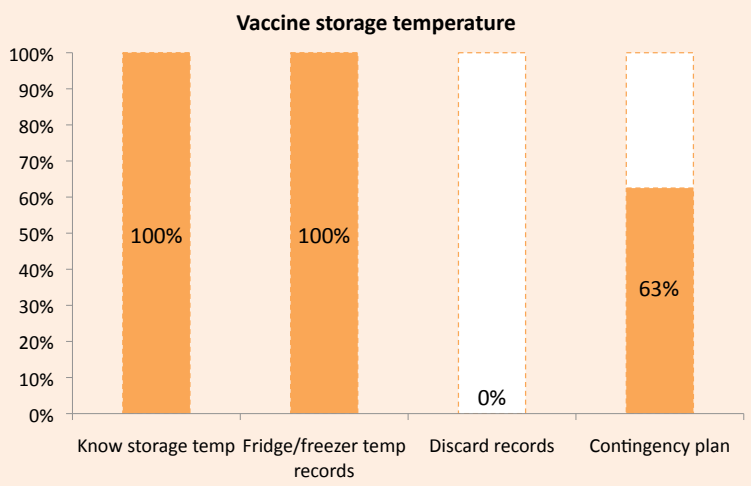


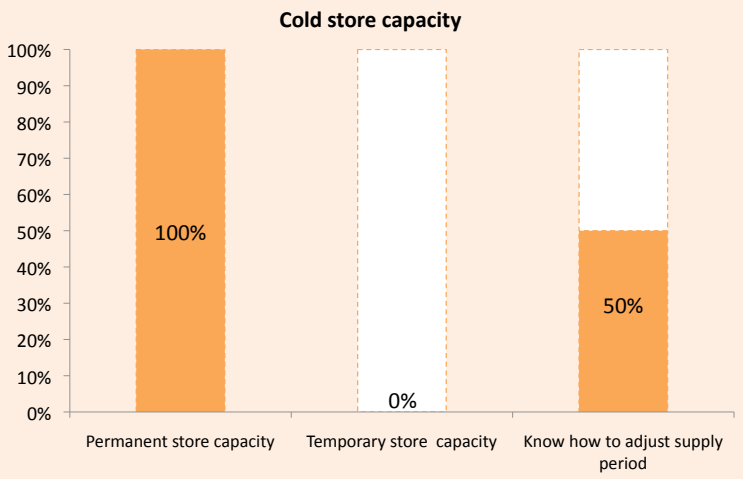
PALAMU DISTRICT STORE

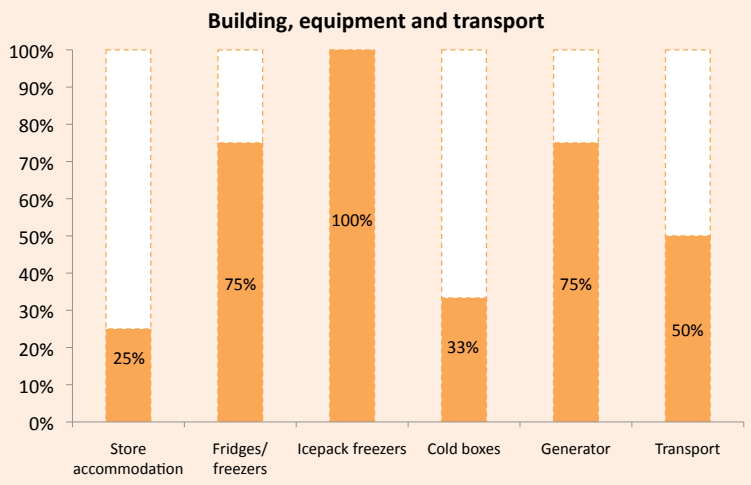
STATUS - VACCINE MANAGEMENT ASSESSMENT 2009

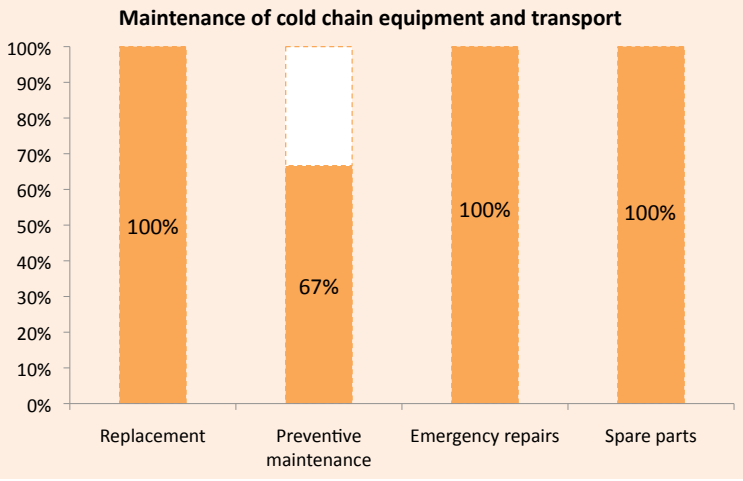


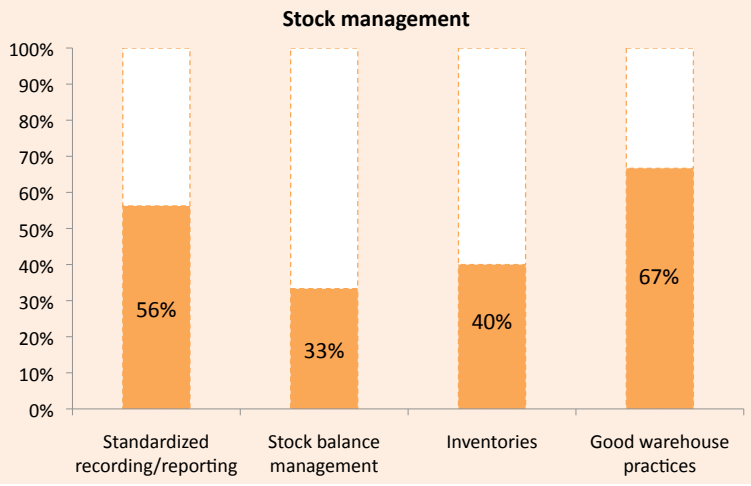
Total population:	16,72,793
Target population:	50,184
Number of PHC served:	
Number of sub centers:	
RI Coverage rate (2008):	53.4%

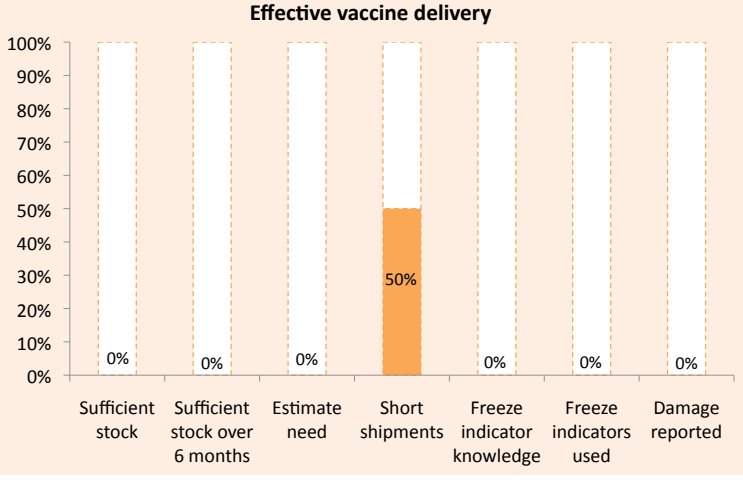






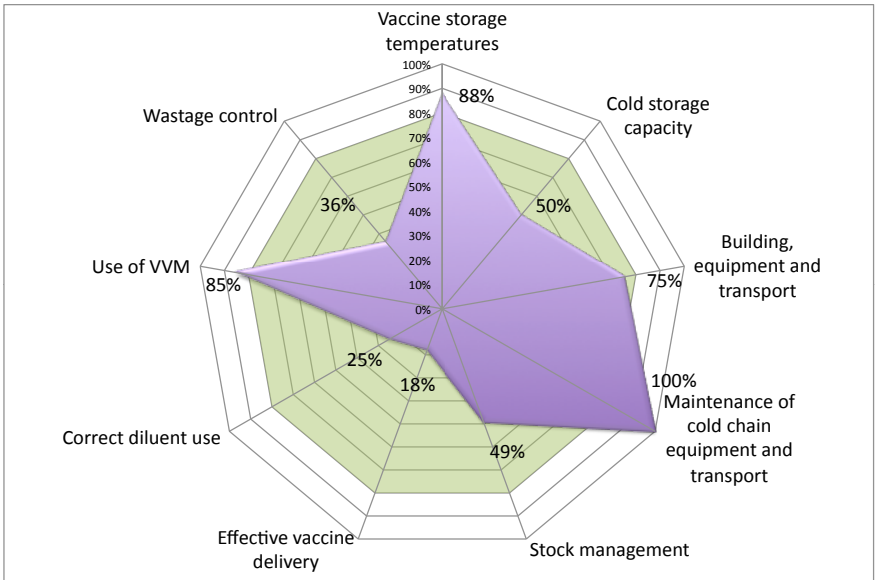






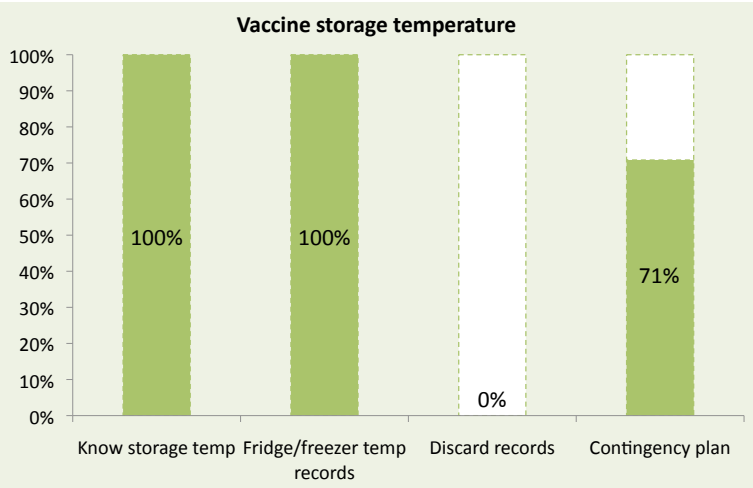
PALAMU - PRIMARY HEALTH CENTERS

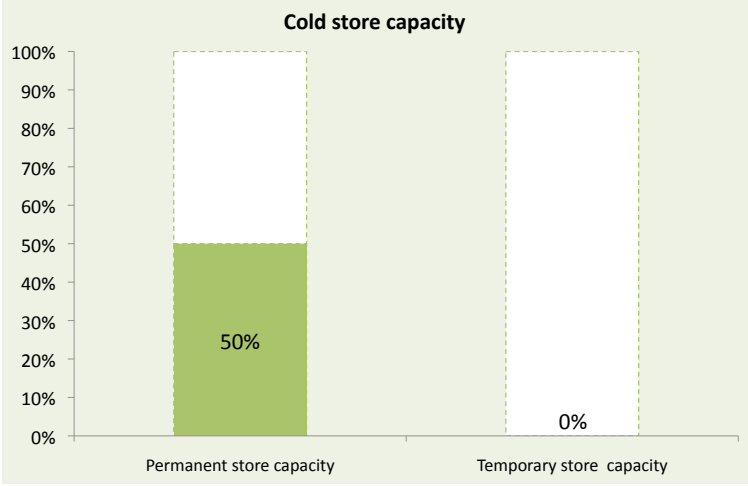
STATUS - VACCINE MANAGEMENT ASSESSMENT 2009

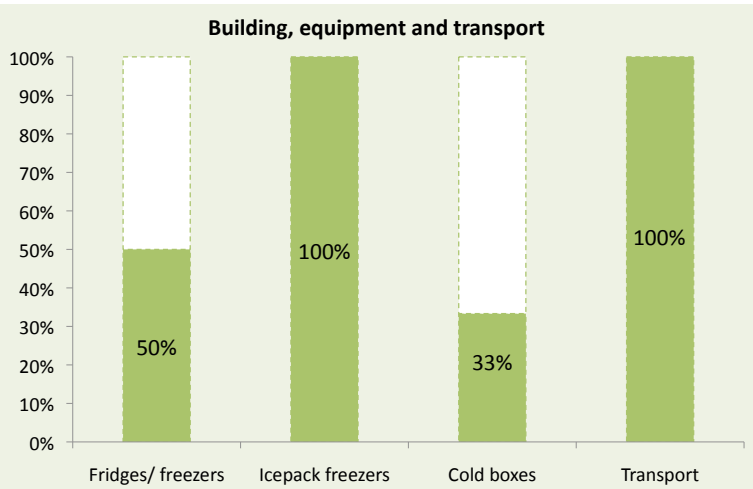


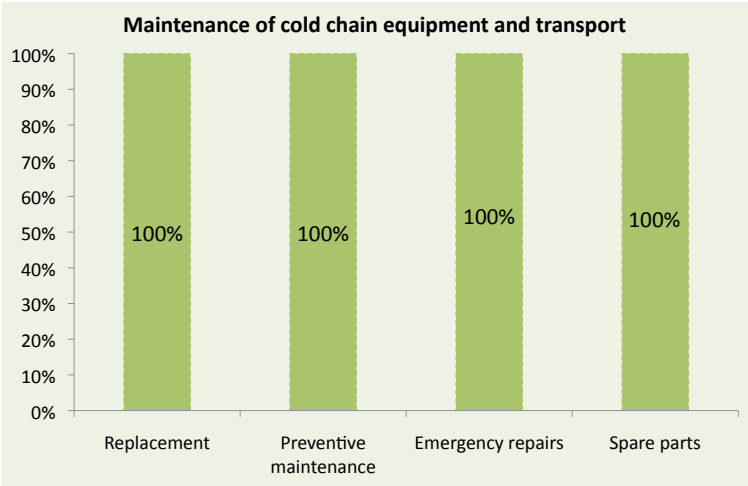
PHC assessed:	Hussainabad
Total population:	20,332
Target population:	6,100
Number of sub centers:	
RI Coverage rate (2008):	49.18%

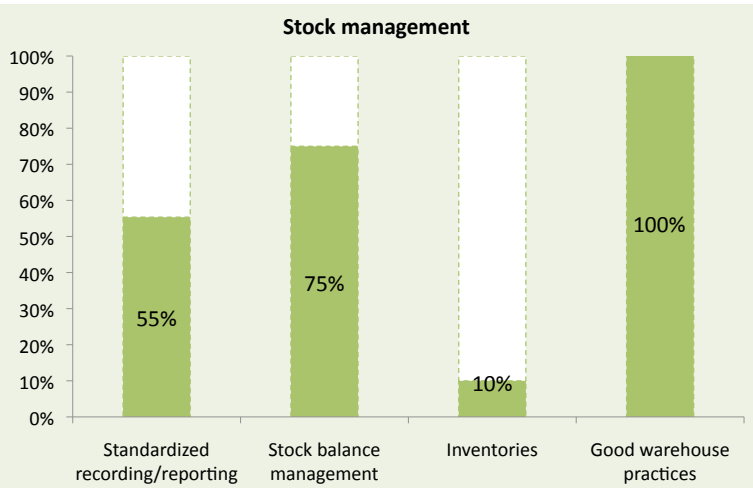
PHC assessed:	Chainpur
Total population:	26,933
Target population:	7,948
Number of sub centers:	
RI Coverage rate (2008):	70.13%

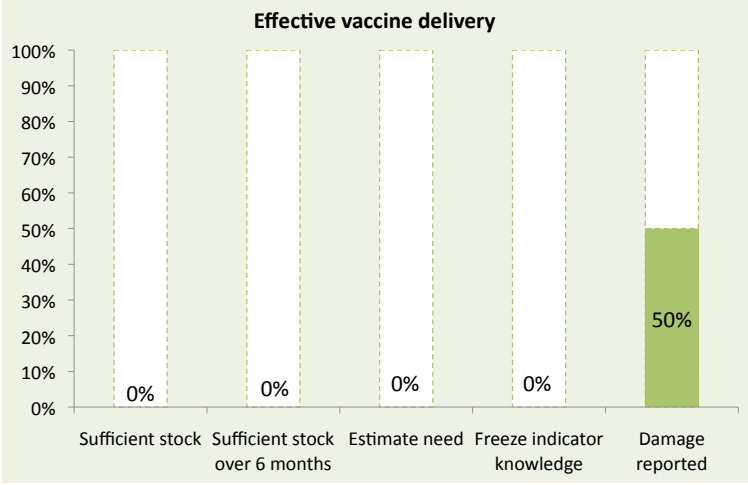






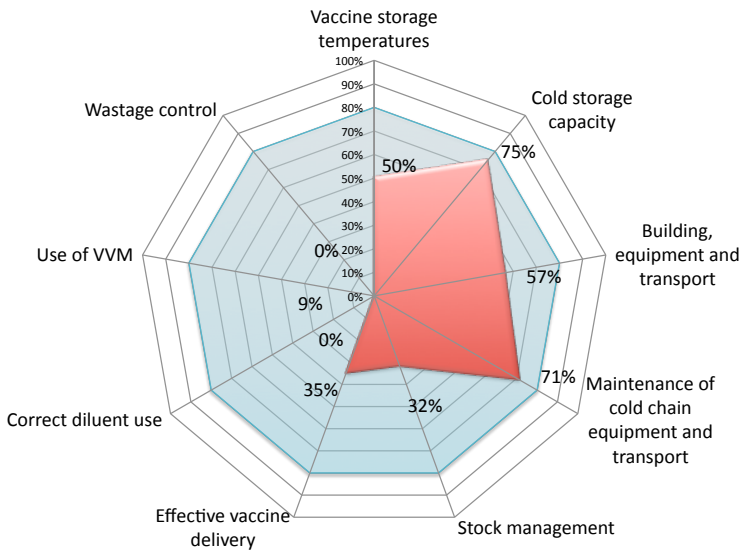






HAZARIBAGH DISTRICT STORE

STATUS - VACCINE MANAGEMENT ASSESSMENT 2009



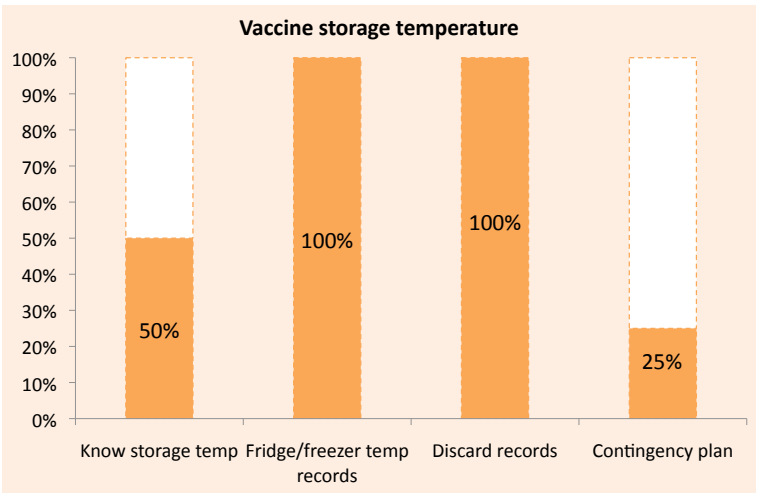
Total population: 16,86,111

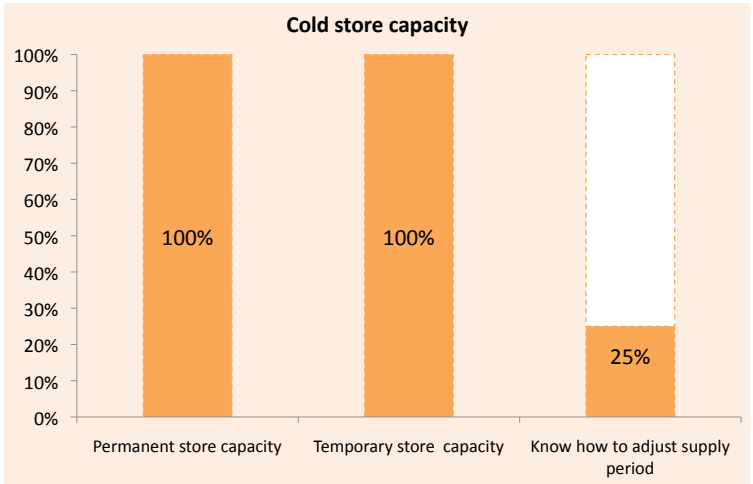
Target population: 41,691

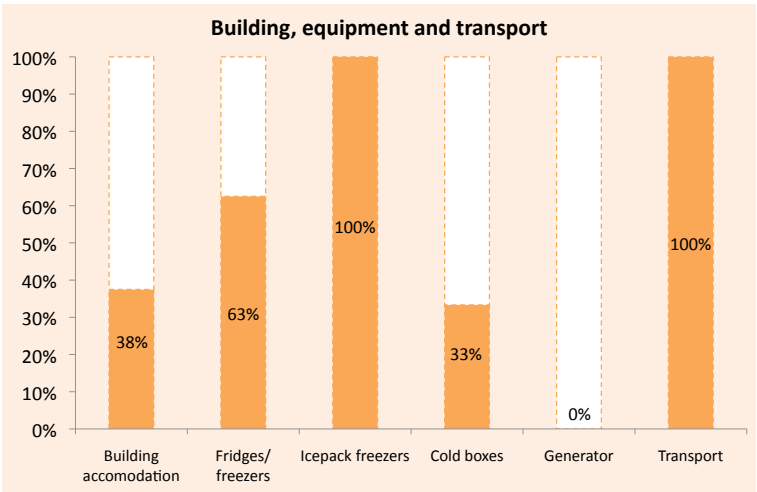
Number of PHC served:

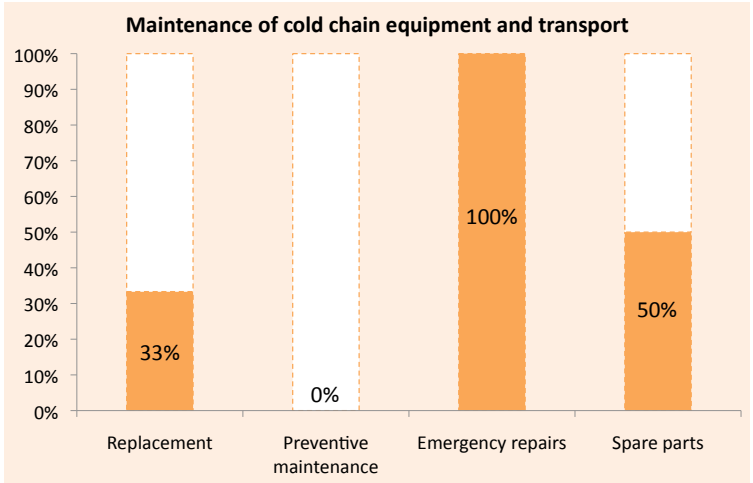
Number of sub centers:

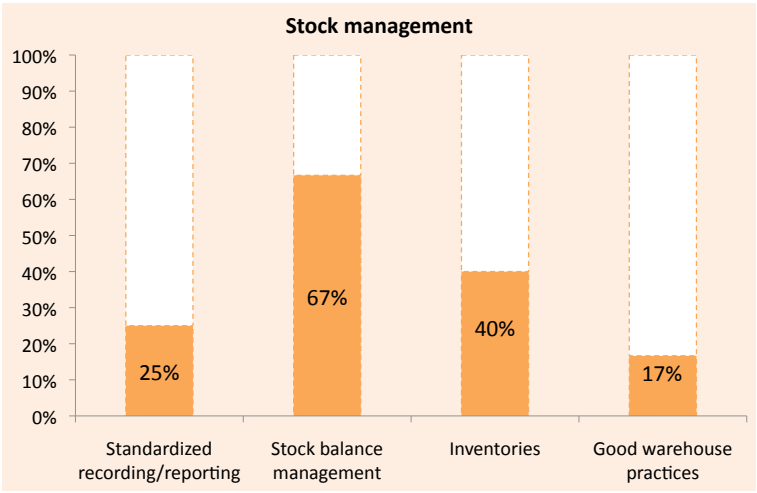
RI Coverage rate (2008): 68.9%

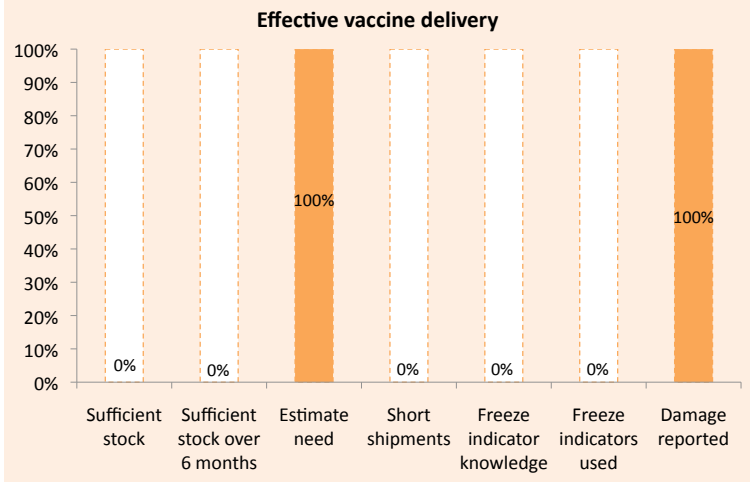






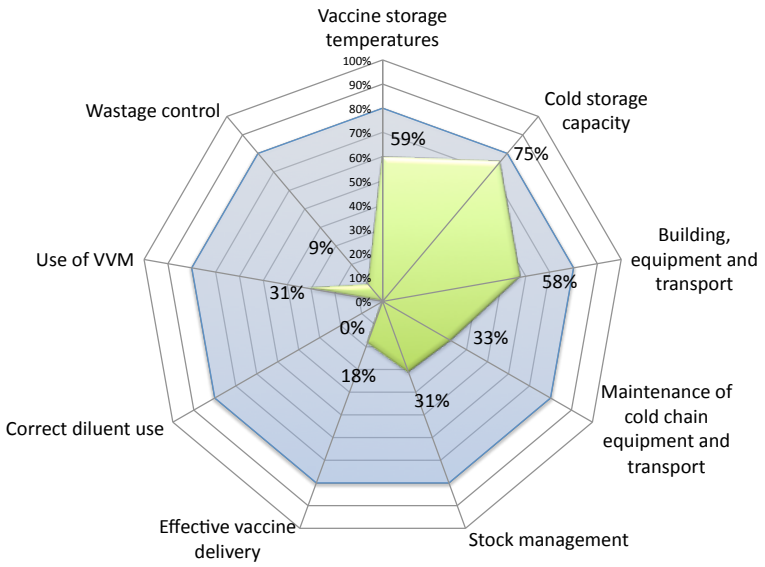






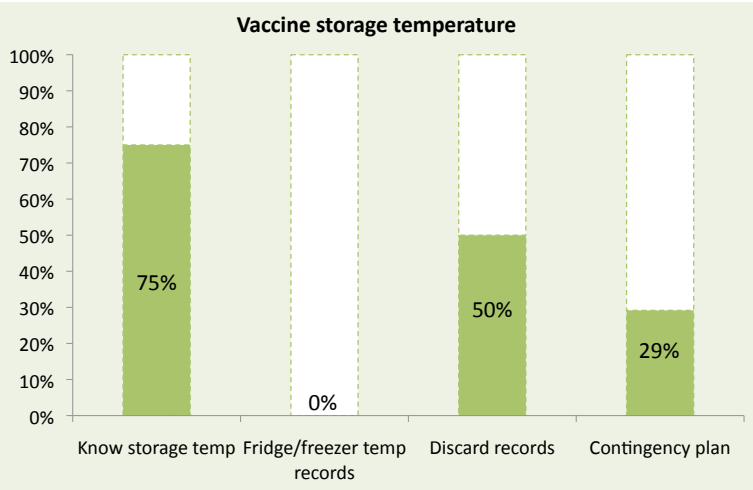
HAZARIBAGH - PRIMARY HEALTH CENTERS

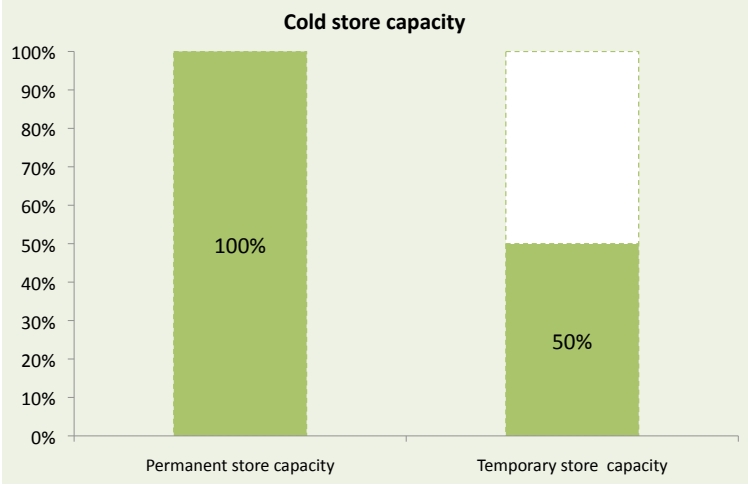
STATUS - VACCINE MANAGEMENT ASSESSMENT 2009

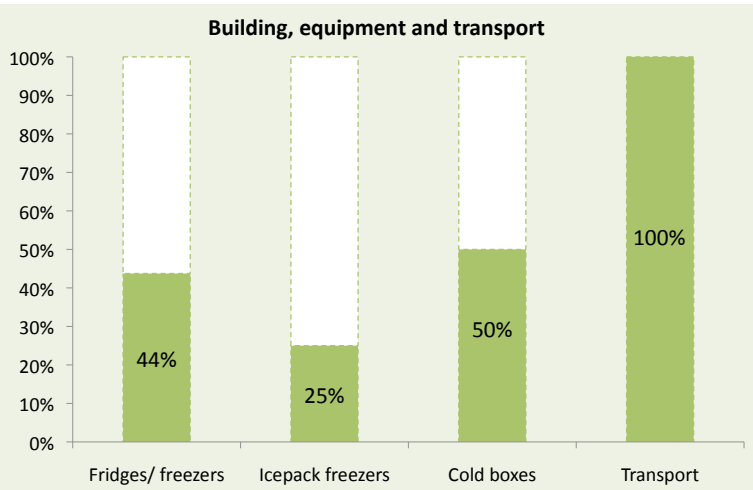


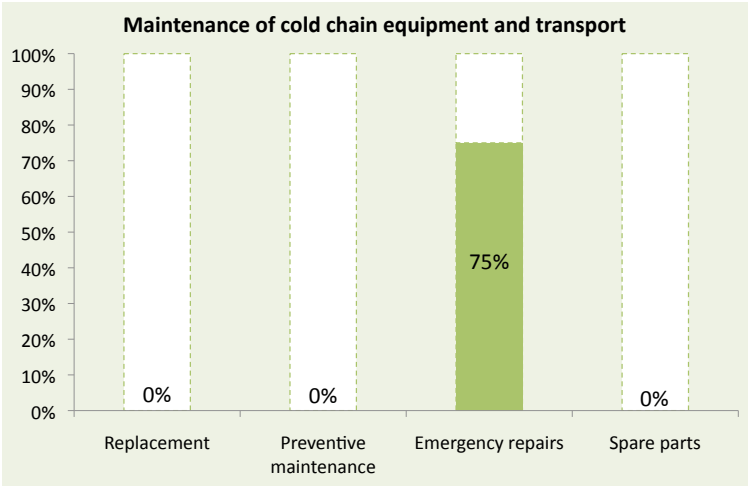
PHC assessed:	Barhi
Total population:	1,66,724
Target population:	4122
Number of sub centers:	
RI Coverage rate (2008):	75.03%

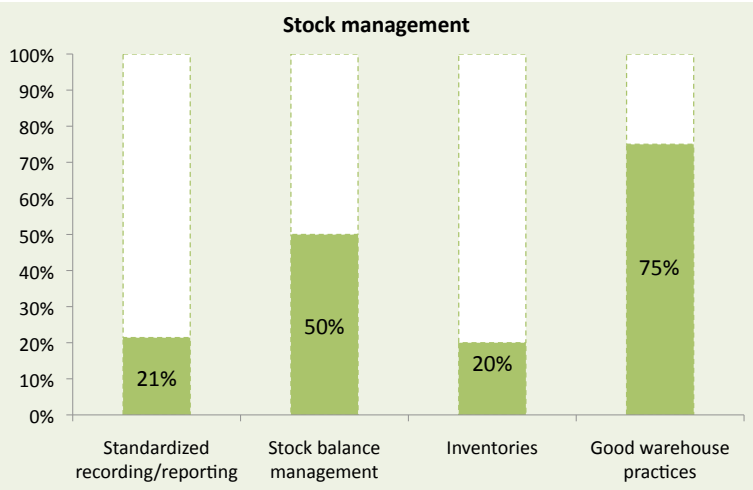
PHC assessed:	Chouparan
Total population:	1,96,103
Target population:	4,849
Number of sub centers:	
RI Coverage rate (2008):	93.42%

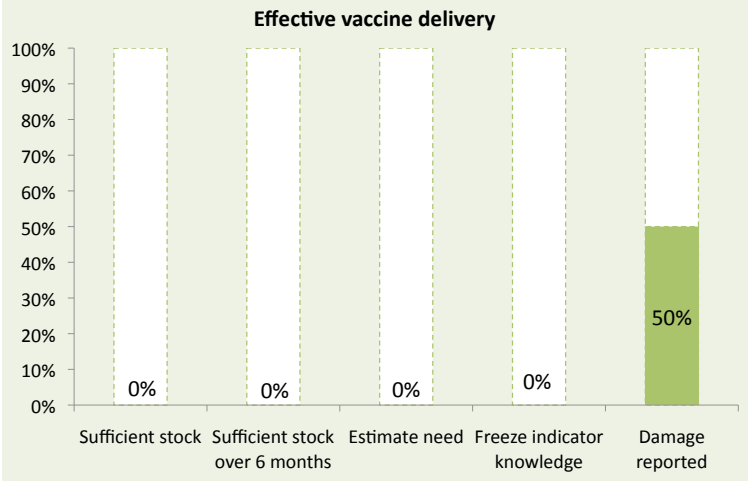






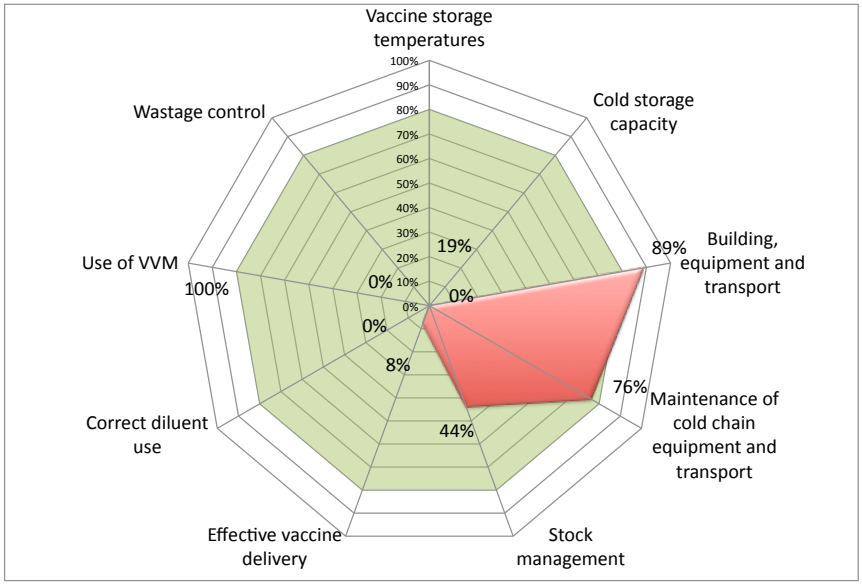




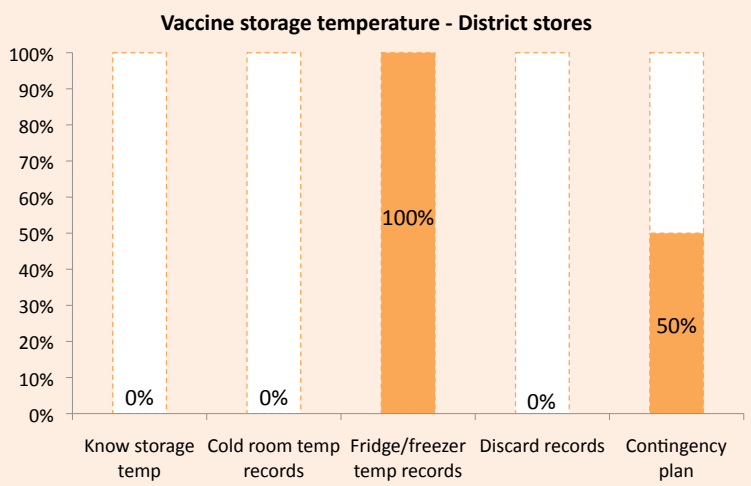


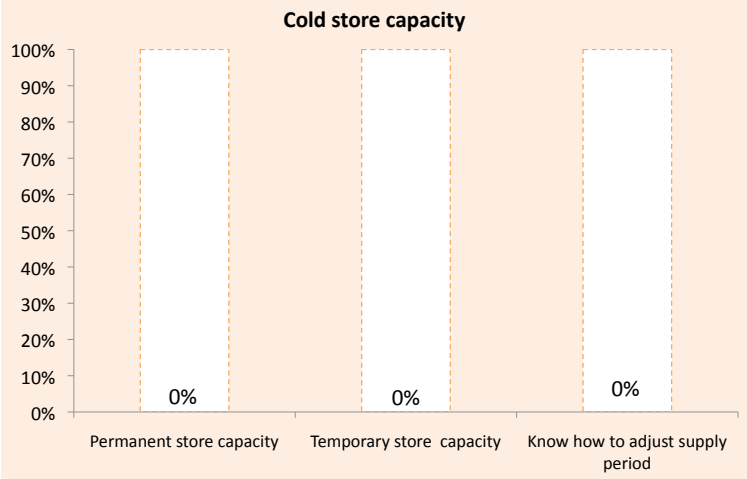
GIRIDIH DISTRICT STORE

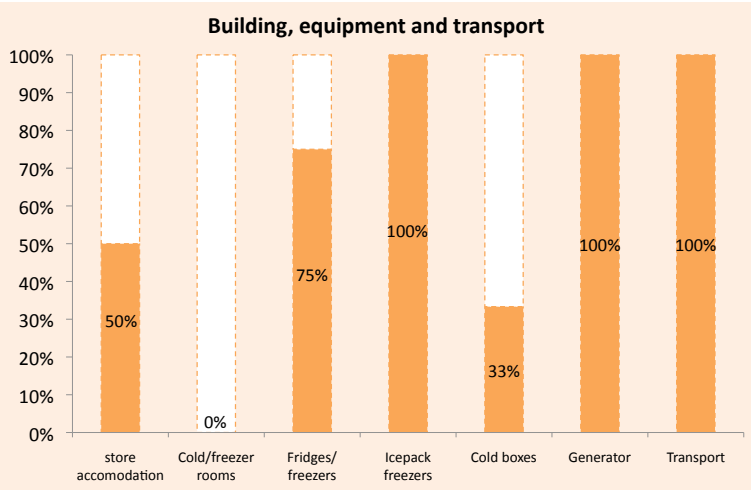
STATUS - VACCINE MANAGEMENT ASSESSMENT 2009

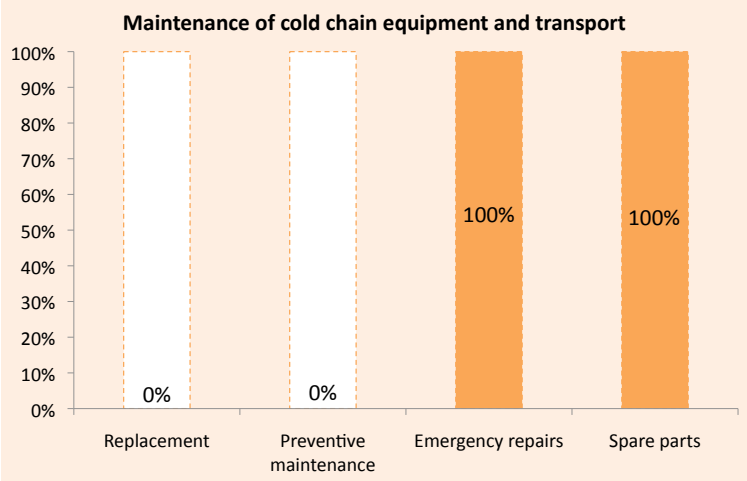


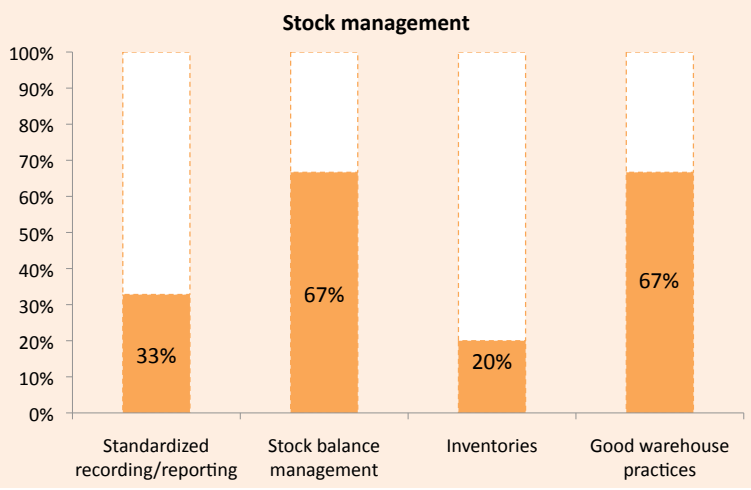
Total population:	22,94,870
Target population:	62,809
Number of PHC served:	
Number of sub centers:	
RI Coverage rate (2008):	21.6%

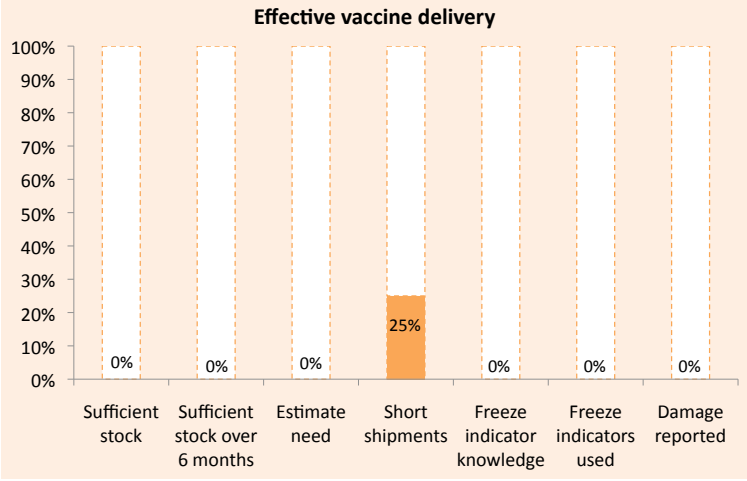






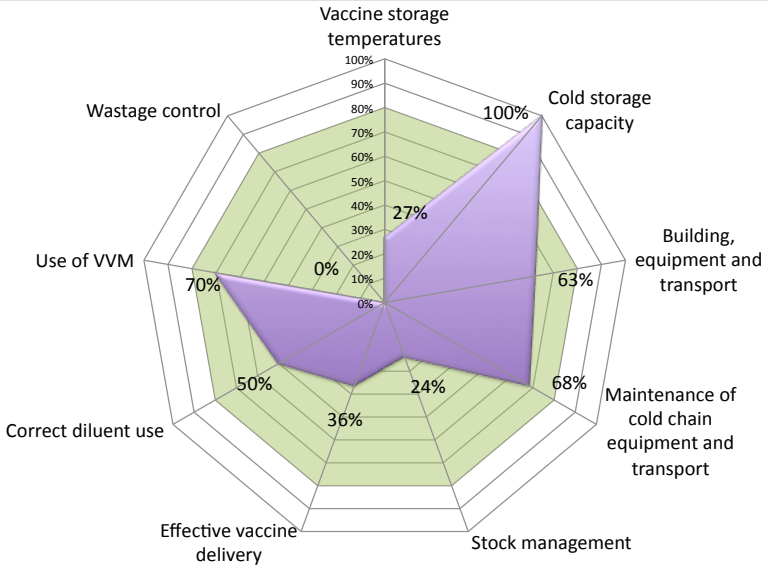






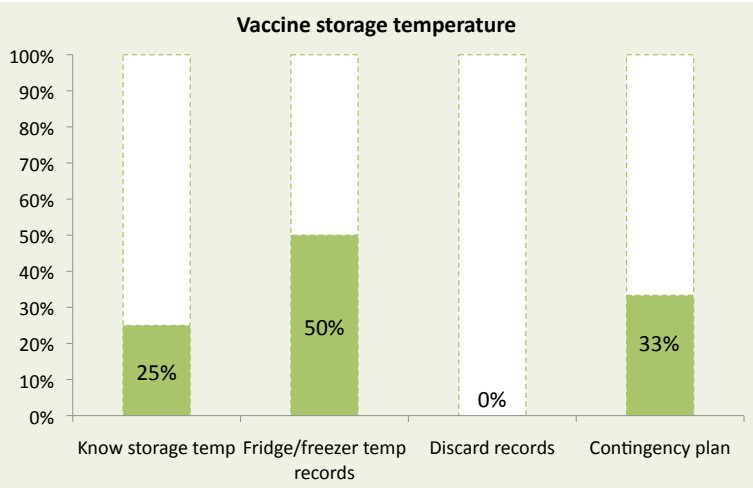
GIRIDIH - PRIMARY HEALTH CENTERS

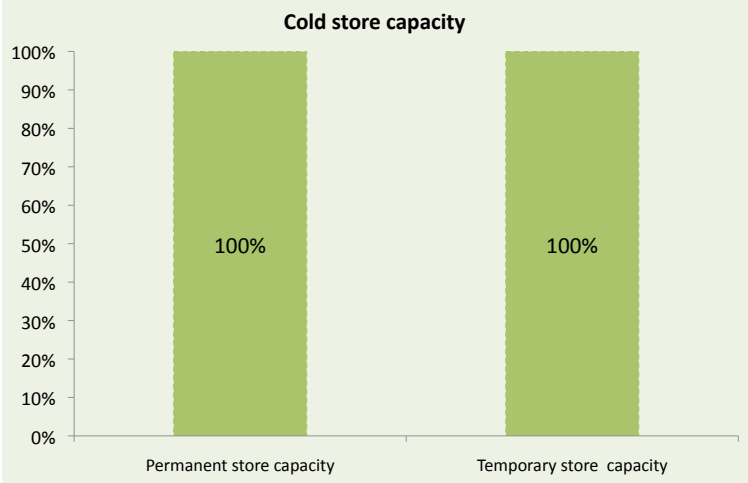
STATUS - VACCINE MANAGEMENT ASSESSMENT 2009

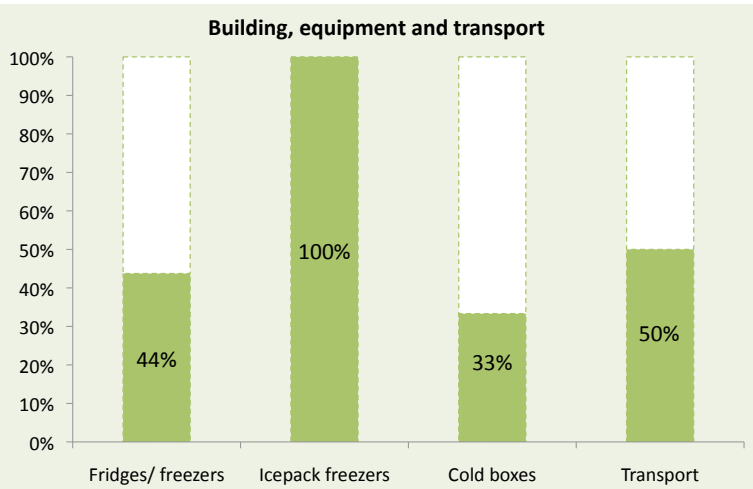


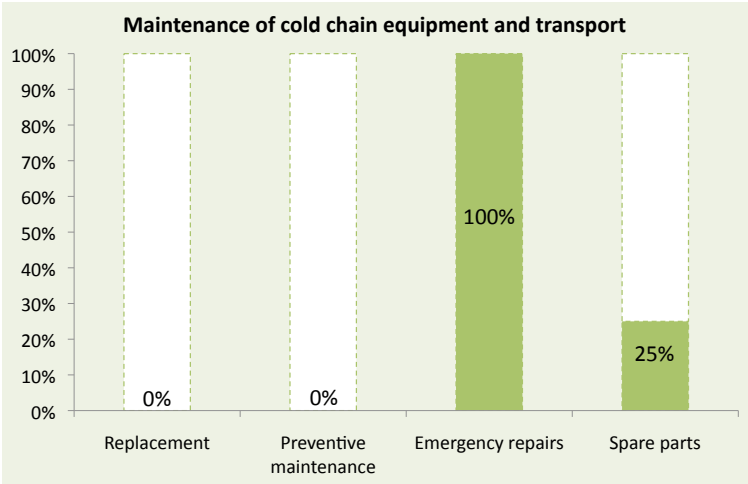
PHC assessed:	Bagodar
Total population:	2,85,038
Target population:	6,858
Number of sub centers:	
RI Coverage rate (2008):	74.9%

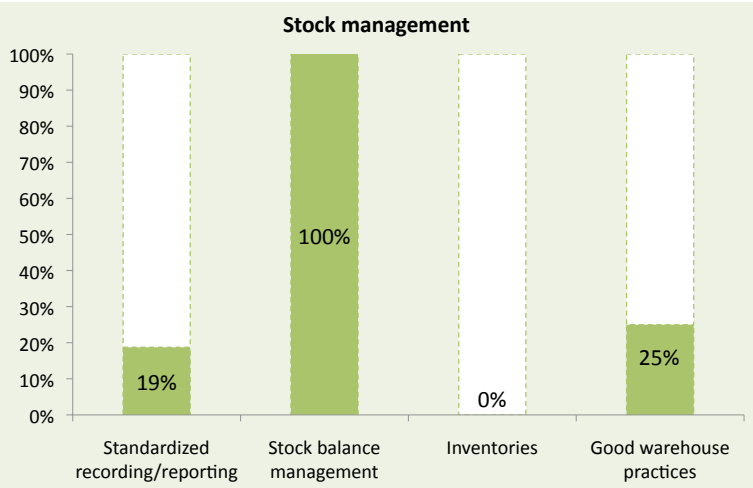
PHC assessed:	Pirtand
Total population:	1,05,112
Target population:	2,529
Number of sub centers:	
RI Coverage rate (2008):	68.09%

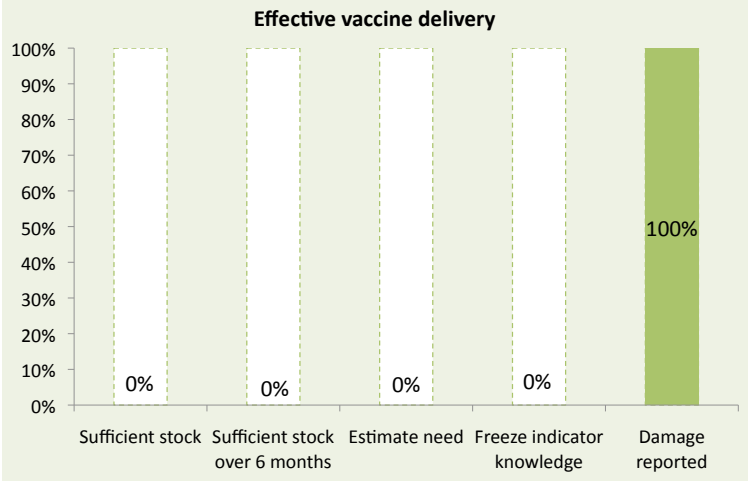






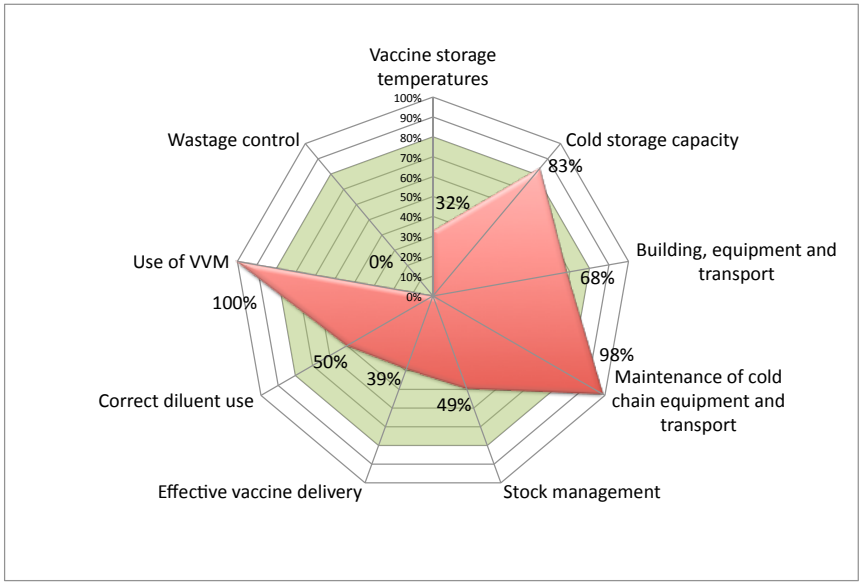






GARWHA DISTRICT STORE

STATUS - VACCINE MANAGEMENT ASSESSMENT 2009



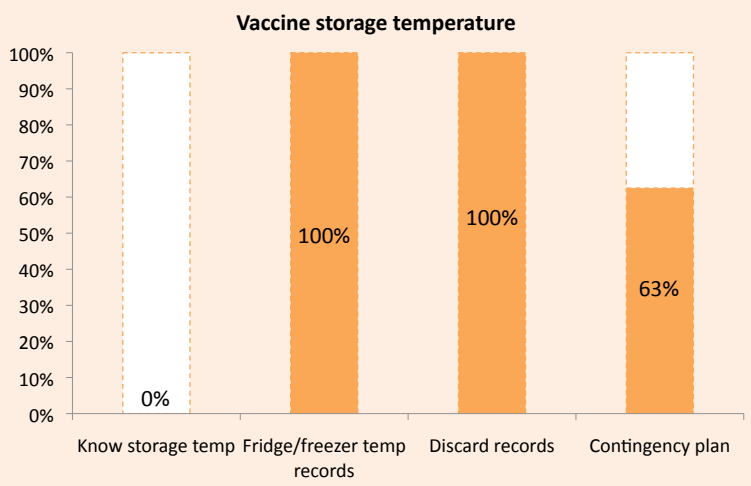
Total population: 11,11,026

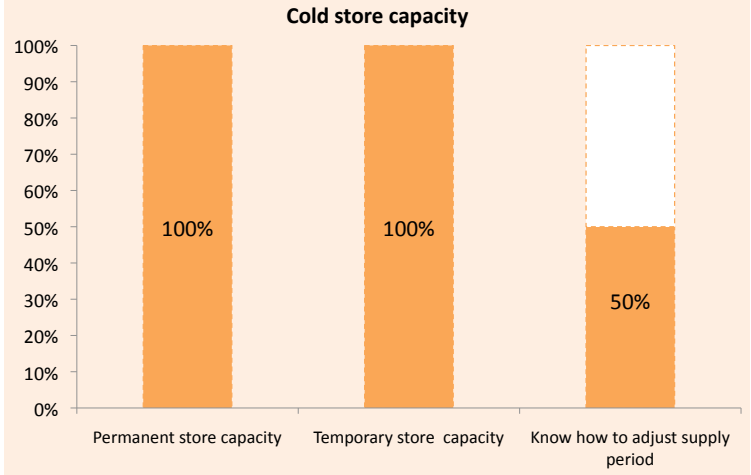
Target population: 35,553

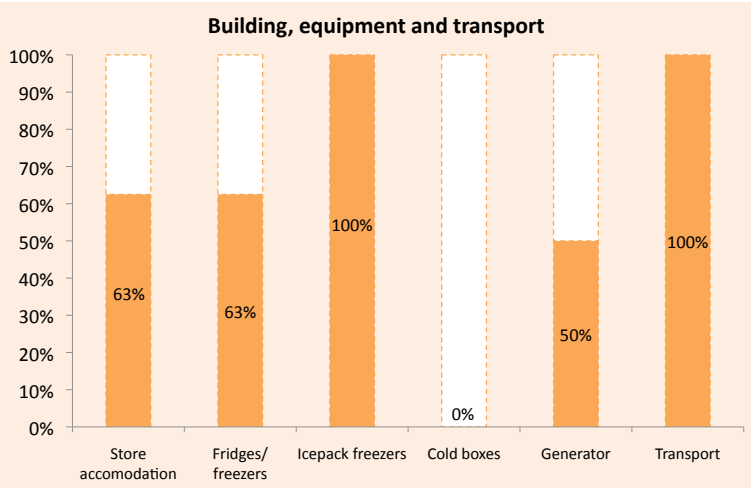
Number of PHC served:

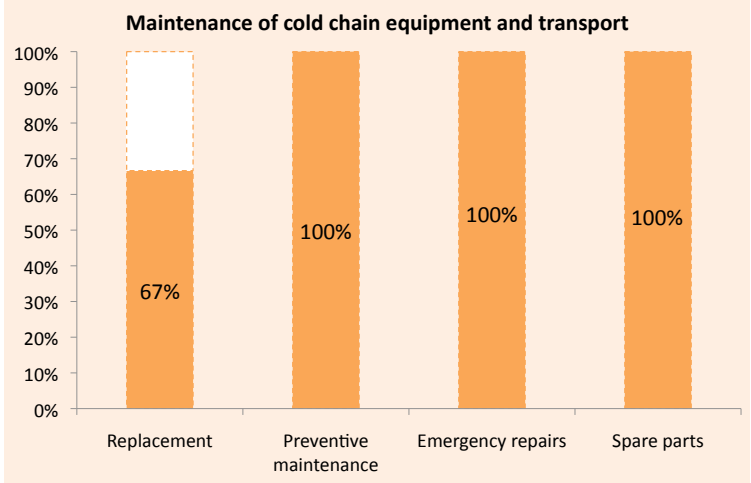
Number of sub centers:

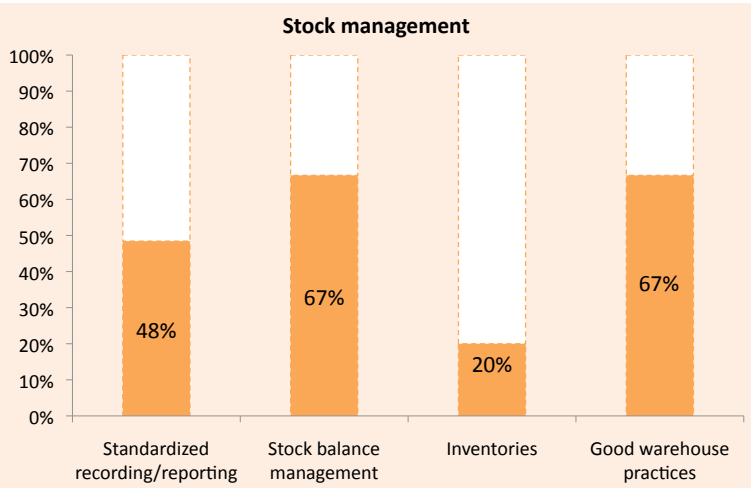
RI Coverage rate (2008): 66.6%

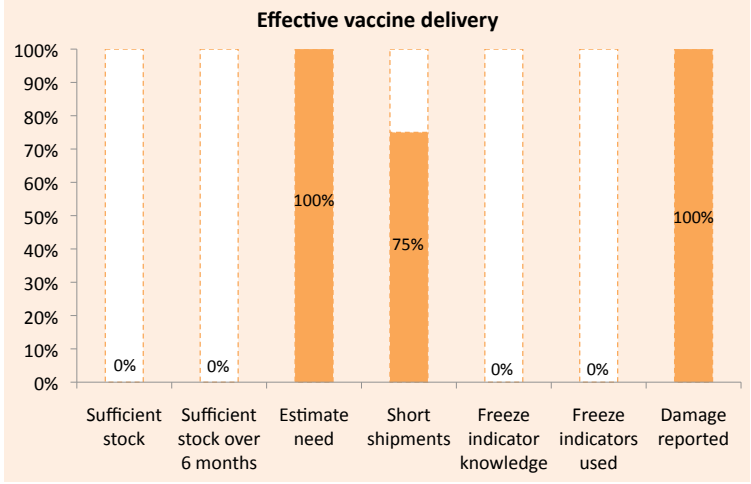






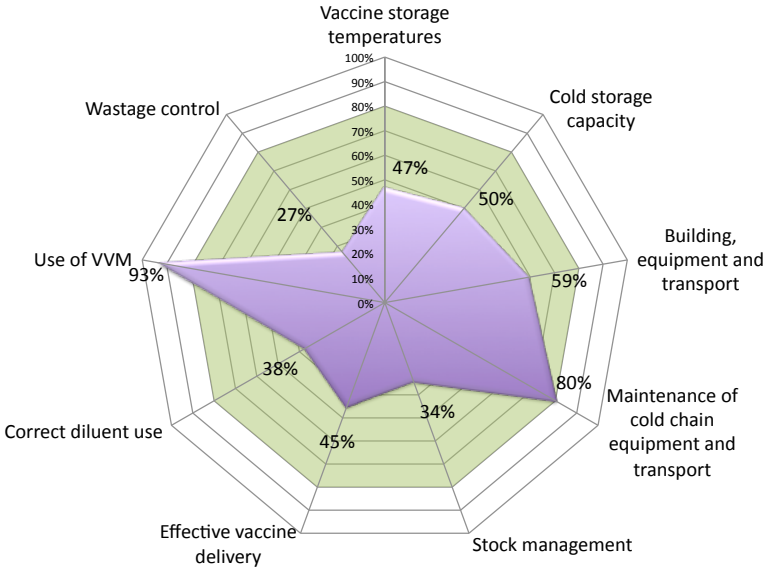






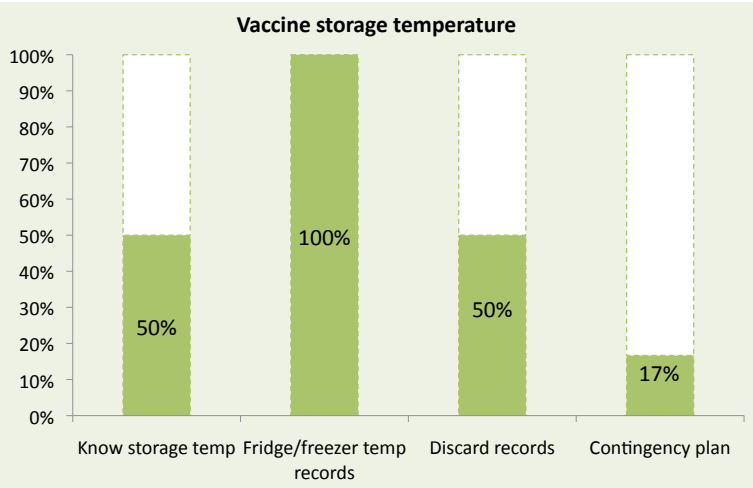
GARWHA - PRIMARY HEALTH CENTERS

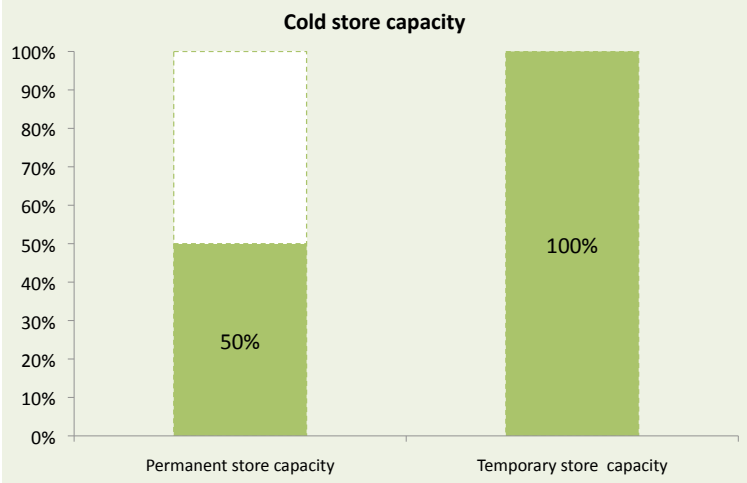
STATUS - VACCINE MANAGEMENT ASSESSMENT 2009

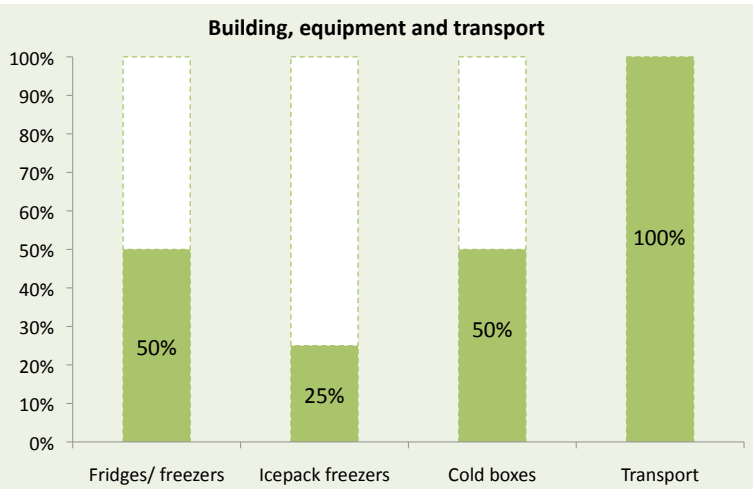


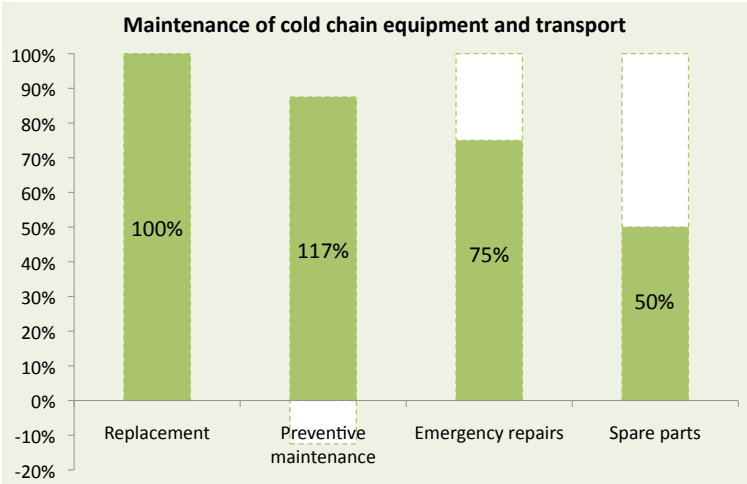
PHC assessed:	Meral
Total population:	1,67,208
Target population:	5,351
Number of sub centers:	
RI Coverage rate (2008):	68.09%

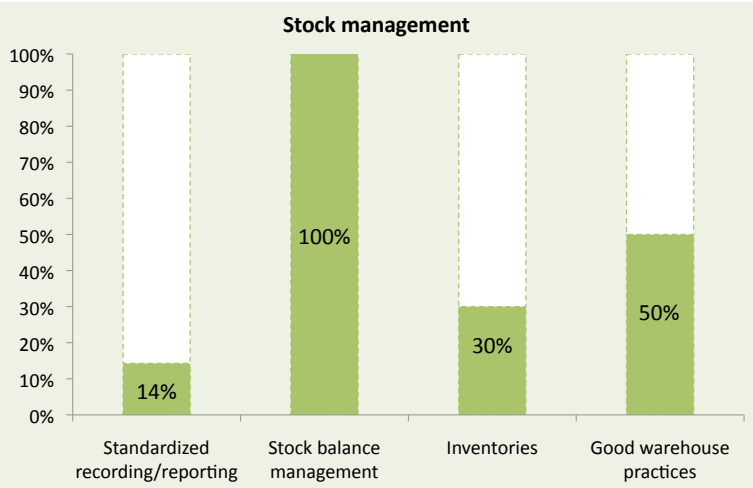
PHC assessed:	Nagaruntri
Total population:	1,51,868
Target population:	4,860
Number of sub centers:	
RI Coverage rate (2008):	80.34%

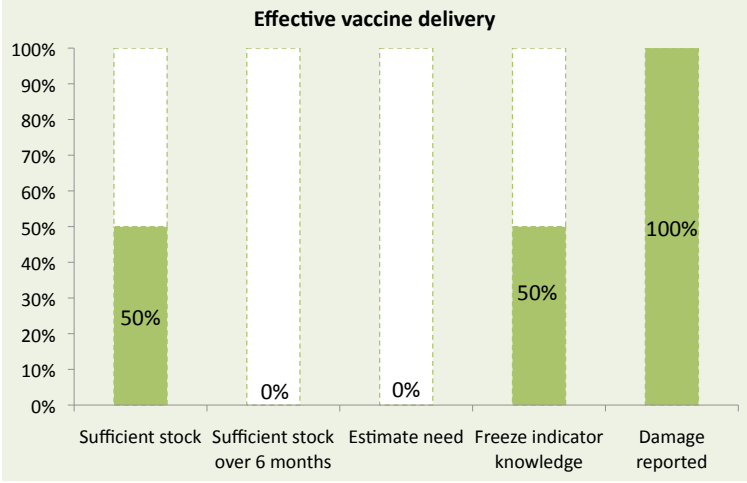






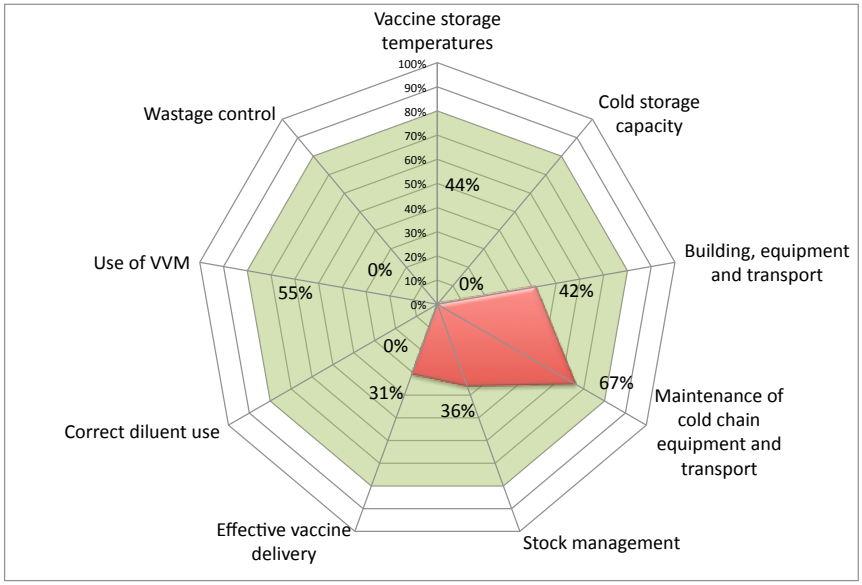




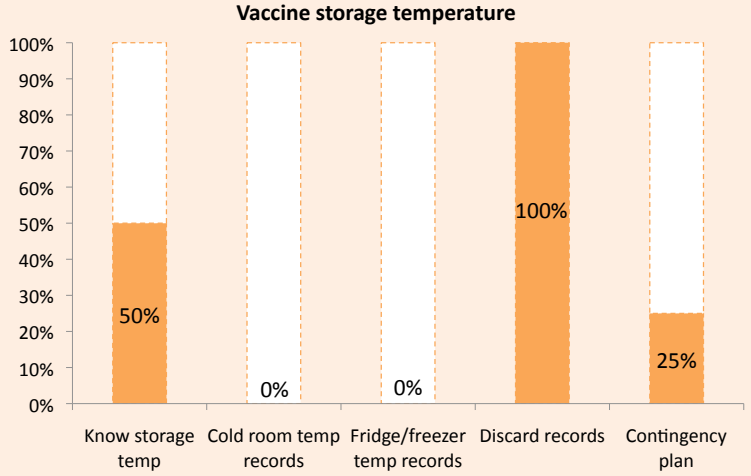


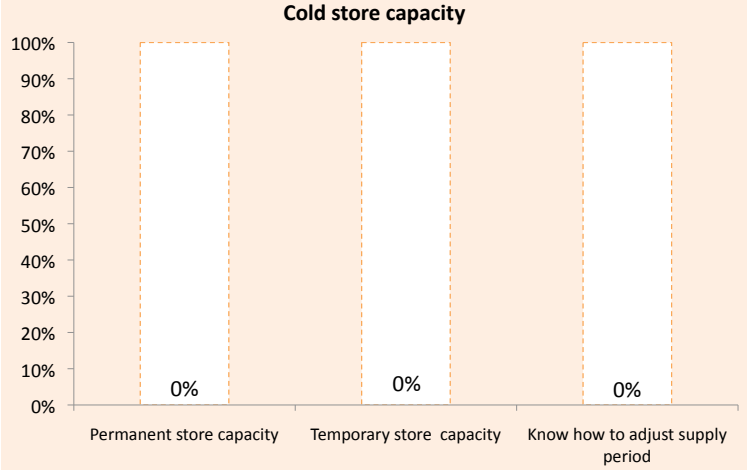
EAST SINGHBHUM DISTRICT STORE

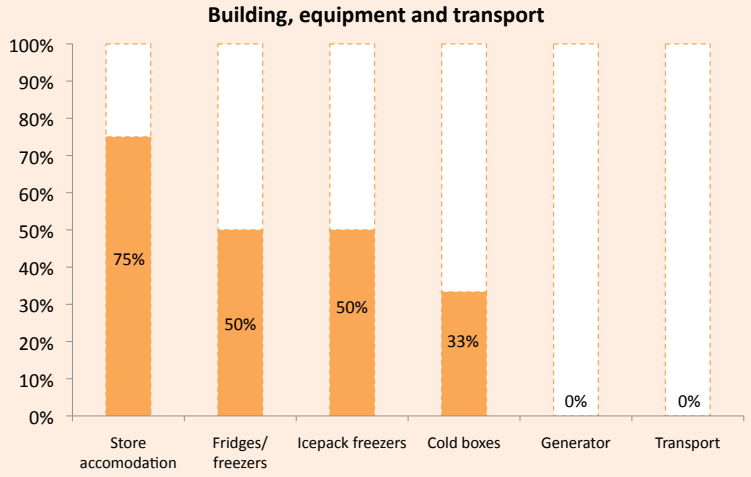
STATUS - VACCINE MANAGEMENT ASSESSMENT 2009

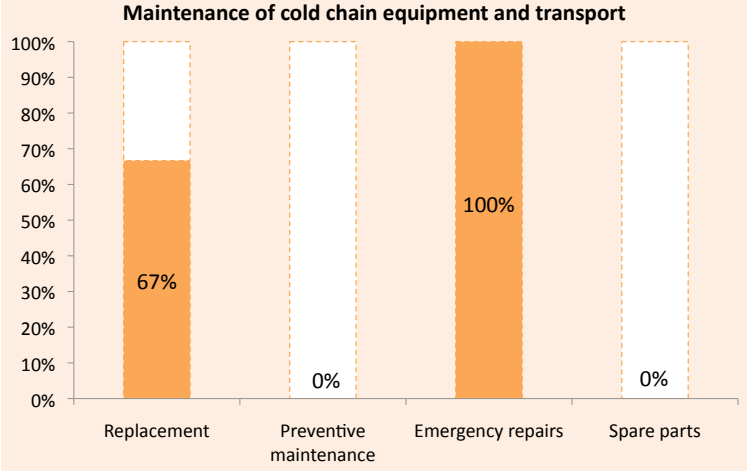


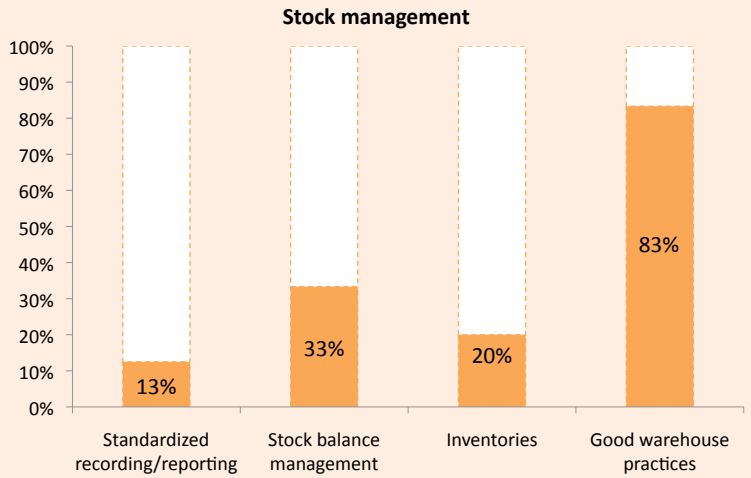
Total population:	2.33 Million
Target population:	62,964
Number of PHC served:	
Number of sub centers:	
RI Coverage rate (2008):	81.5%

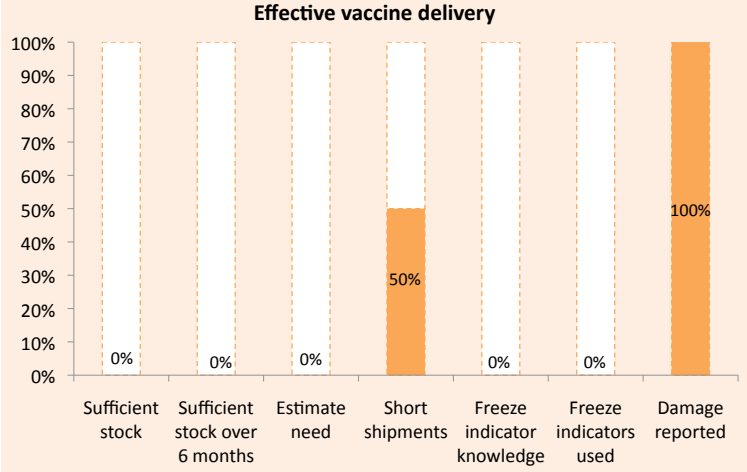






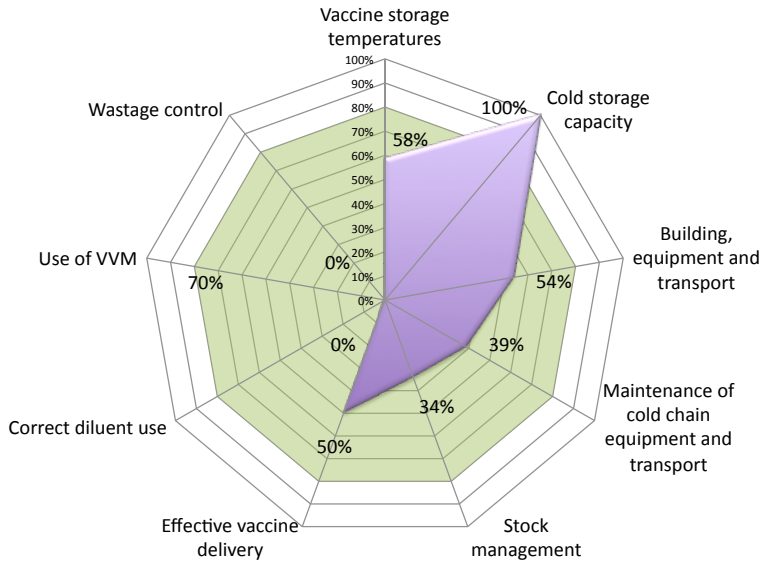






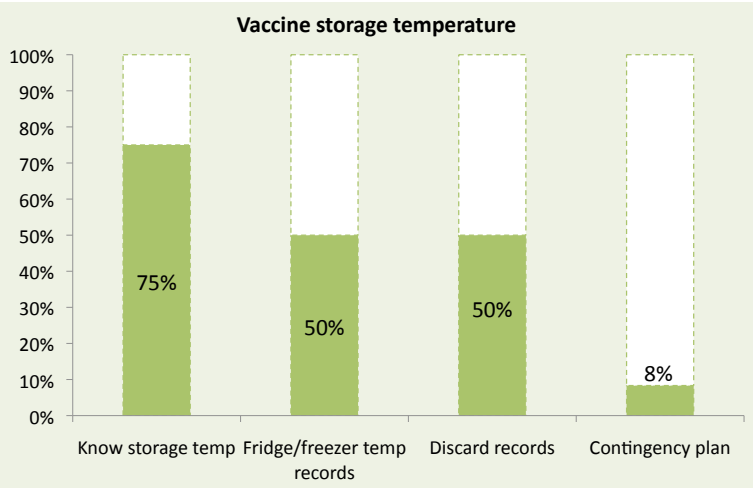
EAST SINGHBHUM - PRIMARY HEALTH CENTERS

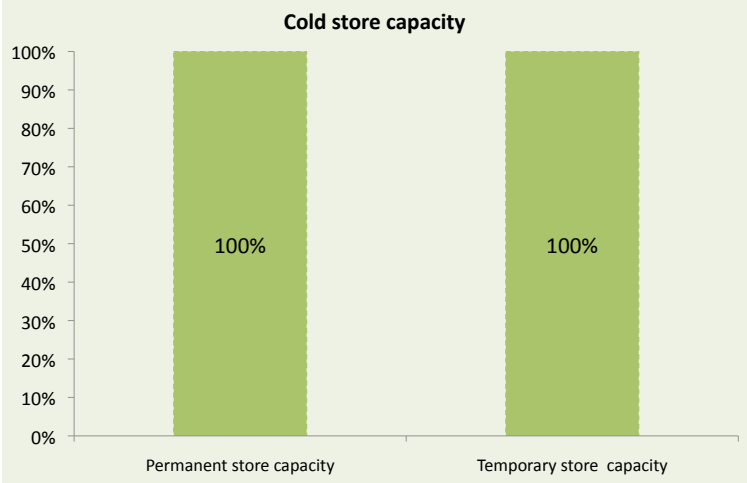
STATUS - VACCINE MANAGEMENT ASSESSMENT 2009

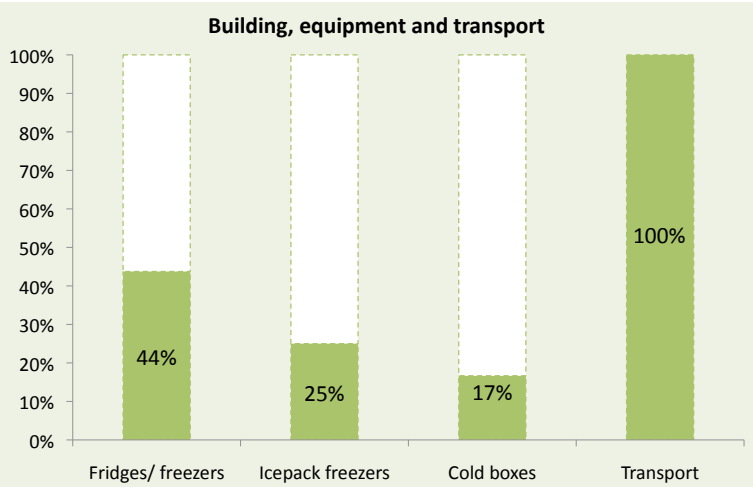


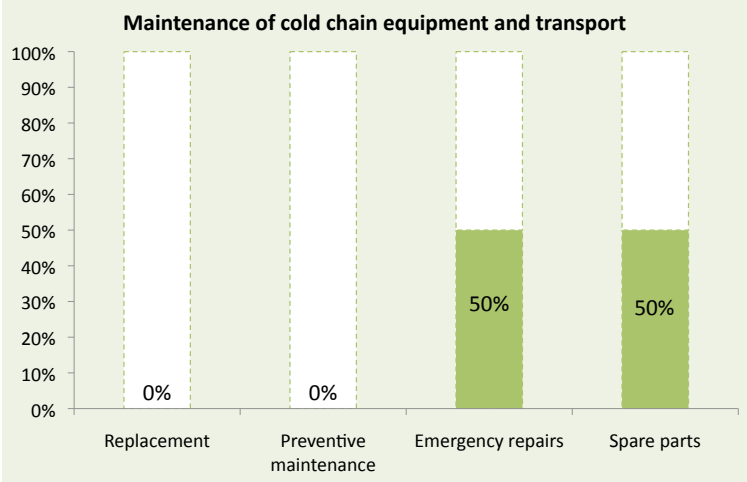
PHC assessed:	Musabani
Total population:	1,05,369
Target population:	2,845
Number of sub centers:	
RI Coverage rate (2008):	53.36%

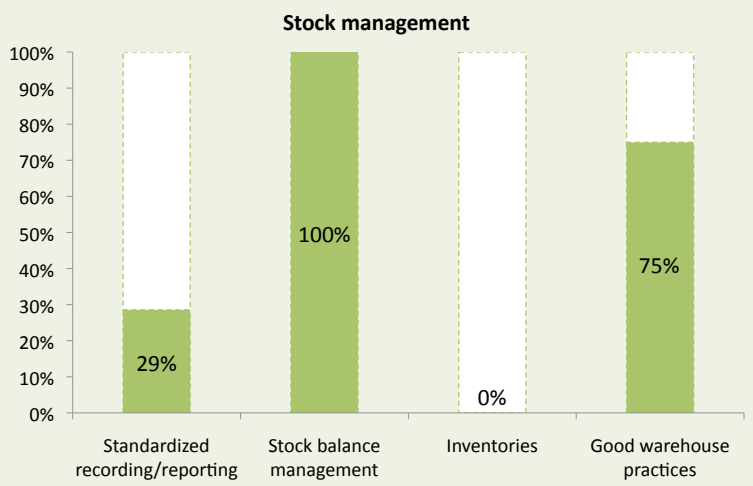
PHC assessed:	Ghatsila
Total population:	1,11,755
Target population:	3,017
Number of sub centers:	
RI Coverage rate (2008):	61.74%

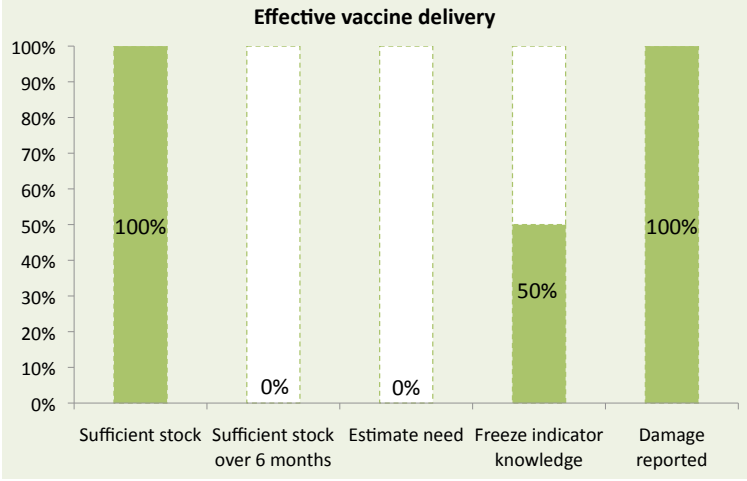






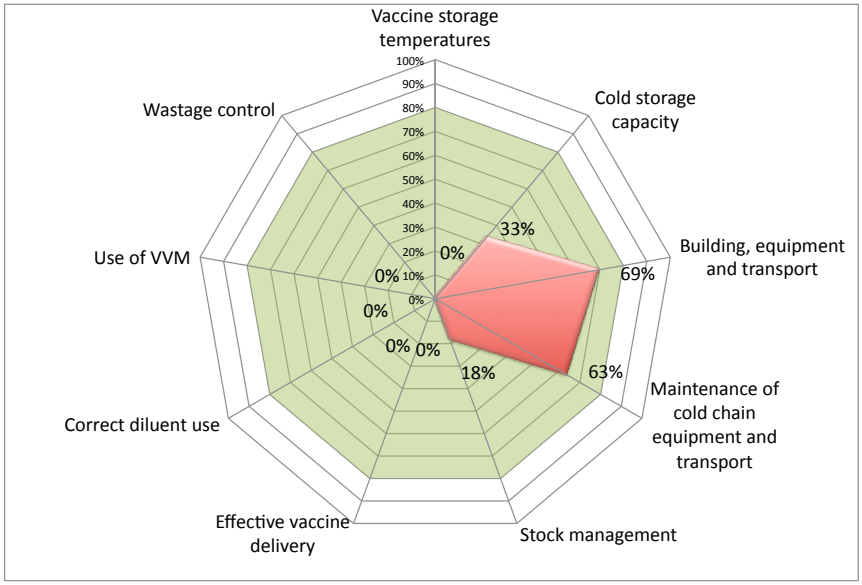




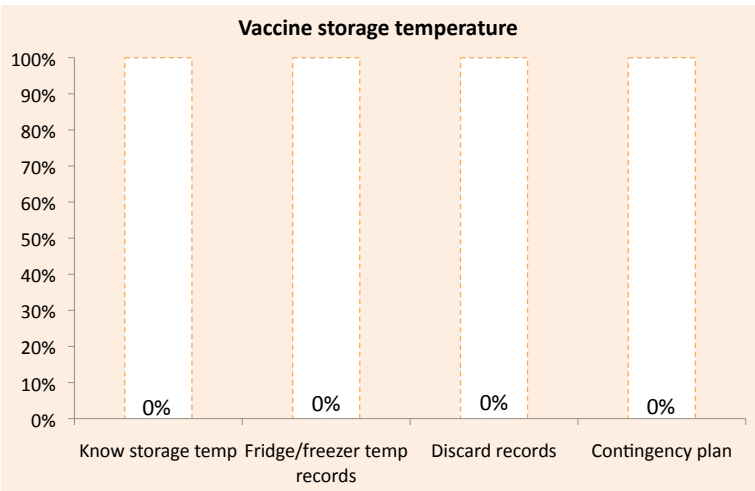


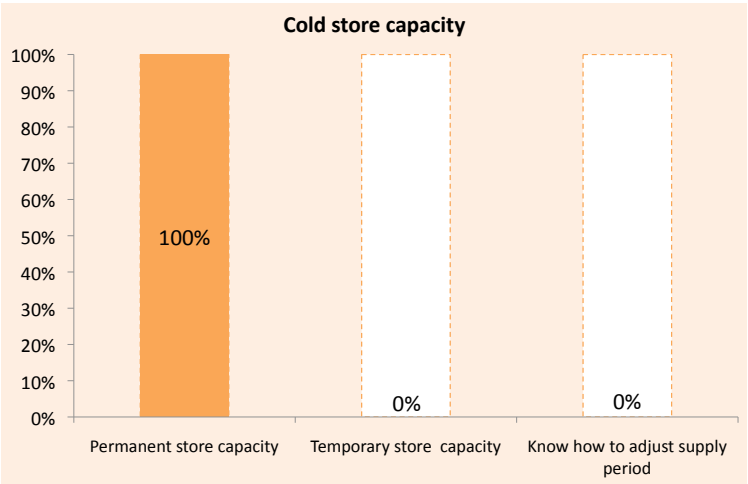
DUMKA DISTRICT STORE

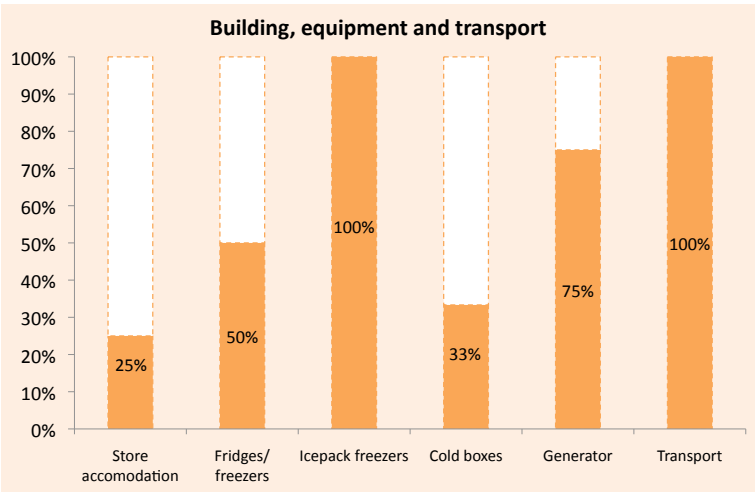
STATUS - VACCINE MANAGEMENT ASSESSMENT 2009

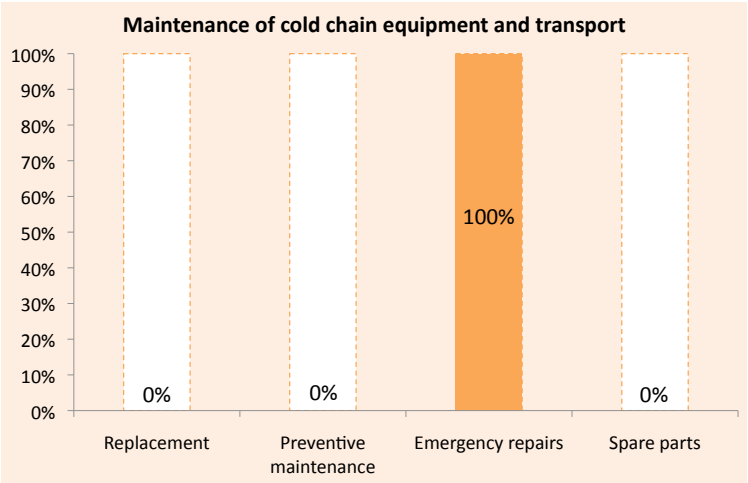


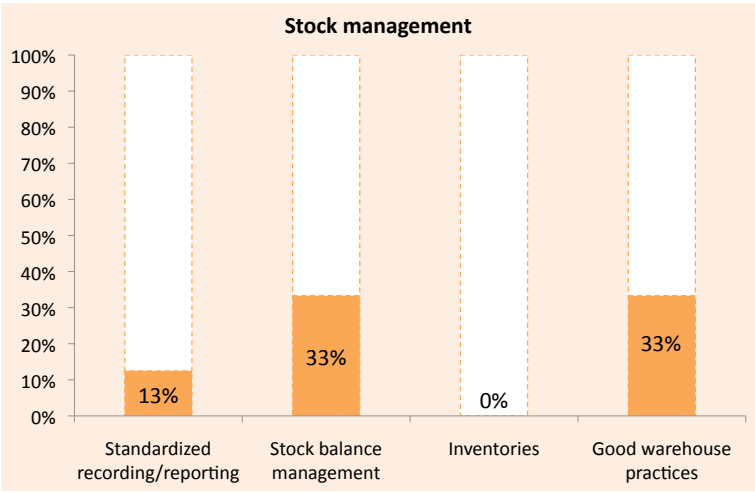
Total population:	12,97,445
Target population:	32,327
Number of PHC served:	
Number of sub centers:	
RI Coverage rate (2008):	52.9%

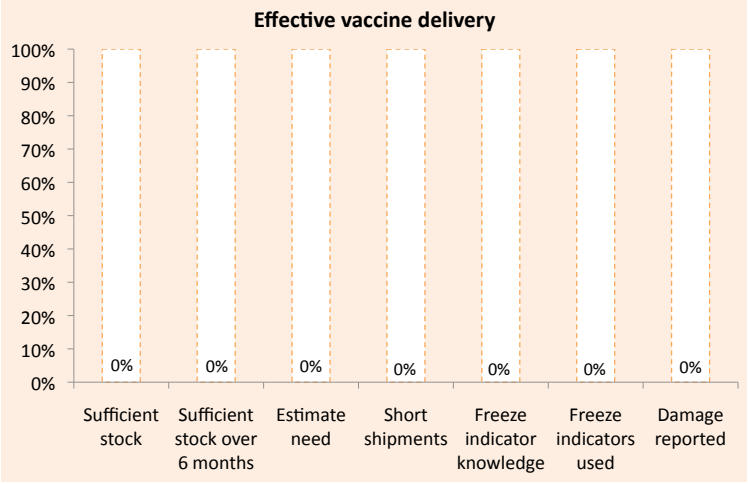






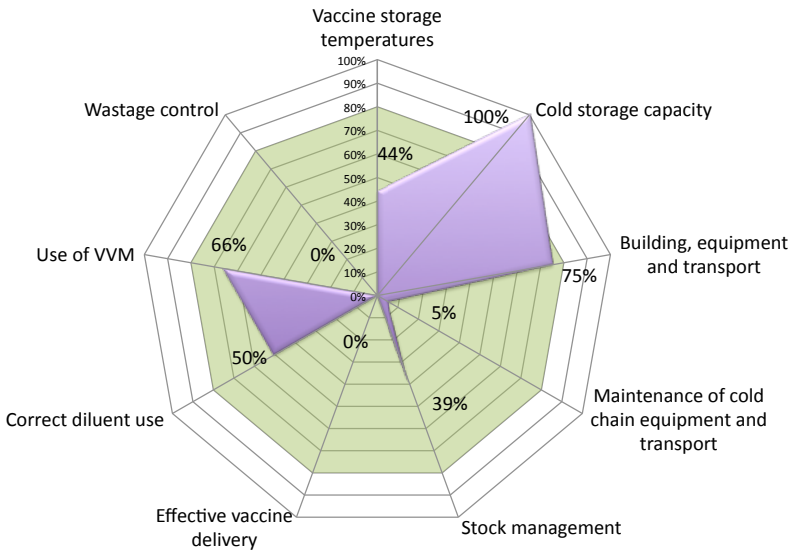






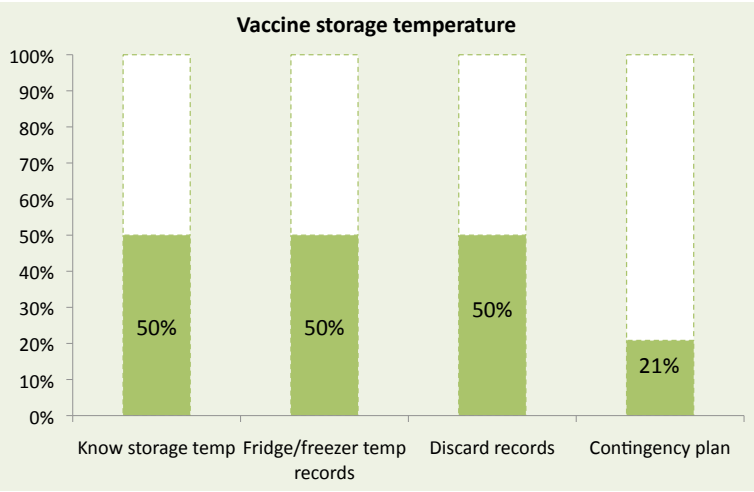
DUMKA - PRIMARY HEALTH CENTERS

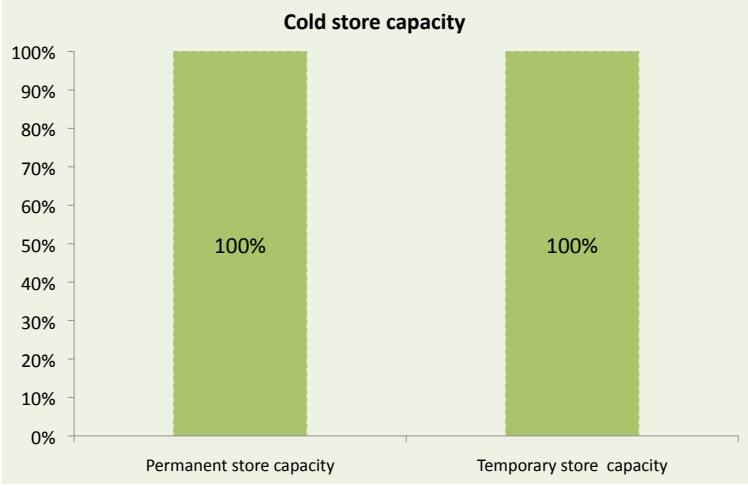
STATUS - VACCINE MANAGEMENT ASSESSMENT 2009

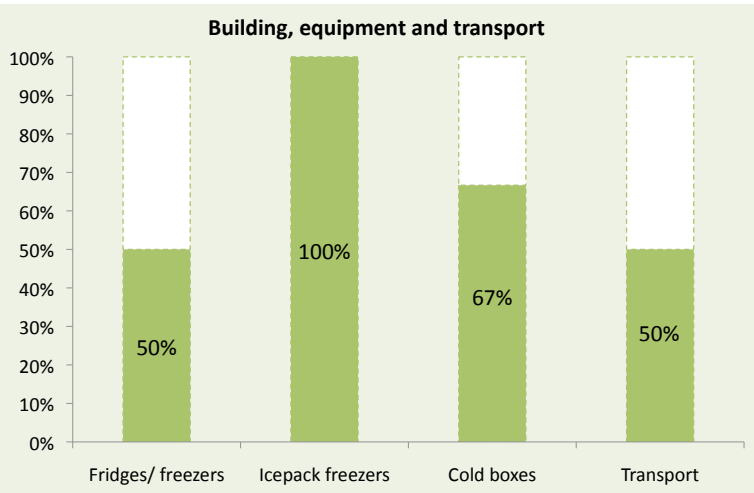


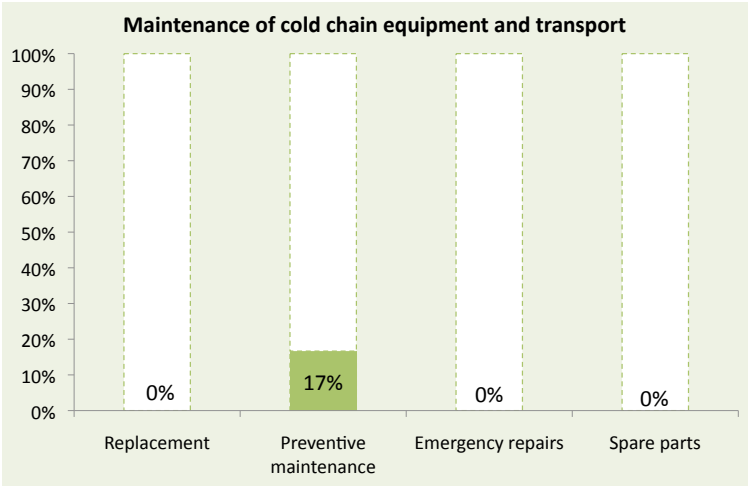
PHC assessed:	Sariyahat
Total population:	1,46,153
Target population:	3,829
Number of sub centers:	
RI Coverage rate (2008):	78.03%

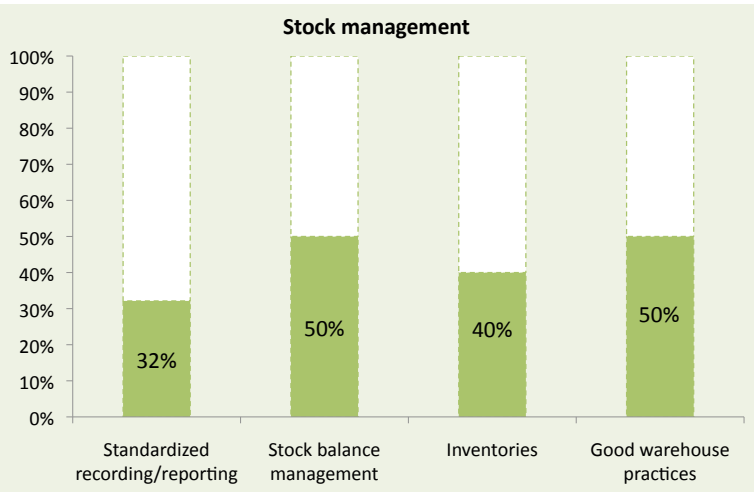
PHC assessed:	Shikaripara
Total population:	1,29,135
Target population:	3,383
Number of sub centers:	
RI Coverage rate (2008):	62.31%

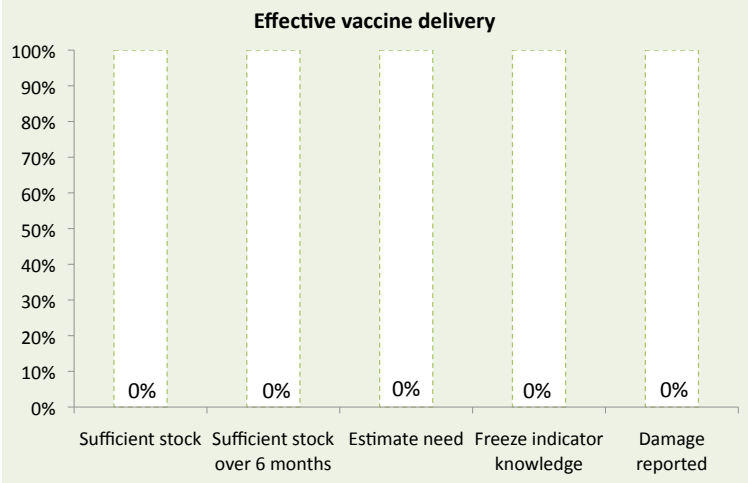






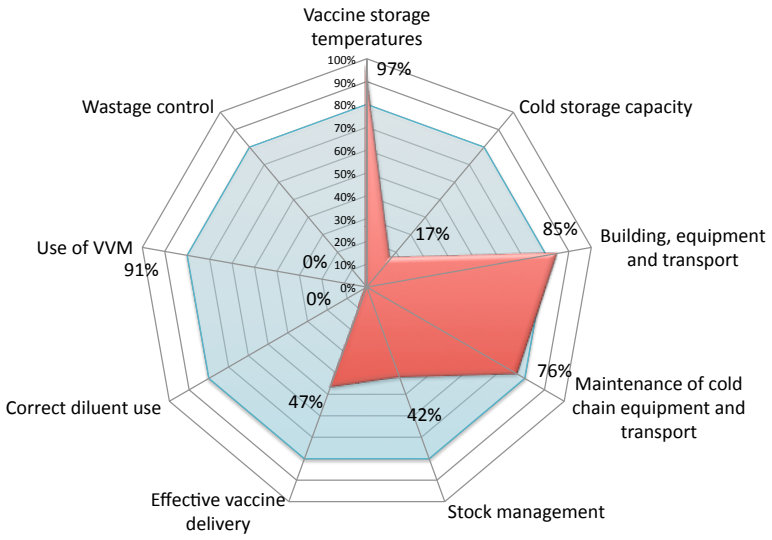




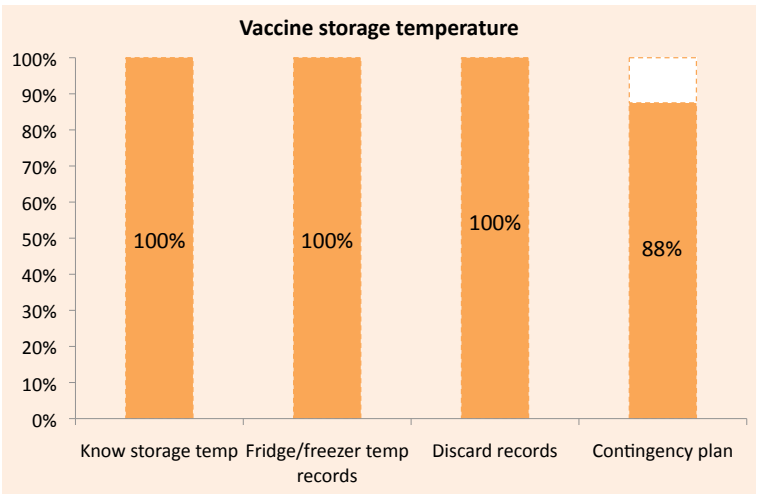


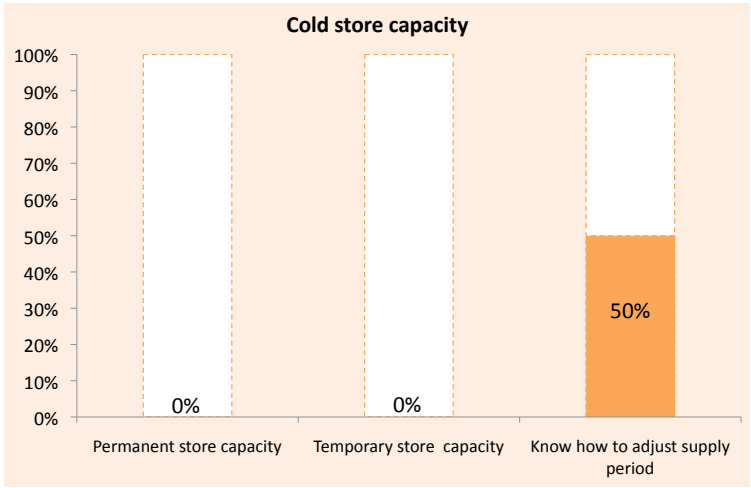
DHANBAD DISTRICT STORE

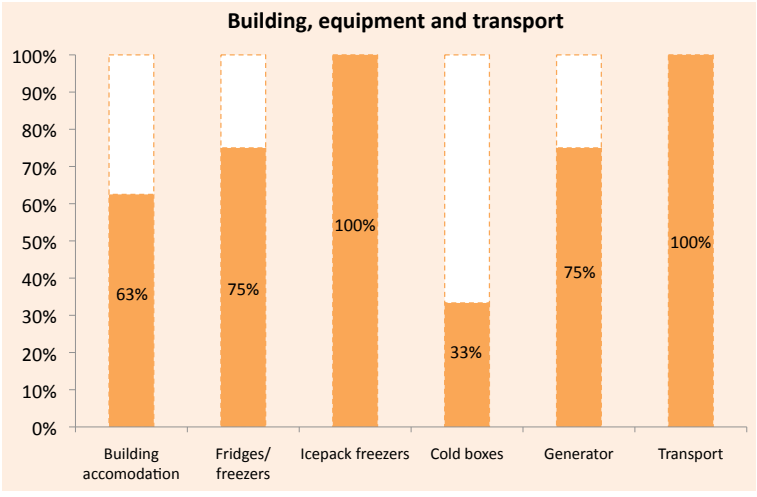
STATUS - VACCINE MANAGEMENT ASSESSMENT 2009

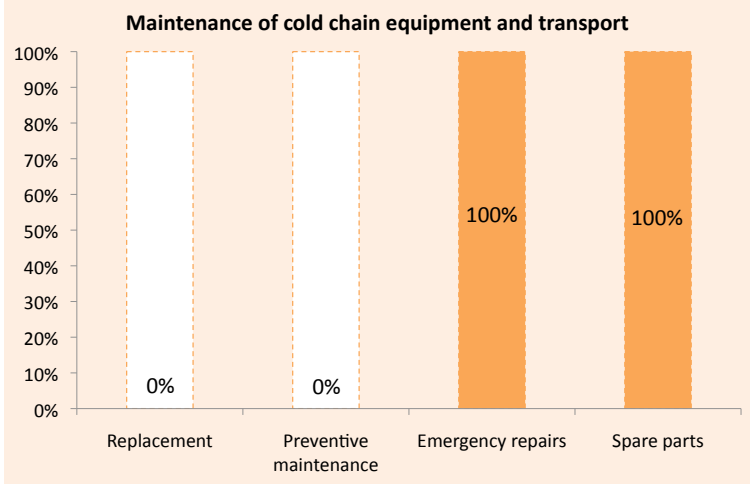


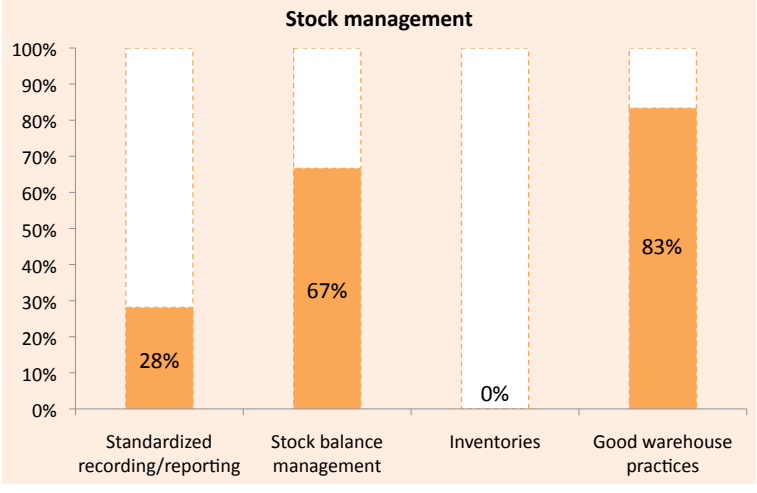
Total population:	20,12,795
Target population:	66,144
Number of PHC served:	
Number of sub centers:	
RI Coverage rate (2008):	47.5%

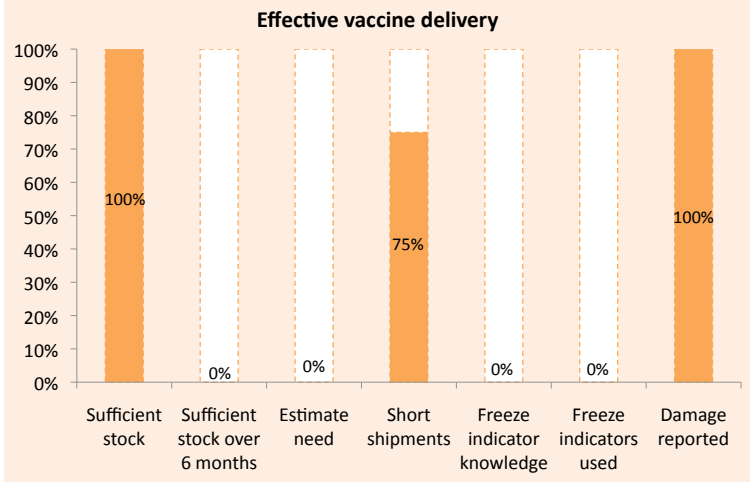






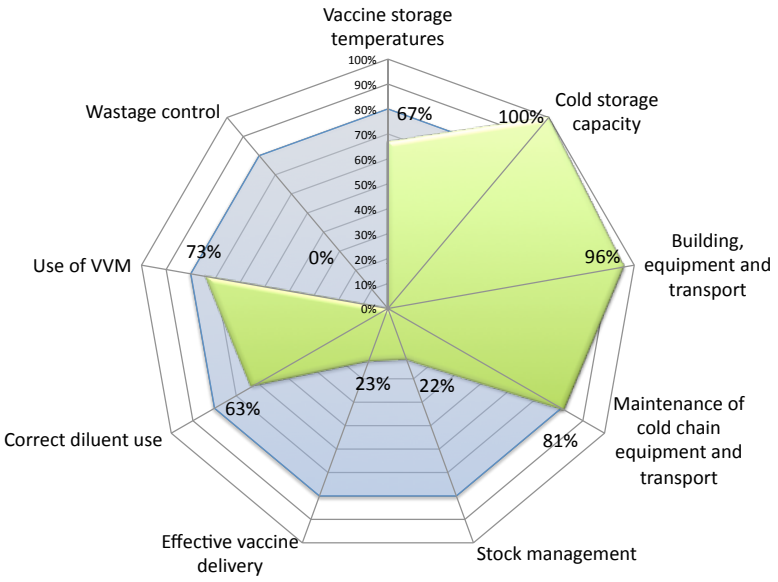






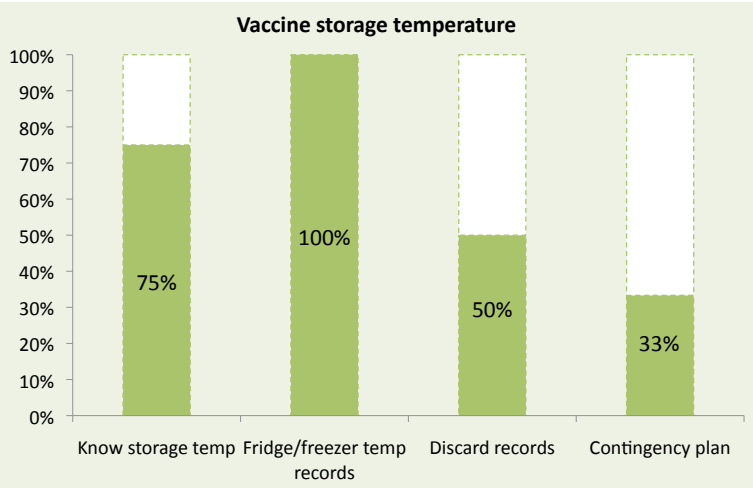
DHANBAD - PRIMARY HEALTH CENTERS

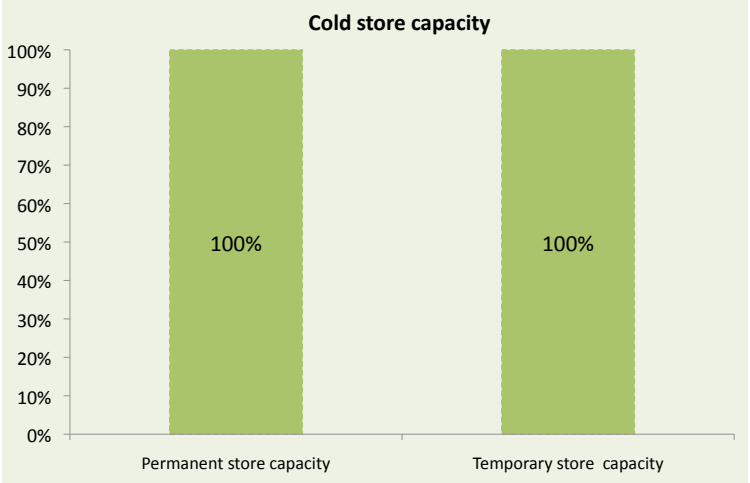
STATUS - VACCINE MANAGEMENT ASSESSMENT 2009

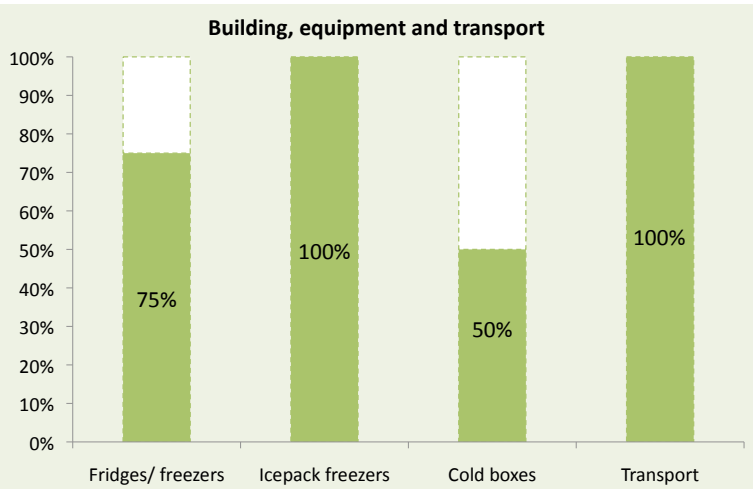


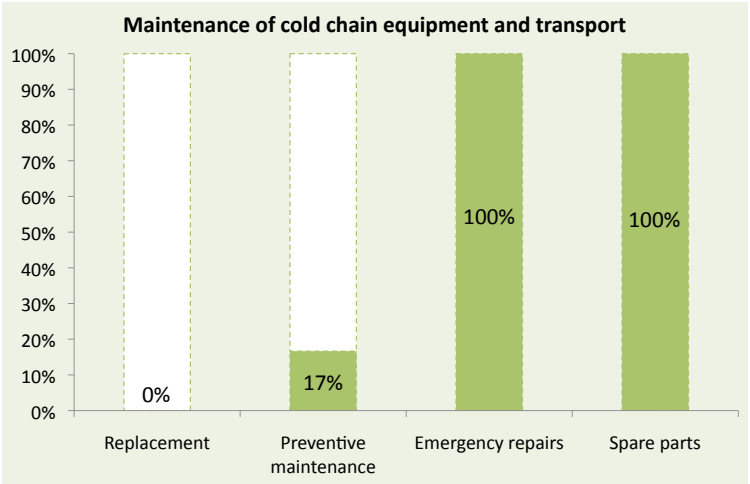
PHC assessed:	Govindpur
Total population:	1,88,800
Target population:	5,664
Number of sub centers:	
RI Coverage rate (2008):	75.37%

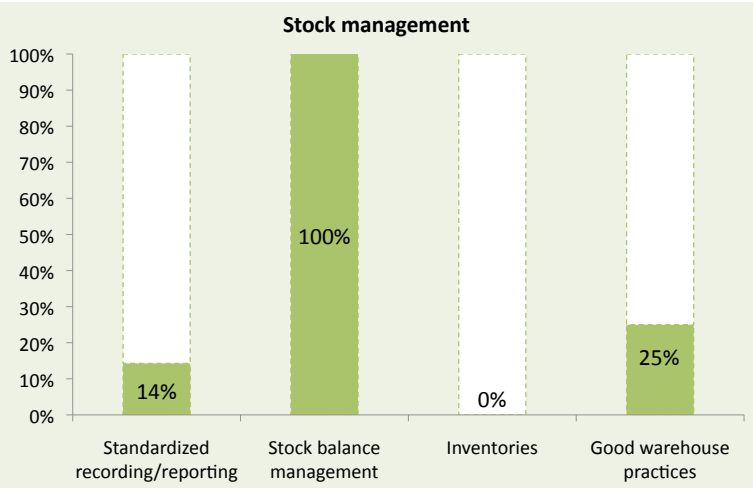
PHC assessed:	Nirsa
Total population:	3,33,500
Target population:	10,008
Number of sub centers:	
RI Coverage rate (2008):	76.02%

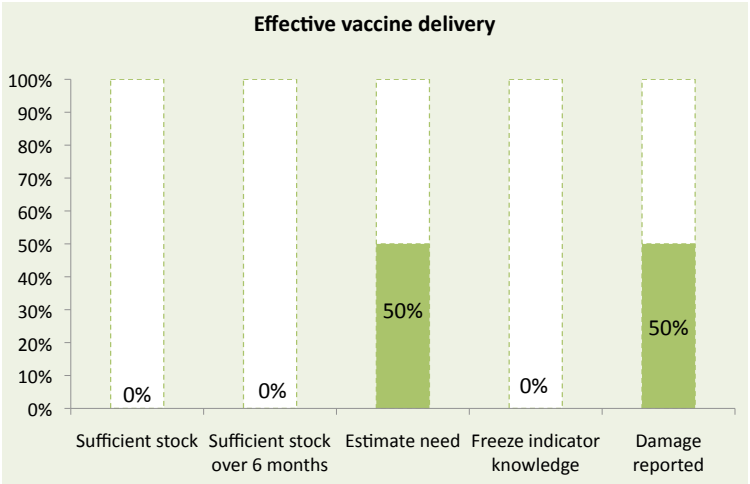






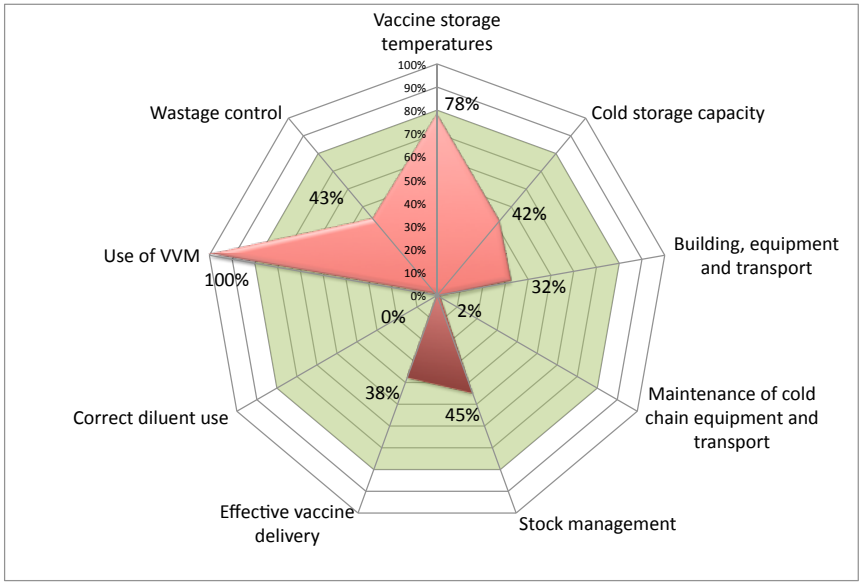




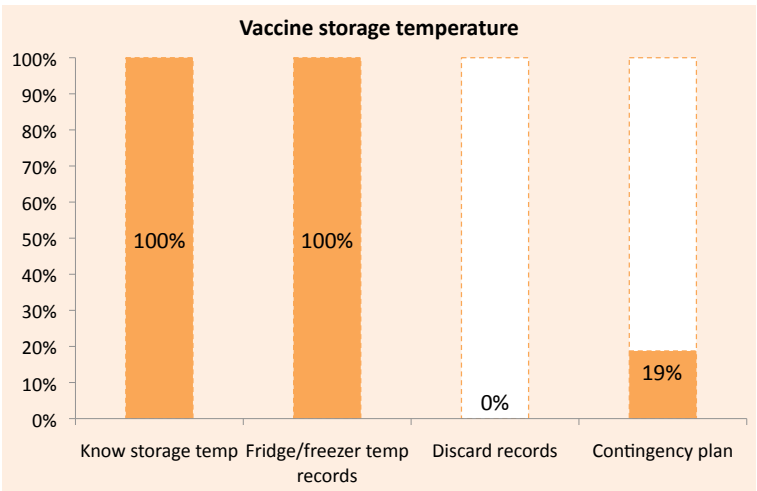


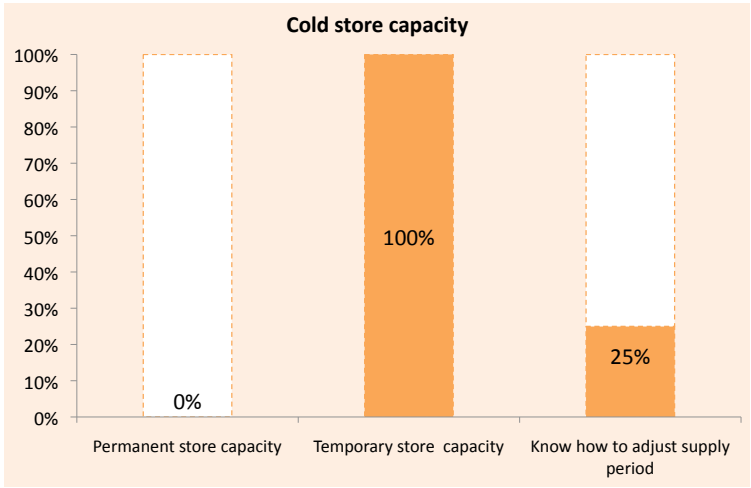
DEOGHAR DISTRICT STORE

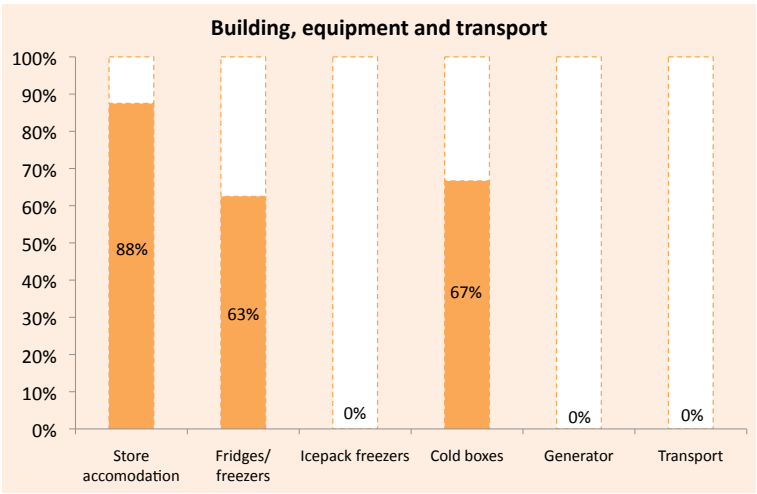
STATUS - VACCINE MANAGEMENT ASSESSMENT 2009

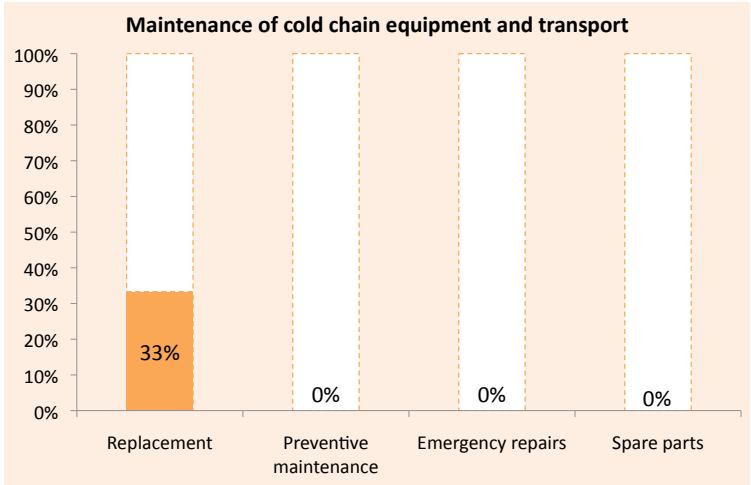


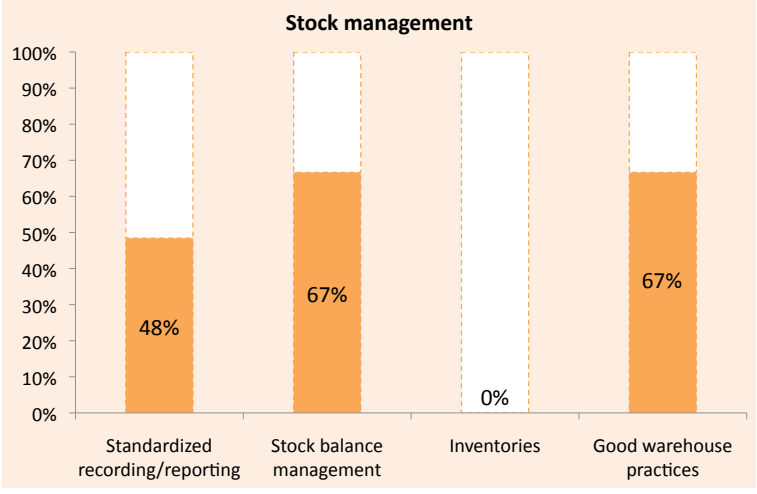
Total population:	13,60,380
Target population:	33,896
Number of PHC served:	
Number of sub centers:	
RI Coverage rate (2008):	35.7%

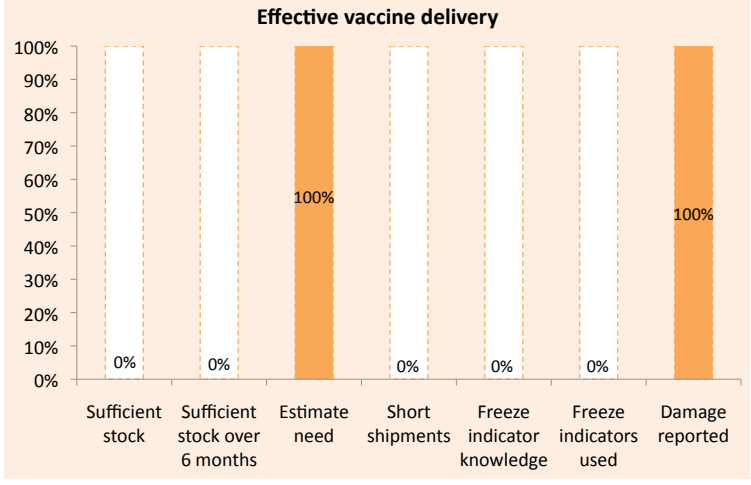






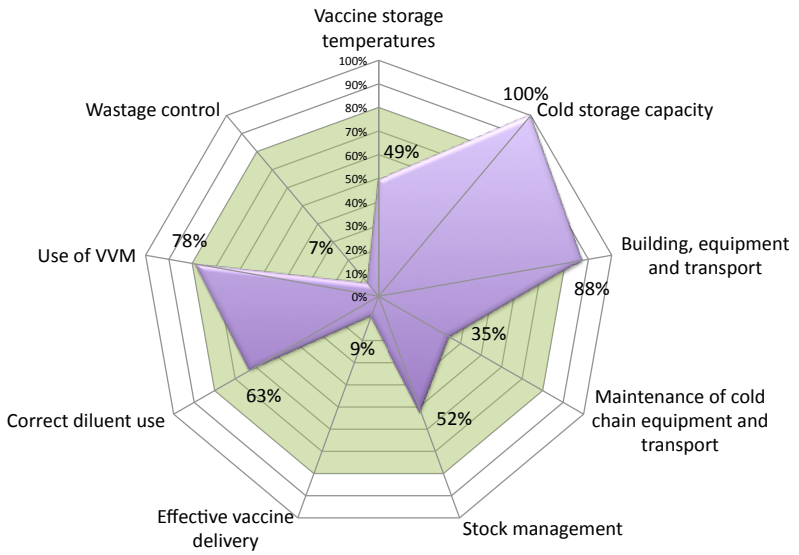






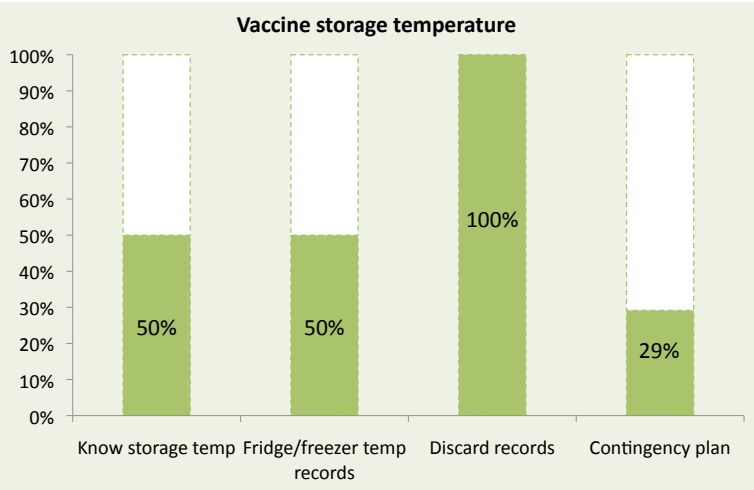
DEOGHAR - PRIMARY HEALTH CENTERS

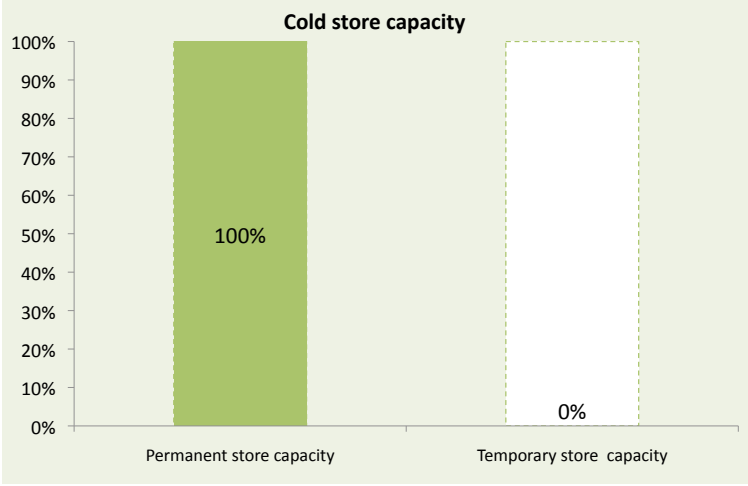
STATUS - VACCINE MANAGEMENT ASSESSMENT 2009

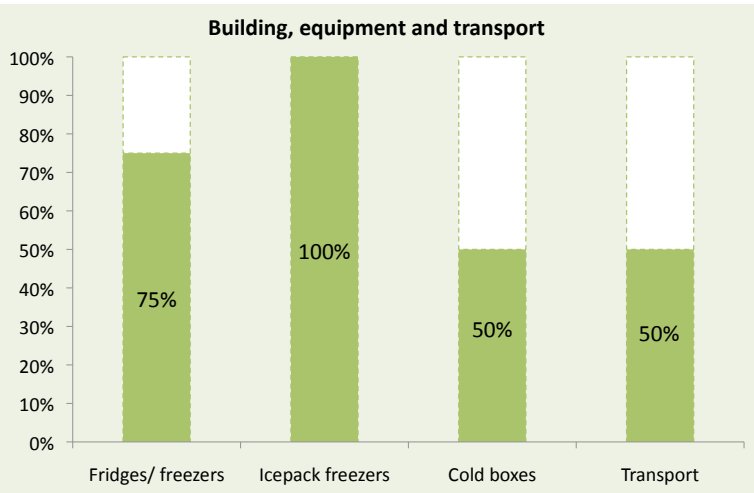


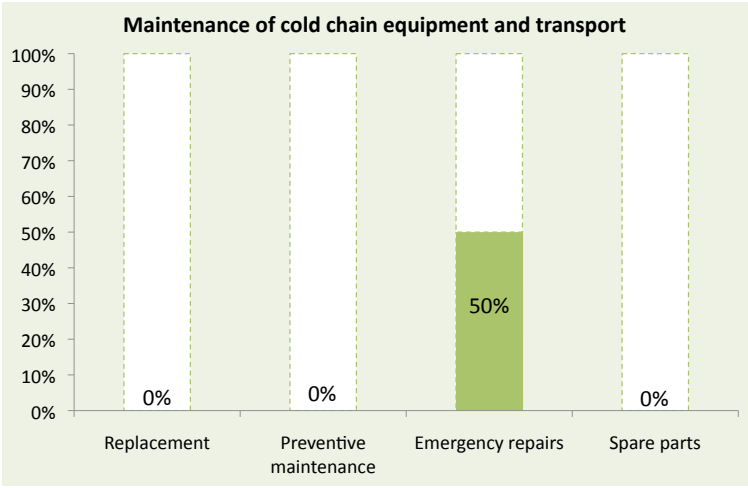
PHC assessed:	Jasidih
Total population:	1,84,057
Target population:	4,822
Number of sub centers:	
RI Coverage rate (2008):	51.9%

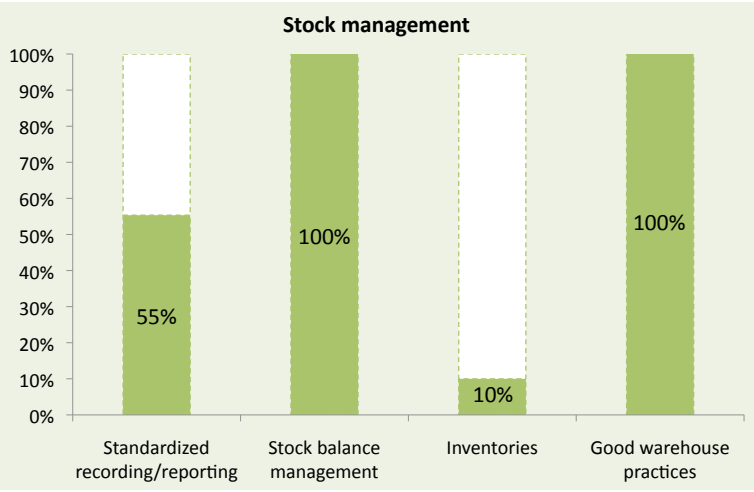
PHC assessed:	Palajori
Total population:	1,49,454
Target population:	3,916
Number of sub centers:	
RI Coverage rate (2008):	60.24%

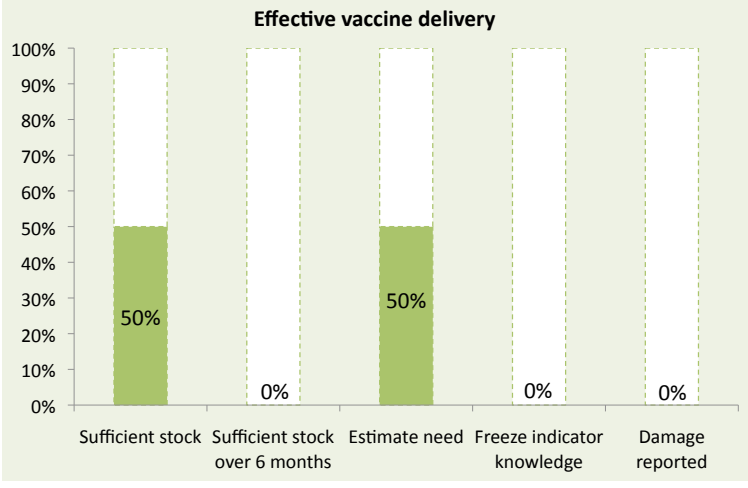






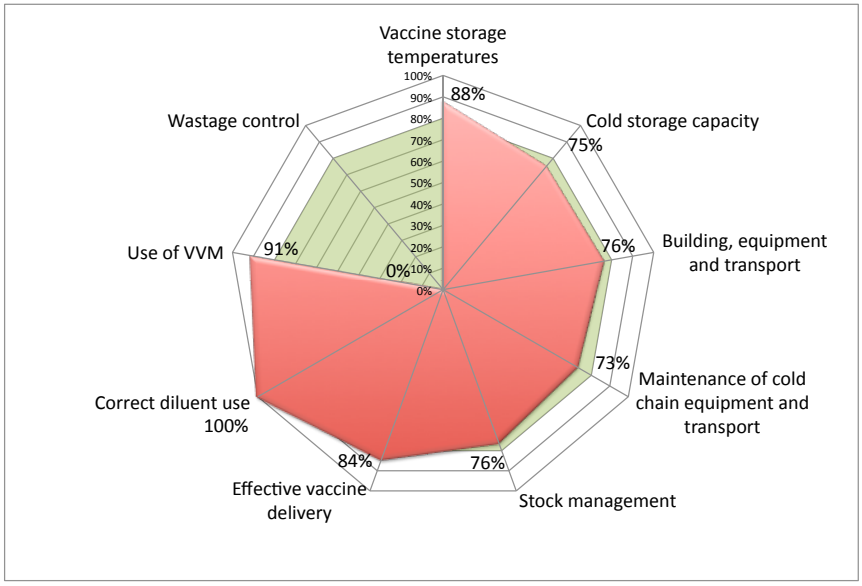




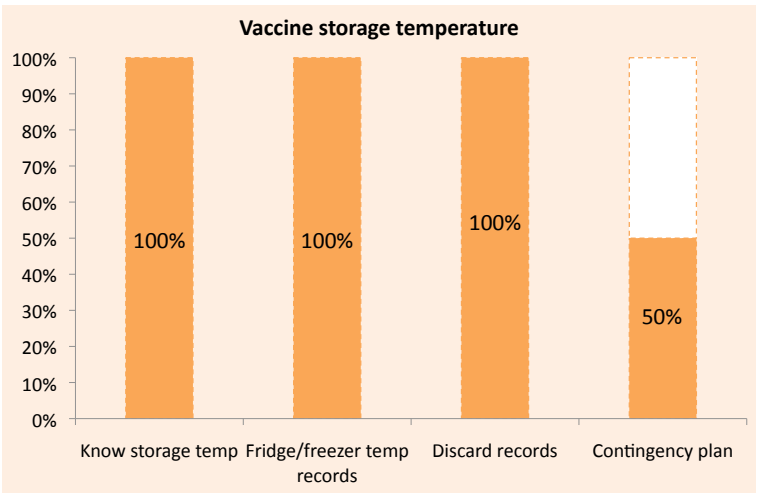


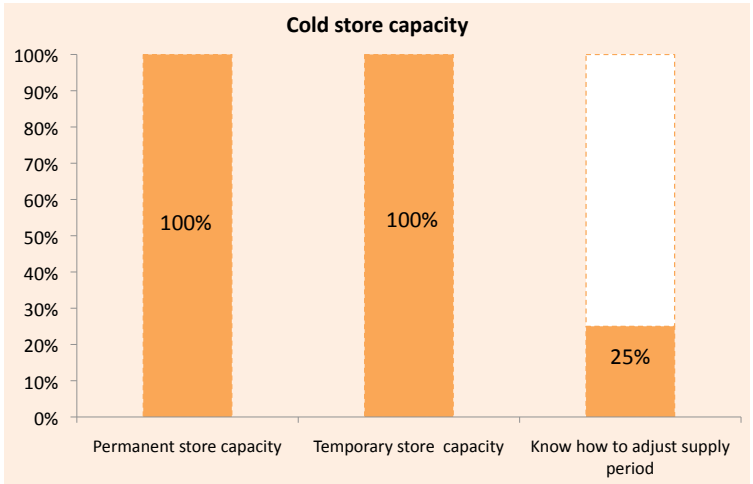
GODDA DISTRICT STORE

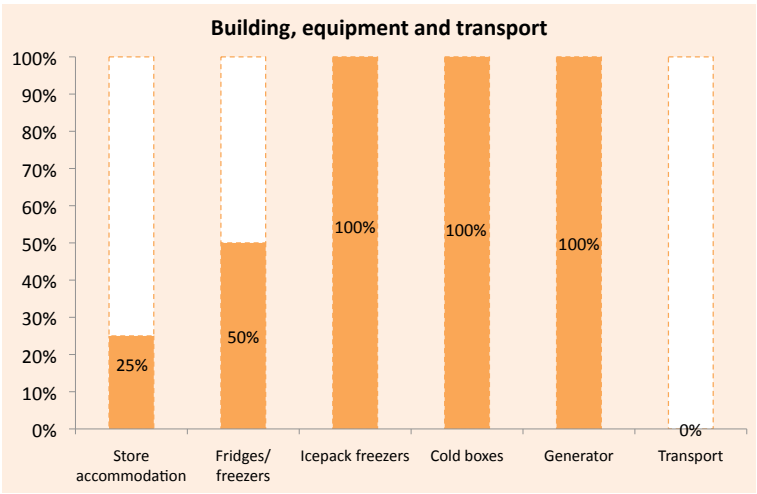
STATUS - VACCINE MANAGEMENT ASSESSMENT 2010

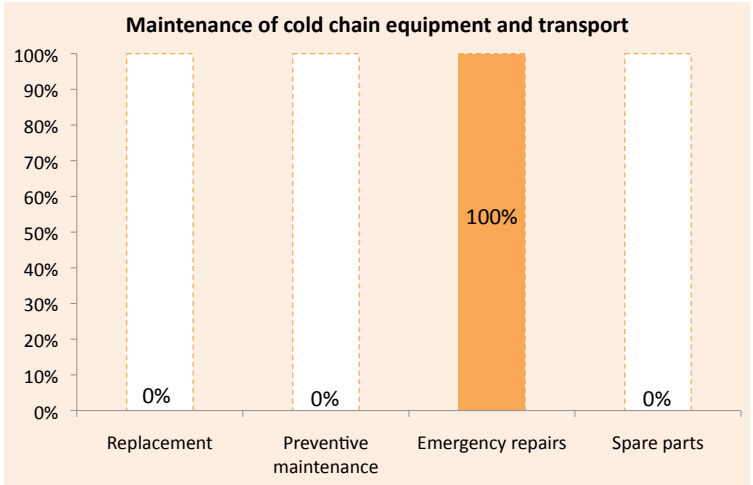


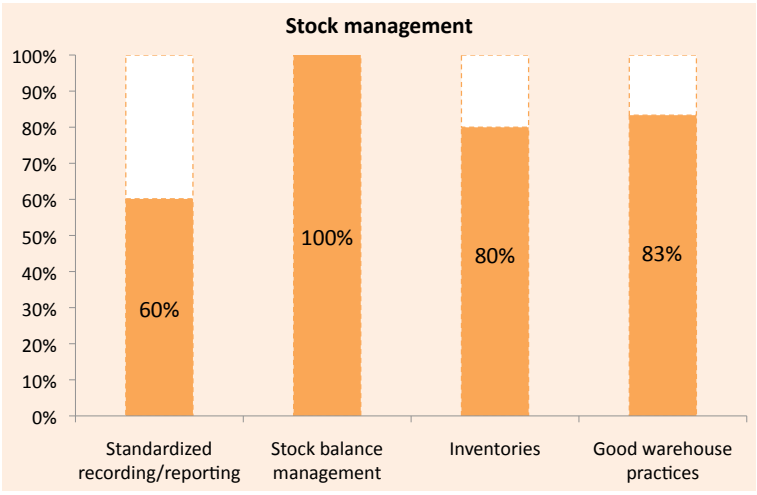
Total population:	12,46,417
Target population:	37,098
Number of PHC served:	7
Number of sub centers:	195
RI Coverage rate (2009):	70.9%

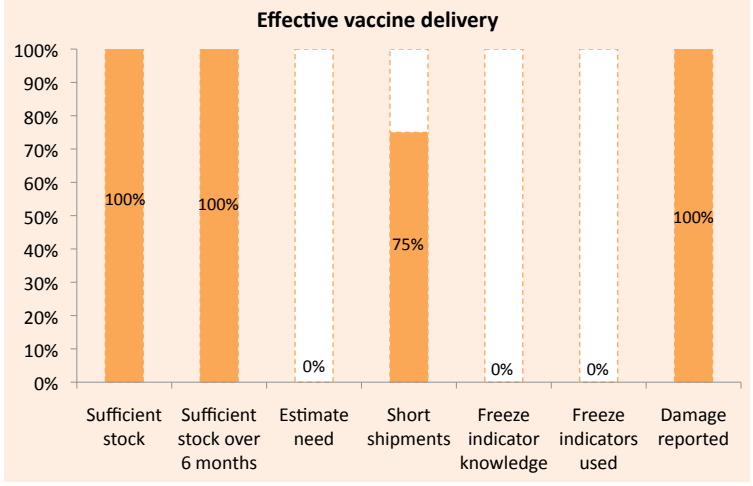






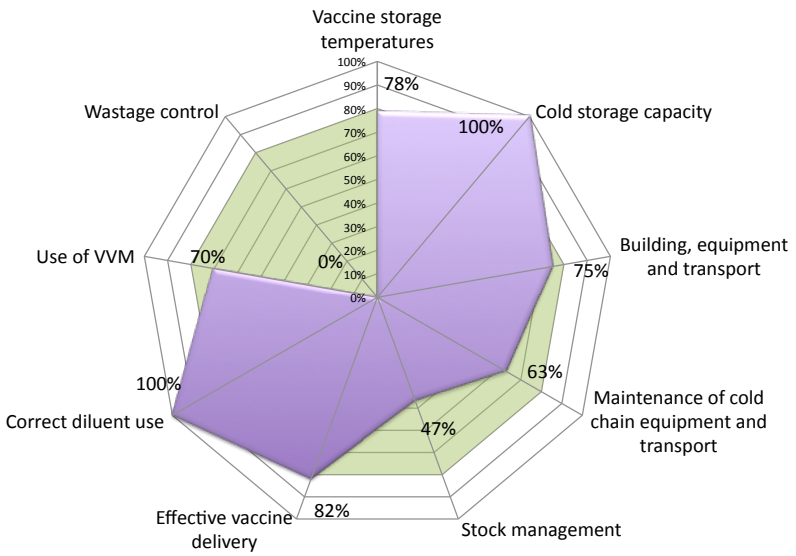






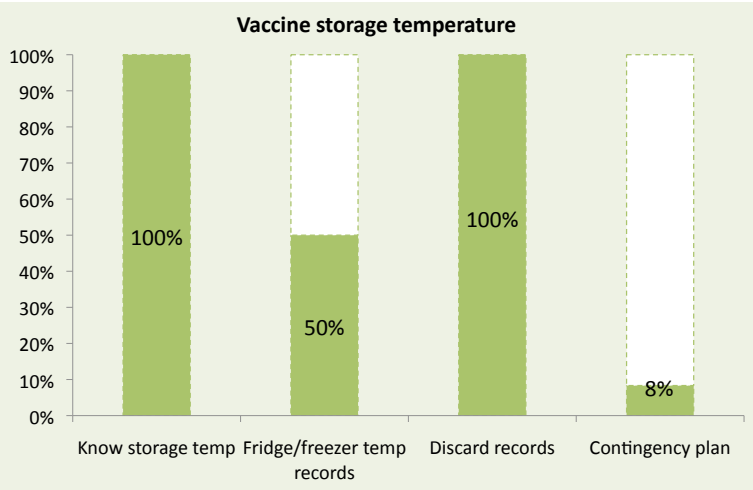
GODDA - PRIMARY HEALTH CENTERS

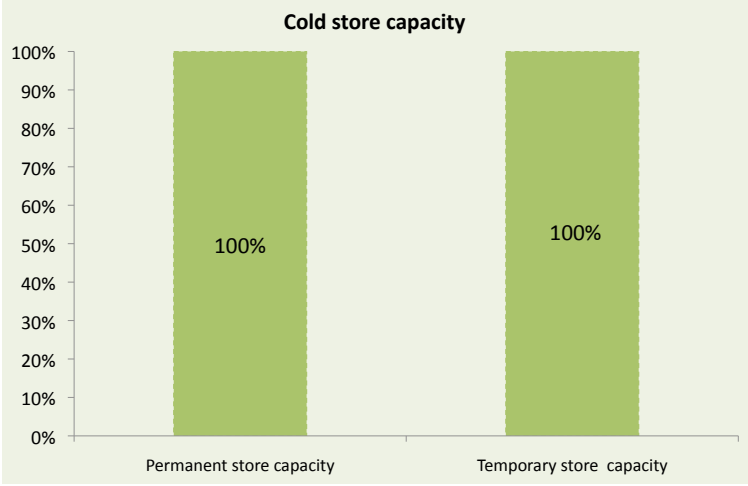
STATUS - VACCINE MANAGEMENT ASSESSMENT 2010

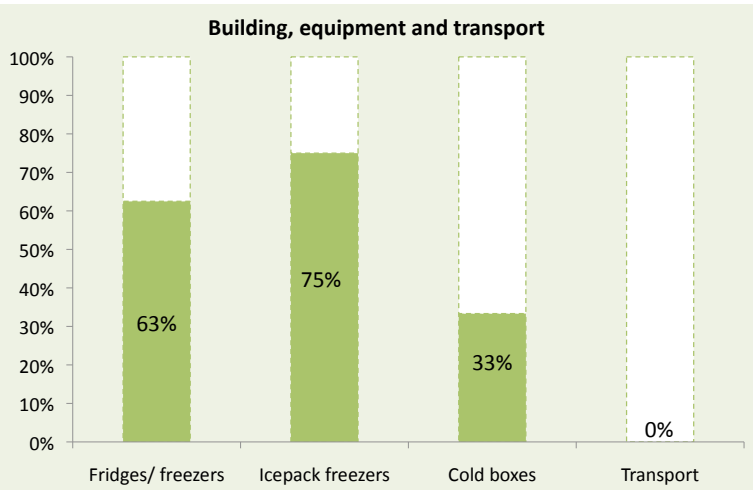


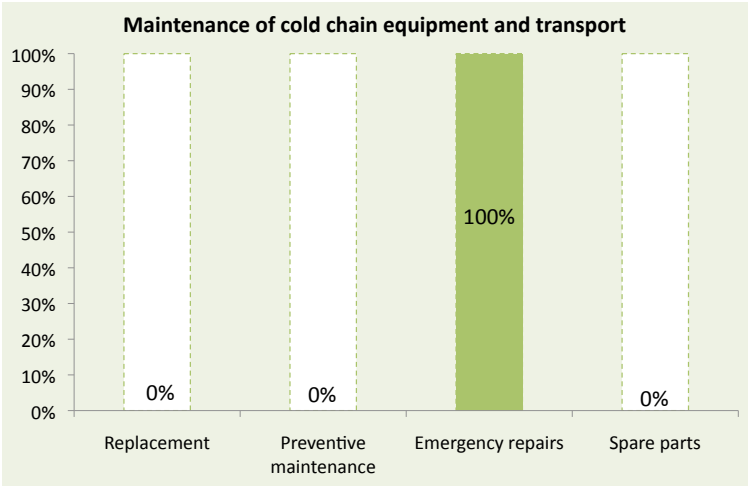
PHC assessed:	Mahagama
Total population:	1,79,284
Target population:	5,319
Number of sub centers:	23
RI Coverage rate (2009):	100%

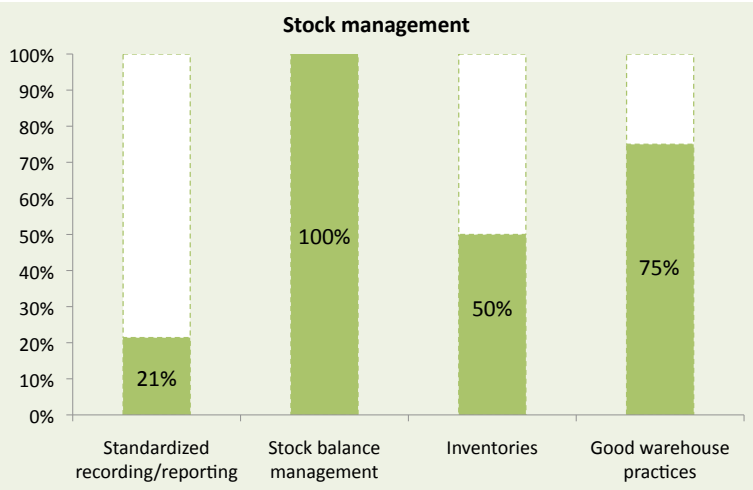
PHC assessed:	Meharma
Total population:	1,30,032
Target population:	6,792
Number of sub centers:	25
RI Coverage rate (2009):	79.8%

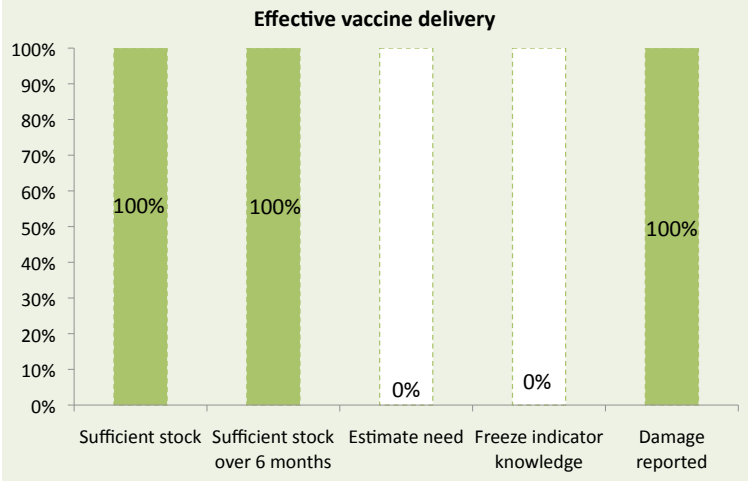






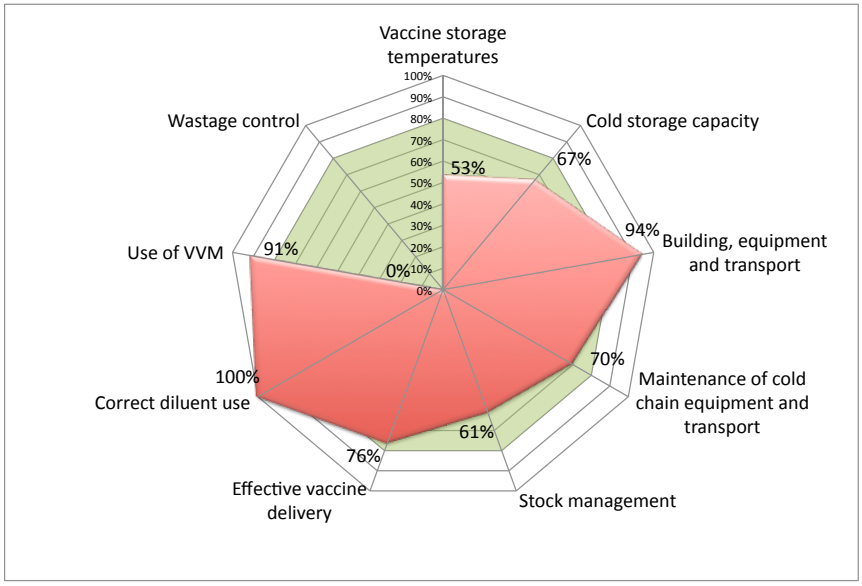




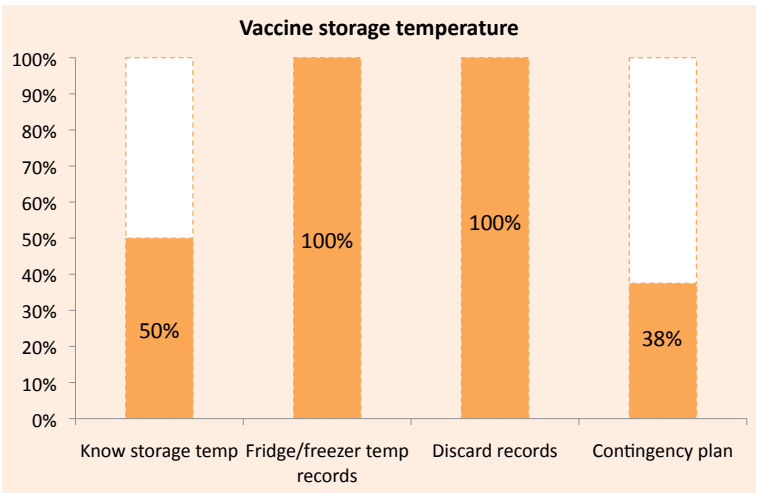


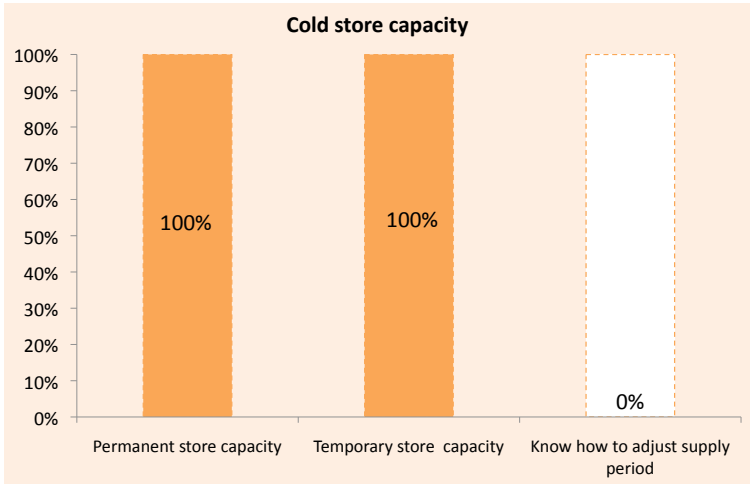
JAMTARA DISTRICT STORE

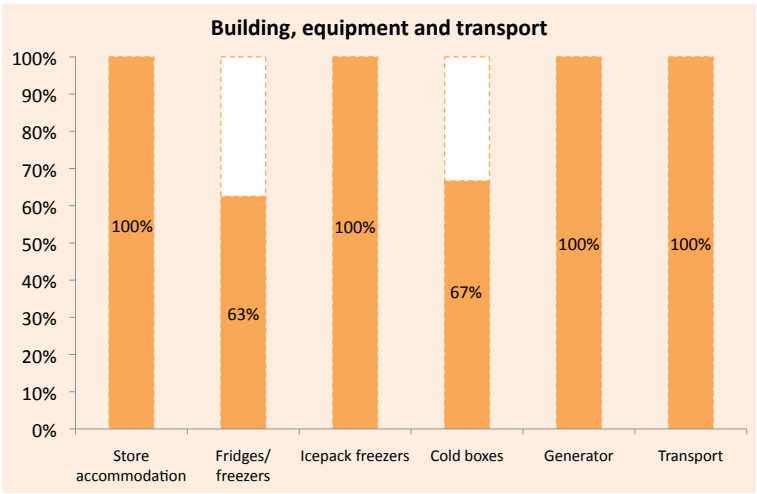
STATUS - VACCINE MANAGEMENT ASSESSMENT 2010

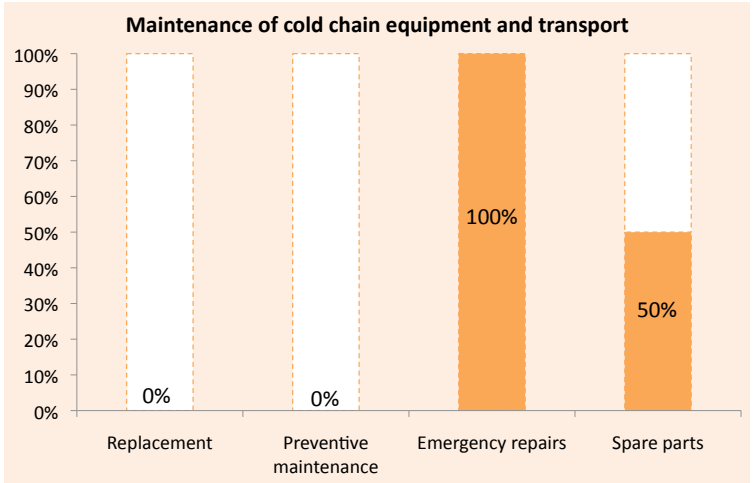


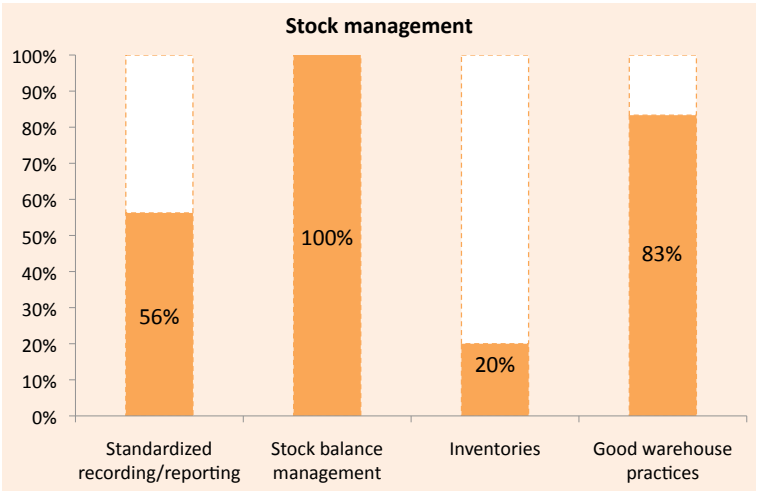
Total population:	7,37,402
Target population:	22,122
Number of PHC served:	4
Number of sub centers:	131
RI Coverage rate (2009):	63%

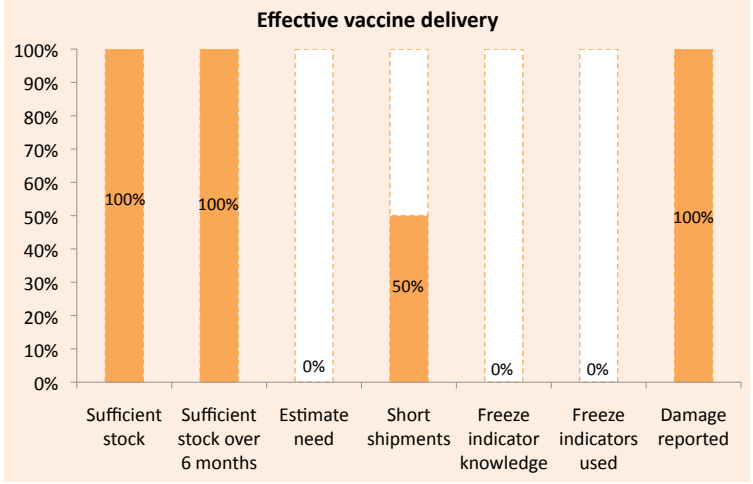






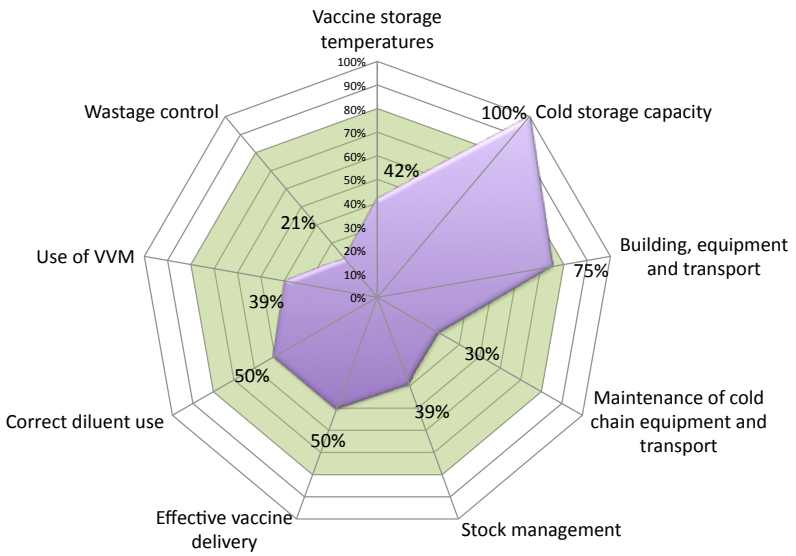






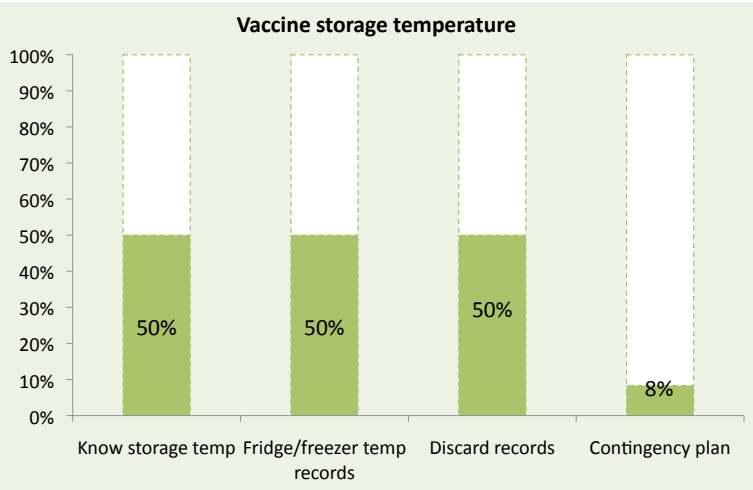
JAMTARA - PRIMARY HEALTH CENTERS

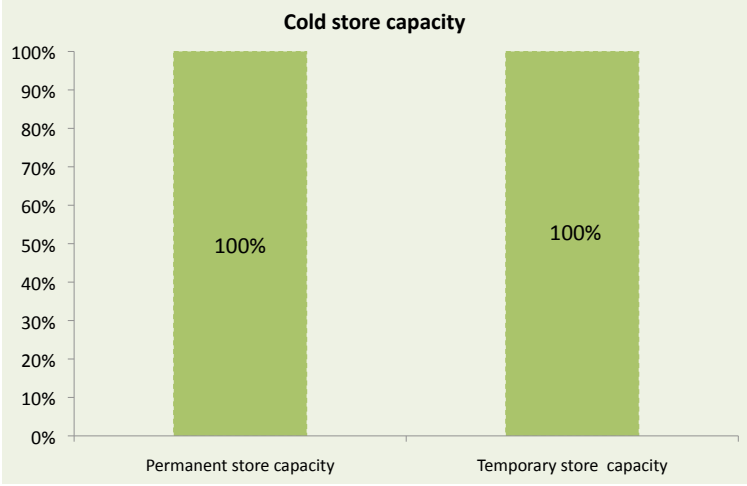
STATUS - VACCINE MANAGEMENT ASSESSMENT 2010

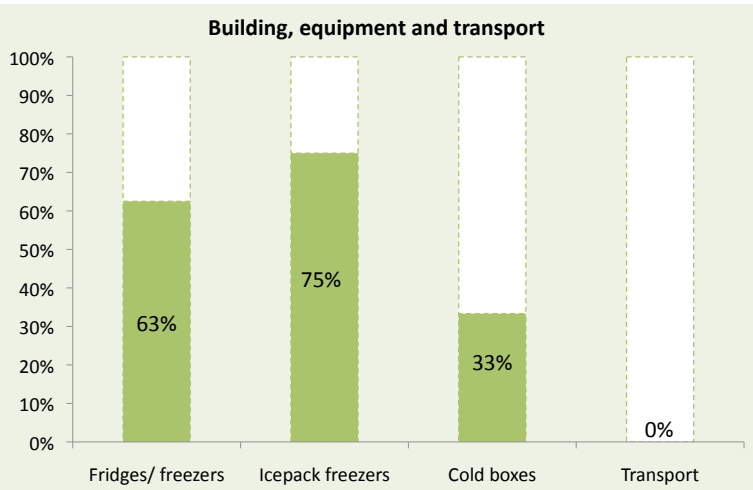


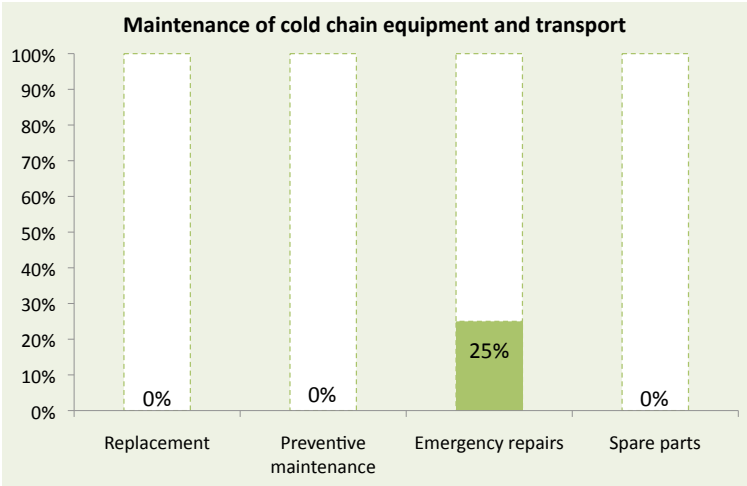
PHC assessed:	Kundhit
Total population:	1,32,396
Target population:	3,400
Number of sub centers:	15
RI Coverage rate (2009):	60%

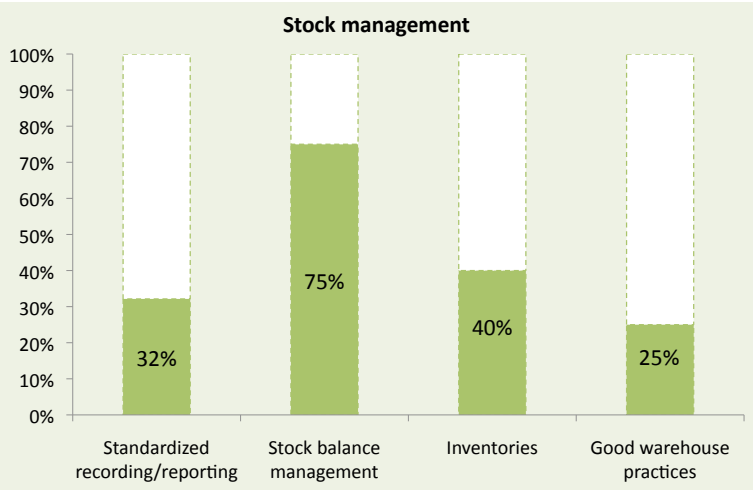
PHC assessed:	Narayanpur
Total population:	1,90,621
Target population:	4,610
Number of sub centers:	26
RI Coverage rate (2009):	59%

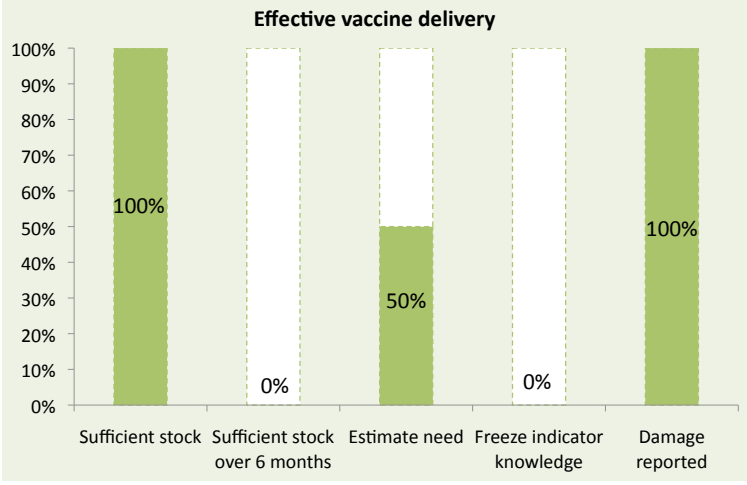






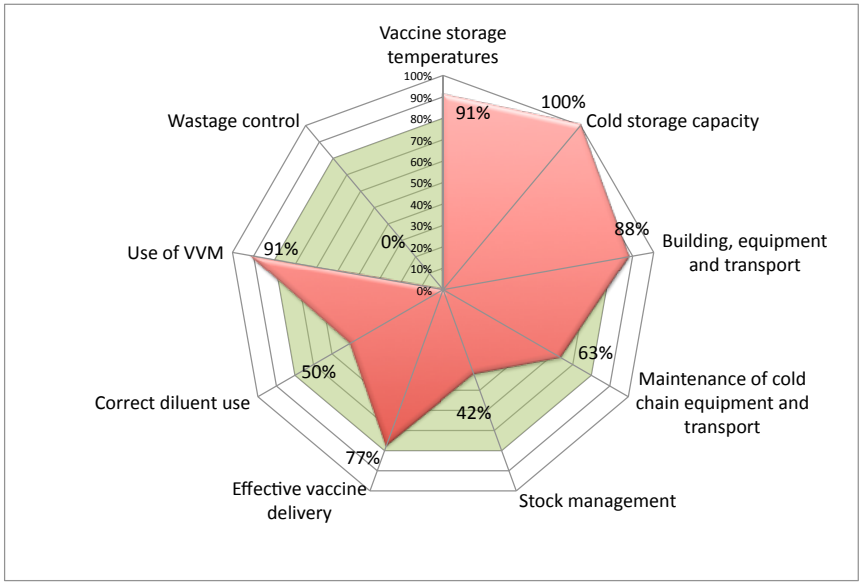




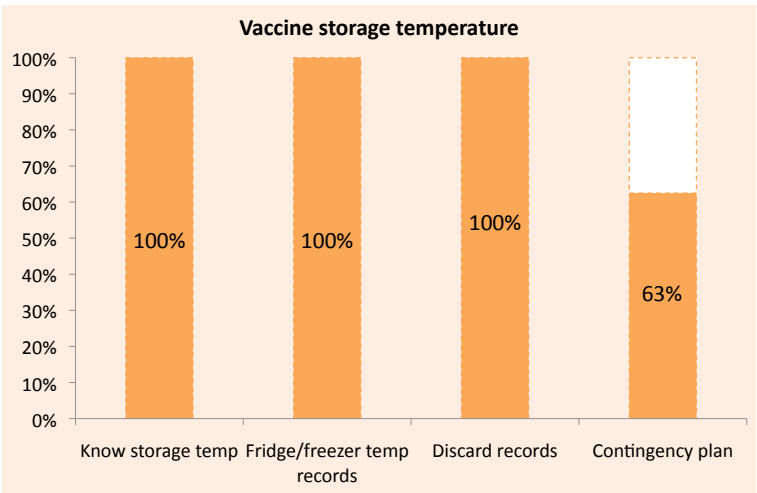


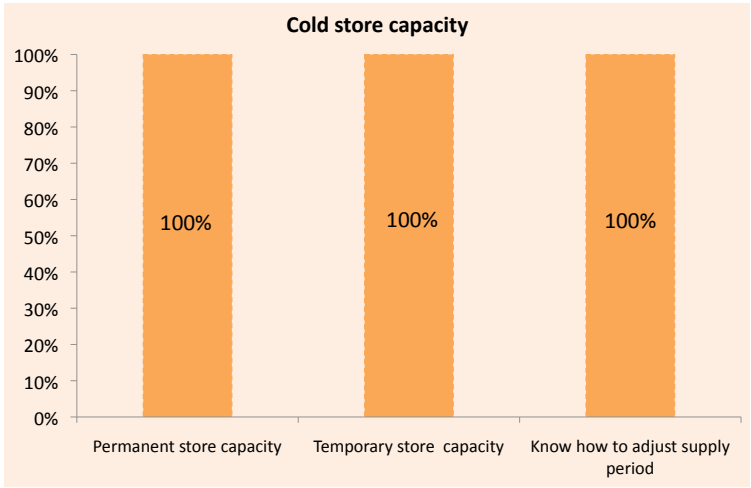
PAKUR DISTRICT STORE

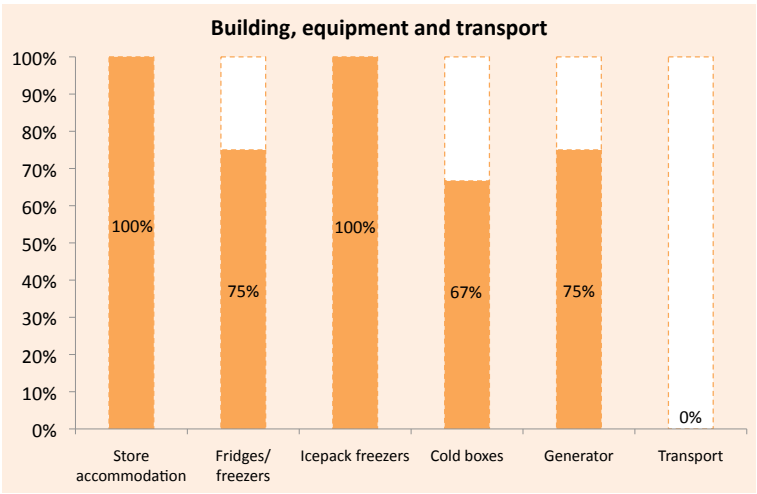
STATUS - VACCINE MANAGEMENT ASSESSMENT 2010

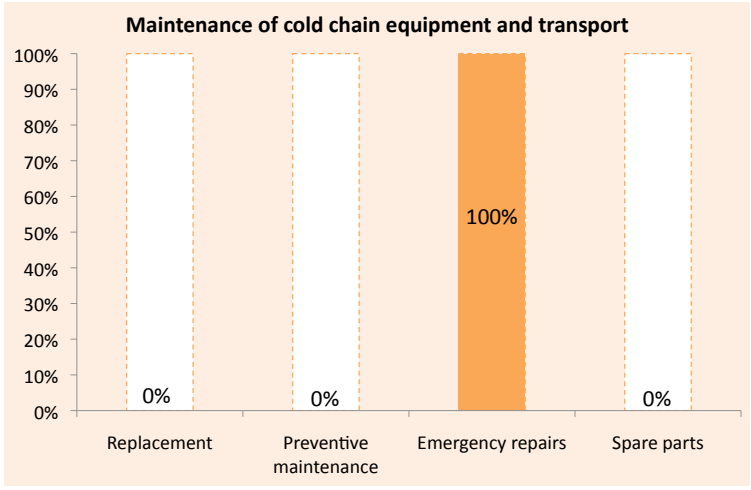


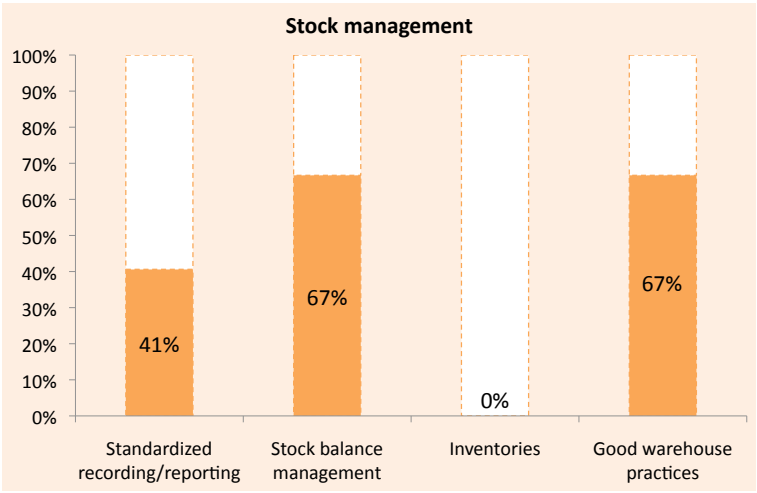
Total population:	8,69,359
Target population:	26,081
Number of PHC served:	6
Number of sub centers:	121
RI Coverage rate (2009):	61%

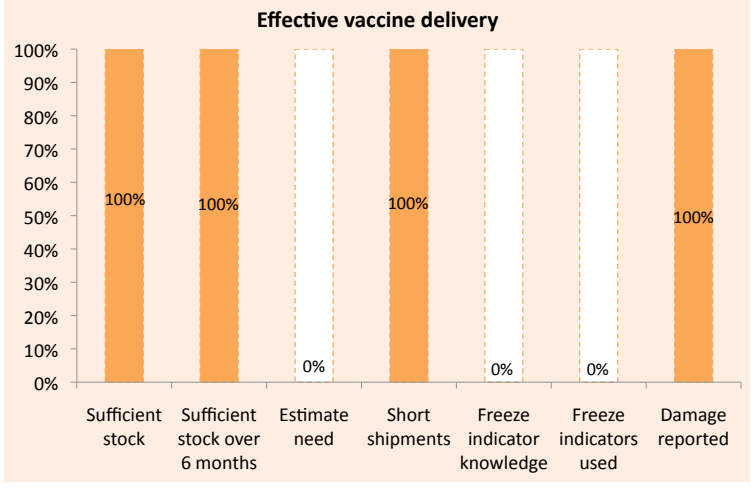






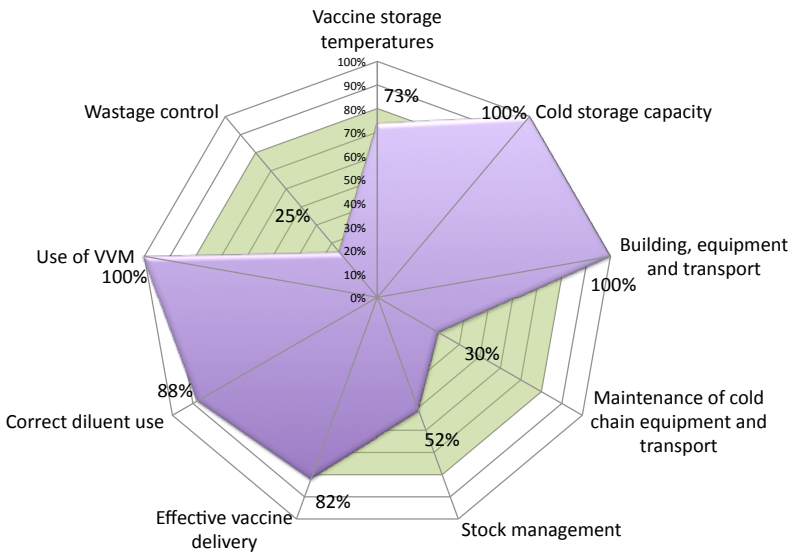






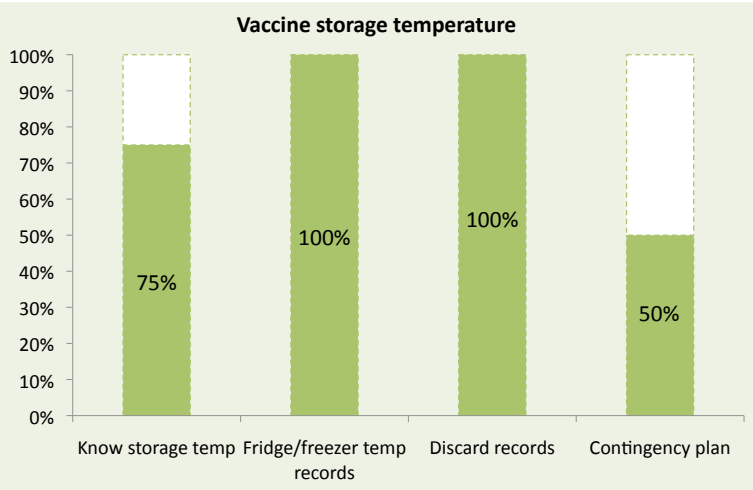
PAKUR - PRIMARY HEALTH CENTERS

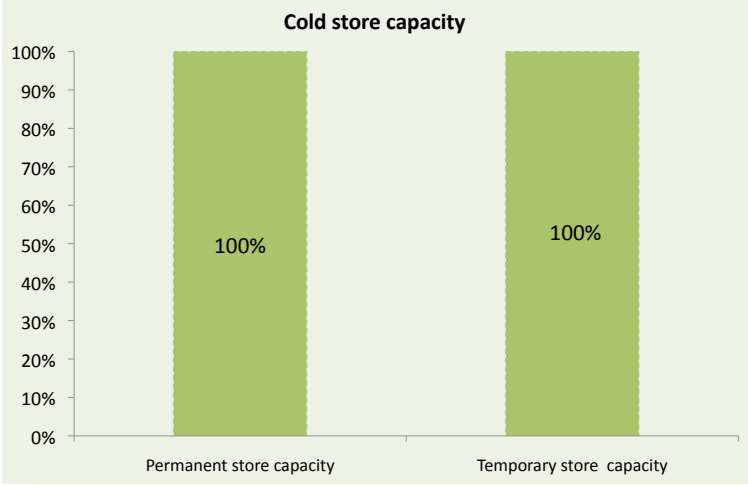
STATUS - VACCINE MANAGEMENT ASSESSMENT 2010

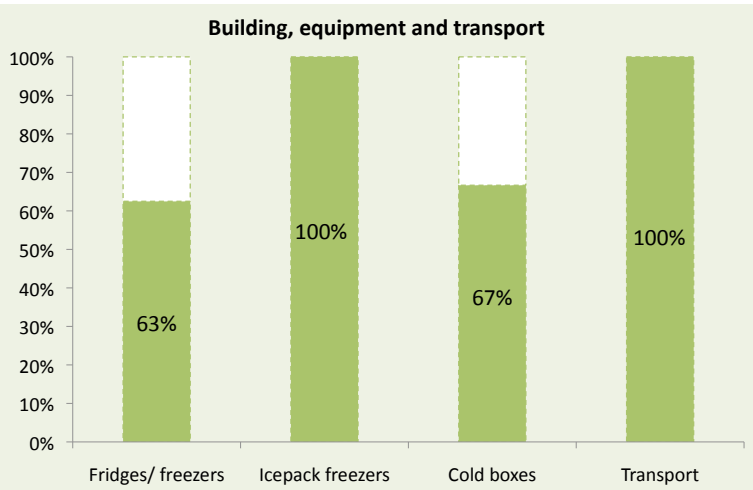


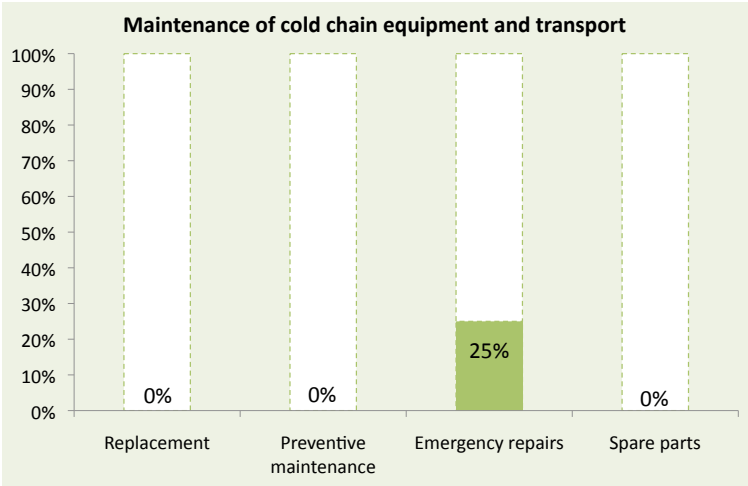
PHC assessed:	amarapara
Total population:	72,156
Target population:	2,165
Number of sub centers:	16
RI Coverage rate (2009):	59.6%

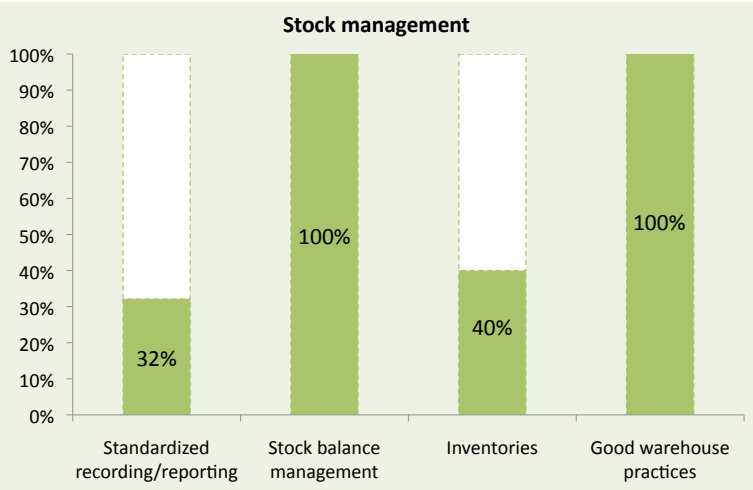
PHC assessed:	Hiranpur
Total population:	81,994
Target population:	2,460
Number of sub centers:	15
RI Coverage rate (2009):	64%

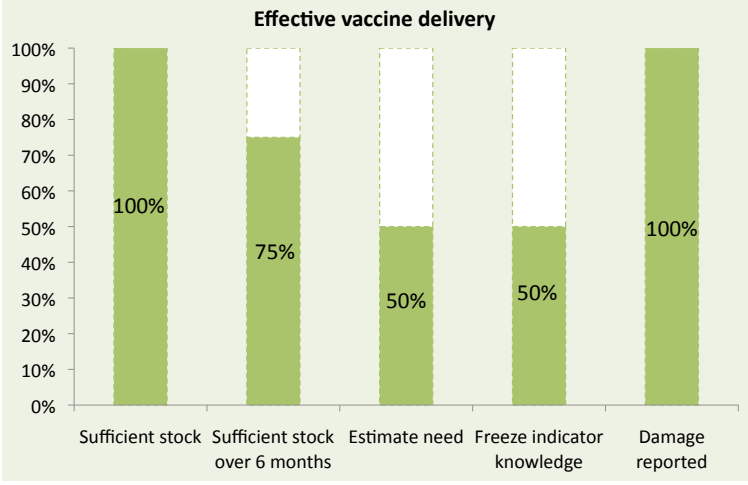






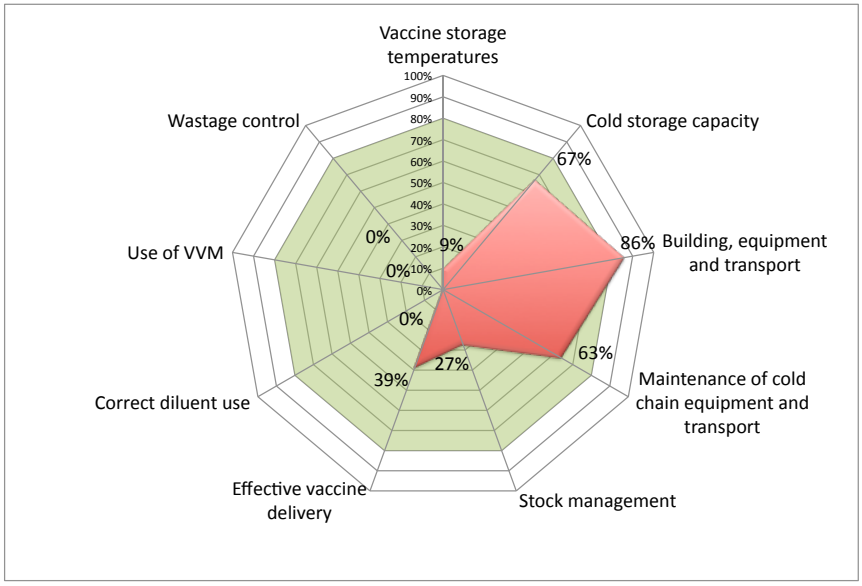




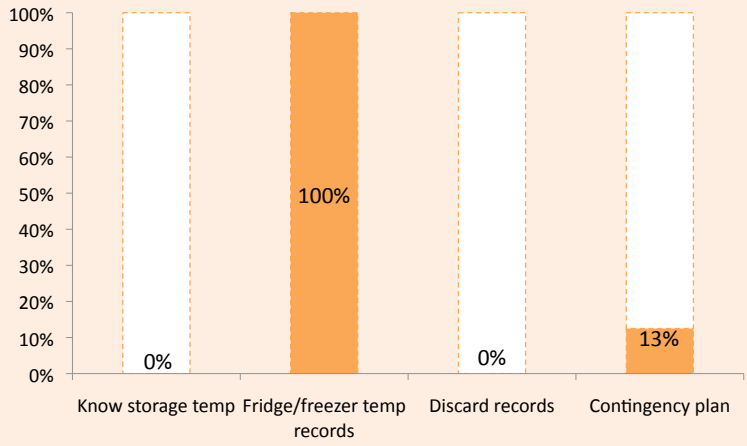


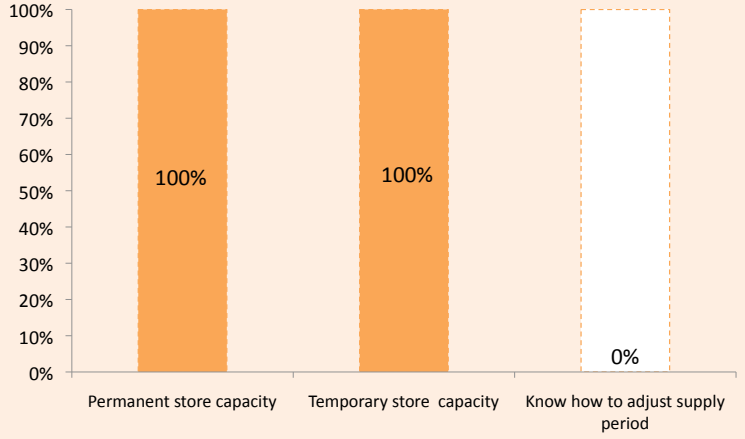
LATEHAR DISTRICT STORE

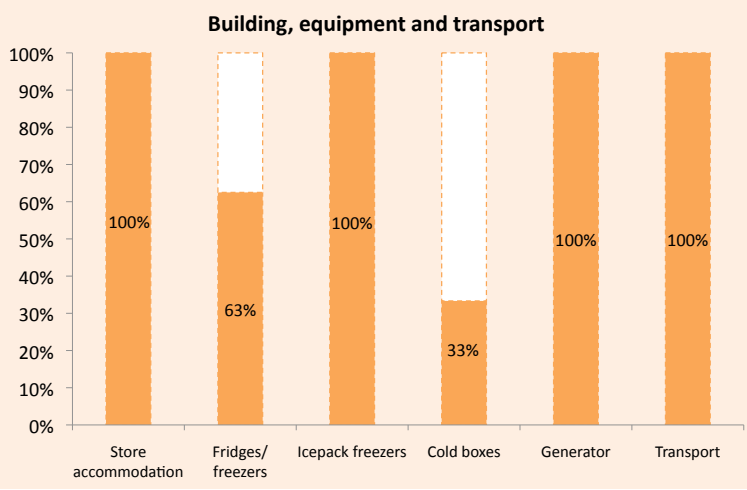
STATUS - VACCINE MANAGEMENT ASSESSMENT 2010

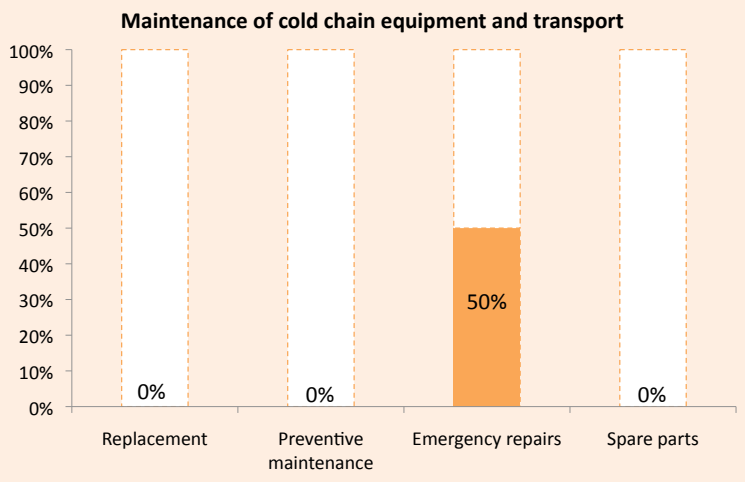


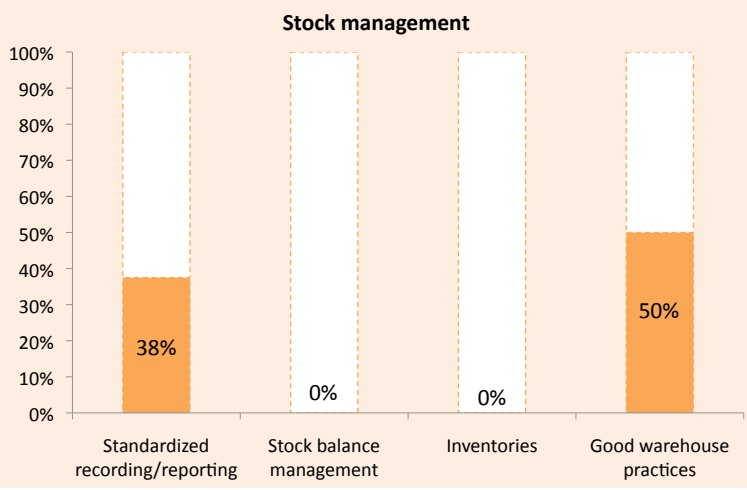
Total population:	7,12,000
Target population:	18,727
Number of PHC served:	7
Number of sub centers:	108
RI Coverage rate (2009):	89%

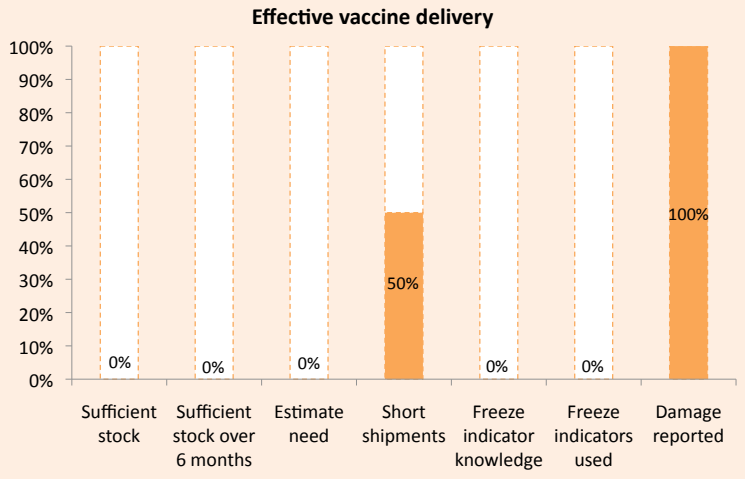






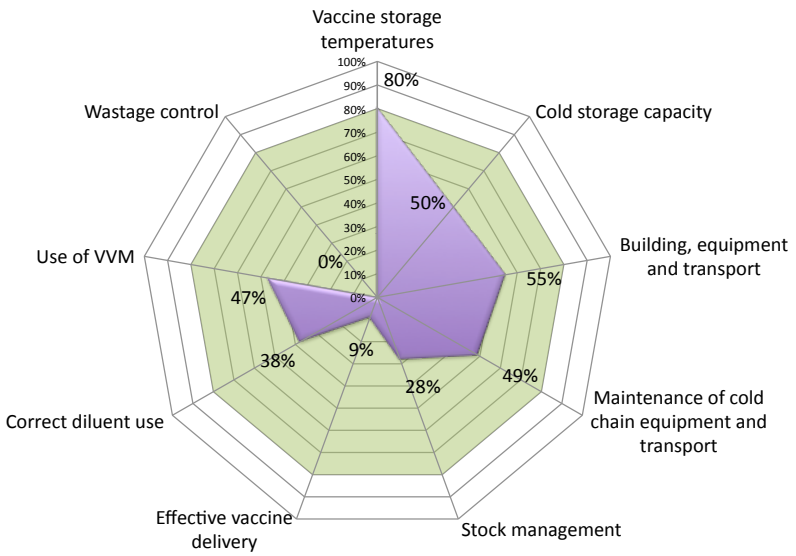






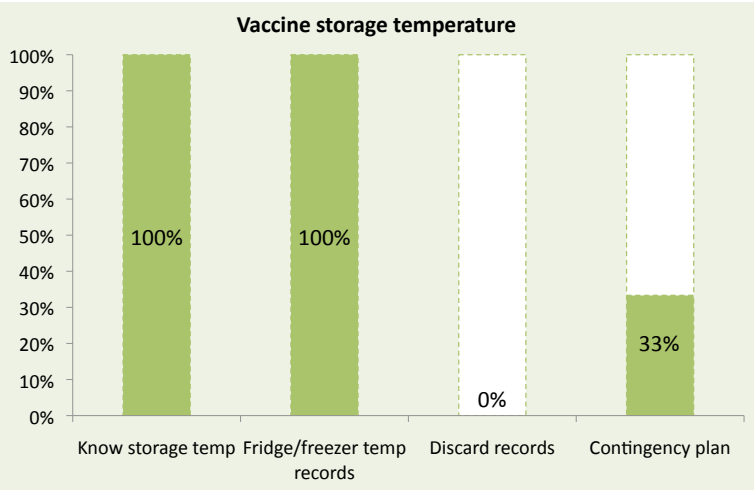
LATEHAR - PRIMARY HEALTH CENTERS

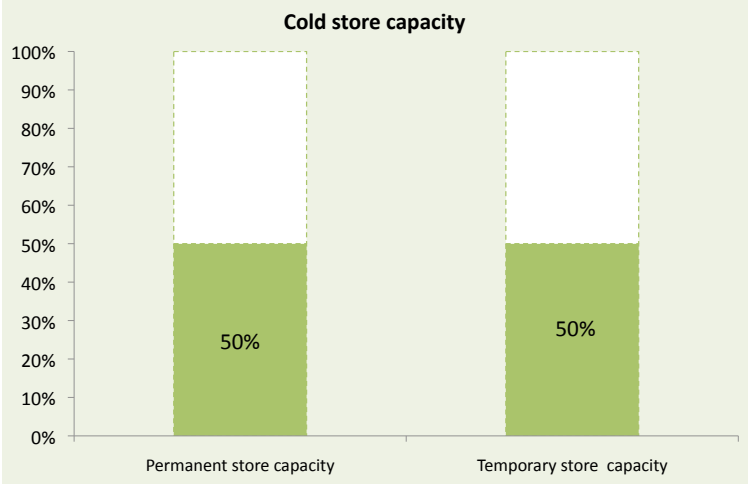
STATUS - VACCINE MANAGEMENT ASSESSMENT 2010

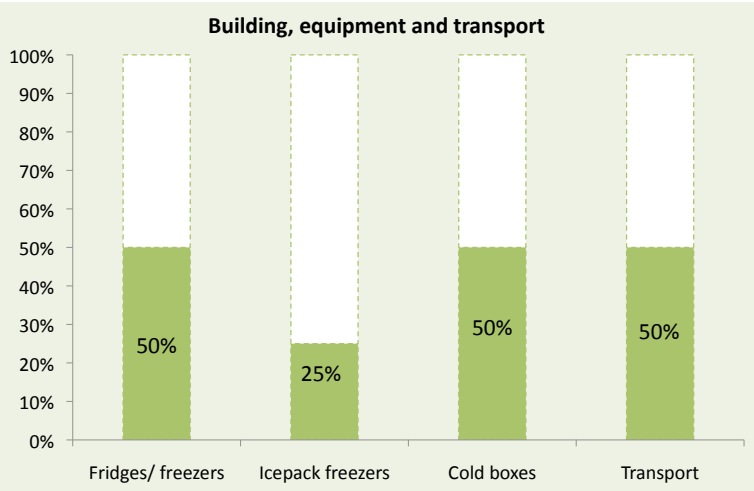


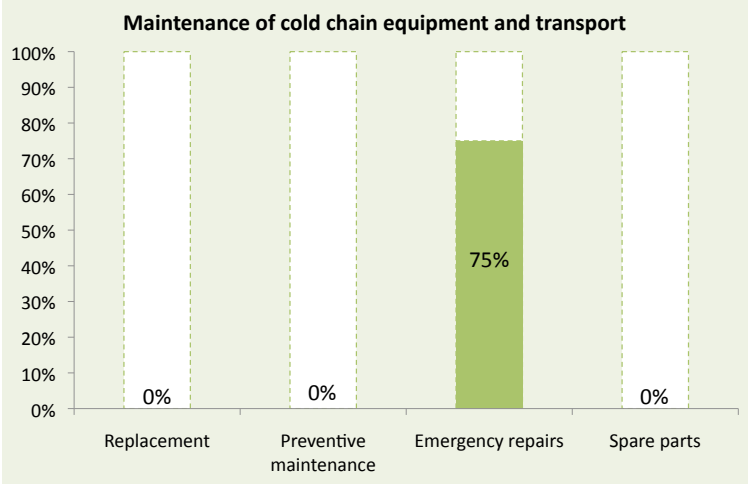
PHC assessed:	Chandwa
Total population:	1,03,823
Target population:	2,731
Number of sub centers:	16
RI Coverage rate (2009):	85%

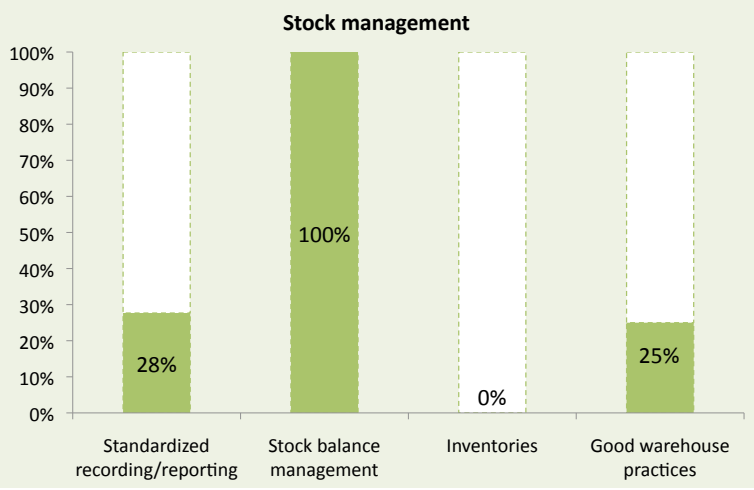
PHC assessed:	Manika
Total population:	93,590
Target population:	2,808
Number of sub centers:	15
RI Coverage rate (2009):	111%

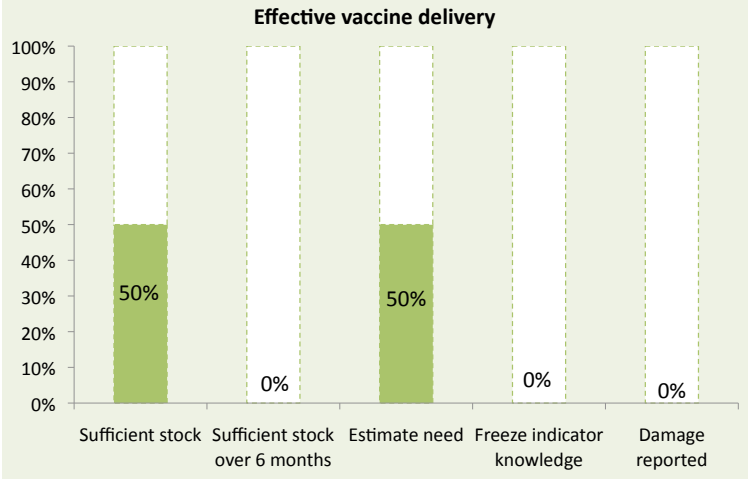






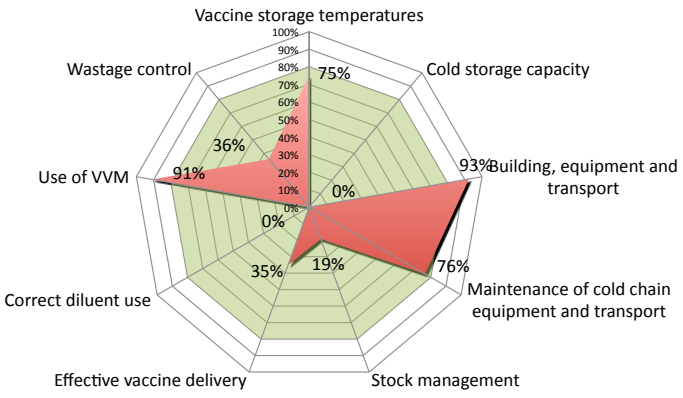






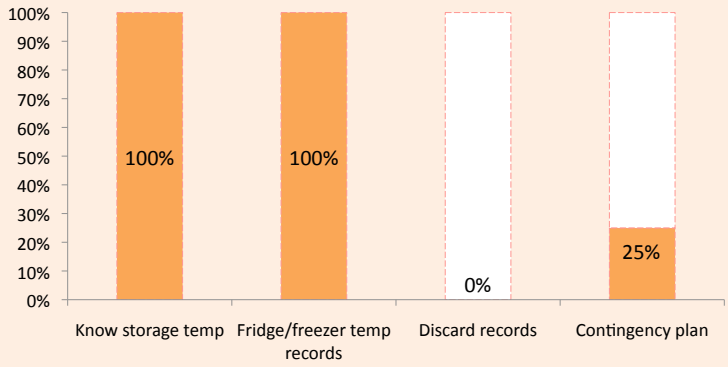
CHATRA DISTRICT STORE

STATUS - VACCINE MANAGEMENT ASSESSMENT 2010

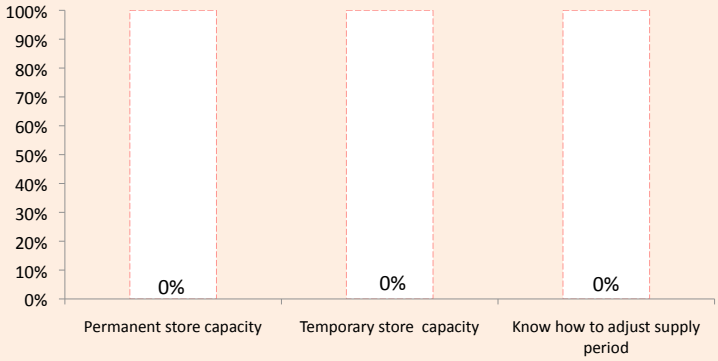


Total population:	9,49,9337
Target population:	25,631
Number of PHC served:	6
Number of sub centers:	93
RI Coverage rate (2009):	69.7%

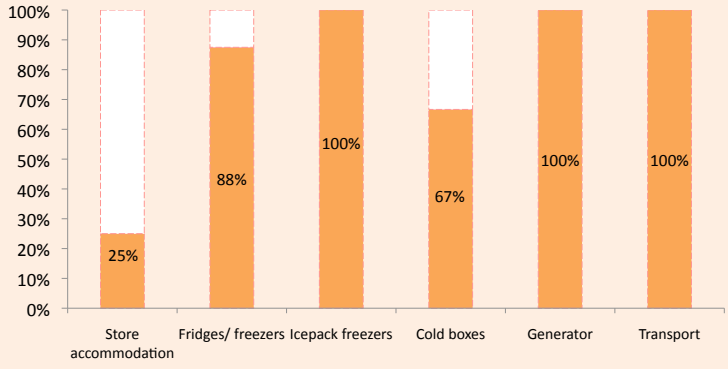
Vaccine storage temperature



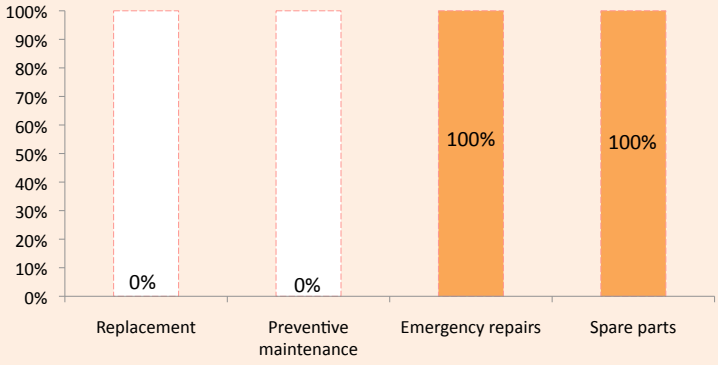
Cold store capacity



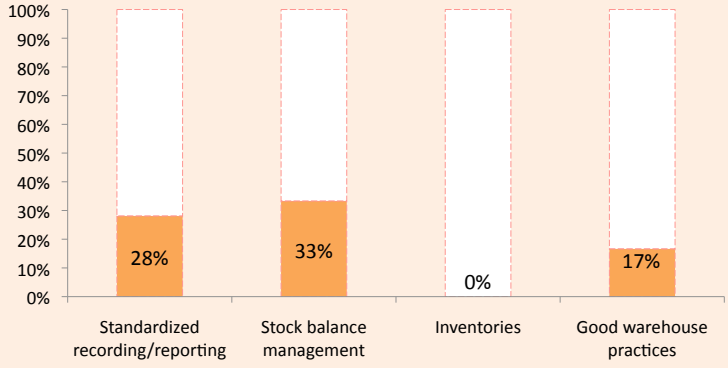
Building, equipment and transport



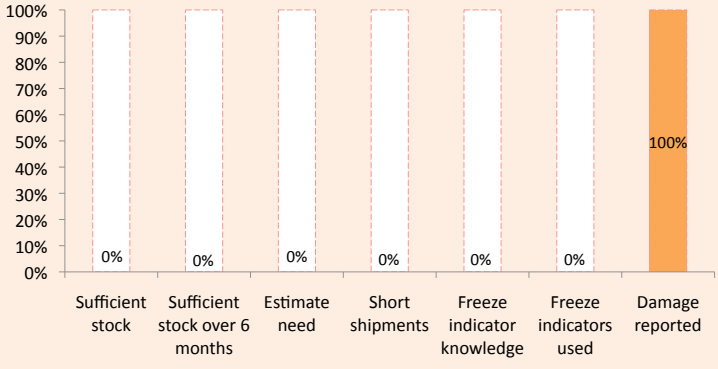
Maintenance of cold chain equipment and transport



Stock management

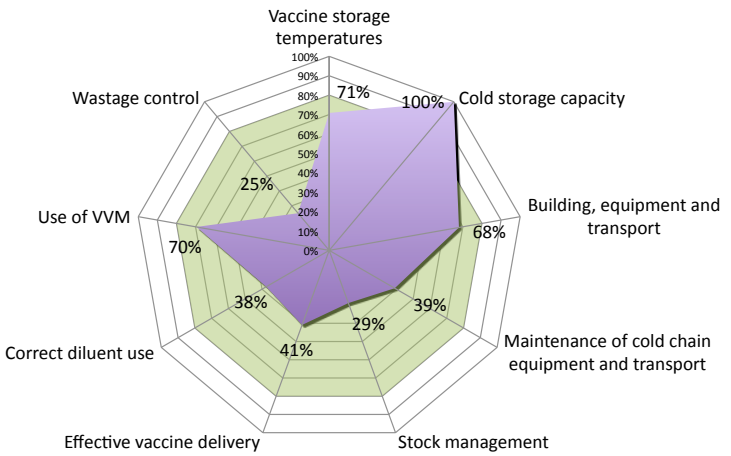


Effective vaccine delivery



CHATRA - PRIMARY HEALTH CENTERS

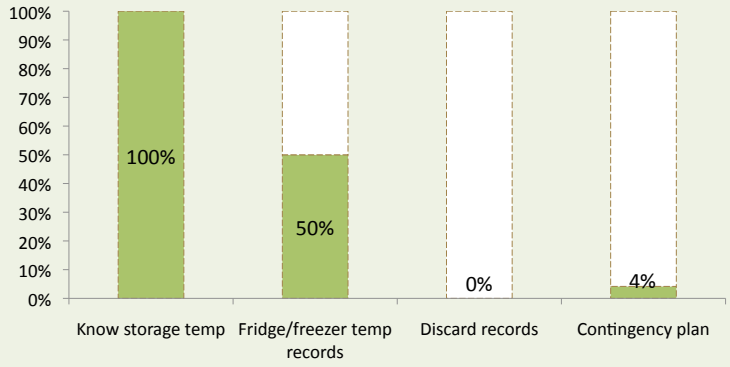
STATUS - VACCINE MANAGEMENT ASSESSMENT 2010



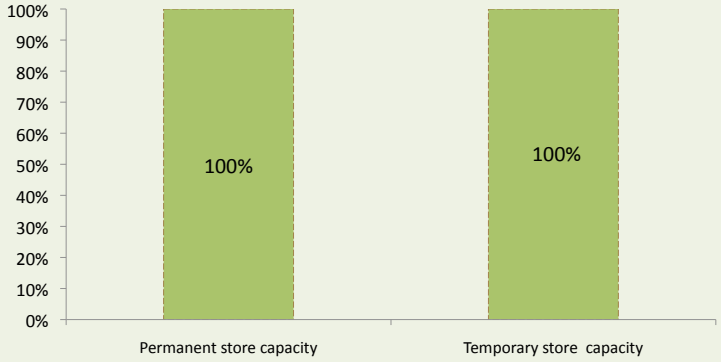
PHC assessed:	Hunterganj
Total population:	1,53,284
Target population:	3,985
Number of sub centers:	16
RI Coverage rate (2009):	85%

PHC assessed:	Simaria
Total population:	1,43,322
Target population:	3,745
Number of sub centers:	17
RI Coverage rate (2009):	111%

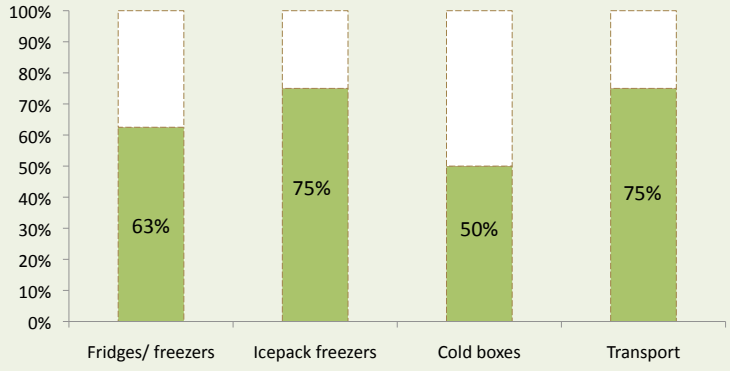
Vaccine storage temperature



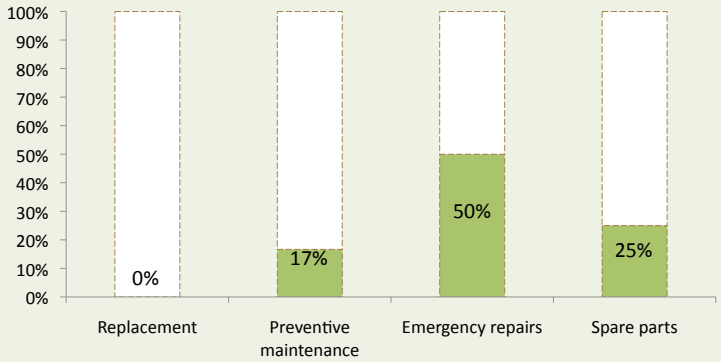
Cold store capacity



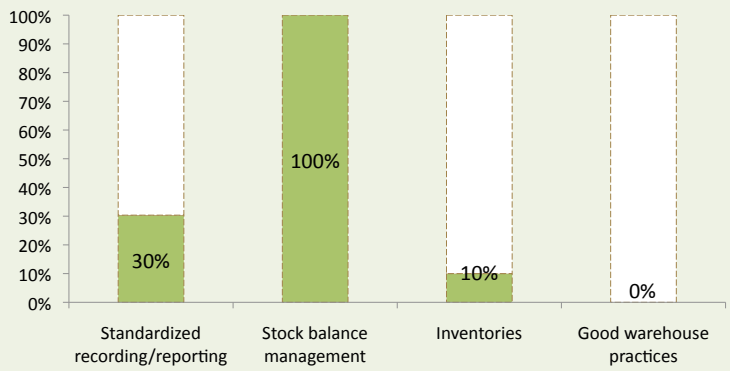
Building, equipment and transport



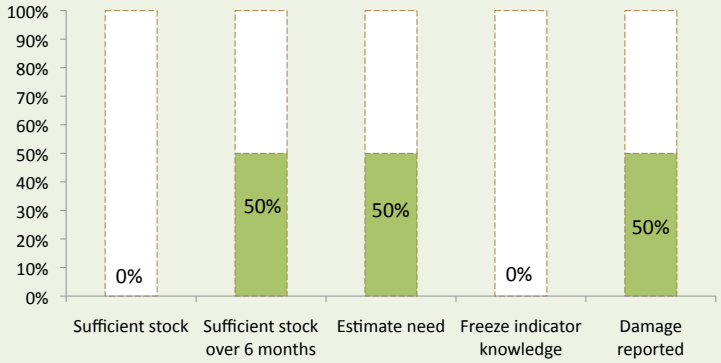
Maintenance of cold chain equipment and transport



Stock management

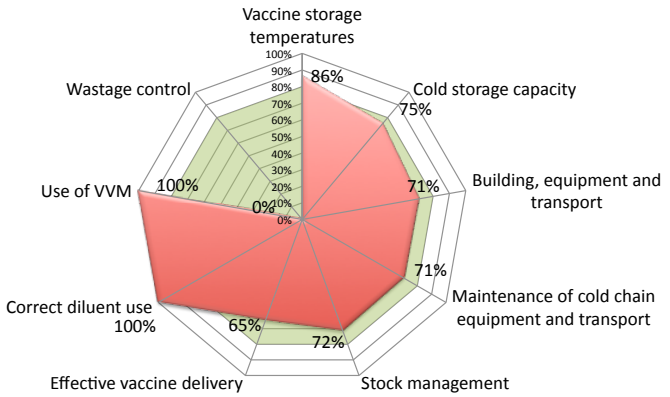


Effective vaccine delivery



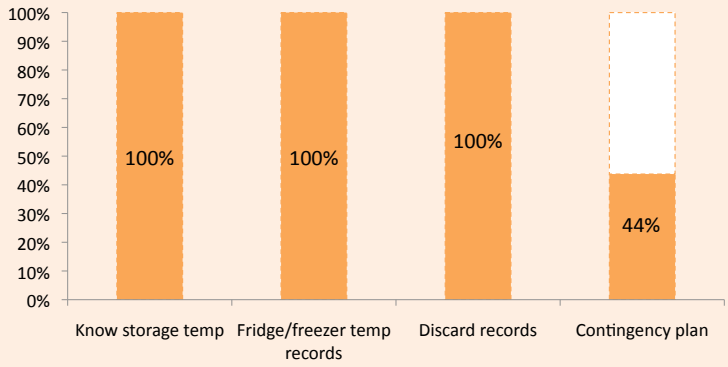
SERAIKELA DISTRICT STORE

STATUS - VACCINE MANAGEMENT ASSESSMENT 2010

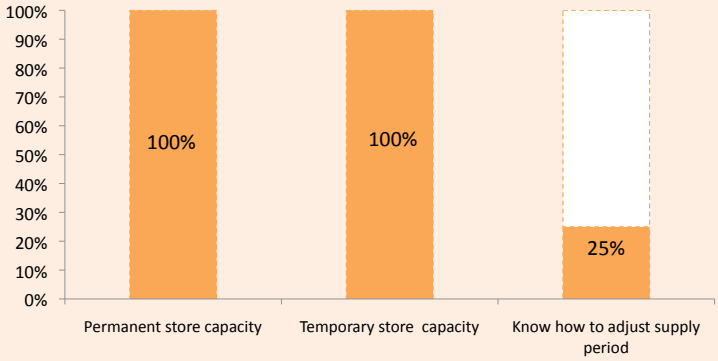


Total population:	9,40,209
Target population:	28,206
Number of PHC served:	8
Number of sub centers:	194
RI Coverage rate (2009):	71.7%

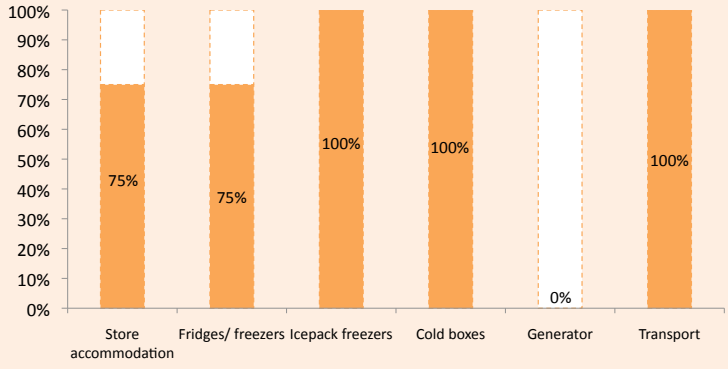
Vaccine storage temperature



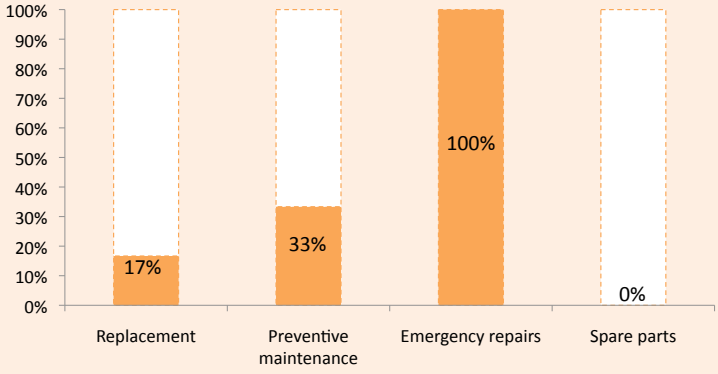
Cold store capacity



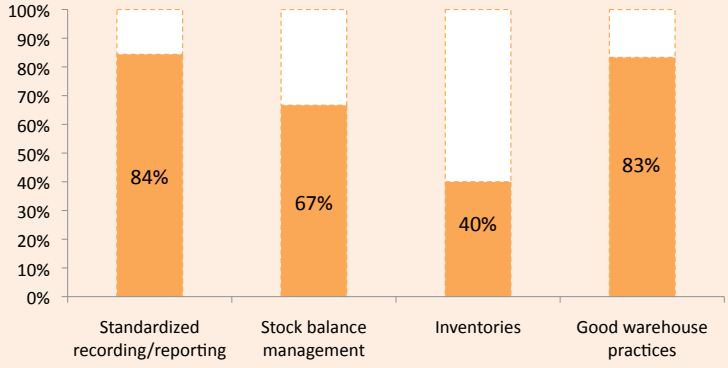
Building, equipment and transport



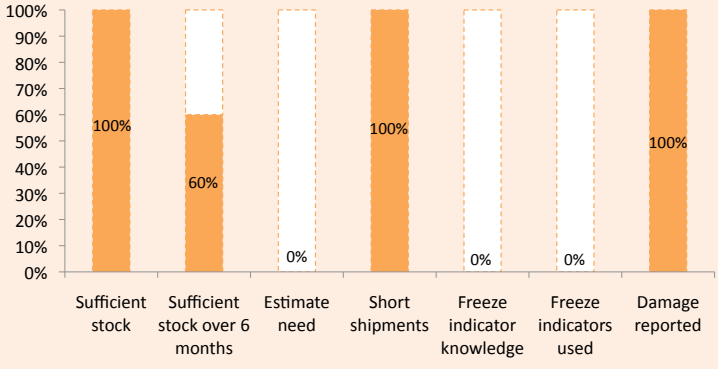
Maintenance of cold chain equipment and transport



Stock management

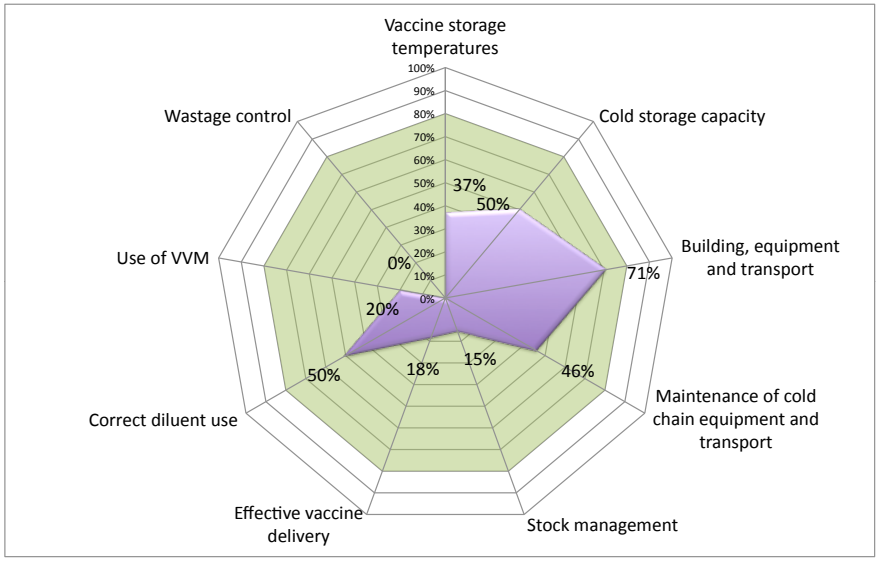


Effective vaccine delivery



SARAIKELA - PRIMARY HEALTH CENTERS

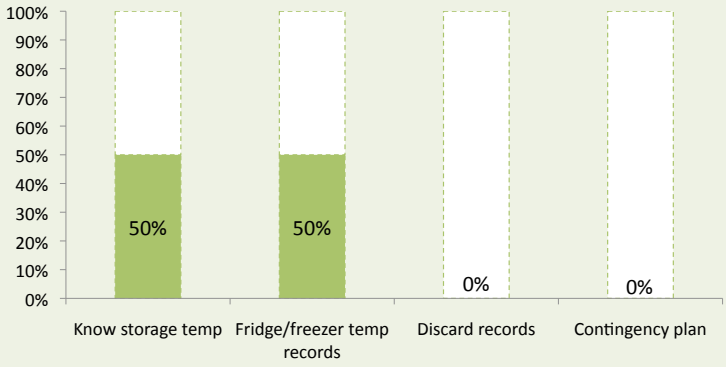
STATUS - VACCINE MANAGEMENT ASSESSMENT 2010



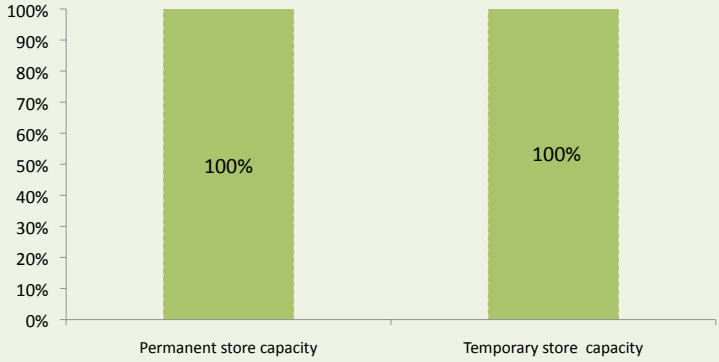
PHC assessed:	Ichagarh
Total population:	1,11,720
Target population:	3,351
Number of sub centers:	27
RI Coverage rate (2009):	56.8%

PHC assessed:	Kharsawan
Total population:	79,600
Target population:	2,388
Number of sub centers:	20
RI Coverage rate (2009):	80%

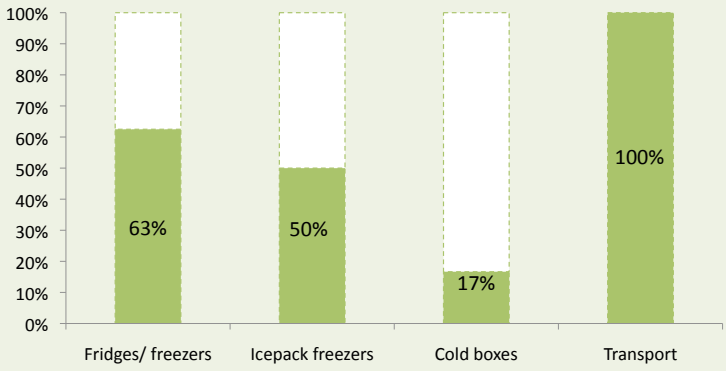
Vaccine storage temperature



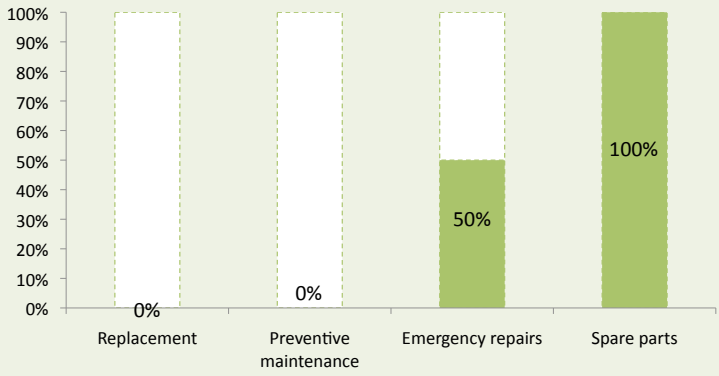
Cold store capacity



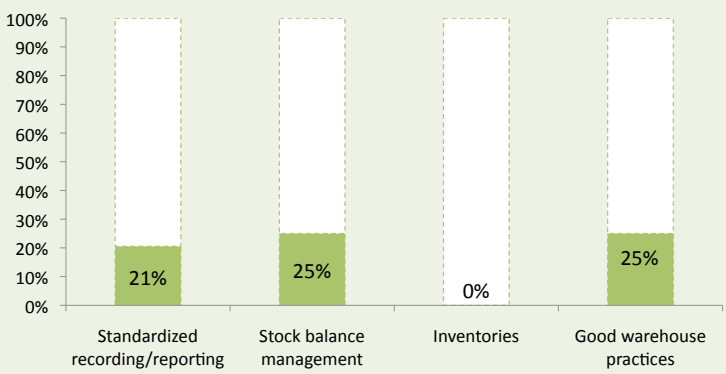
Building, equipment and transport



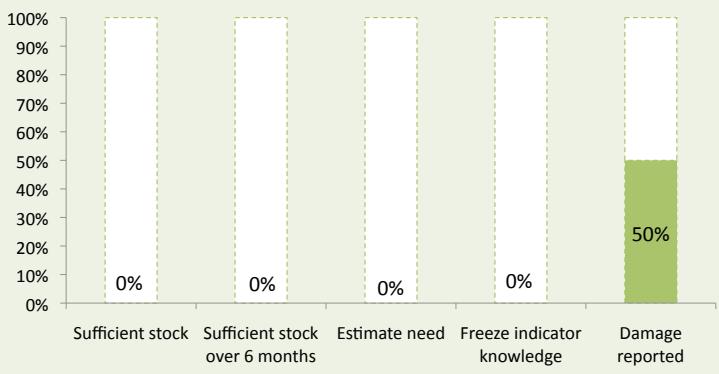
Maintenance of cold chain equipment and transport



Stock management

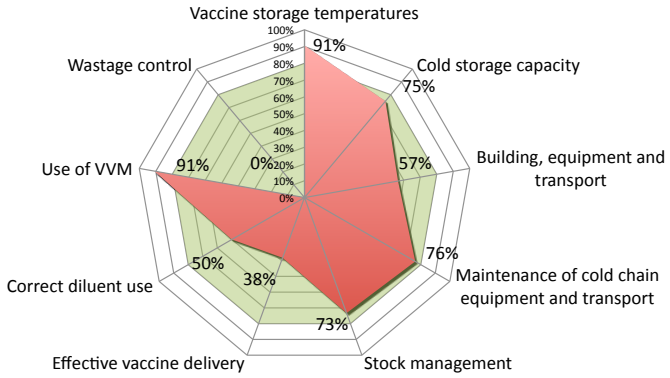


Effective vaccine delivery



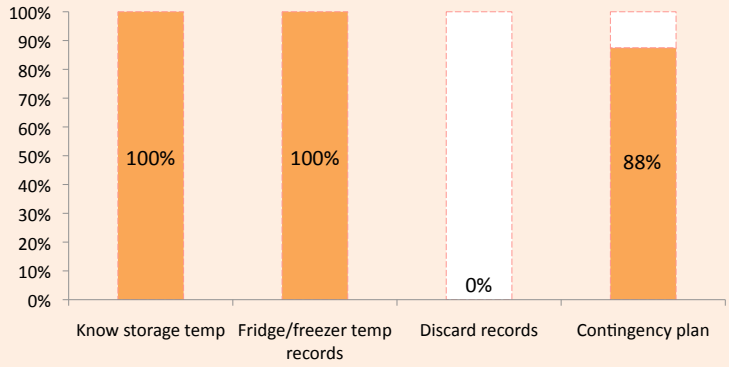
KODARMA DISTRICT STORE

STATUS - VACCINE MANAGEMENT ASSESSMENT 2010

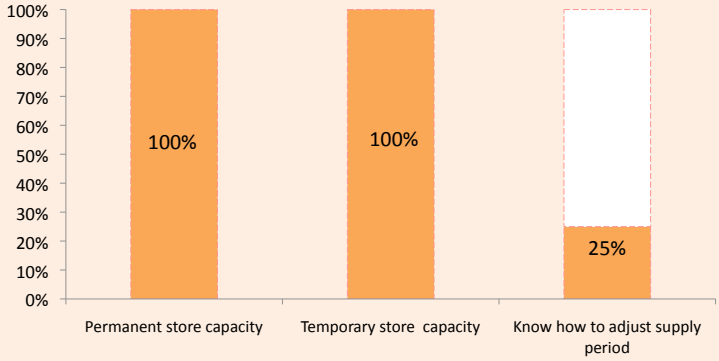


Total population:	5,85,130
Target population:	17,554
Number of PHC served:	4
Number of sub centers:	62
RI Coverage rate (2009):	55.1%

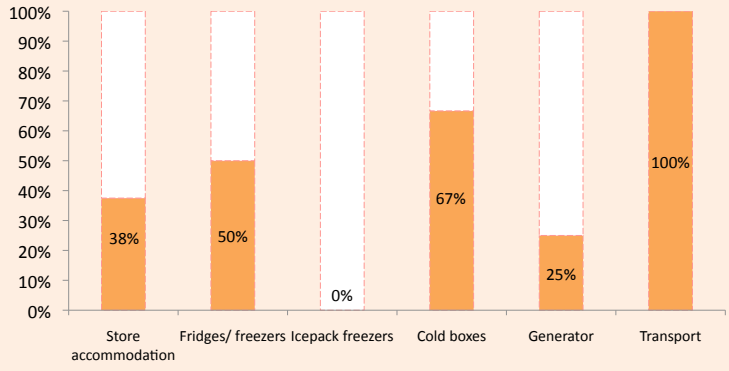
Vaccine storage temperature



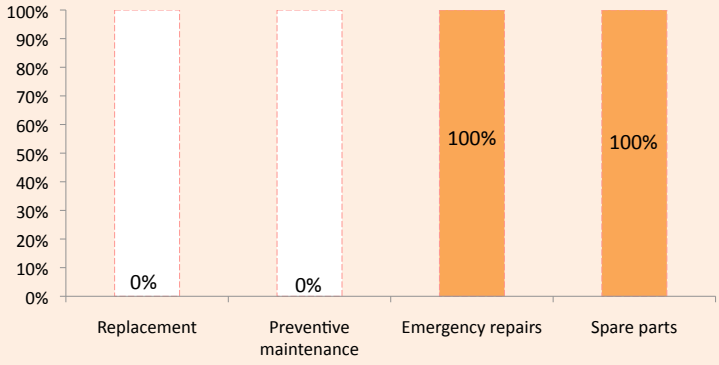
Cold store capacity



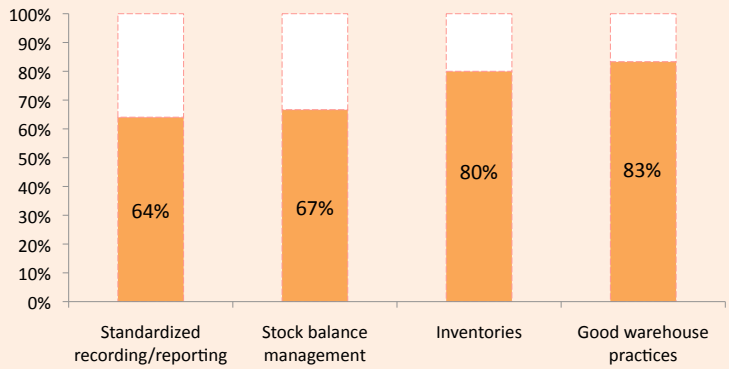
Building, equipment and transport



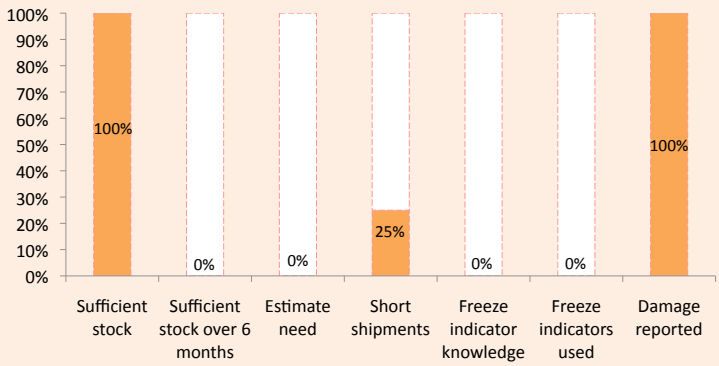
Maintenance of cold chain equipment and transport



Stock management

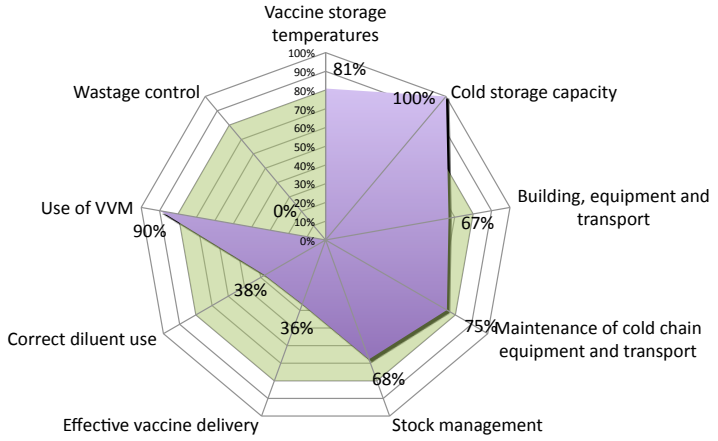


Effective vaccine delivery



KODERMA - PRIMARY HEALTH CENTERS

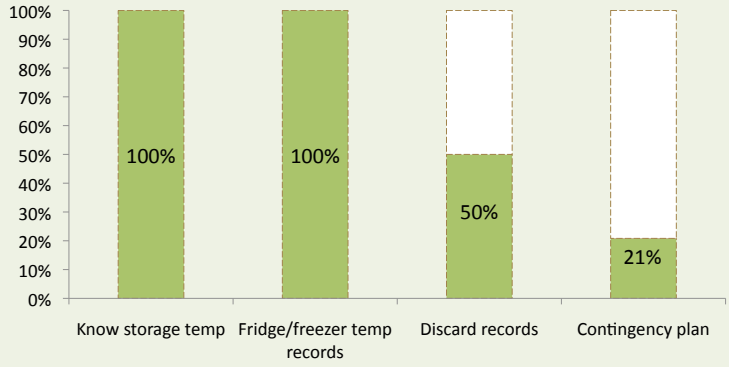
STATUS - VACCINE MANAGEMENT ASSESSMENT 2010



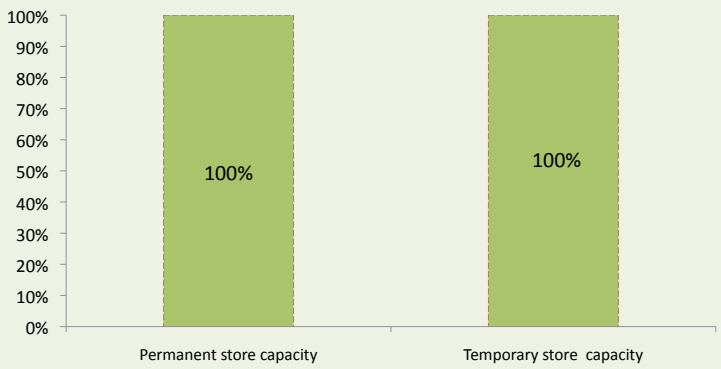
PHC assessed:	Satagawn
Total population:	65,397
Target population:	1,636
Number of sub centers:	12
RI Coverage rate (2009):	47.1%

PHC assessed:	Sadar
Total population:	2,36,101
Target population:	6,601
Number of sub centers:	19
RI Coverage rate (2009):	26.8%

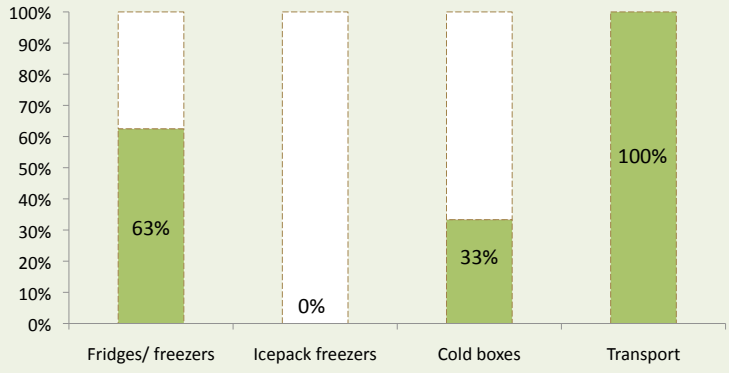
Vaccine storage temperature



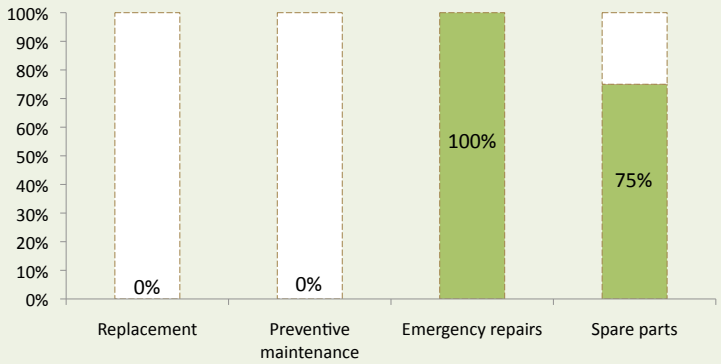
Cold store capacity



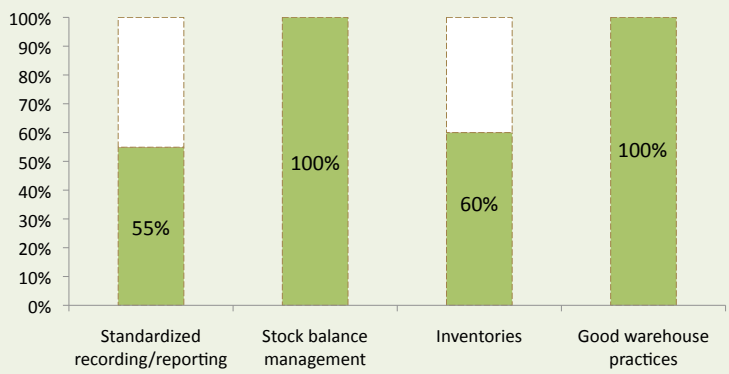
Building, equipment and transport



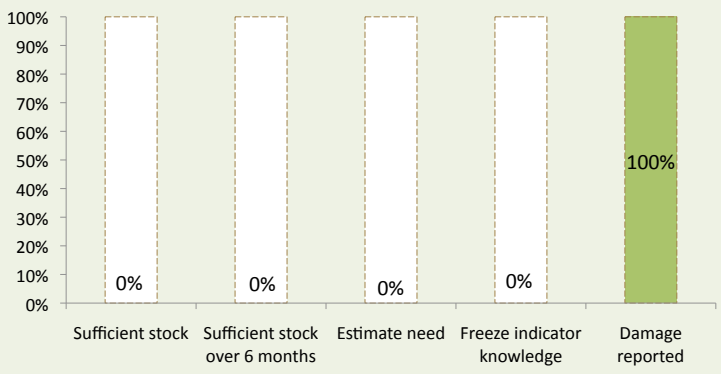
Maintenance of cold chain equipment and transport



Stock management

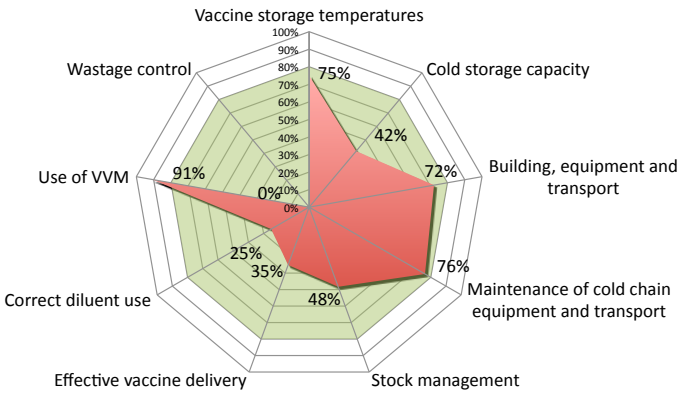


Effective vaccine delivery



RAMGARH DISTRICT STORE

STATUS - VACCINE MANAGEMENT ASSESSMENT 2010



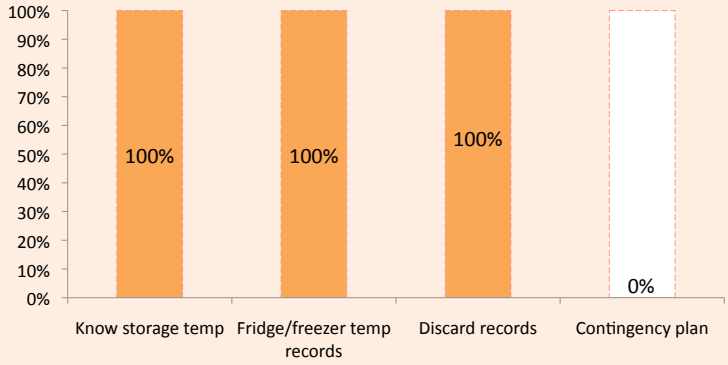
Total population:

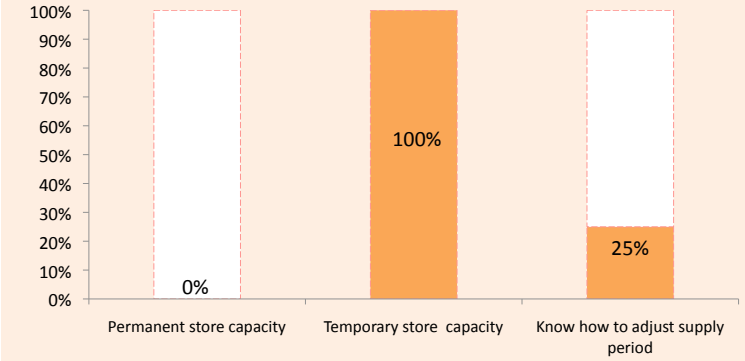
Target population:

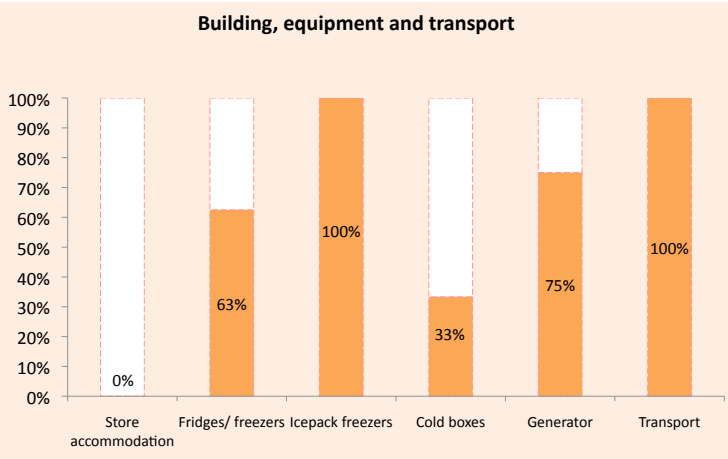
Number of PHC served:

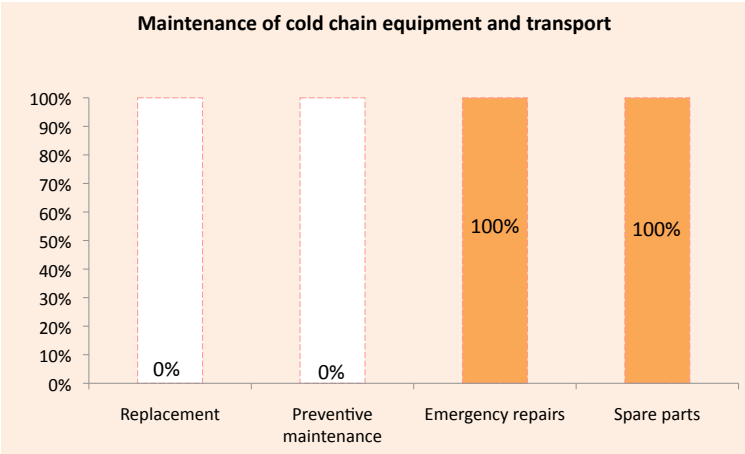
Number of sub centers:

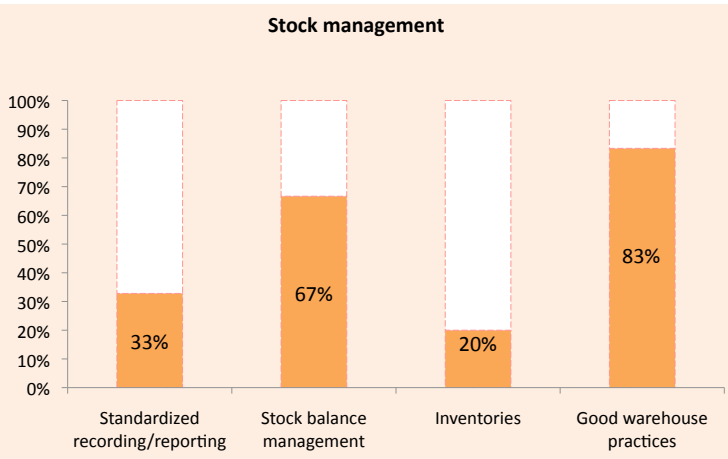
RI Coverage rate (2009): %

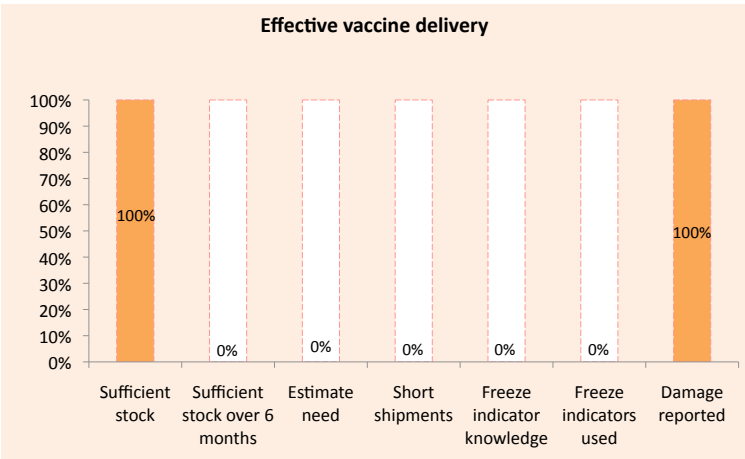






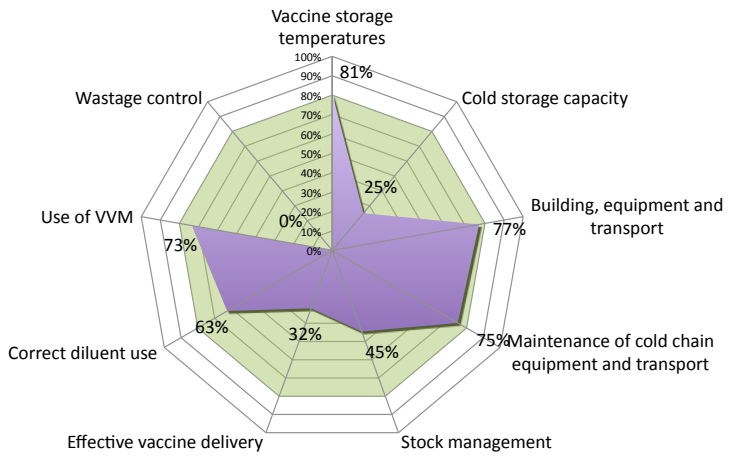






RAMGARH - PRIMARY HEALTH CENTERS

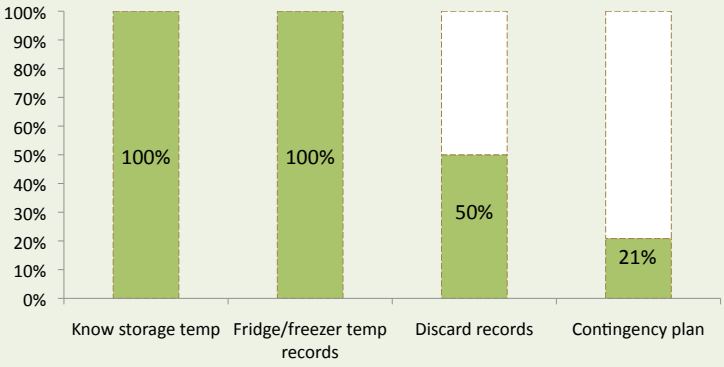
STATUS - VACCINE MANAGEMENT ASSESSMENT 2010



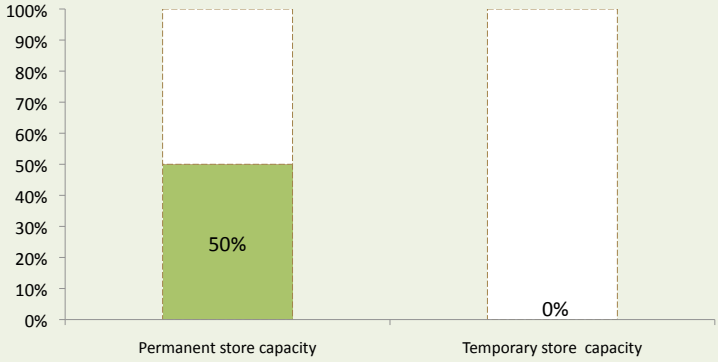
PHC assessed:
Total population:
Target population: 85%
Number of sub centers:
RI Coverage rate (2009):

PHC assessed:
Total population:
Target population:
Number of sub centers:
RI Coverage rate (2009): %

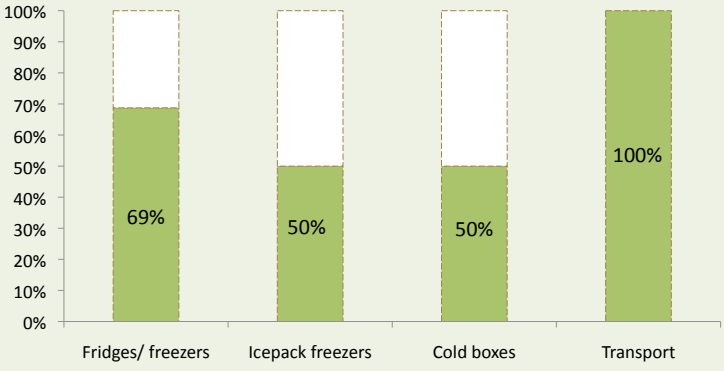
Vaccine storage temperature



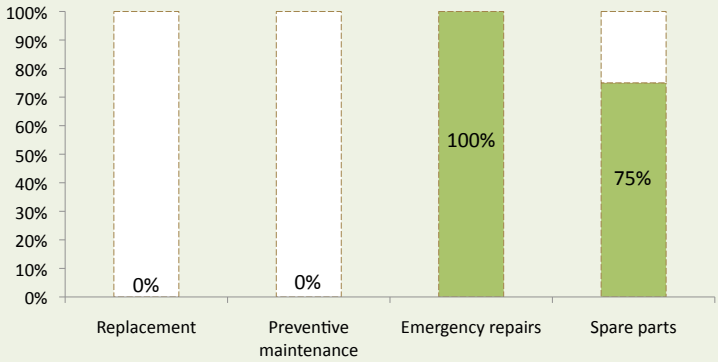
Cold store capacity



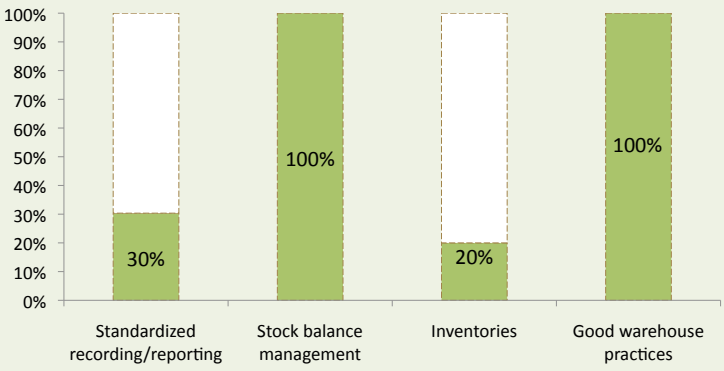
Building, equipment and transport



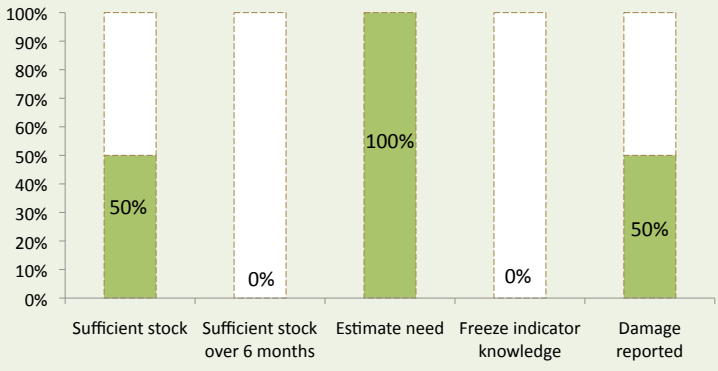
Maintenance of cold chain equipment and transport



Stock management

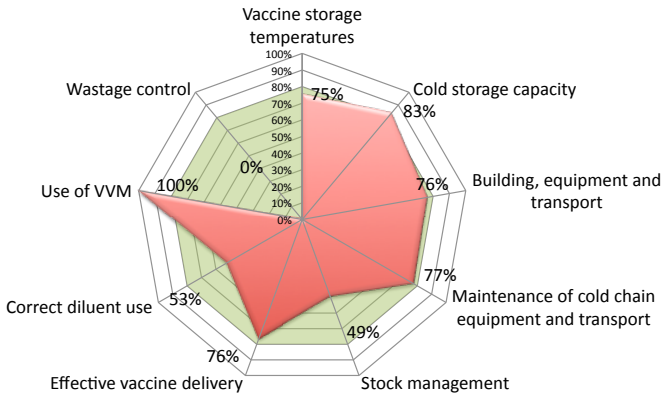


Effective vaccine delivery



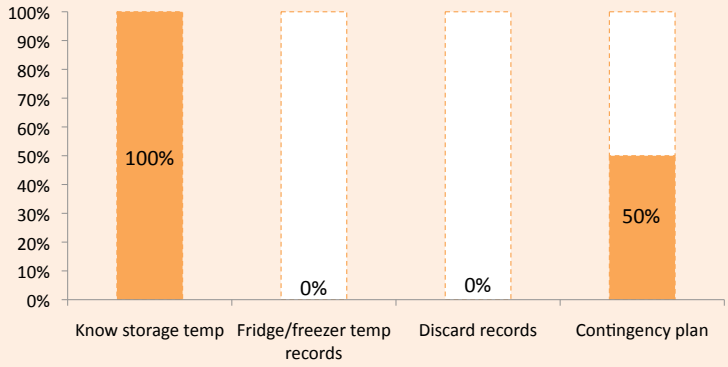
LOHARDEGA DISTRICT STORE

STATUS - VACCINE MANAGEMENT ASSESSMENT 2010

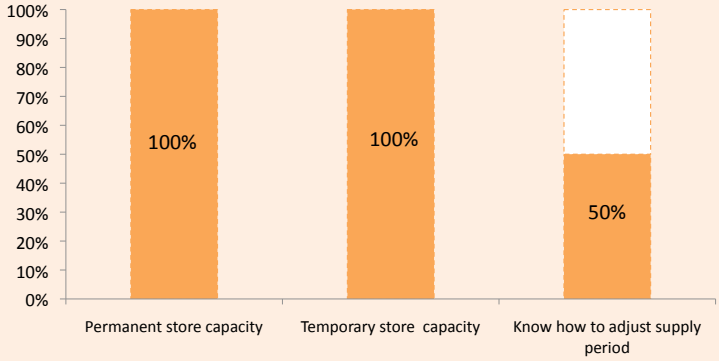


Total population:	4,33,721
Target population:	14,583
Number of PHC served:	5
Number of sub centers:	73
RI Coverage rate (2009):	92%

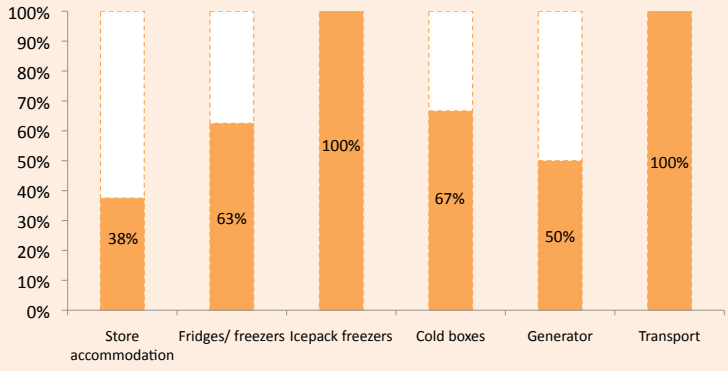
Vaccine storage temperature



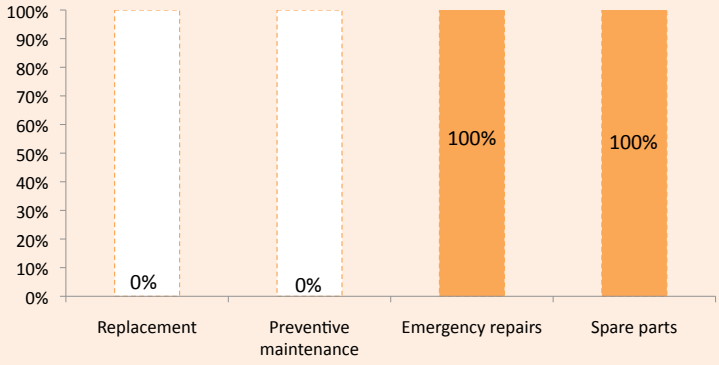
Cold store capacity



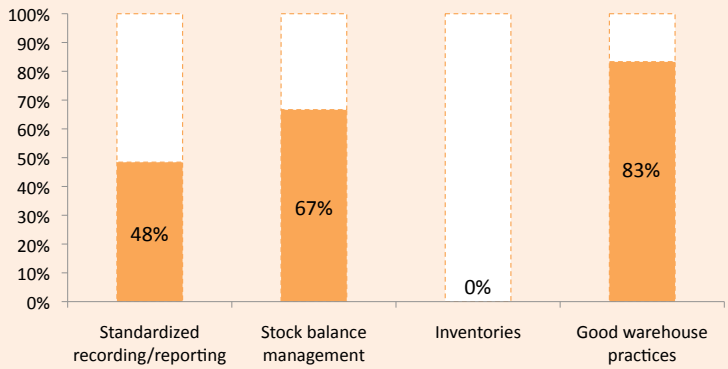
Building, equipment and transport



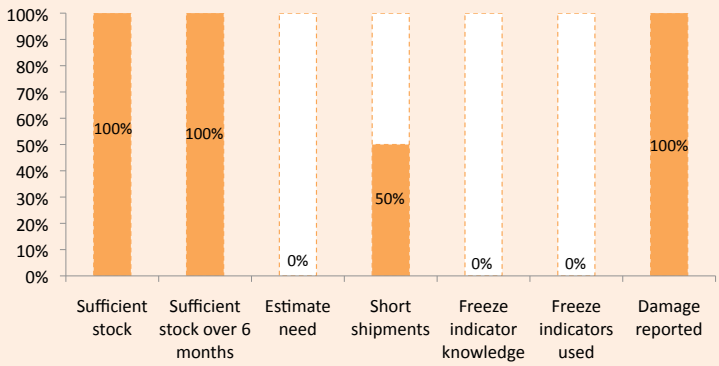
Maintenance of cold chain equipment and transport



Stock management

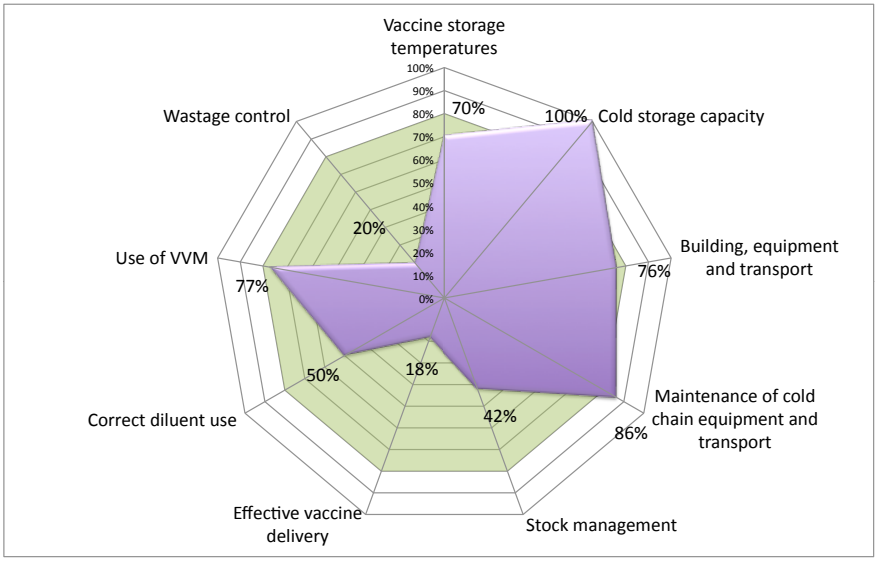


Effective vaccine delivery



LOHARDEGA - PRIMARY HEALTH CENTERS

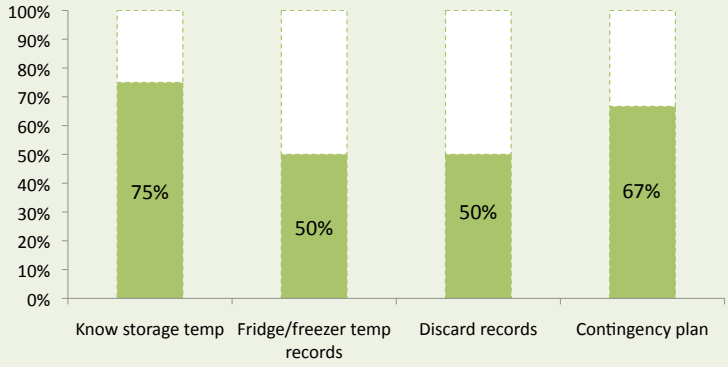
STATUS - VACCINE MANAGEMENT ASSESSMENT 2010



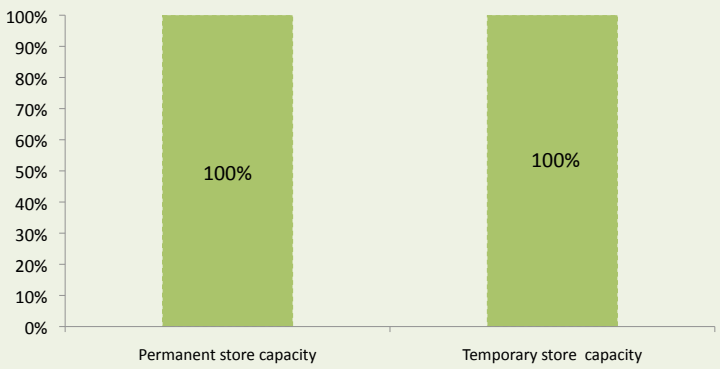
PHC assessed:	Bhandra
Total population:	67,797
Target population:	2,034
Number of sub centers:	15
RI Coverage rate (2009):	80.7%

PHC assessed:	Kuru
Total population:	1,02,446
Target population:	3,073
Number of sub centers:	15
RI Coverage rate (2009):	81%

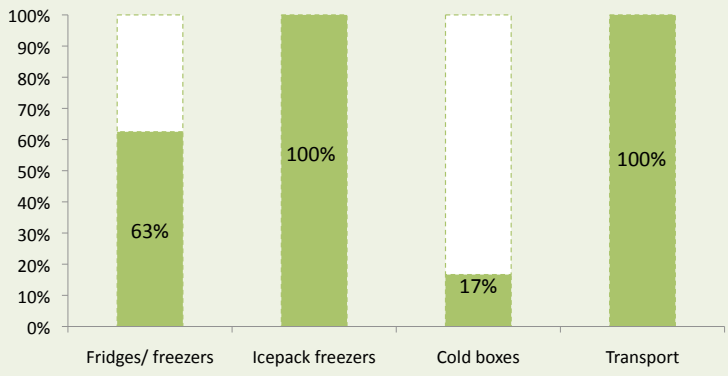
Vaccine storage temperature



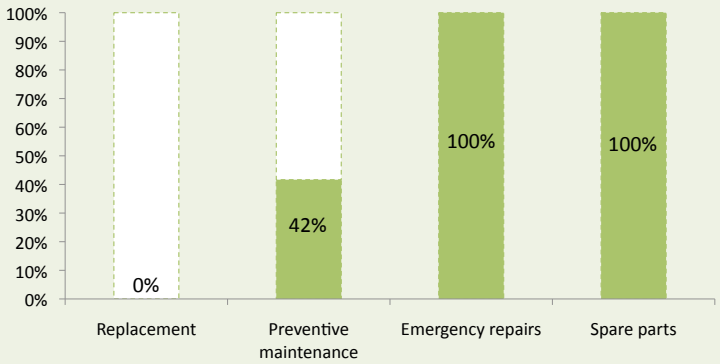
Cold store capacity



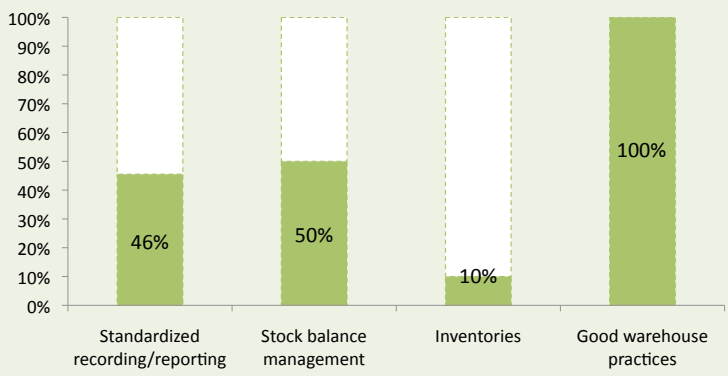
Building, equipment and transport



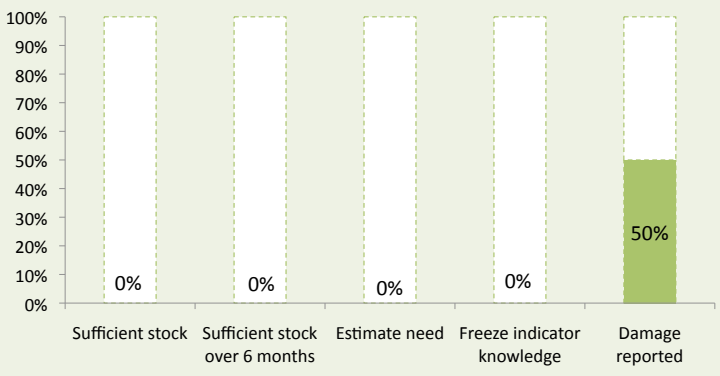
Maintenance of cold chain equipment and transport



Stock management

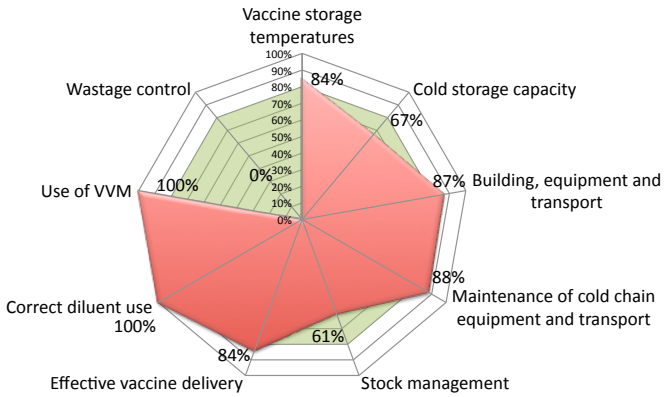


Effective vaccine delivery



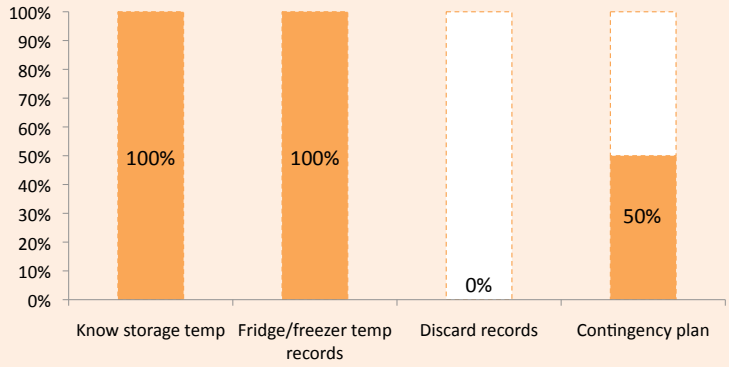
SIMDEGA DISTRICT STORE

STATUS - VACCINE MANAGEMENT ASSESSMENT 2010

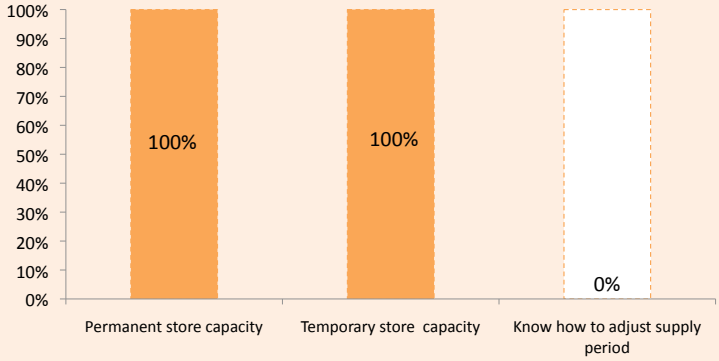


Total population:	5,80,546
Target population:	17,416
Number of PHC served:	7
Number of sub centers:	155
RI Coverage rate (2009):	66%

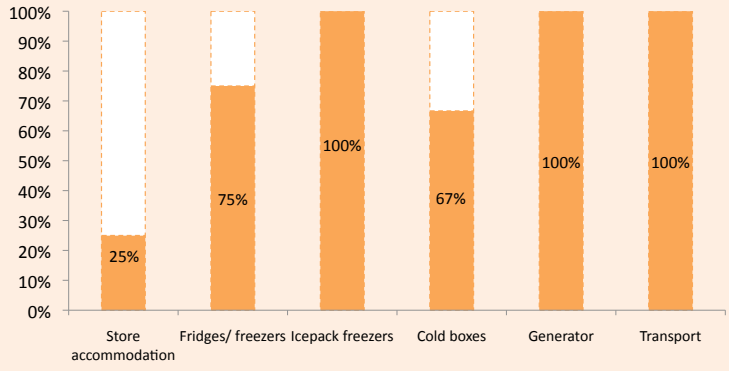
Vaccine storage temperature



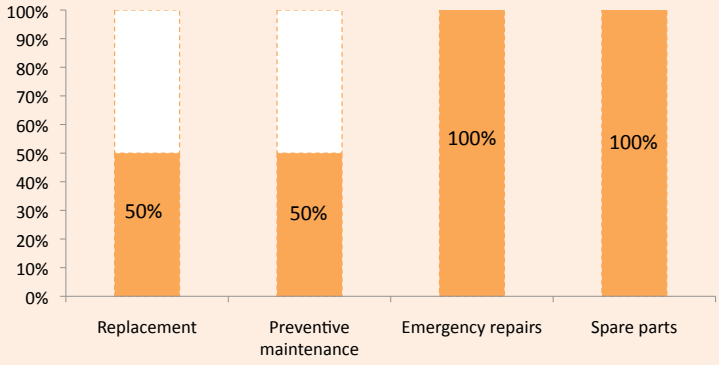
Cold store capacity



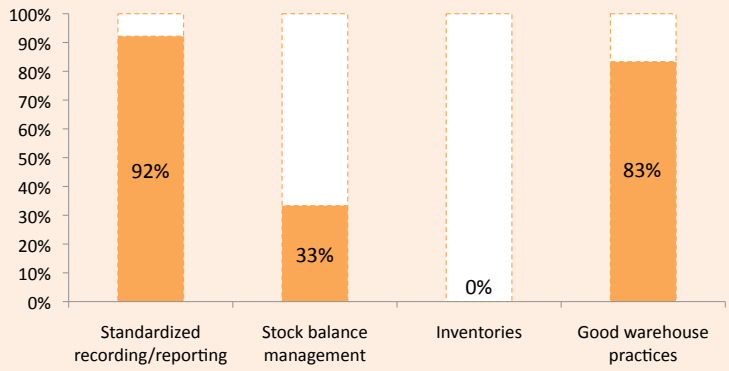
Building, equipment and transport



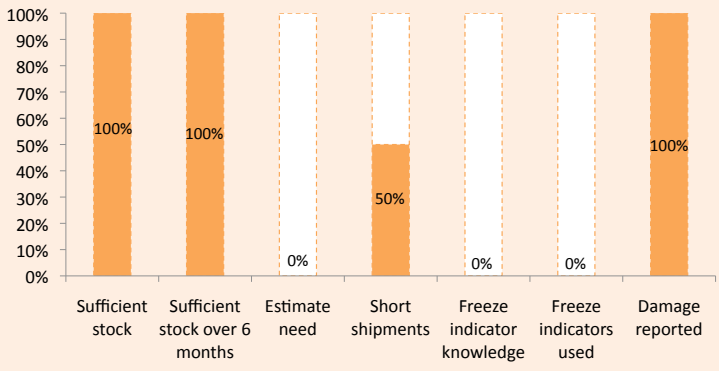
Maintenance of cold chain equipment and transport



Stock management

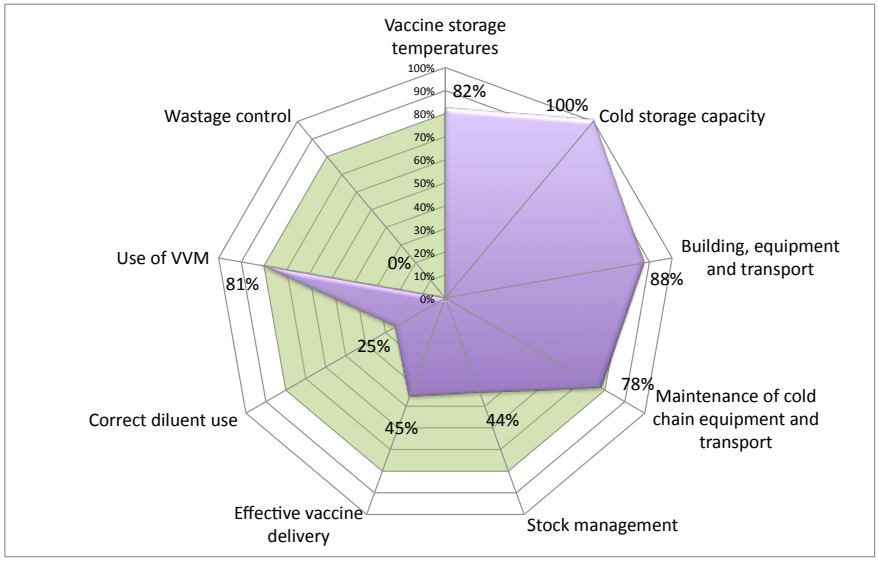


Effective vaccine delivery



SIMDEGA - PRIMARY HEALTH CENTERS

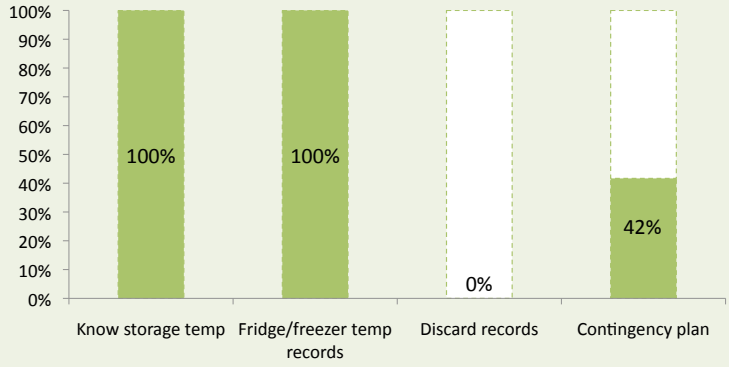
STATUS - VACCINE MANAGEMENT ASSESSMENT 2010



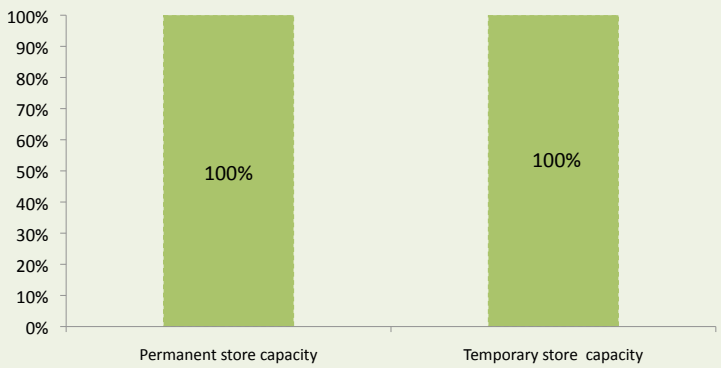
PHC assessed:	Kolebira
Total population:	70,000
Target population:	2,070
Number of sub centers:	17
RI Coverage rate (2009):	65%

PHC assessed:	Jaldega
Total population:	88,793
Target population:	2,388
Number of sub centers:	27
RI Coverage rate (2009):	66%

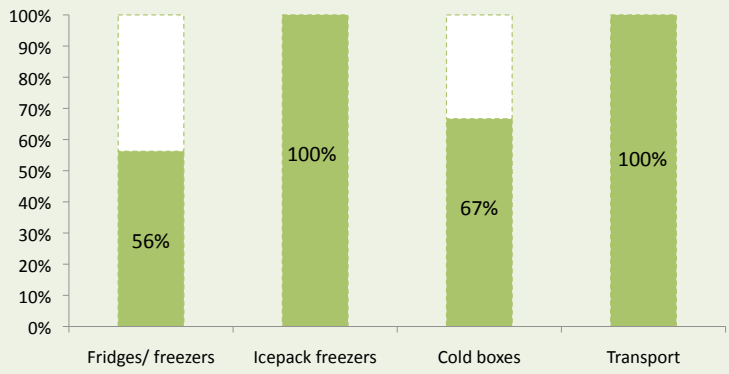
Vaccine storage temperature



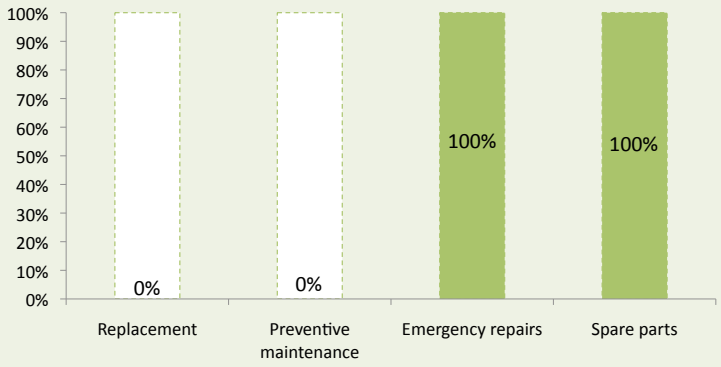
Cold store capacity



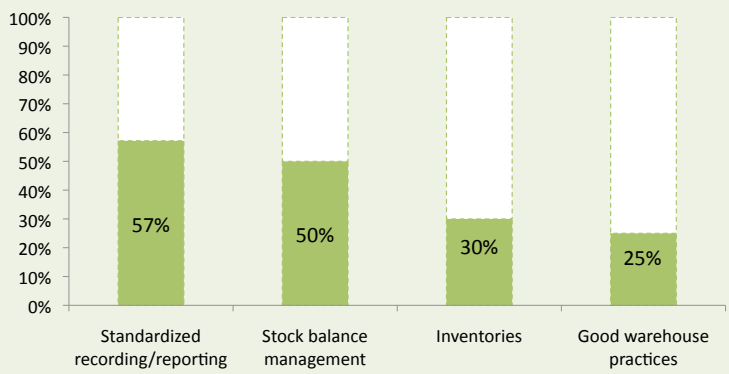
Building, equipment and transport



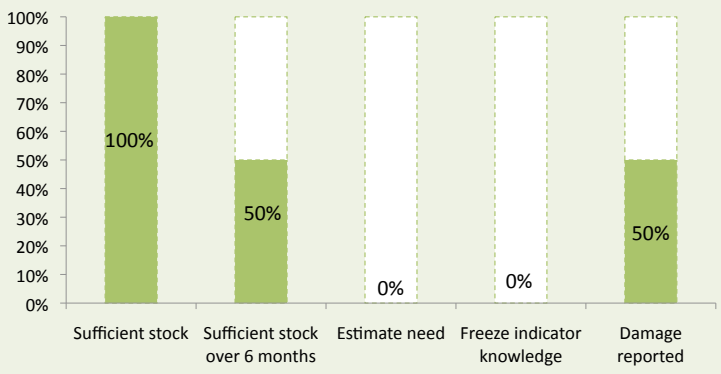
Maintenance of cold chain equipment and transport



Stock management

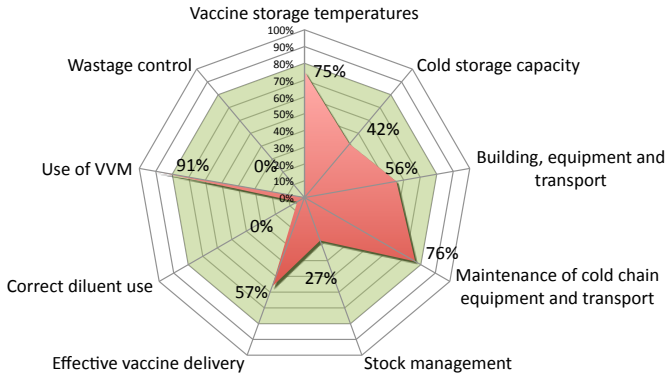


Effective vaccine delivery



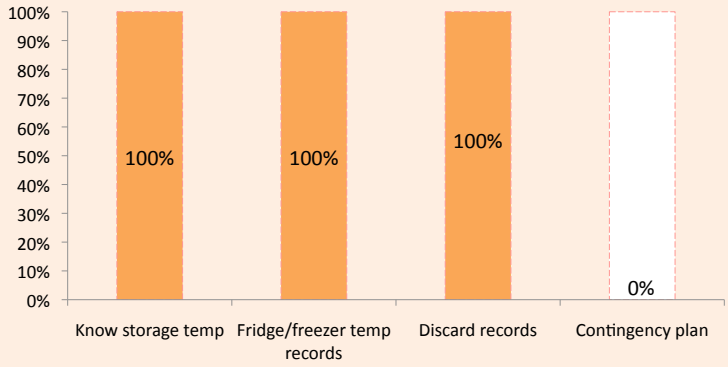
BOKARO DISTRICT STORE

STATUS - VACCINE MANAGEMENT ASSESSMENT 2010

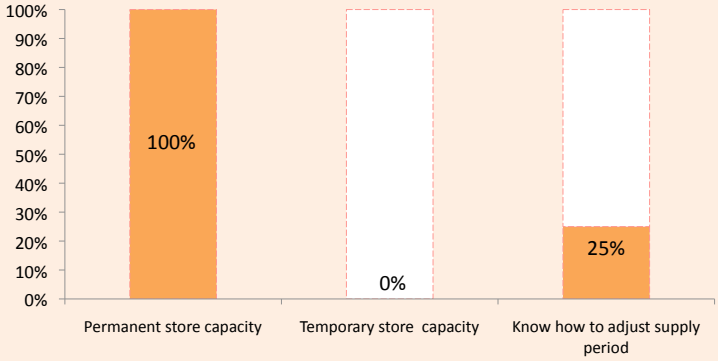


Total population:	20,58,852
Target population:	51,582
Number of PHC served:	8
Number of sub centers:	116
RI Coverage rate (2009):	63.5%

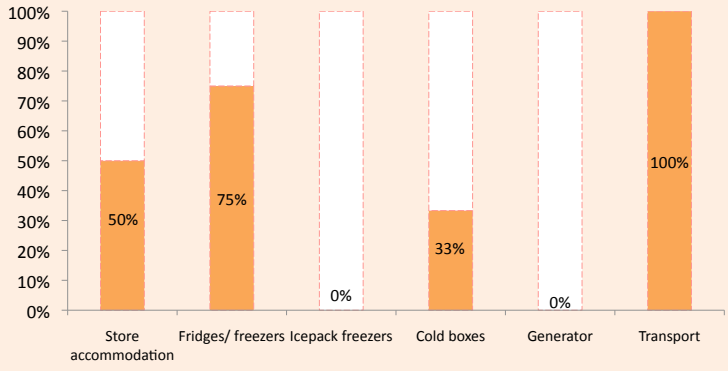
Vaccine storage temperature



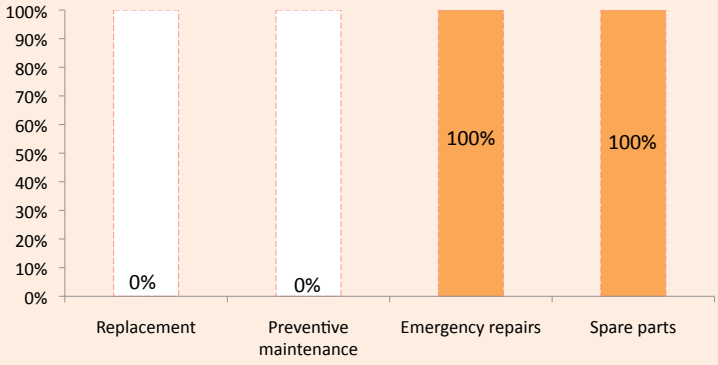
Cold store capacity



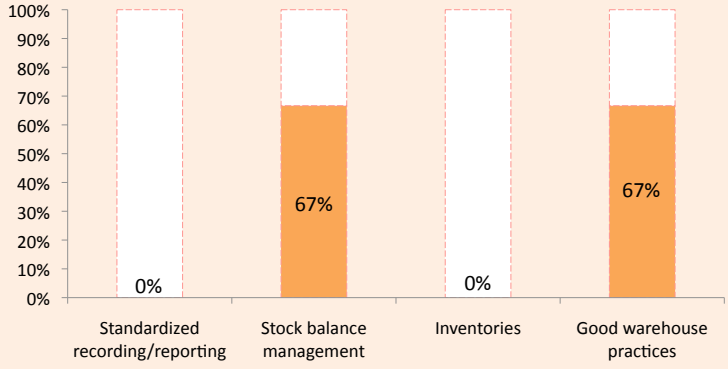
Building, equipment and transport



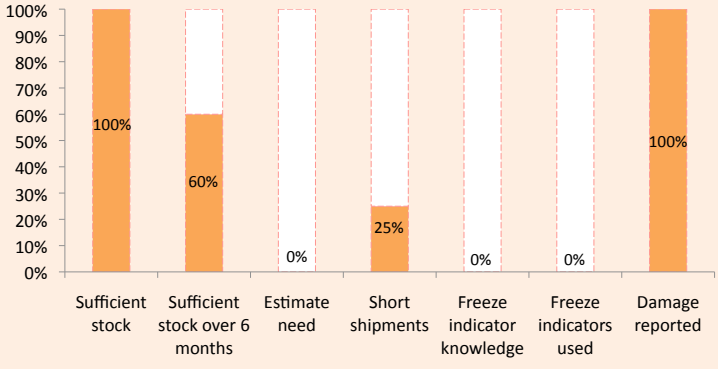
Maintenance of cold chain equipment and transport



Stock management

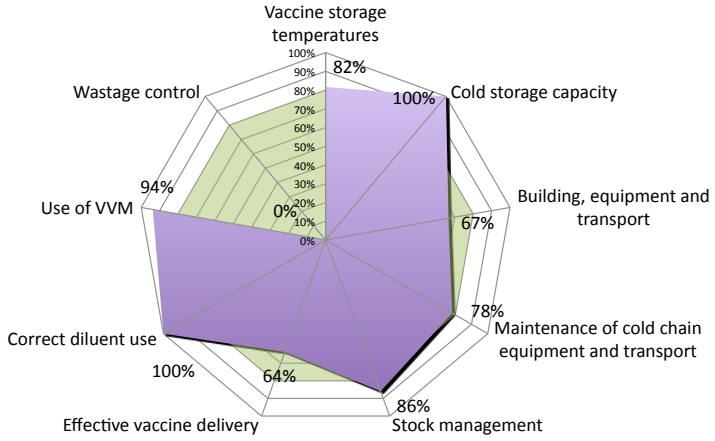


Effective vaccine delivery



BOKARO - PRIMARY HEALTH CENTERS

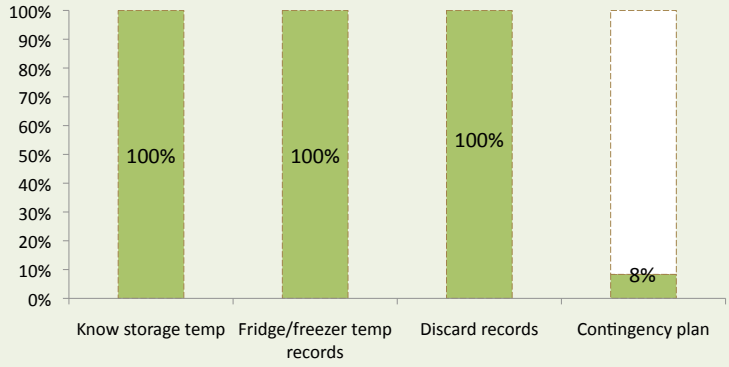
STATUS - VACCINE MANAGEMENT ASSESSMENT 2010



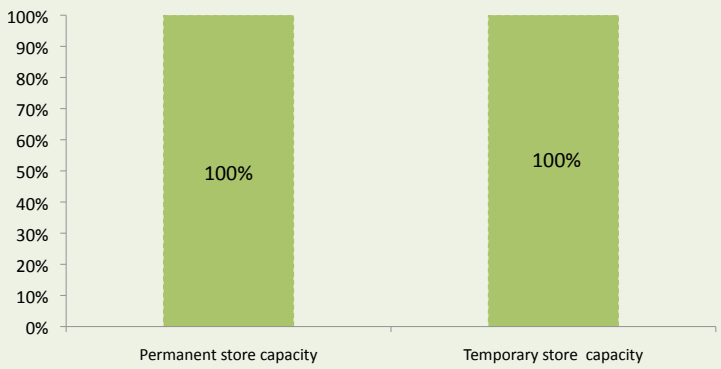
PHC assessed:	Chandankyari
Total population:	2,23,928
Target population:	5,610
Number of sub centers:	12
RI Coverage rate (2009):	56.5%

PHC assessed:	Peterwar
Total population:	1,31,705
Target population:	3,300
Number of sub centers:	12
RI Coverage rate (2009):	65.6%

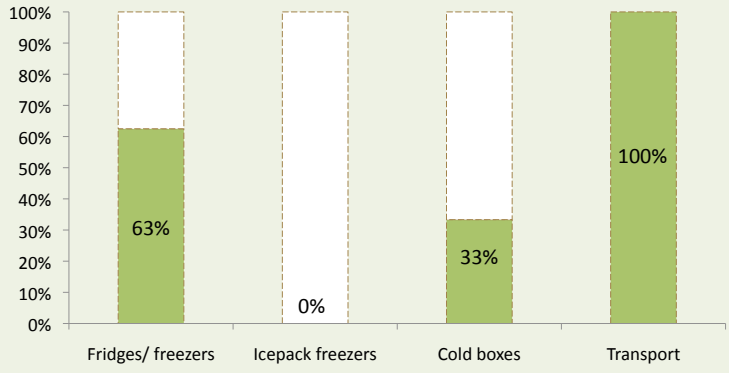
Vaccine storage temperature



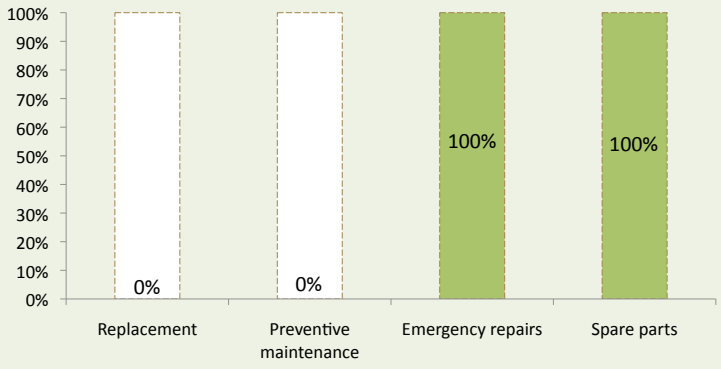
Cold store capacity



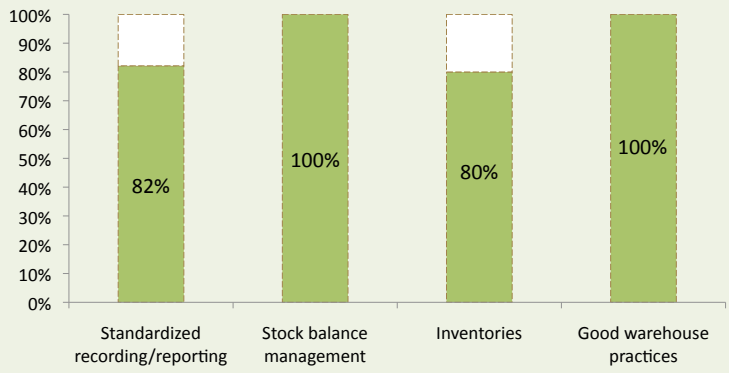
Building, equipment and transport



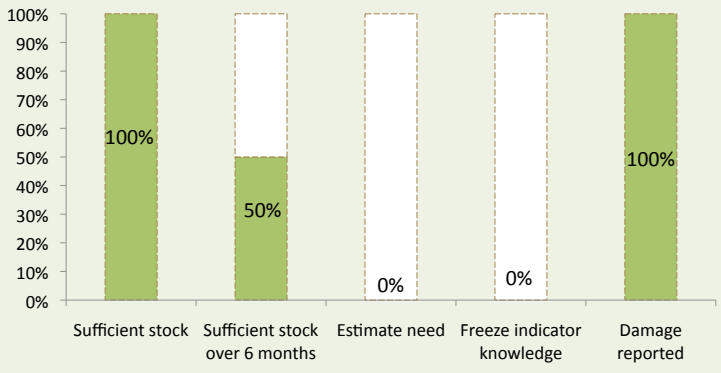
Maintenance of cold chain equipment and transport



Stock management

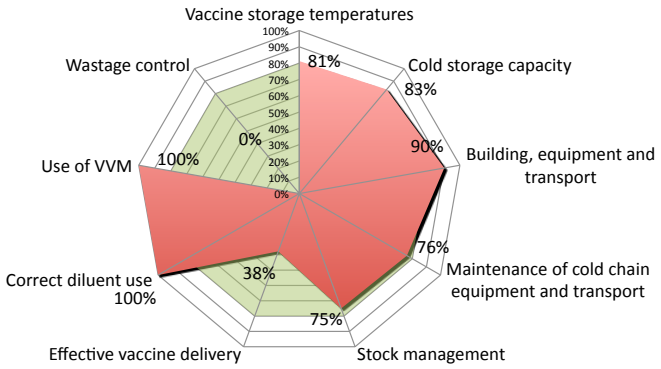


Effective vaccine delivery



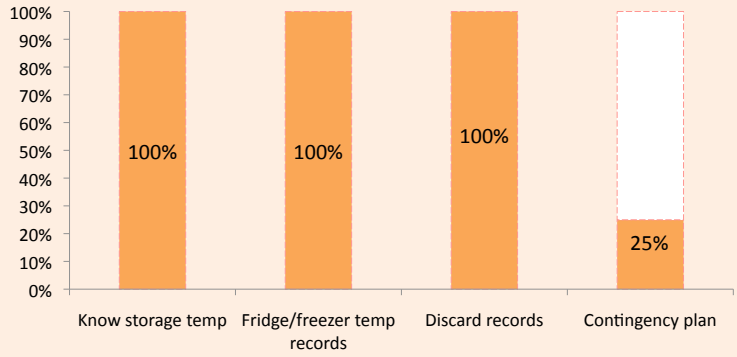
RANCHI DISTRICT STORE

STATUS - VACCINE MANAGEMENT ASSESSMENT 2010

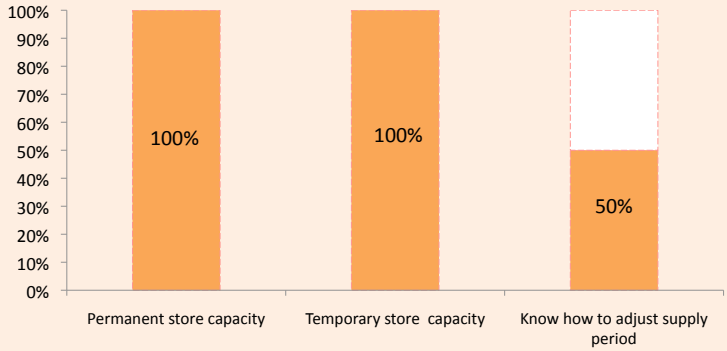


Total population:	29,16,227
Target population:	87,487
Number of PHC served:	14
Number of sub centers:	325
RI Coverage rate (2009):	%

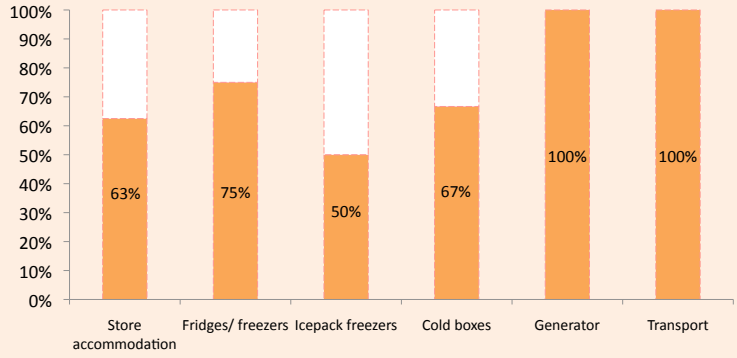
Vaccine storage temperature



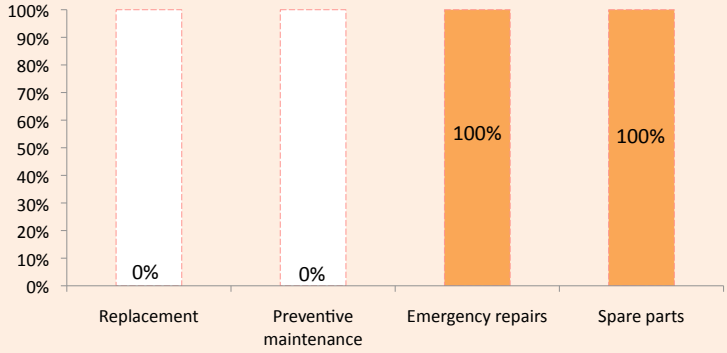
Cold store capacity



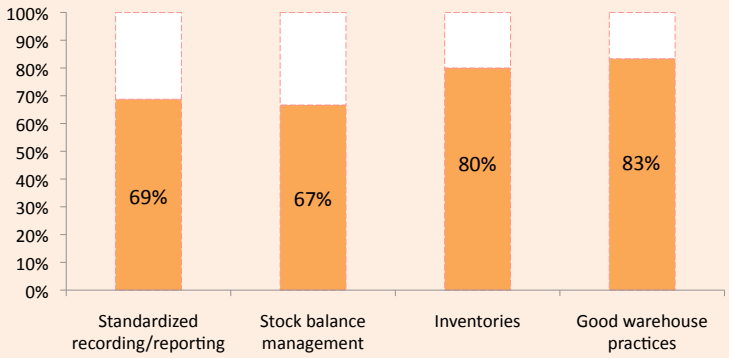
Building, equipment and transport



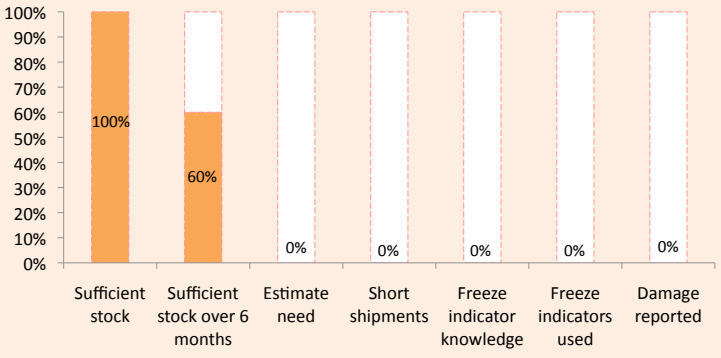
Maintenance of cold chain equipment and transport



Stock management

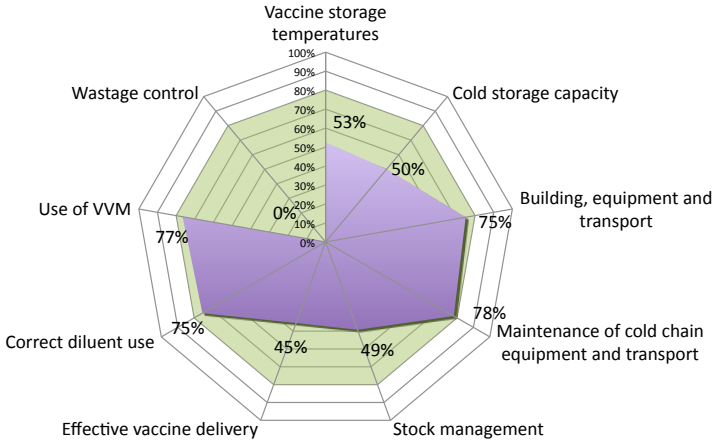


Effective vaccine delivery



RANCHI - PRIMARY HEALTH CENTERS

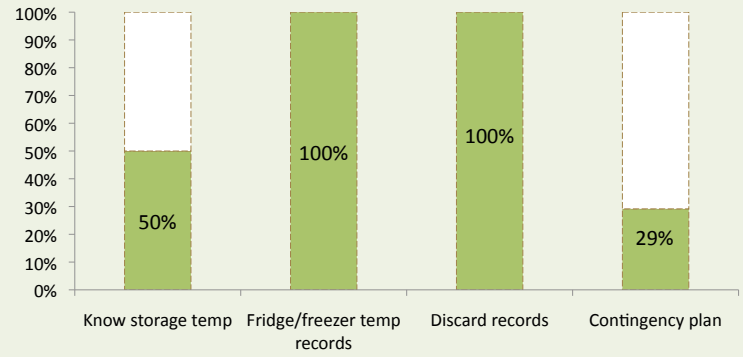
STATUS - VACCINE MANAGEMENT ASSESSMENT 2010



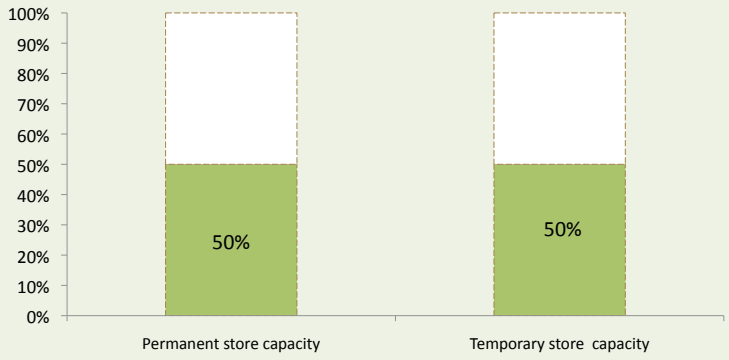
PHC assessed: Chanho
Total population:
Target population:
Number of sub centers:
RI Coverage rate (2009): %

PHC assessed: Silli
Total population:
Target population:
Number of sub centers:
RI Coverage rate (2009): %

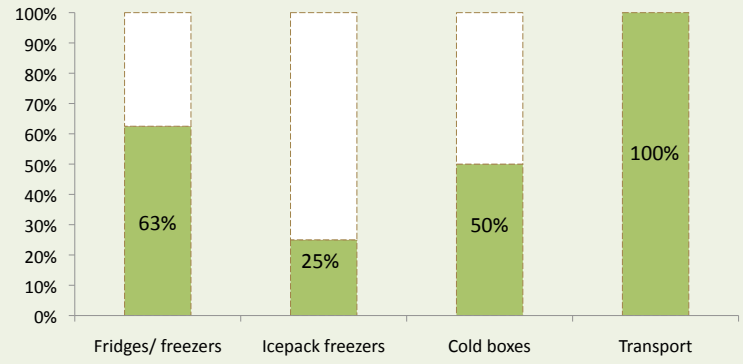
Vaccine storage temperature



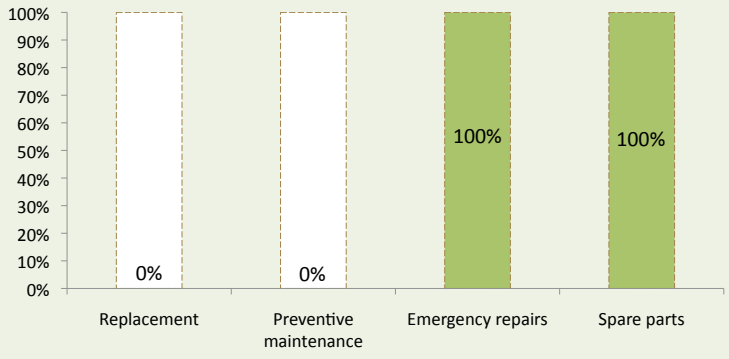
Cold store capacity



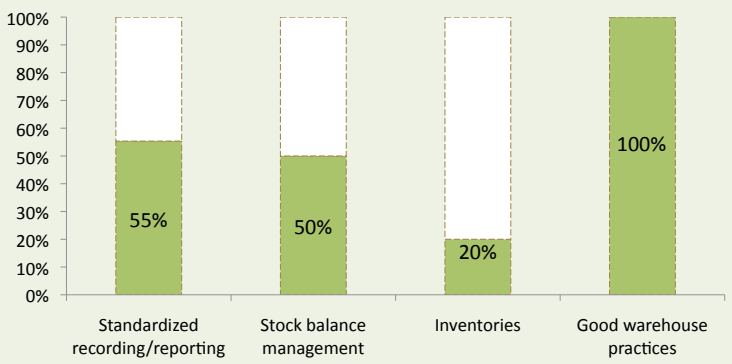
Building, equipment and transport



Maintenance of cold chain equipment and transport



Stock management



Effective vaccine delivery