



Comparative Assessment of Various Models of Mobile Medical Units for Provision of Service in Remote and Under- Served Areas

2023



**Centre for Community Medicine
All India Institute of Medical Sciences, New Delhi**

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The health sector in India is a decentralized body. It is monitored from the centre and controlled by every State. The health care delivery system in India is based on primary health care approach that seeks to provide services that are affordable, equitable and acceptable for its citizens. The primary duties of the health sector are prevention and control of diseases, provision of safe drinking water, nutrition and sanitation, population stabilization, collaboration with other sectors for social security measures, gender empowerment, and reducing the impact of climate change and disaster on health (1). As defined by the World Health Organization, health system includes all organizational structures, institutions, resources and manpower, who deliver health care services, and whose primary intent is to promote, restore or maintain health (2). India has a mixed health care system, inclusive of public and private health care providers. The public health care infrastructure is a three-tier system (primary, secondary and tertiary). However, a large proportion of population avail the health services through private hospitals which incur them with high out of pocket expenditure (3). In addition, the doctor-people ratio is overall less as compared to the standards set by the World Health Organization (WHO), and also skewed as in few states having higher doctor people ratio as compared to others wherein there is acute shortfall (4,5).

Although India has made significant advances in health care over the last decade, however, there are huge rural- urban disparities, and access to healthcare in rural areas and marginalized urban populations still remains a challenge. Rural areas are characterized by low population density, and hence greater distances to health care services, which implies relatively great distances between people and health care facilities. The limited range of services available, lack of manpower and deficient quality of services are other barriers to health care for the rural populations.

In the urban areas, slum population and marginalized communities face similar challenges, where dispensaries or urban health centres do not exist. Even if available, they may not be accessible to these vulnerable population groups. Also, lack of space in overcrowded slums poses a barrier for creating fixed infrastructure. Therefore, a system of medical care, which can efficiently produce a positive effect within the available resources, is important.

To enhance access to care and create equitable distribution of health services across the country, the Government of India created the National Health Mission (NHM). The NHM has taken many initiatives to provide healthcare to underserved populations, including providing one mobile medical unit (MMU) in each district.

As India moves towards the Universal Health Coverage, the needs of people in unreached areas assume a high priority. MMUs can play an important role to increase the accessibility of public health services in remote or difficult to reach locations.

A mobile unit may be described as any mobile, transportable or re-locatable structure intended to provide shared medical services to the community on a permanent or temporary basis. Mobile units are usually pre-manufactured and equipped with services and transported to the desired location for operation. Mobile clinics offer flexible and viable options for treating isolated and vulnerable groups as well as to newly displaced populations.

MMUs were viewed as a key service strategy to reach the vulnerable and marginalised populations living in remote, difficult areas as well as for communities that are cut off from mainstream services on account of climatic conditions and geography. They also played a significant role in the delivery of health services to uninsured or under insured populations.

MMUs are equipped with basic diagnostic and treatment facilities that can move from one place to another, and which can provide opportunities for early and improved detection of a multitude of health conditions, particularly those of public health importance. The states were, however, expected to ensure the adoption of the most suitable and sustainable model of MMU based on their local requirements. This intervention can be implemented directly under the public health system or it can be contracted to the Non- Governmental Organizations (NGOs) that have flexibility to adapt to local contexts to ensure better implementation.

As of December 2014, there were about 1301 operational MMUs in 368 districts across the country(2). Besides the Government initiatives, there is a good variety of MMUs currently being implemented by charitable organizations or NGOs too.

The norms for setting up of MMUs were revised in 2015, which included norms of deployment, the target geographical areas, and types of services which were modified based on the learning and experience of NRHM. Under the revised guidelines, broadly three models of operationalizing MMUs were suggested:

1. Government operated MMU.
2. Operation of MMU on outsourcing basis- where capital expenditure, drugs and supplies are provided by Government.
3. Out-sourcing of MMU services including both capital expenditure and operational expenses. However, drugs and supplies to be provided by the Government.

As of March 2018, there were a total of 1427 operational MMUs across the country. (Annexure1). In the present assessment, we aim to compare various models of MMUs for provision of service in remote and under-served areas.

MMUs have been shown to increase the access to health care services, reducing out of pocket expenditure, improving early detection and facilitating referrals. (6,7)

The Harvard model “Knowledgeable Neighbours’ has also shown effectiveness of MMUs in NCD screening. (8) A literature review of studies conducted from 1996 -2017 regarding mobile health units in the United States showed that these units are successful and cost-effective models of health care delivery to reach the under served populations. (9) However, limitations such as lack of referral linkages, changes in health behaviour of populations served, and a need to conduct research on the models aligned to national health priorities were highlighted.

In a systematic review of studies conducted in developing countries (India, Pakistan, Thailand, Malawi, Iran, Costa Rica and Africa), Khanna et al reported that MMU have many advantages in terms of coverage of remote areas, provision of primary health care services and some specialized services. However, they highlighted the importance of periodic assessment of the MMUs for effective implementation and policy analysis. (10)

Even though the concept of mobile medical unit is much older, there is less well documented literature which of various models captures assessment of various models.

At this point of time, when the network of MMUs has been implemented in almost the whole of India, it becomes very important to take up implementation research studies to analyse the impact of these MMUs. We need to understand whether the launching of these MMUs can really play a pivotal role in providing healthcare services to the unreached people of rural India and underserved urban areas. Thorough studies aiming to assess the impact are therefore required to be undertaken to get a ample framework for policy analysis (5).In the present assessment, we aim to compare various models of MMUs for provision of service in remote and under-served areas.

Need for assessment of various models of Mobile Medical Units-

Mobile health clinics provide an alternative portal into the healthcare system for the medically disenfranchised, that is, people who are outside of mainstream healthcare due to issues of trust, language, immigration status or simply location. Mobile health clinics as providers of last resort are an essential component of the healthcare safety net providing prevention, screening, and appropriate triage into mainstream services. Despite the face value of providing services to underserved populations, a focused analysis of the relative value of the mobile health clinic model has not been elucidated. The question that remains is the returns on the investment on various models of Mobile medical units in terms of the services rendered and improvement in health outcomes(4).

- ◆ To compare various models of MMUs for provision of services in selected remote districts of India.
- ◆ To assess the functioning of MMUs in terms of
 - ◆ Services provided
 - ◆ Beneficiaries covered
 - ◆ Reach to remote and under-served areas
 - ◆ Mechanism of monitoring & evaluation
 - ◆ Quality of care
 - ◆ Cost of service provision

3.1 Framework of assessment

A logic framework was developed and served as a basis for developing the plan for assessment of MMU models. The assessment was planned to be undertaken at the District level as well as MMU level in the field. However, COVID pandemic restricted our movement and therefore most information were collected through online interviews.

Table 1: Framework of the data collection

Key domains	Sub domains	Methods	Key person to be interviewed	Indicators
Input	MMU	In-depth interview Record review	Chief Medical Officer/ Head of the organisation	<ul style="list-style-type: none"> Model of the MMU- contracting in/ out/ mixed, sanctioned/functional. Target population. Operational plans-availability of plans/ frequency of visits.
	Manpower	Checklist In-depth interview	Chief Medical Officer/ Head of the organisation Medical officer of the MMU	<ul style="list-style-type: none"> Availability of manpower- according to guidelines, contractual/ regular. Training of staff. Other stakeholders supporting the MMU functioning.
	Materials / Drugs/ Diagnostics	Checklist	Medical officer of MMU	<ul style="list-style-type: none"> Suggested list of drugs in MMU. Out of stock situations. Challenges in acquiring drugs and supplies. Proposed list of medical equipment and instruments of MMU.

				<ul style="list-style-type: none"> • Status of the equipment at MMU- availability/ functional. • Vehicle- outsourced/ owned, maintenance.
	*Costing and finance	In-depth interview	Chief Medical Officer/ Head of the organisation	<ul style="list-style-type: none"> • Details of financing and procurement depending on the models of MMU • Monthly expenditure on MMU and their maintenance
				<ul style="list-style-type: none"> • Operational cost per patient • Operational cost per trip
Process	Services provided	Checklist In-depth interview	Medical officer of MMU	<ul style="list-style-type: none"> • Curative services- Maternal and neonatal services, NCD related services • Preventive services- vaccination • Promotive services- IEC, Awareness programmes • Referral • Feedback from the referral Coverage of MMU • Measurement of service quality • Barriers and facilitators in providing services through MMU
	*Quality of services		Medical officer of MMU	<ul style="list-style-type: none"> • NCD related- <ul style="list-style-type: none"> -Essential preventive PHC services -related to NCDs -Essential curative PHC services -related to NCDs • ANC- <ul style="list-style-type: none"> Service provision Experience of care • Child- <ul style="list-style-type: none"> Equipment and personnel present. Adequate training and knowledge-Immunization. Use of national case management algorithm. Client satisfaction

Outcome	Effect on the community	In-depth interview FGD	Chief Medical Officer/ Head of the organisation Beneficiaries (5) Village heads/ ASHA/other health related workers	<ul style="list-style-type: none"> • Formats of monitoring and evaluation. • Reports of service delivery in last six months- average number of patients seen per visit, no. of lab tests/ blood smears/ sputum collected per visit, • No. of villages/habitations visited with route map in last six months. • Referral linkages- supportive documents (no. of patients referred to higher facilities). • Record of beneficiary feedback. • System of reviewing the feedback.
		In-depth interview		<ul style="list-style-type: none"> • Perceived quality of services by the beneficiaries.

Table 2: Estimation of annual expenditure of MMU

Indicators		Source of information and measurement
Capital inputs	Vehicle a. Replacement cost b. Annual equivalent cost	Time used- register maintained at the office
	Equipment a. Number b. Cost per equipment c. Useful life in years d. Annual equivalent cost per item	MMU nodal officer.
	Furniture a. Number b. Cost per furniture c. Useful life in years d. Annual equivalent cost per item	MMU nodal officer.
Recurrent inputs	Cost of medicines	Stock register and indent book
	Vaccines a. Doses obtained b. Doses administered c. Dose per vial d. No. of vials used e. Cost per vial	Stock register and indent book
	Cost of supplies	Stock register and indent book

	Cost of personnel a. No. b. Personnel cost per hour c. Total person hours spent in MMU d. Annual personnel cost	Interview of staff
	Maintenance cost of vehicle	Key informants at transport office
	Operational cost of vehicle Cost of fuel	Key informants at transport office
Output indicators	Outpatient services	No. of general out patient visit in the reference period Population served under MMU
	Immunization	No of immunization given through MMU No. of under 5 children in study area
	Antenatal care	No of antenatal visits in MMU No of pregnant women registered in the area
	Family planning	No. of eligible couples in the study area
	Health education	Total population catered to by MMU

***Table 3: Framework for quality assessment**

Services	Indicators
NCD	Essential preventive services -related to NCDs <ul style="list-style-type: none"> • Availability of IEC materials • Provision of counselling
	Essential curative PHC services -related to NCDs <ul style="list-style-type: none"> • Medical management – Availability of drugs • Referral to other services such as laboratory rapid tests, as well as physiotherapy and physical rehabilitation services • Referral to a specialized physician in cases that are beyond the competence of MMU
ANC	Service provision <ul style="list-style-type: none"> • Reason for ANC visit • Height measured • Weight recorded • Blood pressure taken • Did urine test • Did a blood test • Received a tetanus injection • Received IFA tablets

ANC	Experience of care <ul style="list-style-type: none"> • Told the results after the tests • Told about pregnancy complication • Told where to go in case of complication • Breast feeding counselling • Privacy
Child	Equipment and personnel present <ul style="list-style-type: none"> • Essential drugs • Trained doctors and staff • Waiting time • Attitude of health workers Adequate training and knowledge-Immunization Use of national case management algorithm Client satisfaction

*[Quality assessment and costing of MMU could not be done due to

1. Restriction of movement due to COVID Pandemic
2. The MMU was involved in COVID related activities at the time of data collection]

Table 4: Source and method of data collection

Source	Method
Chief medical officer	In- depth interview, record review
Heads of private organization/NGO	In- depth interview, record review
MMU staff	In- depth interview
Direct observation	Checklist
Beneficiaries	Exit interview
VHSC/RKS	FGDs

3.2. Selection of State Partners

The states of Assam, Rajasthan and Tamil Nadu were selected, in order to have representation from various geographical zones of the country.

3.2.1. Selection of States

The criteria for selection of states for assessment of MMU were:

1. Presence of functional MMUs as per March 2018 report(NHM, MoHFW)
2. Geographical spread to ensure that states cover different zones of the country.

3.2.2. Selection of districts in each State

Two districts from each state were selected. This was done on the basis of the functioning of MMU and in consultation with the state officials. Selected districts were:

- Assam: Majuli and Tinsukhia
- Rajasthan: Jodhpur and Pali
- Tamil Nadu: Kanchipuram and Thiruvallur

Rationale for selection of districts

In Assam, the MMUs are divided into two categories based upon the areas, as tea garden MMUs and non-tea garden MMUs. The districts were selected to ensure representation of both the models from the state. While Tinsukia district was selected for its large proportion of population from tea garden areas; Majuli district with known inaccessibility challenges as a river island, was identified for non-tea garden MMU's representation.

In Rajasthan, the districts Jodhpur and Pali were selected randomly from the list of functional MMUs obtained from the office of the District Program Manager.

In Tamil Nadu, the state Government had permitted to conduct the study in the field practice area of the participating institute (Shri Ram Chandra Medical College and Research Institute, Chennai). Since they have a Public-Private partnership with PHC Nemam and PHC Kundrathur for training UGs/PGs under, the Districts of Tiruvallur and Kancheepuram were chosen respectively.

3.2.3. Institutional partners

One medical college was selected from each State to carry out the assessment and collect appropriate data/information. The institutional partners were:

- Assam- Assam Medical College, Dibrugarh
- Rajasthan- AIIMS, Jodhpur
- Tamil Nadu- Sri Ramachandra Medical College & Research Institute, Chennai

[Details of states and persons involved are provided in Annexure- 2]

3.3. Method of data collection

The information for MMU assessment were collected through a combination of the following methods-

- a. Desk Review-** A situation analysis on the number and types of MMUs in the three selected states was done in March 2020.
- b. Interview of State and District Health officials-** Interviews were conducted with the district coordinators, medical officer in charge MMV, state and district level program managers. This was facilitated by a letter from NHSRC

to the states, requesting the state NHM to provide the background data and support in conducting the field study. The respective state officials were contacted over the phone and through e-mails.

The research teams also visited the offices of the District Program Managers and Medical Officers -in charge of the MMUs. Interviews were conducted regarding the mode of service delivery under MMUs, condition and functioning status of the MMUs, barriers faced in provision of services, referral linkages etc. (Annexure 3)

- c. **Site Visits-** Following the interview of State and District health officials, the research teams from state partners visited two MMU in each State. The Medical Officer in-charge of the MMU was interviewed. Interviews were also conducted with MMU staff such as the pharmacist, nurse and lab technicians. The MMU vehicle was also observed and findings were noted as per the checklist developed by the project investigators. (Annexure 3, Section II)

In some places (Assam), exit interviews from few beneficiaries were conducted.

- d. Review of records, registers, reports etc
- e. Data were collected on the activities before the COVID-19 pandemic and after the activities were resumed after the lockdown.

3.4. Study duration:

The study duration was initially planned for 18 months (from May 2019 to December 2020). However, due to the movement restrictions due to COVID Pandemic, the study was extended to March 2021.

3.5. Tool Preparation

The assessment tool was developed in consultation with the partner institutions and inputs from the NHSRC. [Annexure 3]

A tool development meeting was organised in January, 2019 wherein all the state partner representatives were invited to discuss and formulate a primary interview tool. The checklist provided in the Operational Guidelines for Mobile Medical Unit was used as a guide towards the development of the interview tool.

The draft interview tool was shared with NHSRC for their inputs and refinement. In addition to the tool, a framework for assessment was developed and shared with NHSRC.

A meeting with the team from NHSRC was held where further discussions were made. The tool was revised accordingly and shared with the states.

3.6. Training

Field staff recruited for data collection were trained by the respective institutions. The staff were trained on administration of the interview schedule, extraction of data from reports and records.

3.7. Ethical clearance

Ethical clearance for the project was obtained from the Ethical committee of All India Institute of Medical Sciences, New Delhi and all partner institutes.

3.8. Modifications due to COVID pandemic

Due to the COVID- 19 pandemic, there was a nation-wide lockdown from March 2020, and all activities had to be suspended. A virtual meeting was organised with state partners in August 2020, to review the situation and the following changes were made.

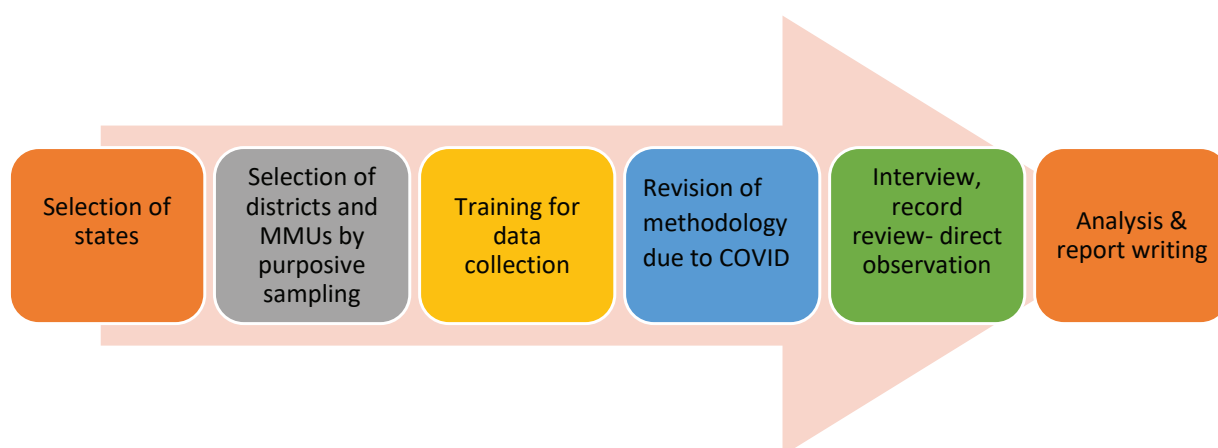
- The tool had to be revised, and an additional component of COVID- related activities were added. Some information regarding the changes brought in the MMU services due to COVID were included in the interview tool.
- It was decided to carry out telephonic/virtual interviews with the responsible health officials. Field visits were made to the MMU by the state partners, but the central team could not carry out supervisory field visits in the states due to travel restrictions.
- The exit interview component was made optional and was left to the decision of the State partner according to the feasibility.

Table 5 : Indicators for Assessment

Input	Level of Data collection	Process	Outcome	Indicators
MMUs sanctioned	State/ district	No. of sanctioned as per PIP	No.of MMU operational in current year	% of MMUs functional among sanctioned Model-wise
Manpower	District	Recruitment Training	Availability of trained staff	% vacant positions % contractual/regular/ others % of trainings completed as per plan
Materials Drugs diagnostics	MMU	Maintenance of stock registers	Updated registers Availability of drugs & diagnostics	% Drugs stock-out Availability of drugs/ diagnostics as per check List of diagnostics which are not functional
Population covered	District	Norms / criteria of selection of area for MMU as per guidelines	MMU as per norms Presence of route maps with GPS	%MMU as per norms % of areas where route maps of the area present % link with GPS tracker

Service delivery	District	Frequency of visits Availability of plan	Operationalising plan	% of visits as per plan (by MMUs)
Range of services provided	District & MMU	Service provision as per guidelines	Services actual provided	Average number of patients seen per visit/ MMU % services provided according to plan
Vehicle	MMU	Arrangement of vehicle, Maintenance of log book	Availability of vehicle, log book	% of MMU with functional vehicle % of MMU with updated log book/ monitored by MO No. of days vehicle was not functional in the previous month Safety guidelines followed
Monitoring system	District & MMU	Inbuilt monitoring as per guidelines Generation of reports Conduction of review meetings regularly	Availability of registers Records completed Action taken Review meetings	% report received in time Number of supervisory visits in the previous month
Referral linkage	MMU	Presence of Referral linkage system Presence of back-referral	Referral sites identified Record of referrals maintained	Number and % of referrals in the last 3 months

Flowchart of activities



4.1 Status of MMU

The primary objective of this assessment was to compare various models of MMUs for provision of services in selected districts of India. A situation analysis on the number and types of MMUs in the three selected states was done through desk review in March 2020. The status of MMUs and their types is given in Table 1.

Table 1: Status of MMU in the selected states

S.No.	State	No. of MMUs (As of 31 March 2020)	Model of MMU
1	Assam	130	Outsourced model through M/s Hindustan Latex Family Planning Promotion Trust (HLFPPT)
2	Rajasthan	58 MMU 152 Mobile Medical Vans	Operated by NGOs and Rajasthan Medicare Relief Society (created by the Government of Rajasthan)
3	Tamil Nadu	430	400 MMUs- government operated 30 MMUs- NGO operated

ASSAM

- A total of 130 MMUs are functional.

S.No	Districts	Tea Garden MMU	Non Tea Garden MMU	Total MMU
1	Kamrup Metro	0	1	1
2	Kamrup Rural	0	2	2
3	Baksa	0	2	2
4	Barpeta	0	2	2
5	Nalbari	0	1	1
6	Morigaon	0	1	1
7	Darrang	0	1	1
8	Udalguri	1	1	2
9	Nagaon	2	2	4
10	Sonitpur	1	3	4

11	Dhemaji	0	2	2
12	Lakhimpur	0	2	2
13	Bongaigaon	0	2	2
14	Chirang	0	1	1
15	Kokrajhar	0	2	2
16	Dhubri	0	3	3
17	Goalpara	0	1	1
18	Cachar	6	2	8
19	Hailakandi	3	1	4
20	Karimganj	4	1	5
21	Dima Hasao	0	2	2
22	KarbiAnglong	4	2	6
23	Dibrugarh	20	1	21
24	Jorhat	13	2	15
25	Majuli	0	3	3
26	Golaghat	9	3	12
27	Sivsagar	8	2	10
28	Tinsukia	9	2	11
	TOTAL	80	50	130

- Models of the MMUs - Mixed model.. i.e model with outsourcing of MMU services including CAPEX and OPEX. The scheme is being implemented in outsourced model through M/s Hindustan Latex Family Planning Promotion Trust (HLFPPT) which has been selected through open tendering process.
- Boat clinics are functioning in Assam to cover the riverine char areas. The services provided are intermittent depending upon the availability of fund. And the services provided are OPD services, antenatal check up and immunization. There are 15 no. of boat clinic in 13 districts of Assam (Dhuburi, Borpeta, Nalbari, Goalpara, Kamrup rural, Sonitpur, Majuli, Dibrugarh, Tinsukia, Dhemaji, Lakhimpur, Bongaigaon and Morigaon).
- It was earlier run by CNES (Centre for North East Studies and Policy research). No services provided from for a period of October 2020 to March 2021. No change of services by boat clinic during COVID 19 pandemic. Services have been restarted since April, 2021 with the help of district health society.
- **Reason for non inclusion:** The program is separate one and not included under MMU program. Boat clinics were not included in the 130 total number of MMU list shared by the State Health Mission.

RAJASTHAN

- Presently 58 Medical Mobile Units (6 MMUs are deployed by Devnarayan Yojna) and 152 Mobile Medical Vans are functional in state.
- Medical Mobile Units - A Medical Mobile Unit comprises two vehicles one of which is a diagnostic vehicle having ECG, X-Ray etc. and second is staff vehicle

which is used for transportation of staff. A unit has a Medical Officer, Nurse, Assistant Radiographer, Lab- technician and two drivers.

- Mobile Medical Vans - A Medical Mobile Van is a single vehicle having basic diagnostic facilities vis. Haemoglobinometer, Glucometer, BP Instrument, Weighing Machine etc. This single vehicle carries both staff and equipment. A van has a Medical Officer, Nurse, Lab- technician and one driver.

TAMIL NADU

- There are total of 430 functional MMUs in the State
- There are two models functioning in TN:
 - The majority (i.e. around 400 MMUs) being completely run by the government
 - Around 30 MMUs run completely by NGOs.

4.2. Description of the MMU models

The information were collected for the period prior to the COVID Pandemic [April 2019 to March 2020].

All three models of MMU were seen in the three selected states. A brief summary of the types of MMU is given in Table 2.

- In **Rajasthan**, MMU were operated on an outsourcing basis i.e the **first model** wherein capital expenditure, drugs were provided by the government, however the operational unit was RMRS (Rajasthan Medicare Relief Society). The major problem was the poor maintenance of vehicles in one district. Nevertheless, the MMU provided the full range of services as provided in the guidelines except for IUD insertion. The services provided included the following:
 - Antenatal care (Inj. Tetanus Toxoid, Tab. Iron and Folic Acid, Laboratory tests such as hemoglobin, Urine for sugar and albumin, referral for high risk pregnancies, promotion of institutional deliveries)
 - Post-natal check-up
 - Immunization services
 - Family planning services - Oral Contraceptives, emergency contraception, condoms (IUCD not provided)
 - Treatment of common childhood diseases such as diarrhoea, Acute respiratory illnesses
 - Screening and treatment of non-communicable diseases (Hypertension and Diabetes Mellitus)
 - Early detection of locally endemic diseases - tuberculosis, and malaria. Detection and treatment of kala-azar was being done in Jodhpur

- Minor surgical procedures and suturing (in Pali only)
- IEC on personal hygiene, PNDDT, Vector-borne diseases, HIV/AIDS
- Provision of services during emergency, natural disasters and outbreaks
- In **Assam**, there were two broad categories of MMU, tea garden MMUs and non- tea garden MMUs. In both the categories of MMUs, the capital and operational expenditure were maintained by M/s Hindustan Latex Family Planning Promotion Trust (HLFPPT), thus the MMU model belongs to the **second model** type where operational as well as capital expenditure are outsourced. It was seen that the services by MMU was beneficial to the community especially to the tea garden residents for whom health facilities would be otherwise inaccessible. All services were being provided except for IUCD insertion. The barriers were that the supply of drugs was dependant on the state government which was irregular at times. The services provided included the following:
 - Antenatal care (Inj. Tetanus Toxoid, Tab. Iron and Folic Acid, Laboratory tests such as hemoglobin, Urine for sugar and albumin, referral for high risk pregnancies, promotion of institutional deliveries)
 - Post-natal check-up
 - Family planning services - Oral Contraceptives, emergency contraception, condoms (IUCD not provided)
 - Treatment of common childhood diseases such as diarrhoea, Acute respiratory illnesses
 - Screening and treatment of non-communicable diseases (Hypertension and Diabetes Mellitus)
 - IEC on personal hygiene, PNDDT, Vector-borne diseases, HIV/AIDS
 - Provision of services during emergency, natural disasters, and outbreaks, provided services during the COVID pandemic
- The MMU model selected for assessment in Tamil Nadu was government operated i.e. the third model. As in the other states, the MMUs provided all services except IUD insertion. MMU were also utilised in response to natural calamities and disaster relief operations. The services provided included the following:
 - Antenatal care (Inj. Tetanus Toxoid, Tab. Iron and Folic Acid, Laboratory tests such as hemoglobin, Urine for sugar and albumin, referral for high risk pregnancies, promotion of institutional deliveries)
 - Post-natal check-up
 - Immunization services
 - Family planning services - Oral Contraceptives, emergency contraception, condoms (IUCD not provided)

- Treatment of common childhood diseases such as diarrhoea, Acute respiratory illnesses
- Screening and treatment of non-communicable diseases (Hypertension and Diabetes Mellitus)
- Provision of services during emergency, natural disasters (floods), outbreaks (Dengue), During COVID - Screening, Fever clinic, contact tracing, Swab collection
- Due to restrictions faced in data collection, information related to costing (like salaries, equipment drugs etc.) could not be collected in detail. However, though the initial cost of establishing the MMU may be high, but the running cost is similar in different settings which is around INR 120,000-150,000 annually for fuel and vehicle maintenance charges.

Table 2: Summary of the types of MMU

	Rajasthan	Assam	Tamil Nadu
MMU model	Both Type 1 and Type 2 Outsourcing basis- where capital expenditure, drugs and supplies are provided by the Government	Type 2 CAPEX, OPEX have been incurred by the outsource agency. Tea garden MMUs and non tea garden MMUs	Type 3 Government run
Operational unit	RMRS (Rajasthan Medicare Relief Society)	M/s Hindustan Latex Family Planning Promotion Trust (HLFPPT)	Government
Drugs and equipment	RMRS (Rajasthan Medicare Relief Society) Supply through District Drug Welfare works	Drugs and consumables have been provided by Govt. of Assam through district health system.	Procured through the TamilNadu Medical Service Commission (TNMSC) once or twice in a year
Equipment	Already installed at the time of purchase of vehicle	Equipment is provided and maintained by the outsource agency.	Already installed at the time of purchase of vehicle
Human Resources	Medical officer, lab technician, pharmacist, driver	Medical doctor, Nurse, Lab technician, Pharmacist, Driver	1 Medical Officer, 1 Staff nurse, 1 Laboratory Technician, 1 Driver and 1 helper in each of the MMUs Except MO all other staff are contractual in both centres.

Comparative assessment of MMUs

Manpower and Logistics

Table 3: Human resources as per the provision in the MMU

Human resource	Guideline	Model 1	Model 2	Model 3
Medical officer (MBBS)	1	1	1	1
Nurse (ANM)	1	1	2	1
Laboratory technician	1	1	1	1
Pharmacist	1	1	1	1
Driver	1	2	2	1

In all the three Models, it was observed that they have requisite staff for the functioning of MMU as per the guidelines of NHM for MMU. As mentioned earlier, state NHM has been given the freewill to decide for added resources if essentially required.

Table 4: Availability of the resources in the three models of MMUs

Resources	Type 1	Type 2	Type 3
No. of vehicles per MMU	2 per MMU	2 per MMU	1 per MMU
No. of trips in a month	20	22	40
Link with GPS for mobile tracking	Functional	Functional	Not functional
% of Equipment *	26	80	53
% of Equipment in working order*	23	80	52
% of Available drugs*	50	30	56

*This is calculated on the basis of the equipment and drugs required as per operational guidelines.

Model 1 and Model 2 in Rajasthan and Assam respectively were equipped with 2 vehicles, however Model 3 in Tamil Nadu had only one vehicle as it was associated with the PHC.

The number of trips made by MMU in model 1 and model 2 was 20 and 22 respectively. Model 3 made an average of 40 trips a month.

Proportion of functional equipments in working condition was better in Model 2 as compared to Model 1 and Model 3.

MOBILE MEDICAL VANS IN RAJASTHAN

Luni Block of Jodhpur district



वि. बालक चिकित्सा एवं स्वास्थ्य आंच शिशिर विवरण			
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4.3. Services and reach of MMUs

Table 5 : Services provided and reach of MMUs

	Rajasthan	Assam	Tamil Nadu
Population served	<p>The MMUs in Jodhpur district caters to urban as well as rural population whereas MMU in Pali district caters to rural population exclusively.</p> <p>The area served by the MMUs is remote in rural regions and slum areas in urban regions. Pali camps were organised in areas where there were no ANM, but currently they cater to migrant populations residing in areas where there are no ANM.</p>	<p>The MMU of Assam serves tea garden population and non tea garden population. Total number of rural beneficiaries in Majuli district is 199253 and those in Tinsukhia is 1063186.</p> <p>The MMU in Tinsukhia district also serves 264743 beneficiaries of urban area.</p>	<p>MMU serves a total of 77163 beneficiaries which comprises both rural and urban populations.</p> <p>Site to be served is determined by the MMU team, Block MO and then approved by District authority. Sometimes demand from community leaders to District Authority</p>
MMU operational	80% of sanctioned MMUs were operational in Jodhpur district. In Pali 100% of the sanctioned MMUs were operational.	100% of the sanctioned MMUs are operational in both the districts.	80% functional MMUs in Kundrathurand 96% functional MMUs in Nemam Block
Camps	<p>On an average 20 camps are organized for each MMU in a month.</p> <p>MMU from Jodhpur has not participated in any natural/man made calamities, those from Pali participate in transit camp as per the demands of BCMO.</p> <p>MMU of both districts participate in VHSNC meetings.</p> <p>Log book for planning visits is maintained in Jodhpur. In Pali an online software [Camp monitoring system] for planning and monitoring visits.</p>	<p>The MMU makes one visit in a day in both the districts, approximately 30 visits in a month</p> <p>There has been active participation in natural/ man-made calamities by MMU in both districts.</p> <p>In Majuli, there is no participation in VHSNC, whereas MMU of Tinsukhia participates in VHSNC.</p> <p>Log book to plan visits are maintained in both the districts</p>	<p>In both the districts, MMUs make 2 visits per day, i.e. approximately 60 visits per MMU per month.</p> <p>MMUs of both the districts participate in natural/ man-made calamities.</p> <p>Block Medical Officer participates in VHSNC meetings.</p> <p>Both the MMU have properly maintained Log books for planning of visits.</p>

Vehicle	<p>Vehicle of the MMU is owned by the Government. An MMU in Pali incurs Rs 16,000 per month as the fuel cost. On an average the MMU vehicle has a breakdown for 5 to 10 days in a year.</p>	<p>The vehicles are outsourced</p> <p>All cost required for implementation of MMU services and its maintenances are been paid to outsourced party (HLFPPT) as per their quoted rate which was finalized vide an open national tender held in 2016.</p>	<p>Vehicle is owned by the government.</p> <p>Cost of the fuel in the year 2019-2020 was Rs 1,20,000/- in each MMU.</p> <p>Maintenance cost of the vehicle in the same year was Rs. 10,000/-.</p>
		<p>As per the order the replacement cost of the vehicle is borne by the service provider.</p> <p>There was no downtime of MMU van</p>	<p>On an average the MMU van suffers downtime of 10 days in a year.</p> <p>The MMU vehicle goes for maintenance once or twice in a month. At that time they are provided with alternate vehicle.</p>
Drugs and equipment procurement	<p>Drugs are directly supplied through District Drug Welfare which works under CM&HO.</p> <p>Equipment are preinstalled at the time of vehicle purchase.</p>	<p>As per order NHM, Assam govt. provides free drugs and consumables through District Health Society.</p> <p>Equipment: All equipment are provided by the service provider.</p>	<p>The required drugs are indented by block PHC through the Tamil Nadu Medical Service Commission.</p> <p>Equipment as provided initially and when upgraded in 2014.</p>
Services provided	<p>Antenatal care (Inj. Tetanus Toxoid, Tab. Iron and Folic Acid, Laboratory tests such as hemoglobin, Urine for sugar and albumin, referral for high risk pregnancies, promotion of institutional deliveries),</p>	<p>ANC- Special focus on Ante Natal and Post Natal Care in Tea Garden areas Immunization done by SC and no communication with MMU.</p>	<p>ANC: BP/Blood sugar/Urine alb/sugar, Inj TT/ IFA</p> <p>b.Immunisation Every Wednesday and treatment of common morbidity</p>

	<p>Post-natal check-up, Immunization services, Family planning services - Oral Contraceptives, emergency contraception, condoms (IUCD not provided)</p> <p>Treatment of common childhood diseases such as diarrhoea, Acute respiratory illnesses</p> <p>Screening and treatment of non-communicable diseases (Hypertension and Diabetes Mellitus)</p> <p>Early detection of locally endemic diseases - tuberculosis, and malaria. Detection and treatment of kala-azar was being done in Jodhpur.</p> <p>Minor surgical procedures and suturing (in Pali only)</p> <p>IEC on personal hygiene, PNDT, Vector-borne diseases, HIV/AID</p> <p>Provision of services during disasters and outbreaks.</p> <p>Also provided services during COVID</p>	<p>Antenatal care services were provided both at tea garden and non tea garden MMUs, although ante natal attendance was more at tea garden MMUs.</p> <p>NCD clinic: Treatment and follow up is done in both tea garden and non tea garden MMUs</p> <p>Lab tests - spot laboratory test carried out; report and medication thereafter.</p> <p>Follow up of the patients every month in the Tea Garden areas.</p> <p>Special emphasis on detection of Anemia and TB.</p>	<p>c. NCD: Screening, follow-up and provision of medication to those aged above 40, general examination, Monthly drugs supply</p> <p>- Provision of services during disasters such as floods and building collapse. Also provided services during COVID.</p>
Referral services	<p>The patients are referred to the appropriate centre taking into consideration the severity of the health problem and accessibility from the particular site.</p>	<p>The MMU s have the list of government hospitals where they refer the patients who needs specialised health service or in case of emergency.</p>	<p>The list of referral centres are available with MMUs. The patients are referred to the appropriate centre depending on the severity of the health problem and accessibility</p>



Table 6: Services not provided as per guidelines

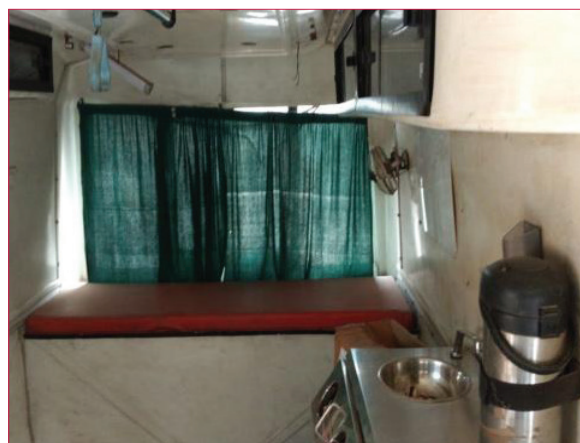
States	Services
Rajasthan	IUD services were not provided
Assam	Immunization and IUD services were not provided as they are done through subcentre
Tamil Nadu	IUD services were not provided

Table 7: Advantages and disadvantages of the three models

	Advantages	Disadvantages
Model 1 (Capital cost by the Govt. while operational cost by a cooperative agency)	<ul style="list-style-type: none"> - Good Co-ordination with the local health system. - Active participation in Village Health, Nutrition and Sanitation Day (VHNSD) and meetings of VHNSC - Provided services during the COVID-19 lockdown period. 	<ul style="list-style-type: none"> - More down time for vehicles.
Model 2 (Outsourced)	<ul style="list-style-type: none"> - Better maintenance of the vehicles - Since vehicles are maintained by an out-sourced agency, no down time for the vehicles. 	<ul style="list-style-type: none"> - Poor co-ordination with the local health system. - No participation in VHNSC or MAS - Poor maintenance of records, particularly those related to costs. - No record maintained for vehicle and equipment at district and state MMU cell. Maintained by outsource agency. - Not utilized for COVID-related services.
Model 3 (Government run)	<ul style="list-style-type: none"> - Good Co-ordination with the local health system. - Active participation in Village Health, Nutrition and Sanitation Day (VHNSD) - Utilized for COVID-19 related services during the pandemic 	<ul style="list-style-type: none"> - The funds for repair and maintenance of the vehicle are provided by the Govt. The down-time for vehicles is more.

MOBILE MEDICAL VANS IN RAJASTHAN

Osian Block of Jodhpur district



MOBILE MEDICAL VANS IN TAMIL NADU

District Kanchipuram



District Thiruvillur



Table 8: Services provided during COVID Pandemic

	Rajasthan	Assam	Tamil Nadu
MMU s functional during COVID lockdown	Yes, under Rajasthan Medicare Relief Society	No	Yes
Services provided during the COVID pandemic	General OPD Awareness for face mask and social distancing, ANC, PNC services NCD screening	Nil	COVID related activities- SARS-CoV2 sample collection, fever clinic, related health education
Target population during COVID	Migrant population in areas where there is no ANM	Same population as in pre COVID times	Same population as in pre COVID time
No. of beneficiaries during April to Nov 2020	Not available	Not available	90,207

MOBILE MEDICAL VANS IN ASSAM

MMU vehicle in Tinsukia



4.4. Indicators

Using the framework we looked into some key indicators in assessing the three models of MMU

Table 9 : Indicators for assessment of MMU models

	Indicators	Rajasthan (Type 1)	Assam (Type 2)	Tamil Nadu (Type 3)
MMUs sanctioned	% of MMUs functional among sanctioned Model-wise	90%	100%	100%
Manpower	% vacant positions %contractual/regular/others % of trainings completed as per plan	No vacant positions 100%training completed	No vacant positions 100% training completed	No vacant position 80% are contractual staff 100% training completed
Materials Drugs diagnostics	% Drugs stock-out Availability of drugs/ diagnostics as per check List of diagnostics which are not functional	50% of the drugs are available Medicines related to RMNCH services such as ORS, IFA, Co trimoxazole were available.	Only 34% drugs and consumables are available 64% Equipment are available and 90% are functional.	56% of the drugs and consumables are available 54 % of the consumables and equipment are available out of which 90% are functional

		<p>Common analgesics and antibiotics were available. However, antibiotic eye drops, anti allergic agents, anesthetic agents and anti-snake venom were not available.</p> <p>27% of the consumables and equipment are available out of which 88% are functional</p>	<p>Medicines related to RMNCH services such as ORS, IFA, were available. However, Co trimoxazole was not available. Common analgesics and antibiotics were available. Only two antibiotics were available. However, antibiotic eye drops, anti allergic agents, anesthetic agents and anti snake venom were not available</p>	<p>Medicines related to RMNCH services such as ORS, IFA, Co trimoxazole were available. Common analgesics and antibiotics, including antibiotic eye drops were available. However, anti allergic agents, anesthetic agents and anti-snake venom were not available</p>
Population covered	<p>% MMU as per norms</p> <p>% of areas where route maps of the area present</p> <p>% link with GPS tracker</p>	<p>Yes as per norms 100% coverage of the area with route maps available</p> <p>Link with GPS tracking is not functional</p>	<p>Yes as per norms 100% GPS system for mobile tracking.</p>	<p>Yes as per norms (Covers 25 to 30 remote villages)</p> <p>100% areas have route maps</p> <p>Link with GPS tracking is not functional</p>
Service delivery	% of visits as per plan (by MMUs)	100% visits	100% visits	100% visits

Range of services provided	Average number of patients seen per visit/MMU % services provided according to plan	40 patients seen on an average per day. - 100% of services provided, except IUCD	49 patients seen per day Immunization not given by MMU . Other services are all provided	30 patients seen per day per MMU Family planning services are not provided through MMU. All other services provided as per guidelines
Vehicle	% of MMU with functional vehicle	100%	100%	100%
	% of MMU with updated log book/ monitored by MO	100%	100%	100%
	No. of days vehicle was not functional in the previous month Safety guidelines followed	10days in a month	No downtime	10days for maintenance and fitness certificate Alternate vehicles are provided during downtime. But overall, vehicles are poorly maintained
	Cost of maintenance (annually)	Information not available	Not mentioned (all outsourced)	Rs.10,000
	Fuel cost (annually)	Information not available Rs 16,000 in the last month	Not mentioned (all outsourced)	Rs.120,000
Monitoring system	% report received in time	Information not available	Poor record maintenance	Monthly or quarterly review

Referral linkage	Number and % of referrals in the last 3 months	Referral to government hospitals, The patients are referred to the appropriate centre depending on the severity of the health problem and accessibility from the particular site. Number of referrals not available	Referral to district hospital Number of referrals not available	The patients are referred to the appropriate centre depending on the severity of the health problem and accessibility from the particular site. Number of referrals not available
Repurposed for COVID services		Yes	No	Yes

Providers' Perspective:

Utility of MMU

- The MMU staff and local community health workers believed that MMUs were useful to the community as they provided services in remote areas. These were reported to be particularly useful in areas with poor road conditions and poor connectivity as people from these areas could not reach the health facilities

Barriers to services provision through MMU

- One major barrier reported was the equipment installed in the vehicles are old and need replacement. Bad roads make travel difficult and also leads to destruction of equipment inside the vehicles. There is poor maintenance of vehicles in Rajasthan.
- Most of the staff are contractual and there is a high turnover which affects the continuity of services
- Lack of appropriate seating arrangement in the camps and inside the vehicles for patients and health staff.
- Limited diagnostic facilities were available.

Suggestions

- It was suggested that there was a need to increase the number of visits to include all beneficiaries
- More involvement of local stakeholders such as school teachers, community mobilizers and local influencers in order to facilitate communication with the beneficiaries

Community Perspective:

As per the exit interviews, the following feedback was received from the beneficiaries:

- Most of the beneficiaries found that the services provided by the MMU were beneficial for them.
- For most of the participants, time spent in reaching MMU from their home was approximately five minutes.
- ASHA was the main source of information about the MMU.
- The beneficiaries were not aware of all the services available at the MMU.
- Regarding quality of services, majority of the participants found the services to be excellent. None of the beneficiaries reported poor quality of services.
- People were satisfied with behaviour of the MMU staff. All the beneficiaries reported the behaviour of staff to be 'excellent'.
- All but one beneficiary reported that there was adequate privacy for examination
- A separate facility for examination of female patients was available in the MMU.

Overall, the beneficiaries were satisfied with the services provided by the MMU and found them useful.

Challenges faced in data collection

1. **Restriction of field activities in states-** In view of the COVID -19 pandemic, routine services and field activities were restricted.
2. **Delay in the project-** The data collection was hindered as most MMU s and Health officials were involved in the COVID pandemic. As the cases declined, the health officials agreed to support the State Partners in giving the required information.
3. **Changes in the Interview Schedule-** Keeping in mind the spread of COVID infection, it was decided to conduct a distant/ video conferences/ telephonic interview. This also required changes in the interview schedule to cover the data required, to the maximum. It was suggested specifically to gather the information pertaining to April 2019- March 2020. Along with this some information regarding MMU response to COVID situation was also collected. The exit interview with patients could not be carried out in all the sites.
4. **Site visits:** The MMU sites were visited by the state partners from September 2020 to January 2021. However, the central team could not perform supervisory visits due to travel restrictions.
5. **Inability to collect data on cost:** Details of cost and other financial implications could not be obtained from most of the districts despite repeated efforts. In model 2, where the services were outsourced, no records on cost could be obtained from the MMU officer in charge.

- 6. Inability to conduct exit interviews with beneficiaries:** The research teams could not conduct exit interviews at majority of the sites because routine services were discontinued and the MMUs were being utilized for COVID related services such as fever screening and sample collection for COVID -19. Only one MMU site in Assam had resumed services, and exit interviews were conducted with beneficiaries by the research team on the day of site visit.

Conclusion

This study looked into each of the models in the states of Rajasthan, Assam and Tamil Nadu. Rajasthan represented the first model wherein the expenditure, drugs were provided by the government, however the operational unit was outsourced. Assam represented the second model which is a total outsourced model where the drugs were supplied by the government. Tamil Nadu represented the third category of a fully government run model. The MMUs make scheduled visits according to the plan. However there are challenges due to irregular supply of drugs and equipment.. Since most of the staff were contractual, there is high turnover which affects the quality of services. Poor maintenance of records is seen in all the three states.

The presence of MMU is essential for providing health services to the unreached. Besides the routine activities, they are also being utilised for disaster relief operations in Tamil Nadu and transit camps in Rajasthan.

Providing services at the doorstep of the community especially for patients with chronic diseases is an added advantage. It ensures continuation of care for patients with NCD who require lifelong medications for preventing disease complications.

The repurposing of the MMU during the COVID pandemic was a major advantage. The presence of already functioning MMUs in these districts enabled outreach programs by the government at such a crucial time.

There is a need to provide continued support to MMUs as they have been shown to be extremely valuable in providing health care. They have also proved beneficial especially in the time of the pandemic and in disasters.

A mechanism of upgradation and maintenance of equipment needs to be worked out. Family planning service like IUD services which was lacking in all the three states needs to be provided. Improvement in diagnostic facilities and regular supply of drugs is required. Deployment of staff at all levels need to be streamlined.

There is poor record maintenance in all MMU. This can be improved by having a simplified reporting format which can be used uniformly by all MMUs irrespective of the type. If possible, a computerised system can be developed. Implementation research can be carried out in a more systematic manner using pre-defined parameters with longitudinal follow-up component.

It is envisaged under the Comprehensive Primary Health Care (CPHC) that the care would be complemented through outreach services and MMUs, with the principle of a seamless continuum of care that ensures the principles of equity, quality, universality and no financial hardship.

MMUs have been listed as one of the key inputs to ensure primary health care services at HWCs. Linkages with Mobile Medical Units (MMU) have been identified as a platform to improve access and coverage in remote and underserved areas where there is difficulty in establishing HWCs.

MMUs role has also been defined by linking it to nearby HWCs, where medical consultation could be arranged on scheduled days, for those unable to travel to referral sites. MMUs could be used in conjunction with specific service delivery platforms, which otherwise are difficult to operationalize in that locality. MMUs are envisaged to meet the specific needs of the community- as a supplement to the HWC network.

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Annexures

Annexure 1: Operational Status of MMUs under NHM (as on 31stMarch, 2018)

S. No.	State/UTs	Total MMUs	S.no.	State/UTs	Total MMUs
1	Bihar	6	21	Gujarat	61
2	Chhattisgarh	0	22	Haryana	9
3	Himachal Pradesh	0	23	Karnataka	70
4	Jammu & Kashmir	11	24	Kerala	28
5	Jharkhand	100	25	Maharashtra	40
6	Madhya Pradesh	144	26	Punjab	33
7	Orissa	8	27	Tamil Nadu	415
8	Rajasthan	206	28	Telangana	0
9	Uttar Pradesh	0	29	West Bengal	54
10	Uttarakhand	0	30	A&N Island	0
11	Arunachal Pradesh	16	31	Chandigarh	0
12	Assam	130	32	D&N Haveli	1
13	Manipur	9	33	Daman & Diu	0
14	Meghalaya	4	34	Delhi	2
15	Mizoram	9	35	Lakshadweep	0
16	Nagaland	11	36	Puducherry	4
17	Sikkim	4		All India	1427
18	Tripura	0			
19	Andhra Pradesh	52			
20	Goa	0			

Source: MIS reports from States/UTs

Annexure 2: List of State Partners

S. No	State	Institute	Principal Investigator
1	Assam	Assam Medical College, Dibrugarh, India	Dr. Ajanta Deuri
2	Rajasthan	AIIMS-Jodhpur, Rajasthan, India	Dr. Pankaja Ravi Raghav
3	Tamil Nadu	Department of Community Medicine, Sri Ramachandra Medical College & Research Institute, Chennai, Tamil Nadu	Dr. Suresh Varadarajan, Dr. Pankaj B. Shah

Annexure 3: Interview Schedule

Background: The National Health Mission aims to provide universal access to equitable, affordable and quality health care services. One major initiative under the NRHM was the operationalization of Mobile Medical Units (MMUs) to provide health care services for populations living in remote, inaccessible, un-served and underserved areas. The key objective of the MMU is to reach these populations with a set of preventives, promotive and curative services including but not limited to RCH services, which are free to the patient at the point of care.

In the present assessment, we aim to compare various models of MMUs for provision of service in remote and under-served areas.

The interviewers are requested to read the following instructions carefully before filling the Tool.

1. This document consists of 2 Sections and one Annexure.
2. Please write your response in space provided against each query in the document.
3. In queries with response options as 'YES/NO', write Y for yes and N for no.
4. Any additional remark may be given in the last page, or details may be attached separately if necessary.
5. For clarification of doubts, may please contact respective institute.

SECTION I

Source- Officer In charge of the organization at District

S.No	General information		
1	Target population a. Rural b. Urban		
2	Number of MMUs in the District	Sanctioned	operational
3	Do you organize training sessions for health professionals of the MMU	Yes/No	
4	In past one year how many training sessions were conducted for each	Doctors	Nurses
5	When was the last training session organized		
6	No. of visits per MMU in a day		
7	In your district, has there been a Participation of MMU in natural/man made calamities		
8	Do you participate in VHSNC(Village Health ,Sanitation and Nutrition Committee)		
9	Is Log book for planning visits ,maintained [Yes/ No]If yes kindly take a snapshot of the same		

The following questions are directed for any one MMU in the district

10	How is the site to be served by the MMU determined	
	Do the residents of the site have other facilities for any other health services	
11	Vehicle of the MMU- a. Is it outsourced/ owned - If outsourced, was an MoU signed between the Government and the provider b. Replacement cost of the vehicle(record) c. Cost of fuel in the year 2019-2020 (record) d. Maintenance cost for the year 2019-2020 (record)	
12	What is the mode of service delivery of MMU (Government or through Public Private Partnership)	
13	Elaborate the procurement process of drugs and equipments	
14	Condition and functioning status of MMUs a) Down time of MMU van in the year 2019-2020 b) No. of times there has been a breakdown of MMU van c) No. of times MMU van is sent for maintenance in the year 2019-2020	
15	Monthly expenditure on MMUs and their maintenance (record)	
16	Services provided by the MMUs [checklist in the annexure]	
17	Availability of drugs and diagnostic services [checklist in the annexure]	
18	How has the model of MMU facilitated in the implementation of services under following heads: a. Antenatal care b. Immunization and child care c. NCD clinic	
19	What barriers have you faced in the MMU activities in the current model of the MMU under following heads: a. Vehicular b. Drugs c. Equipment d. Public resistance	

20	Details of financing and procurement of drugs and equipment in the current model of the MMU	
21	Do you have list of government/private hospitals for referral of cases if required [supportive documents]	
22	Do you keep record of beneficiary feedback. [take a snapshot]	
23	Is there a system of reviewing the feedback? If yes, who is responsible for the same?	

Formats for Monitoring and Evaluation [Record for at least 3 MMU in the district]

S.No	Location	Average/number of beneficiaries per day			Average/No. Of test per day			Nearest facility to MMU- Name and Type
		Total	ANC	PNC	ECG	Xray	All tests	
24								
25								
26								

Details of Human Resources in the MMU

			Personnel cost per hour[salary/no. of hours dedicated for MMU]	Total person hours spent in MMU
27	Medical officers Qualification	Female		
28		Male		
29	Radiologist			
30	Nurse			
31	Laboratory technician			
32	Pharmacist			
33	Helper			
34	Drivers			
35	Specialists	OBG, Paed, Physician Others		

SECTION II

Changes in the activities during COVID pandemic:

36	When was the last visit made by the MMU before lockdown	
37	Were the residents of the sites served by the MMU informed regarding any alternative source of health services	
38	Has MMU restarted the visits ? yes/No	
39	What services are being offered currently?	

Services Provided		
Curative	Yes/no	Remarks
Reproductive & Child Health Services		
Family Planning Services		
Diagnostic		
Specialised facilities and services		

Suggested list of Drugs in the MMU	Available [Yes/No]	Cost for the year 2019-2020 [Record review]
Analgesics, Antipyretics and Nonsteroidal Anti-inflammatory		
Anesthetic		
Antiallergic		
Anti-infective		
Miscellaneous		
Vaccines dose per vial number of vials used		

Equipment and furniture

Name of the Instrument	Quantity for MMU proposed	Quantity for MMU		Cost per equipment	Useful life in years
		Available	Functional		
Microscope with Light source (Binocular) 1	1				
Sterilizer 38 cms with electric drums 1	1				
Dressing Drum (11x9) 2	2				
Weighing Machines Adults Simple 1	1				
Weighing Machines Baby Simple 1	1				
Stethoscope 2	2				
B.P. Apparatus 2	2				
Hemoglobin meter (Manual & digital) 1	1				

Centrifuge machine (mini) 1	1				
Incubator 1	1				
Micro typing Centrifuge 1	1				
Nebulizer 1	1				
Ambu bag Adult 2	2				
Ambu bag Paediatric 2	2				
Laryngoscope Adult 1	1				
Laryngoscope Child 1	1				
Suction apparatus with accessories 1	1				
Torch & spot light	1				
Glucometer 1	1				
Refrigerator (capacity 50 to 60 liters) 1	1				
Needle cutter (manually operated) 1	1				
Laboratory table- Portable 1	1				
2 computers- laptop preferred 1	1				
Laser Printer 1	1				
Broadband Internet Data Card 1	1				
Digital camera 1	1				
Speaker 2	2				
Amplifier 1	1				
LCD Projector 1	1				
Water Purifier 1	1				
Foldable Half Bench	2				
Foldable seats for staff	4				
Waste Collecting bins, as per Biomedical waste Management Specifications					
Stool	4				
Cot	1				
Examination table	1				
Brackets for oxygen Cylinder with adjustable straps	2				
Detachable stretcher	1				
Hooks for an intravenous bottle	4				

Chairs	5			
Generator	1			
AC, Fan	1			
Transfusion Bottle Hoo	2			
Dvd Player	1			
Fire Extinguisher	1			
View Box	1			
Digital clock	1			
Height Measurement Instrument	1			
Stainless Steel Cabinet	3			
Water Storage Tank	1			
Extension box	2			

Annexure 4. State Wise Reports

A4.1 Report on Assessment of Mobile Medical Units (MMUs) in Assam state

Project Name: - “Comparative Assessment of various models of Mobile Medical Units for provision of service in remote and under-served areas”

Study center name: -Assam Medical College, Dibrugarh , India

Introduction:

Assam is the largest state considering its population & geographical area among the eight Sister States of North East India. The state Assam is sharing her border with 7 states like Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland and West Bengal. Assam with her geographical area of 78,438 sq. kms. i.e. about 2.4 percent of the country’s total geographical area, provides shelter to 2,58 percent of the population of the country. The population of Assam is about 31,169,272 as in 2011 census, of which 15,954,927 are males and 15,214,345 are females. The sex ratio (females per 1000 males) is 954 and the female literacy ratio is 73.18 percent.

Table A1. Demographic Statistics

Table 1. Demographic profile of Assam and all India (Census 2011)		
Population and demographic indicators	All India	Assam
Area (Sq km)	3,287,240	78,438 sq.km
Population 2011 (million)	1210.1	31205576
Population density (per sq. km)	382	398
Rural population (in crore)	83.3	26807034
Urban population (in crore)	37.7	4398542
Literacy rate	74	72.19
Male literacy rate	82.10	77.85
Female literacy rate	65.46	66.27

Sex ratio	940	958
Child sex ratio [0-6 year(s) age-group]	914	962
Birth Rate	21.6	22.4
Infant Mortality Rate	42	22.5 [NFHS 5]
Crude Death Rate	7.0	7.2
Decadal Growth Rate	17.64	17.1

Measures taken by NHM Assam for Health care services: To cover the hard to reach areas and areas where healthcare facility is inadequate, the Assam Government has deployed 130 Mobile Medical Units (MMUs) of which 80 are deployed in the tea garden areas. At present 414 tea gardens are covered by these MMUs every month. MMUs are basically “hospital on wheel” manned with doctor, nurse, paramedical staff equipped with basic free diagnostic services and free medicines. More than 20.31 lakh patients have been treated in 47,020 camps organised by these MMUs from June 2017 to January 2019.

To provide healthcare services in the riverine and char areas, one-of-its kind Boat Clinics have been deployed with 15 Boat Clinics operating across 13 districts from 2008. These are basically “Floating Hospitals” manned with doctor, nurse, paramedical staff equipped with basic free diagnostic services and free medicines. A total 20,72,880 patients are treated in 27,959 camps organised by Boat Clinics(6).

Project findings:

Background:-

Before selection of districts information on type, number and operationalization was collected from State MMU office from state project manager, MMU. It was found that all MMUs of Assam, CAPEX, OPEX have been incurred by the outsource agency, which is included in the annual cost per MMU. Only drugs and consumables have been provided by Govt. of Assam through district health system.

One tea garden and one non-tea MMU garden were selected. Tinsukia district represented tea garden population, while Majuli district represented hard to reach area as it is a river island.

Overall main operational points of MMUs

(a) Procurement process of drugs and equipments: - Equipments have been provided and maintained by the outsource agency. So, no data maintained by the district for it’s cost. However indent is given to the outsource agency for any requirement. Drugs and consumables have been supplied by the Govt. of Assam through district health system. Indent of drugs and consumables are given to the district drug store on monthly basis. So, its’ availability depends upon the availability of Govt. supply. Cost register is not maintained.

Comparative table of Tinsukhia and Majuli Districts

(Information based on interviews conducted for both district coordinators of MMUs)

S.No.	General Information	District Coordinator of Tinsukhia	District Coordinator of Majuli district
1	Training sessions organized for health professionals of the MMU	Yes (4 for doctors and 6 for nurses)	Yes (1 for doctors and 1 for nurses)
2	Log book for planning visits, maintained If yes kindly take a snapshot of the same	Yes	Yes
3	Mode of service delivery of MMU (Government or through Public Private Partnership)	Through PPP mode	Through PPP mode
4	Condition and functioning status of MMUs a) Down time of MMU van in the year 2019-2020 b) No. of times there has been a breakdown of MMU van c) No. of times MMU van is sent for maintenance in the year 2019-2020	No downtime No breakdown As per maintenance and service schedule	Nil
5	How has the model of MMU facilitated in the implementation of services under following heads: a) Antenatal care b) Immunization and child care c) NCD clinic	A. ANC: Individual counseling by MO and group counseling by ANM. B. Immunization done by SC and no communication with MMU. C. NCD clinic: Awareness given and treatment given. 1. With this model of MMU, community can be reached at their door step and also reaching the unreached.	Antenatal Care 1/ Weight Check 2/BP check 3/ HB check B. I 1/ Help other health organization c.NCD clinic 1/ BP Check 2/ RBS Check 3/ Follow up

		<ol style="list-style-type: none"> 2. MMU is having fully equipped with a team consisting of a MBBS Doctor, two ANM's, one Pharmacist, one Lab technician and ophthalmic assistant and it take cares of the primary health care and selective secondary health care. 3. Through MMU service could be provided on spot laboratory test report and medication thereafter. 4. Special focus on Ante Natal and Post Natal Care in Tea Garden areas. 5. Provide counseling on family planning, health & hygiene, communicable/ non communicable diseases and different health programmes scheduled by NHM. 6. Follow up of the patients every month in the Tea Garden areas. 7. Special emphasis on detection of Anemia and TB. 	
6	<p>What barriers have you faced in the MMU activities in the current model of the MMU under following heads:</p> <ol style="list-style-type: none"> a) Vehicular b) Drugs c) Equipment d) Public resistance 	<p>No issue MMU team feels the need of a system to track the referred patients. Also, suggested to keep a trial box in the list of equipment's and this could help the Ophthalmic Assistants in checking the refractive errors for patients</p>	<p>So far the MMU teams are receiving a good response from the population they are serving. However MMUs in tea garden areas had to face some resistance in entering the villages during COVID pandemic and lock down.</p>

7	Do you have list of government/private hospitals for referral of cases if required [supportive documents]	Yes (written document not found)	Yes
8	Do you keep record of beneficiary feedback? [take a snapshot]	Yes (Record not found for snapshot)	Yes
9	Is there a system of reviewing the feedback? If yes, who is responsible for the same?	Project officer Arnab Kumar Barman is responsible	Yes Project Officer (District)

Comparative chart of Majuli and Tinsukhia districts for services, suggested list of drugs in the MMUs, vaccine, equipments and furniture

II. Services Provided (Information based on interview of both district coordinators of MMUs/MMV)			
Curative	For Majuli district (Yes/No)	For Tinsukia district (Yes/No)	Remarks
Referral of complicated cases	Yes	Yes	
Early detection of TB, Malaria, Leprosy, Kala-Azar, and other locally endemic communicable diseases and non-communicable diseases such as hypertension, diabetes and cataract cases	Yes	Yes	No Kala Azar (for Pali)
Minor surgical procedures and suturing	yes	Yes	
Specialist Services such as O&G Specialist, Paediatrician and Physician	No	No	
Reproductive & Child Health Services			
Ante-natal check up and related services e.g. injection - tetanus toxoid, iron and folic acid tablets, basic laboratory tests such as haemoglobin, urine for sugar and albumin and referral for other tests as required	Yes	Yes	
Referral for complicated pregnancies	Yes	Yes	
Promotion of institutional delivery	Yes	Yes	

Post-natal check up	Yes	Yes	
Immunization clinics (to be coordinated with local Sub-centres/ PHCs	No	No	
Treatment of common childhood illness such as diarrhea, ARI/ Pneumonia, complication of measles etc	Yes	Yes	
Treatment of RTI/STI	no	Yes	
Adolescents care such as lifestyle education, counseling, treatment of minor ailments and anemia	Yes	Yes	
Family Planning Services			
Counselling for spacing and permanent method	Yes	Yes	
Distribution of Nirodh, oral contraceptives, emergency contraceptives	Yes	Yes	
IUD insertion	No	No	
Diagnostic			
Investigation facilities like haemoglobin, urine examination for sugar and albumin	Yes	Yes	
Smear for malaria and vaginal smear for trichomonas	Yes	No	
Clinical detection of leprosy, tuberculosis and locally endemic diseases	yes	Yes	
Screening of breast cancer, cervical cancer etc	No	No	
Specialised facilities and services			
X-ray	No	No	
ECG	Yes	Yes	
Ultrasound test	No	No	
Emergency services and care in times of disaster/epidemic/ public health emergency/ accidents	yes	Yes	
IEC Material on health including personal hygiene, proper nutrition, use of tobacco, diseases, PNDT Act etc., RT/STI, HIV/AIDS.	Yes	Yes	

Name of the instrument	Quantity for MMU proposed	Quantity for MMU/MMV (Information based on Majuli, Assam)		Quantity for MMU/MMV based on Tinsukhia, Assam)	
		Available	Functional	Available	Functional
Microscope with Light source	1	NO		1	1
Sterilizer 38 cms with electric drums 1	1	1	1	1	1
Dressing Drum (11x9) 2	2	2	2	2	2
Weighing Machines Adults Simple 1	1	1	1	YES (1)	YES
Weighing Machines Baby Simple 1	1	1	1	YES (1)	YES
Stethoscope 2	2	YES (2)	YES (1)	YES (2)	YES
B.P. Apparatus 2	2	YES (2)	YES (2)	YES (2)	YES (1)
Hemoglobin meter (Manual & digital) 1	1	YES (1)	YES (1)	YES (2)	YES (2)
Centrifuge machine (mini) 1	1	1	1	1	1
Incubator 1	1	1	1	1	1
Micro typing Centrifuge 1	1	1	1	1	1
Nebulizer 1	1	1	1	1	1
Ambu bag Adult 2	2	2	2	2	2
Ambu bag Paediatric 2	2	2	2	2	2
Laryngoscope Adult 1	1	1	1	1	1
Laryngoscope Child 1	1	1	1	1	1
Suction apparatus with accessories 1	1	1	1	1	1
Torch & spot light	1	YES (1)	YES	YES (1)	YES
Glucometer 1	1	1	1	YES (1)	YES
Refrigerator (capacity 50 to 60 liters) 1	1	1	1	1	1
Needle cutter (manually operated) 1	1	1	1	YES (1)	YES
Laboratory table- Portable 1	1	1	1	1	1
2 computers- laptop preferred 1	1	NO		1	1
Laser Printer 1	1	NO		NO	
Broadband Internet Data Card 1	1	NO		1	1

Digital camera 1	1	NO		NO	
Speaker 2	2	2	2	YES (2)	NO
Amplifier 1	1	1	1	1	1
LCD Projector 1	1	NO	NO	YES (1)	YES
Water Purifier 1	1	NO		NO	NO
Foldable Half Bench	2	1	1	YES (1)	YES
Foldable seats for staff	4	YES (1)	YES	NO	
Waste Collecting bins		YES		YES	
Stool	4	YES (4)	YES	YES (4)	YES
Cot	1	NO		YES (1)	YES
Examination table	1	YES (1)	YES	YES (1)	YES
Brackets for oxygen Cylinder	2	NO		YES (1)	YES
Detachable stretcher	1	NO		NO	
Hooks for an intravenous bottle	4	YES (1)	YES	YES (4)	YES
Chairs	5	YES (1)	YES	YES (1)	YES (1)
Generator	1	NO		1	1
AC, Fan	1	1	1	YES (4)	4
Transfusion Bottle Hoo	2	YES (1)	YES	NO	NO
DVD Player	1	NO	NO	NO	
Fire Extinguisher	1	YES (1)	YES	YES (1)	YES
View Box	1	1	1	NO	
Digital clock	1	0	0	YES (1)	YES
Height Measurement Instrument	1	1	1	YES (1)	YES
Stainless Steel Cabinet	3	NO		NO	NO
Water Storage Tank	1	1	1	NO	
Extension box	2	NO		YES (1)	YES
Screen (for privacy)	2	2	2	2	2
Emergency light	2	YES (2)	YES	4	4
Towel Holder	2	YES (1)	YES		
Semi-Auto Haematology analyser	1	1	1	1	1
Test tubes	1	1	1	1	1

Auto pipettes	1	1	1	2	2
Ophthalmoscope	1	1	1	NO	
Auto scope	1	1	1	1	1
Examination Torch	2	YES (1)	YES	YES (1)	YES
Mobile Lab	1	1	1	1	1
12 LED ECG Machine	1	1	1	1	1

I. Suggested list of Drugs in the MMU	Majuli district Available [Yes/No]	Tinsukia district Available [Yes/No]	Cost for the year 2019-2020 [Record review]
Analgesics, Antipyretics and Nonsteroidal Anti-inflammatory			No information shared
1. Acetyl Salicylic Acid Tablets 300 - 350 mg	No	No	
2. Ibuprofen Tablets 200 mg, 400 mg	Yes	Yes	
3. Paracetamol Tablets 500 mg	Yes	Yes	
Anesthetic			
1. Ethyl Chloride Spray 1%	No	No	
2. Lignocaine Hydrochloride Topical Forms 2-5%			
3. Lignocaine Hydrochloride Injection 1%, 2% + Adrenaline 1:200,000			
4. Lignocaine Hydrochloride Injection 1%, 2%			
5. Diazepam Tablets 5 mg/ Injection 5 mg / ml			
Antiallergic			
1. Dexamethasone Tablets 0.5 mg/ Injection 4 mg / ml	No	No	
2. Promethazine Tablets 10 mg, 25 mg/ Syrup 5 mg / 5 ml	No	No	
Anti-infective			
1. Amoxicillin Powder for suspension 125 mg / 5 ml;	Yes	Yes	
2. Amoxicillin Capsules 250 mg/ 500 mg	Yes	No	
3. Ampicillin Capsules 250 mg/ 500 mg	No	No	
4. Ampicillin Powder for suspension 125 mg / 5 ml	No	No	

5. Co-Trimoxazole Tablets (40 + 200 mg)	Yes	No
6. Co-Trimoxazole Tablets (80 + 400 mg)	No	No
7. Co-Trimoxazole suspension 40 + 200 mg / 5 ml	No	No
8. Doxycycline Capsules 100 mg	Yes	No
9. Erythromycin Syrup 125 mg / 5 ml	No	No
10. Erythromycin Estolate Tablets 250 mg/ 500 mg.	No	No
11. Metronidazole Tablets 200 mg, 400 mg	Yes	Yes
12. Tinidazole U Tablets 500 mg	No	No
Miscellaneous		
1. Activated Charcoal Powder	No	No
2. Atropine Sulphate Injection 0.6 mg / ml	No	No
3. Albendazole Tablets 400 mg/ Suspension 200 mg/ 5 ml	No	Yes
4. Domperidone Tablets 10 mg/ Syrup 1 mg / ml	Yes	No
5. Oral Rehydration Salts	Yes	Yes
6. Chloramphenicol Drops/Eye ointment 0.4%, 1%	No	No
7. Tetracycline Ointment 1% Hydrochloride	No	No
8. Methylergometrine tablet 0.125 mg/	No	No
9. Methylergometrine Injection 0.2mg/ml	No	No
10. Iron and Folic Acid : Tablets large and small	Yes	Yes
11. Hydrogen Peroxide Solution 6%	No	No
12. Povidone Iodine Solution 5%, 10%	Yes	Yes
13. Chlorine tablets	No	No
14. Oral contraceptives	No	Yes
15. Condoms	No	Yes
16. IUD	No	No
17. Emergency contraceptives	No	Yes
18. Injection Tetanus toxoid	No	No
19. Anti Snake venom	No	No
20. Drugs for all National Health Programmes	Yes	No
21. V Ringer Lactate	No	No

22. Dextrose	No	No
23. Normal Saline	Yes	No
24. PHC drug kits	No	Yes
25. Sterile gloves/ Sterile dressings	Yes	Yes
26. Disposable syringes and needles	Yes	Yes
27. Intravenous sets/ stand	Yes	No
28. Lab Consumables including rapid diagnostic test kits for malaria	Yes	Yes
Vaccines dose per vial number of vials used		
1. BCG	Nil	Nil
2. OPV		
3. DPT		
4. Hepatitis B		
5. Measles		
6. MMR		
7. Typhoid		
8. DT		
9. Td		

In tea garden MMU 30.6% drugs and consumables are present and it is 34.7% in non-tea rural MMU.

Vaccines were absent in both MMUs.

Availability of equipment and furniture							
Name of equipment	Quantity proposed	Tea garden MMU			Non-tea garden MMU		
		Available	Functional	Deficit	Available	Functional	Deficit
Microscope with Light source (Binocular)	1	1	1	0	0	0	-1
Sterilizer 38 cms with electric drums	1	1	1	0	1	1	0
Dressing Drum (11x9)	2	2	2	0	2	2	0
Weighing Machines Adults Simple	1	1	1	0	1	1	0
Weighing Machines Baby Simple	1	1	1	0	1	1	0
Stethoscope	2	2	2	0	2	1	-1
B.P. Apparatus	2	2	1	-1	2	2	0

Hemoglobin meter (Manual & digital)	1	2	2	0 (+1)	1	1	0
Centrifuge machine (mini)	1	1	1	0	1	1	0
Incubator	1	1	1	0	1	1	0
Micro typing Centrifuge	1	1	1	0	1	1	0
Nebulizer	1	1	1	0	1	1	0
Ambu bag Adult	2	2	2	0	2	2	0
Ambu bag Paediatric	2	2	2	0	2	2	0
Laryngoscope Adult	1	1	1	0	1	1	0
Laryngoscope Child	1	1	1	0	1	1	0
Suction apparatus with accessories	1	1	1	0	1	1	0
Torch & spot light	1	1	1	0	1	1	0
Glucometer	1	1	1	0	1	1	0
Refrigerator (capacity 50 to 60 liters)	1	1	1	0	1	1	0
Needle cutter (manually operated)	1	1	1	0	1	1	0
Laboratory table-Portable	1	1	1	0	1	1	0
Computers- laptop preferred	1	1	1	0	0	0	-1
Laser Printer	1	0	0	-1	0	0	-1
Broadband Internet Data Card	1	1	1	0	0	0	-1
Digital camera	1	0	0	-1	0	0	-1
Speaker	2	2	2	0	2	2	0
Amplifier	1	1	1	0	1	1	0

Availability of equipment and furniture							
Name of equipment	Quantity proposed	Tea garden MMU			Non-tea garden MMU		
		Available	Functional	Deficit	Available	Functional	Deficit
LCD Projector 1	1	1	1	0	0	0	-1
Water Purifier 1	1	0	0	-1	0	0	-1
Foldable Half Bench	2	1	1	-1	1	1	-1
Foldable seats for staff	4	0	0	-4	1	1	-3
Waste Collecting bins, as per Biomedical waste Management Specifications	Yes	Yes	Yes	0	yes	yes	0
Stool	4	4	4	0	4	4	0
Cot	1	1	1	0	0	0	-1
Examination table	1	1	1	0	1	1	0
Brackets for oxygen Cylinder with adjustable straps	2	1	1	-1	0	0	-2
Detachable stretcher	1	0	0	-1	0	0	-1
Hooks for an intravenous bottle	4	4	4	0	1	1	-3
Chairs	5	1	1	-4	1	1	-4
Generator/ Inverter	1	1	1	0	0	0	-1
AC, Fan	1	1, 4	1, 4	0	1	1	0
Transfusion Bottle Hoo	2	0	0	-2	1	1	-1
Dvd Player	1	0	0	-1	0	0	-1
Fire Extinguisher	1	1	1	0	1	1	0
View Box	1	0	0	-1	1	1	0
Digital clock	1	1	1	0	0	0	-1
Height Measurement Instrument	1	1	1	0	1	1	0
Stainless Steel Cabinet	3	0	0	-3	0	0	-3

Water Storage Tank	1	0	0	-1	1	1	0
Extension box	2	1	1	-1	0	0	-2
Screen (for privacy)	2	2	2	0	2	2	0
Emergency light	2	4	4	0(+2)	2	2	0
Soap Container	3	1	1	-2	1	1	-2
Towel Holder	2	0	0	-2	1	1	-1
Semi-Auto Haematology analyser (3 part)	1	1	1	0	1	1	0
Test tubes	1	1	1	0	1	1	0
Auto pipettes	1	2	2	0 (+1)	1	1	0
ophthalmoscope	1	0	0	-1	1	1	0
Auto scope	1	1	1	0	1	1	0
Examination Torch	2	1	1	0	1	1	-1
Mobile Lab	1	1	1	0	1	1	0
12 LED ECG Machine	1	1	1	0	1	1	0

There was an equipment deficit of 28.6% in tea gardens and 38.1% in non tea garden MMU.

A4.2 Report on Assessment of Mobile Medical Units (MMUs) in Rajasthan state

Institutional State Partner: - AIIMS-Jodhpur, Rajasthan, India

Introduction: Rajasthan is located on the western side of the country, where it comprises most of the wide and inhospitable Thar Desert (also known as the Rajasthan Desert and Great Indian Desert) and shares a border with the Pakistani provinces of Punjab to the Northwest and Sindh to the west, along the Sutlej-Indus river valley. It is also the seventh largest populous state of India, with a total population of 68.6 million (Census 2011), one third population of Rajasthan lives in rural areas. In terms of geographical area, Rajasthan is the largest state in India and has a low population density of 200 persons per square kilometer as compared with the population density of 382 persons per square kilometer for India (Census 2011). State of Rajasthan is situated in western part of India and is the largest State of country in terms of geographical spread (342,239 sqkm. i.e. 10.4% of India's total area). (Table 1)

Table A 2. Demographic Statistics

Table 1. Demographic profile of Rajasthan and all India (Census 2011)		
Population and demographic indicators	All India	Rajasthan
Area (Sq km)	3,287,240	342,239
Population 2011 (million)	1210.1	68.6
Population density (per sq. km)	382	201
Rural population (in crore)	83.3	4.33
Urban population (in crore)	37.7	1.32
Literacy rate	74	66.11
Male literacy rate	82.10	79.19
Female literacy rate	65.46	52.12
Sex ratio	940	926
Juvenile sex ratio [0-6 year(s) age-group]	914	883
Birth Rate	21.6	25.9
Infant Mortality Rate	42	49
Crude Death Rate	7.0	6.6
Decadal Growth Rate	17.64	21.44

Number of facilities: Rajasthan has 33 districts, at present there are 35 district hospitals, 5 satellite hospitals, 16 sub-divisional hospitals, 551 community health centres, 2066 primary health centres and 13227 sub centres in the State. The healthcare delivery system in Rajasthan comprises of a mix of public and private providers. The public healthcare delivery system is mainly a three-tiered system comprising of a vast network of 14,408 Sub-centers and 2080 Primary Health Centers at the primary level, 571 Community Health Centers, 19 sub-district hospitals and 34 district hospitals at the secondary level, and 8 teaching hospitals and healthcare institutions at the tertiary level (Rural Health Statistics, 2016 and National Health Profile, 2016). The average population served per government hospital bed is 1521 for Rajasthan as compared to 1678 for India (National Health Profile, 2016). The private healthcare delivery system comprises of individual practitioners, small clinics and hospitals and is highly fragmented, with a vast majority of it being serviced by the unorganized sector.

About MMUs/MMVs

Support to Mobile Medical Units (MMUs) under NHM, now encompassing both NRHM and NUHM is a key strategy to facilitate access to public health care particularly to people living in remote, difficult, under-served and unreached areas. The objective of this strategy is to take healthcare to the doorstep of populations, particularly rural, vulnerable and under-served areas. This is not meant to transfer patients.

MMU services are envisaged to meet the technical and service quality standards for a Primary health Centre through provision of a suggested package of services under 12 thematic areas- Maternal Health, Neonatal and Infant Health, Child and Adolescent health, Reproductive Health and Contraceptive Services, Management of Chronic Communicable Diseases, Management of Common Communicable Diseases & basic OPD care (acute simple illnesses), management of Common Non-Communicable Diseases, Management of mental Illness, Dental Care, Eye Care/ ENT Care, Geriatric Care and Emergency Medicine. These services are provided free of cost through MMUs, besides enabling referrals.

Mobile Medical Units v/s Mobile Medical Vans

Each MMU consists of 2 Vehicles- 1 for the movement of doctors and paramedical staff and second vehicle is fully equipped with diagnostic facilities like X-Ray, ECG, Film auto processor, Semi auto analyser etc.

Mobile Medical Van has single vehicle which carries staff and equipment in the same vehicle. It has basic diagnostic facilities like glucometer, haemoglobinometer, BP instrument etc.

Functions (Mobile Medical Services)

According to Department of Medical Health & Family Welfare, Government of Rajasthan, the key objectives are:

1. To provide regular primary health services in desert/tribal/inaccessible villages/regions/blocks in all the districts of Rajasthan through MMUs and MMVs where health facilities such as PHCs, CHCs, Sub-Centers or private health care facilities are not available.
2. To supplement the existing health system by providing free of cost health services in the far flung areas on a regular monthly basis and referrals to appropriate health facilities.
3. To improve uptake of curative and preventive health services such as immunization, antenatal & post natal care, and general OPD services, in the identified villages/regions, with the aim of reducing the incidence of common illnesses and lowering maternal mortality and infant mortality.
4. To provide diagnostic services to the people living in far flung areas.
5. To endeavor for overall improvement in the health indicators of state.
6. To endeavor in achieving the goals of NHM i.e. improvement in health indicators like IMR, MMR etc.
7. To cover all Gram Panchayats of Rajasthan in order to provide basic Medical and Health facilities.

Types of Mobile Medical Units (MMUs) model

Under the revised guidelines, broadly, three models of operationalizing MMUs were suggested:

- Government operated MMU
- Operation of MMU on outsourcing basis- where capital expenditure, drugs and supplies are provided by the Government.
- Outsourcing of MMU services including both capital expenditure and operational expenses. However, drugs and supplies are provided by the government.

Staffing: Type and Number of Staffs

S. No.	MMUs	MMVs
1	Medical Officer- 1 (Preferably Lady Medical Officer)	Medical Officer- 1 (Preferably Lady Medical Officer)
2	X-Ray Technician-1	ANM or Nurse Grade II-1
3	ANM or Nurse Grade II-1	Lab technician-1
4	Lab technician-1	Driver-1
5	Driver-2 (One for Diagnostic Vehicle and another for Staff vehicle)	Helper-1
6	Helper-1	

Project findings:

During ongoing COVID pandemic since April 2020, MMUs/MMV is being operated in every district of Rajasthan state under RMRS (Rajasthan Medicare Relief Society), which is headed by a District collector and is operated under the supervision of the CM&HO. Drug & equipment, is supplied under RMSCL (Rajasthan Medical Services Corporation Limited). Only two types of model are currently running: **MMU model one** (Government operated MMU) **and MMU model two** (Operation of MMU on outsourcing basis- where capital expenditure, drugs and supplies are provided by the Government). But MMU model **third type** (Outsourcing of MMU services including both capital expenditure and operational expenses; drugs and supplies are provided by the government) is not functional yet, and is proposed to be implemented soon by the state government.

Based on telephonic communications done with all district coordinators (District Program Manager) of MMUs/MMV, following main points were reported regarding operation of MMUs/MMV in Rajasthan state.

- Only eight MMUs are reported in working (based on MMU model one) condition.
- Most of the MMUs have been converted to MMV (Mobile OPD) due to the old conditions.

1. Background:-

In the present study two districts Jodhpur and Pali, were selected for assessment of Mobile Medical Units (MMUs) in Rajasthan state.

In Jodhpur ten vehicles were sanctioned for cover both rural and urban area populations (two Mobile Medical Units and eight Mobile Medical Vans), at present only 8 MMVs are operating. According to the district coordinator, before Covid19 and during Covid-19 camps were organized in remote areas of rural populations and slum areas of urban populations.

In Pali district, ten Mobile Medical Vans sanctioned only for rural area populations (No Mobile Medical Units sanctioned for Pali district) are operating.

2. Models:-

Prior to Covid-19, MMUs/MMV operated in every district of Rajasthan state on an outsourcing basis where capital expenditure, drugs and supplies are provided by the state government due to end of the tender during Covid- 19; MMUs/MMV are currently operated under Government owned.

3. Survey places of MMUs/MMV->

In Jodhpur district two rural places were visited; **Janadesar village in Luni block** and **Basanibhatiyar village in the Osian block** scheduled for visit as per the communication done with district co-ordinator of MMUs of Jodhpur district.

In Pali district three rural places were visited; **Binja village in Rohat block, Muliyawas village of Pali district and Repadawas village in Sojat block** scheduled for visit as per the communication done with district co-ordinator of MMUs/MMV of Pali district. According to the district coordinator, before Covid-19, the camp plan was done in a way that MMV was given service where there is no ANM. At present, during Covid-19, camps are organized in migrant areas where people have come from outside and there is no ANM.

4. Overall main operational points of MMUs/MMVs of Jodhpur and Pali districts:-

About MMUs/MMVs in Jodhpur district:

(a) Procurement process of drugs and equipments: -

For drug procurement: -Direct supply to MMV through District Drug Welfare (DDW works under CM&HO).

For equipment: - Equipment already installed at the time of vehicle purchased.

(b) Monthly expenditure on MMUs/MMV and their maintenance: -

Note: - No information shared regarding maintenance cost for the year 2019-2020, replacement cost of the vehicle, cost of the fuel in the year 2019-2020 and monthly expenditure of MMUs and their maintenance.

(c) Details of Human resources in the MMV:-

Note: - No information shared in this regard, such as total number of manpower with designation, personnel cost per hour and total person hours spent in MMV.

About MMV in Pali district:

(a) Procurement process of drugs and equipments: -

Flow Chart for drug supply chain: -

For equipment: -Equipments were already installed at the time of vehicle purchase. Procurement comes from the money that is settled on the budget by taking approval from District Health Society or MD-National Health Mission of the state.

(b) Monthly expenditure of MMV and their maintenance cost: -

S. no.	Purpose of expenditure	Total amount per month	Type of model
1	Through outsource (NGO)	1, 15000/- to 1, 21000/- per month	Type II- Operation of MMU on outsourcing basis- where capital expenditure, drugs and supplies are provided by the Government.
2	Through Government	30,000 to 40,000/- per month (without contract manpower)	Type I- Government operated MMU
3	Cost of the fuel (for the year 2019-2020)	16,000/- per month (For one MMV fuel cost)	Type I-Government operated MMU & Type II- Operation of MMU on outsourcing basis- where capital expenditure, drugs and supplies are provided by the Government.

Note: -No information shared regarding maintenance cost and replacement cost of the vehiclefor the year 2019-2020.

(c) Details of Human resources in the MMV:-

One Medical officer, one laboratory technician, one pharmacist, one helper and one driver are required for overall management of each MMV.

Note: - No information shared regarding personnel cost per hour and total person hours spent in MMV.

5. Persons involved for interview during overall survey study: Detail information mentioned in table 2.

Table 2:- Details of the persons involved during the study period.

S. No.	Name of District	Designation of person of MMUs/ MMVs	Remarks (if any)
1	Jodhpur	District Program Manager	Interview based on MMV
2		Medical Officer-Incharge MMV	
3		Medical Officer -Incharge MMV	
4	Pali	District Program Manager	Interview based on MMV
5		Medical Officer-Incharge MMV	
6		Medical Officer-Incharge MMV	
7		Medical Officer (Ayush-RBSK)-Incharge MMV	

Comparative table of Jodhpur and Pali districts

(Information based on interviews conducted for both district coordinators of MMUs/MMVs)

Some Important points:-

- In Jodhpur district training sessions was organized for health professionals but not done in Pali district.
- In Pali district no mechanism available for keep record of beneficiary feedback but In Jodhpur district they keep record of beneficiary feedback of Gov. listed hospitals only.

S.No.	General Information	District Coordinator of Jodhpur district	District Coordinator of Pali district
1	Training sessions organized for health professionals of the MMU	Yes, (One training was organized in January 2020 for Doctors and Nurses)	No
2	Log book for planning visits ,maintained If yes kindly take a snapshot of the same	Yes (snapshot not shared with us for the same)	Yes, Through online Software CMS (Camp monitoring system) Rajasthan.
3	Mode of service delivery of MMU (Government or through Public Private Partnership)	Through PPP mode (before covid-19) Now Gov. owned	At present through government (Max. through service provider state level tender pending)
4	Condition and functioning status of MMUs a. Down time of MMU van in the year 2019-2020 b. No. of times there has been a breakdown of MMU van c. No. of times MMU van is sent for maintenance in the year 2019-2020	Not any for MMU/ MMV. 10 days in a month (for repair & maintenance of vehicle) No information shared in this regard.	Not applicable (No information shared with us) 1. At present 5 days in a month 2. Before Covid-19, 10 days in a month As per requirement of vehicle condition.

5	How has the model of MMU facilitated in the implementation of services under following heads: <ul style="list-style-type: none"> • Antenatal care • Immunization and child care • NCD clinic 	ASHA and ANM of the nearest sub-center provide ANC, Immunization & Child care. For NCD- not yet operational at the present time but likely to be operational in future.	All three are working, for this, the help of ASHA & ANM of the nearest sub center in taken.
6	What barriers have you faced in the MMU activities in the current model of the MMU under following heads: <ul style="list-style-type: none"> • Vehicular • Drugs • Equipment e. Public resistance 	No issue No issue Sometimes equipment gets damaged during the movement of a vehicle. No issue	No issue No issue Too much old equipment replacement required. No issue
7	Do you have list of government/private hospitals for referral of cases if required [supportive documents]	Only Gov. listed hospitals (No supportive documents shared with us so far)	Gov. listed (supported document not shared with us)
8	Do you keep record of beneficiary feedback? [take a snapshot]	Only Gov. listed hospitals (No supportive documents shared with us so far)	Not any (No mechanism in this regard)
9	Is there a system of reviewing the feedback? If yes, who is responsible for the same?	In Block- BCMO In District- DLO	Not applicable
10	Some additional points	Not any	The entire MMV was bought in 2011, it has a life of 7 years but we are running.

Comparative chart of Jodhpur and Pali districts for services, suggested list of drugs in the MMUs/MMVs, vaccine, equipments and furniture

Some important points:-

- In Jodhpur district, according to district coordinator minor surgical procedures and suturing is not happening, but in Pali district, it is happening.
- In Jodhpur district, according to district coordinator Treatment of RTI/STI is happening, but in Pali district it is not happening.
- In Jodhpur district, according to district coordinator Distribution of Nirodh, oral contraceptives, emergency contraceptives are available for peoples, but in Pali district it is not available for peoples.

- In Jodhpur district, according to district coordinator Smear for malaria and vaginal smear for trichomonas and Clinical detection of leprosy, tuberculosis and locally endemic diseases are not available for patients, but in Pali district, all are available.
- In Jodhpur district, according to district coordinator ECG is happening, but it is not happening in Pali district.
- In Jodhpur district, according to district coordinator Emergency services and care in times of disaster/epidemic/ public health emergency/ accidents are not available, but in Pali district, it is available for patients.
- In Jodhpur district, during the field visits of MMVs Disposable syringes and needles, Intravenous sets/ stand and Lab Consumables including rapid diagnostic test kits for malaria are not found, but in Pali district, all are found.

II. Services Provided (Information based on interview of both district coordinators of MMUs/MMV)			
Curative	For Jodhpur district (Yes/No)	For Pali district (Yes/No)	Remarks
Referral of complicated cases	Yes	Yes	
Early detection of TB, Malaria, Leprosy, Kala-Azar, and other locally endemic communicable diseases and non-communicable diseases such as hypertension, diabetes and cataract cases	Yes	Yes	No Kala Azar (for Pali)
Minor surgical procedures and suturing	No	Yes	
Specialist Services such as O&G Specialist, Paediatrician and Physician	No	No	
Reproductive & Child Health Services			
Ante-natal check up and related services e.g. injection - tetanus toxoid, iron and folic acid tablets, basic laboratory tests such as haemoglobin, urine for sugar and albumin and referral for other tests as required	Yes	Yes	
Referral for complicated pregnancies	Yes	Yes	
Promotion of institutional delivery	Yes	Yes	
Post-natal check up	Yes	Yes	
Immunization clinics (to be coordinated with local Sub-centres/PHCs)	Yes	Yes	

Treatment of common childhood illness such as diarrhea, ARI/Pneumonia, complication of measles etc	Yes	Yes	
Treatment of RTI/STI	Yes	No	
Adolescents care such as lifestyle education, counseling, treatment of minor ailments and anemia	Yes	Yes	
Family Planning Services			
Counselling for spacing and permanent method	Yes	Yes	
Distribution of Nirodh, oral contraceptives, emergency contraceptives	Yes	No	
IUD insertion	No	No	
Diagnostic			
Investigation facilities like haemoglobin, urine examination for sugar and albumin	Yes	Yes	
Smear for malaria and vaginal smear for trichomonas	No	Yes	
Clinical detection of leprosy, tuberculosis and locally endemic diseases	No	Yes	
Screening of breast cancer, cervical cancer etc	No	No	
Specialised facilities and services			
X-ray	No	No	
ECG	Yes	No	
Ultrasound test	No	No	
Emergency services and care in times of disaster/epidemic/ public health emergency/ accidents	No	Yes	
IEC Material on health including personal hygiene, proper nutrition, use of tobacco, diseases, PNDT Act etc., RT/STI, HIV/AIDS.	Yes	Yes	

Note: - No information shared for suggested list of drugs, vaccine, equipments and furniture in the MMUs/MMVs by both district coordinators.



II. Suggested list of Drugs in MMUs/MMVs (Information based on Interview of MO-Ic of MMV)		For Jodhpur District, Available (Yes/No) (Information based on Interview of MO-Ic of MMV Luni Block)	For Pali district, Available (Yes/No) (Information based on Interview of MO-Ic of MMV Rohat Block)	Cost for the year 2019-2020 [Record review]
Analgesics, Antipyretics and Nonsteroidal Anti-inflammatory		Yes (All available)		No information shared with us in both districts.
1	Acetyl Salicylic Acid Tablets 300 - 350 mg		No	
2	Ibuprofen Tablets 200 mg, 400 mg		Yes	
3	Paracetamol Tablets 500 mg		Yes	
Anesthetic		Not available any	Not available all	
1	Ethyl Chloride Spray 1%			
2	Lignocaine Hydrochloride Topical Forms 2-5%			
3	Lignocaine Hydrochloride Injection 1%, 2% + Adrenaline 1:200,000			
4	Lignocaine Hydrochloride Injection 1%, 2%			
5	Diazepam Tablets 5 mg/ injection 5 mg/ml			
Antiallergic				
1	Dexamethasone Tablets 0.5 mg/ Injection 4 mg / ml	Yes	Yes	
2	Promethazine Tablets 10 mg, 25 mg/ Syrup 5 mg / 5 ml	Yes	No	
Anti-infective				
1	Amoxicillin Powder for suspension 125 mg / 5 ml;	Yes	Yes	
2	Amoxicillin Capsules 250 mg/ 500 mg	Yes	Yes	
3	Ampicillin Capsules 250 mg/ 500 mg	Yes	Yes	
4	Ampicillin Powder for suspension 125 mg / 5 ml	Yes	Yes	
5	Co-Trimoxazole Tablets (40 + 200 mg)	Yes	Yes	

6	Co-Trimoxazole Tablets (80 + 400 mg	Yes	Yes
7	Co-Trimoxazole suspension 40 + 200 mg / 5 ml	Yes	Yes
8	Doxycycline Capsules 100 mg	Yes	No
9	Erythromycin Syrup 125 mg / 5 ml	Yes	No
10	Erythromycin Estolate Tablets 250 mg/ 500 mg.	No	No
11	Metronidazole Tablets 200 mg, 400 mg	Yes	Yes
12	Tinidazole U Tablets 500 mg	Yes	Yes
Miscellaneous			
1	Activated Charcoal Powder	No	No
2	Atropine Sulphate Injection 0.6 mg / ml	No	No
3	Albendazole Tablets 400 mg/ Suspension 200 mg/ 5 ml	Yes	Yes
4	Domperidone Tablets 10 mg/ Syrup 1 mg / ml	Yes	Yes
5	Oral Rehydration Salts	Yes	Yes
6	Chloramphenicol Drops/ Eye ointment 0.4%, 1%	No	Yes
7	Tetracycline Ointment 1% Hydrochloride	No	No
8	Methylergometrine tablet 0.125 mg/	No	No
9	Methylergometrine Injection 0.2mg/ml	Yes	No
10	Iron and Folic Acid : Tablets large and small	Yes	Yes
11	Hydrogen Peroxide Solution 6%	Yes	Yes
12	Povidone Iodine Solution 5%, 10%	Yes	Yes
13	Chlorine tablets	No	Yes
14	Oral contraceptives	No	Yes
15	Condoms	No	Yes
16	IUD	No	No
17	Emergency contraceptives	No	No

18	Injection Tetanus toxoid	No	No
19	Anti Snake venom	No	No
20	Drugs for all National Health Programmes	Yes	No
21	V Ringer Lactate	No	No
22	Dextrose	No	No
23	Normal Saline	No	No
24	PHC drug kits	No	Yes
25	Sterile gloves/ Sterile dressings	Yes	Yes
26	Disposable syringes and needles	No	Yes
27	Intravenous sets/ stand	No	Yes
28	Lab Consumables including rapid diagnostic test kits for malaria	No	Yes
Vaccine dose per vial number of vials			
1	BCG	Nil	Nil
2	OPV		
3	DPT		
4	Hepatitis B		
5	Measles		
6	MMR		
7	Typhoid		
8	DT		
9	Td		

Equipment and furniture

Note: No information shared with us for the cost per equipment and useful life in years by both Medical Officer-Incharge of MMVs.

Some important points:-

- In Jodhpur district, during the field visit of MMVs Weighing Machines Adults Simple 1, Weighing Machines Baby Simple 1, Speaker 2, Water Purifier 1, Foldable Half Bench, Brackets for oxygen Cylinder with adjustable straps, are not found during observation, but, in Pali district, all are found.

Name of the instrument	Quantity for MMU proposed	Quantity for MMU/MMV (for Jodhpur district) (Information based on Luni Block)		Quantity for MMU/MMV (for Pali district) (Information based on Rohat Block)	
		Available	Functional	Available	Functional
Microscope with Light source (Binocular) 1	1	NO		NO	
Sterilizer 38 cms with electric drums 1	1	NO		NO	
Dressing Drum (11x9) 2	2	NO		NO	
Weighing Machines Adults Simple 1	1	NO		YES (1)	YES
Weighing Machines Baby Simple 1	1	NO		YES (1)	YES
Stethoscope 2	2	YES (1)	YES	YES (1)	YES
B.P. Apparatus 2	2	YES (1)	YES	YES (1)	YES
Hemoglobin meter (Manual & digital) 1	1	YES (1)	YES	YES (1)	YES
Centrifuge machine (mini) 1	1	NO		NO	
Incubator 1	1	NO		NO	
Micro typing Centrifuge 1	1	NO		NO	
Nebulizer 1	1	NO		NO	
Ambu bag Adult 2	2	NO		NO	
Ambu bag Paediatric 2	2	NO		NO	
Laryngoscope Adult 1	1	NO		NO	
Laryngoscope Child 1	1	NO		NO	
Suction apparatus with accessories 1	1	NO		NO	
Torch & spot light	1	YES (1)	YES	YES (1)	YES
Glucometer 1	1	NO		YES (1)	YES
Refrigerator (capacity 50 to 60 liters) 1	1	NO		NO	
Needle cutter (manually operated) 1	1	NO		YES (1)	YES
Laboratory table- Portable 1	1	NO		NO	
2 computers- laptop preferred 1	1	NO		NO	
Laser Printer 1	1	NO		NO	
Broadband Internet Data Card 1	1	NO		NO	
Digital camera 1	1	NO		NO	
Speaker 2	2	NO		YES (2)	NO
Amplifier 1	1	NO		NO	

LCD Projector 1	1	YES (1)	NO	YES (1)	NO
Water Purifier 1	1	NO		YES (1)	NO
Foldable Half Bench	2	NO		YES (1)	YES
Foldable seats for staff	4	YES (5)	YES	NO	
Waste Collecting bins, as per Biomedical waste Management Specifications		NO		NO	
Stool	4	YES (2)	YES	YES (2)	YES
Cot	1	YES (1)	YES	YES (1)	YES
Examination table	1	YES	YES	YES (1)	YES
Brackets for oxygen Cylinder with adjustable straps	2	NO		YES (2)	YES
Detachable stretcher	1	NO		NO	
Hooks for an intravenous bottle	4	YES (1)	YES	YES (1)	YES
Chairs	5	YES (4)	YES	YES (6)	YES (5)
Generator	1	NO		NO	
AC, Fan	1	NO		YES (1)	NO
Transfusion Bottle Hoo	2	YES (1)	YES	YES (1)	YES
Dvd Player	1	YES (1)	NO	NO	
Fire Extinguisher	1	YES (1)	YES	YES (2)	YES
View Box	1	NO		NO	
Digital clock	1	NO		YES (1)	YES
Height Measurement Instrument	1	NO		YES (1)	YES
Stainless Steel Cabinet	3	NO		YES (3)	YES
Water Storage Tank	1	NO		NO	
Extension box	2	NO		YES (1)	YES
Screen (for privacy)	2	NO		NO	
Emergency light	2	YES (1)	YES	NO	
Soap Container	3	NO		NO	
Towel Holder	2	YES (1)	YES	YES (1)	YES
Semi-Auto Haematology analyser (3 part)	1	NO		NO	
Test tubes	1	NO		NO	
Auto pipettes	1	NO		NO	
ophthalmoscope	1	NO		NO	
Auto scope	1	NO		NO	
Examination Torch	2	YES (1)	YES	YES (1)	YES
Mobile Lab	1	NO		NO	
12 LED ECG Machine	1	NO		NO	

Observation of MMVs during field visit of Jodhpur district

S.No.	Name of district	Village Name	Type of MMUs/ MMV Model	Observation	Date of Interview
1	Jodhpur	Janadesar Village in Luni block of Jodhpur district	Both model one and two (before Covid-19 model two and during Covid-19 model one)	The MMV is running in very poor condition. There is no proper seating arrangement because the vehicle is very old. Most of the equipment is damaged or not in working condition (As per recommendation). It seemed as if the cleaning had not been done for a long time and there was dust all around. No dust bin/bio waste management found. The curtains are very old and torn in many places.	October 7 th , 2020
2	Jodhpur	Basanibhatiyani Village in Osian block of Jodhpur district	Both model one and two (before Covid-19 model two and during Covid-19 model one)	There is no proper seating arrangement because the vehicle is very old. Most of the equipment is damaged or not in working condition (As per recommendation). The Van was found clean from inside (No dust bin/bio waste management found)	October 15 th , 2020

Observation of MMVs during field visit of Pali district

S.No.	Name of district	Village Name	Type of MMUs/ MMV Model	Observation	Date of Interview
1	Pali	Binja Village in Rohat Block of Pali district	Both model one and two (before Covid-19 model two and during Covid-19 model one)	The MMV is running in very poor condition. There is no proper seating arrangement because the vehicle is very old. Most of the equipment is damaged or not in working condition (As per recommendation). It seemed as if the cleaning had not been done for a long time and there was dust all around (No dust bin/bio waste management found). The curtains are very old and torn in many places.	October 13 th , 2020
2	Pali	Muliyawas Village of Pali district	Both model one and two (before Covid-19 model two and during Covid-19 model one)	The MMV is running in very poor condition. There is no proper seating arrangement because the vehicle is very old. Most of the equipment is damaged or not in working condition (As per recommendation).	October 7 th , 2020
3	Pali	Repadawas village in Sojat block of Pali district	Both model one and two (before Covid-19 model two and during Covid-19 model one)	The MMV is running in very poor condition. There is no proper seating arrangement because the vehicle is very old. Most of the equipment is damaged or not in working condition (As per recommendation).	October 15 th , 2020

A4.3: Report on Assessment of Mobile Medical Units (MMUs) in Tamil Nadu

Project Name: - “Comparative Assessment of various models of Mobile Medical Units for provision of service in remote and under-served areas”

Study center name: -Department of Community Medicine, Sri Ramachandra Medical College & Research Institute, Chennai, Tamil Nadu

Introduction :Tamil Nadu, - is the fourth largest state of India and is located in the extreme south of the Indian subcontinent. It is bounded by the Indian Ocean to the

east and south, and by the states of Kerala to the west, Karnataka to the northwest, and Andhra Pradesh to the north(7).

According to Indian census data (2011), Tamil Nadu has a population of 72,147,030. Tamil Nadu constituted 5.96 percent of India's population in 2011. The average literacy rate of Tamil Nadu is 80.09 percent(8).

Table 1. Demographic Statistics

Table 1. Demographic profile of Tamil Nadu and all India (Census 2011)		
Population and demographic indicators	All India	Tamil Nadu
Area (Sq km)	3,287,240	130,058 sq km
Population 2011 (million)	1210.1	72,147,030
Population density (per sq. km)	382	555
Rural population (in crore)	83.3	37,229,590.
Urban population (in crore)	37.7	34,917,440
Literacy rate	74	80.09
Male literacy rate	82.10	86.77
Female literacy rate	65.46	73.44
Sex ratio	940	996
Juvenile sex ratio [0-6 year(s) age-group]	914	946
Birth Rate	21.6	15.9
Infant Mortality Rate	42	15/1000 live birth
Crude Death Rate	7.0	6.5
Decadal Growth Rate	17.64	15.60

Number of facilities:

Government Medical & Health Facilities in Tamil Nadu:

S.No.	Government Healthcare Institution	No.
1	Government Medical Colleges	22
2	Hospitals attached with the Medical Colleges	48
3	Tamil Nadu Government Multi Superspeciality Hospital	1
4	Tamil Nadu Government Dental College & Hospital	1
5	District Headquarters Hospitals	29
6	Taluk and Non-Taluk Hospitals	273
7	Primary Health Centres (PHCs)	1806
8	Health Sub Centres (HSCs)	8706
9	Urban Primary Health Centres (UPHCs) including Chennai Corporation	460
10	New Community Health Centres (CHCs) being established under NHM in Chennai Corporation	15
11	Employee's State Insurance (ESI) Hospitals	10
12	ESI Dispensaries	216
13	Indian System of Medicine Hospitals and Dispensaries	1491

About Mobile Medical Units:

Mobile Medical Units have been provided in all 385 blocks under NHM and are functioning since February 2009 under the control of the PHC Patient Welfare Societies. Each Mobile Medical Unit covers at least 25 to 30 remote villages which are being visited on fixed days every month. Services rendered by Mobile Medical Units especially routine immunization/dropout immunization are being strictly monitored. The other routine services (Ante Natal Care, Post Natal Care, Family Welfare Services, Lab Services, Adolescent Care, Referral Services and Counseling Services) rendered by the MMU team are linked with the Village Health and Nutrition (VHN) day if the MMU visits the village on the same day.

Project findings:

1. **Background:-** The State Government had permitted to conduct the study in the field practice area of Sri Ram Chandra Institute of Higher Education and Research. As we have a Public-Private partnership with PHC Nemam & PHC Kundrathur for training UGs/PGs under, the Districts of Tiruvallur and Kancheepuram were chosen respectively.

Models:-

Survey places of MMUs/MMV->

1. **Overall main operational points of MMUs/MMVs-** For both the MMUs, as they are Government run, the drug and equipment are procured through the TamilNadu Medical Service Commission (TNMSC) once or twice in a year (sample indent enclosed)

(Information based on interviews conducted for both district coordinators of MMUs/MMVs)

1. For MMU under PHC Nemam, Block Medical Officer in charge of the MMU was interviewed and for the MMU under PHC Kundrathur, MMU officer was interviewed.

Source- Medical Officer of the MMU

General information	Nemam	Kudrathur
Target population a. Rural b. Urban	NA	77163 (Urban + Rural)
Model of the MMU	Government	Government
Officer in charge		
No. of visits in a day [It will include all the sites in one day]	2	2
Did you Participate in natural/man made calamities	Yes	Yes
Do you Participate in VHSNC	Yes	Yes

Number of Vehicles in your MMU (2vehicle/ 1 vehicle)	1	1
Number of visits in last 1 month	44	40
Number of Villages/Habitations visited in last 1 month [with route map]	44	40
Is there a Link of MMU with GPS for mobile tracking	Functional till last year, now not functional	Not functional since one year
Availability of manpower as per recommendations	Yes	Yes
Are you Aware of route and schedule of the MMU, Services provided, and referral linkage?	Yes	Yes
What are the barriers you are facing in providing services as per present model of MMU	Movable stretcher & ECG may be provided. Otherwise no specific barriers	More money for fuel and maintenance
What are the facilitators in providing services through present model of MMU		Able to serve remote places (including gypsies, brickkiln workers), and people who are not very mobile.
Is there any Involvement of ANM and ASHA in MMU.	ANM. ASHA not available in this area.	ANM-Y ASHA- for community mobilisation
What is the Involvement of other stakeholders who are supporting the MMU functioning [eg-]	Support from Anganwadi centres as regular sites for MMU. Interaction and health education at Gram Panchayath on October 2019	Support from Anganwadi centres as sites for MMU. Once/ twice a year Jamapanthi along with various sectors

Data for the year April 2019- March 2020		Kudrathur	Nemam
Outpatient services	No. of general out-patient visit in the reference period	54,000	64347
	Population served under MMU	77163	NA
Immunization	No of immunization given through MMU in the reference period	4,200 (120-150 per session)	Data with HSC MPW-F
	No. of under 5 children in study area in the reference period	NA	Not available
Antenatal care	No of antenatal visits in MMU in the reference period	3-4 visits each beneficiary	15/day
	No of pregnant women registered in the area in the reference period	Around 1400 beneficiaries	Not available
Family planning	No. of eligible couples in the study area in the reference period	Not available	Not available
Health education	Total population catered to by MMU in the reference period	54,000	Exact number not known

Changes in the activities during COVID pandemic: The MMU of PHC Nemam was performing COVID-related activity, fever screening clinic in a remotely located urban locality, with a facility of collecting throat swab for COVID-19. A photograph of the same is enclosed. The MMU of PHC Kudrathur was supporting the activity of the mini health center at Navalur village (7.5 km from Padappai PHC)

	Kudrathur	Nemam
When was the last visit made by the MMU before lockdown	March 23 rd	March 23 rd for usual activity but continued for COVID related
Were the residents of the sites served by the MMU informed regarding any alternative source of health services	Yes. Utilize the nearby Primary health centre	Yes. Utilize the sub-centre and Primary health centre
Has MMU restarted the visits ? yes/No	Yes, It is gradually resuming its usual services	No (for usual services)

What services are being offered currently?	COVID related, visit Mini health centres and also regular activities are gradually increasing	SARS-CoV2 sample collection, fever clinic and related health education
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Services Provided				
	Kudrathur		Nemam	
Curative	Yes/no	Remarks	Yes/no	Remarks
Referral of complicated cases	Yes	To nearby government health facility	Yes	To nearby government health facility
Early detection of TB, Malaria, Leprosy, Kala-Azar, and other locally endemic communicable diseases and non-communicable diseases such as hypertension, diabetes and cataract cases	Yes	DM/HT -daily basis above 30y, referral of TB, cataract to nearby Govt centre, Inform about suspect Leprosy case to non-medical supervisor	Yes	DM/HT -daily basis, suspected TB, malaria, - refer to nearby DMC, Leprosy- Survey along with non-medical supervisor on Feb 2020, Cataract - once in 3-6 months
Minor surgical procedures and suturing	Yes		No	Wound cleaning and dressing
Specialist Services such as O&G Specialist, Paediatrician and Physician	No	Refer to nearest Govt. Health facility	No	Refer to MCH centre at Poonamallee, Paediatric/ Medicine-nearest/ preferred Govt facility
Reproductive & Child Health Services			No	Refer to MCH centre
Ante-natal check up and related services e.g. injection - tetanus toxoid, iron and folic acid tablets, basic laboratory tests such as haemoglobin, urine for sugar and albumin and referral for other tests as required	Yes	Inj TT and IFA in MMU, Hb nearest subcentre in that area. Urine -alb/sug using dipstick	Yes	Inj. TT and IFA in MMU, Hb nearest subcentre in that area. Urine -alb/sug using dipstick in sites where restroom facilities are available

Referral for complicated pregnancies	Yes		Yes	Drop in vehicle to Tiruvallur GH
Promotion of institutional delivery	Yes	Nearby PHC	Yes	
Post-natal check up	Yes	Come to MMU	Yes	Nearby PNC cases come to vehicle
Immunization clinics (to be coordinated with local Sub-centres/PHCs)	Yes	Every Wednesdays. Staff from sub-centre bring the vaccines	Yes	Every Wednesdays. Staff from sub-centre bring the vaccines
Treatment of common childhood illness such as diarrhea, ARI/Pneumonia, complication of measles etc.	Yes	Yes including IV fluids	Yes	IVF given when required
Treatment of RTI/STI	No		Yes	
Adolescents care such as lifestyle education, counseling, treatment of minor ailments and anemia	Yes	When they visit MMU	Yes	Schools visited on Thursdays and health education given. Check if IFA was given and attend to ailments
Family Planning Services				
Counselling for spacing and permanent method	Yes		Yes	
Distribution of Nirodh, oral contraceptives, emergency contraceptives	Yes	Except emergency contraceptives	No	
IUD insertion	No		No	
Diagnostic				
Investigation facilities like haemoglobin, urine examination for sugar and albumin	Yes	Hb- and Urine alb/sug- dipstick	Yes	Hb- at HSC Urine alb/sug-dipstick
Smear for malaria and vaginal smear for trichomonas	Yes	Smear for malaria taken. Trichomonas-N	Yes	Smear for malaria taken. Trichomonas-N
Clinical detection of leprosy, tuberculosis and locally endemic diseases	Yes	Suspects referred to appropriate facilities	Yes	Suspects referred to appropriate facilities

Screening of breast cancer, cervical cancer etc	Yes (Breast cancer only)	Only if there are complaints	Yes (Breast cancer only)	Only if there are complaints
Specialized facilities and services				
X-ray	No		No	
ECG	Yes		No	
Ultrasound test	No		No	
Emergency services and care in times of disaster/ epidemic/ public health emergency/ accidents	Yes	Flood relief, Dengue fever camps, COVID-19	Yes	Flood relief, Dengue fever camps, COVID-19
IEC Material on health including personal hygiene, proper nutrition, use of tobacco, diseases, PNDT Act etc., RT/STI, HIV/AIDS.	Yes	Yes, pamphlets distributed whenever required		Yes, affixed on and inside the MMU, and a sometimes pamphlets distributed

	Kudrathur		Nemam	
Suggested list of Drugs in the MMU	Available [Yes/No]	Cost for the year 2019-2020 [Record review]	Available [Yes/No]	Cost for the year 2019-2020 [Record review]
Analgesics, Antipyretics and Nonsteroidal Anti-inflammatory				
1. Acetyl Salicylic Acid Tablets 300 - 350 mg	No		No	
2. Ibuprofen Tablets 200 mg, 400 mg	Yes		Yes	
3. Paracetamol Tablets 500 mg	Yes		Yes	
Anesthetic				
1. Ethyl Chloride Spray 1%	No		No	
2. Lignocaine Hydrochloride Topical Forms 2-5%	Yes		Yes	
3. Lignocaine Hydrochloride Injection 1%, 2% + Adrenaline 1:200,000	No		No	

4. Lignocaine Hydrochloride Injection 1%, 2%	No		No	
5. Diazepam Tablets 5 mg/ Injection 5 mg / ml	Yes		No	
Antiallergic				
1. Dexamethasone Tablets 0.5 mg/ Injection 4 mg / ml	Yes		Yes	
2. Promethazine Tablets 10 mg, 25 mg/ Syrup 5 mg / 5 ml	No		No	
Anti-infective				
1. Amoxicillin Powder for suspension 125 mg / 5 ml;	No (125mg TAB used)		No	
2. Amoxicillin Capsules 250 mg/ 500 mg	Yes		Yes	
3. Ampicillin Capsules 250 mg/ 500 mg	No		No	
4. Ampicillin Powder for suspension 125 mg / 5 ml	Yes		Yes	
5. Co-Trimoxazole Tablets (40 + 200 mg)	Yes		Yes	
6. Co-Trimoxazole Tablets (80 + 400 mg)	Yes		Yes	
7. Co-Trimoxazole suspension 40 + 200 mg / 5 ml	No		Yes	
8. Doxycycline Capsules 100 mg	Yes		Yes	
9. Erythromycin Syrup 125 mg / 5 ml	Yes		Yes	
10. Erythromycin Estolate Tablets 250 mg/ 500 mg.	Yes		Yes	
11. Metronidazole Tablets 200 mg, 400 mg	Yes		Yes	
12. Tinidazole U Tablets 500 mg	No		No	
Miscellaneous				
1. Activated Charcoal Powder	No		No	
2. Atropine Sulphate Injection 0.6 mg / ml	No		Yes	
3. Albendazole Tablets 400 mg/ Suspension 200 mg/ 5 ml	Yes		Yes	
4. Domperidone Tablets 10 mg/ Syrup 1 mg / ml	Yes		Yes	

5. Oral Rehydration Salts	Yes		Yes	
6. Chloramphenicol Drops/Eye ointment 0.4%, 1%	No		No (Gentamycin eye drops)	
7. Tetracycline Ointment 1% Hydrochloride	No		No	
8. Methylergometrine tablet 0.125 mg/	No		No	
9. Methylergometrine Injection 0.2mg/ml	No		No	
10. Iron and Folic Acid : Tablets large and small	Yes		Yes	
11. Hydrogen Peroxide Solution 6%	Yes		Yes	
12. Povidone Iodine Solution 5%, 10%	Yes		Yes	
13. Chlorine tablets	No	Bleaching Powder for overhead tanks	No (Bleaching powder)	
14. Oral contraceptives	Yes		Yes	
15. Condoms	No		No	
16. IUD	No		No	
17. Emergency contraceptives	No		No	
18. Injection Tetanus toxoid	Yes	Through MPW-F	No	
19. Anti Snake venom	No		No	
20. Drugs for all National Health Programmes	Y (DM/HT)		No	
21. V Ringer Lactate	Yes		Yes	
22. Dextrose	Yes		Yes	
23. Normal Saline	Yes		Yes	
24. PHC drug kits	No		No	
25. Sterile gloves/ Sterile dressings	Yes		Yes	
26. Disposable syringes and needles	Yes		Yes	
27. Intravenous sets/ stand	Yes		Yes	

28. Lab Consumables including rapid diagnostic test kits for malaria	No		No (Kit for peripheral smear)	
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Vaccines /dose per vial/ number of vials used	Kudrathur		Nemam	
	Available [Yes/No]	Cost for the year 2019-2020 [Record review]	Available [Yes/No]	Cost for the year 2019-2020 [Record review]
1. BCG	Yes	All Vaccines are supplied from nearest PHC	Yes	All Vaccines are supplied from nearest PHC
2. OPV	Yes		Yes	
3. DPT	Yes		Yes	
4. Hepatitis B	Yes (As Pentavalent)		Yes (As Pentavalent)	
5. Measles	No		No	
6. MMR	No(MR)		Yes	
7. Typhoid	No		No	
8. DT	No		No	
9. Td	Yes		Yes	

Equipment and furniture

Name of the Instrument	Quantity for MMU proposed	Kudrathur		Nemam	
		Quantity for MMU		Quantity for MMU proposed	Quantity for MMU
		Available	Functional	Available	Functional
Microscope with Light source (Binocular) 1	1	1	1	1	Used in nearby MCH centre
Sterilizer 38 cms with electric drums 1	1	No	1	1	Kept in PHC
Dressing Drum (11x9) 2	2	1	2	1	1
Weighing Machines Adults Simple 1	1	1	1	1	1
Weighing Machines Baby Simple 1	1	0	0	1	1
Stethoscope 2	2	2	2	2	2
B.P. Apparatus 2	2	2	2	2	2
Hemoglobin meter (Manual & digital) 1	1	1	1	0	NA

Centrifuge machine (mini) 1	1	1	1	1	In MCH centre
Incubator 1	1	0	1	0	NA
Micro typing Centrifuge 1	1	0	1	0	NA
Nebulizer 1	1	0	1	1	1
Ambu bag Adult 2	1	1	1	1	1
Ambu bag Paediatric 2	1	0	1	1	1
Laryngoscope Adult 1	1	0	1	N	NA
Laryngoscope Child 1	1	0	1	N	NA
Suction apparatus with accessories 1	1	0	1	N	NA
Torch & spot light	1	1	1	1	1
Glucometer 1	1	1	1	1	1
Refrigerator (capacity 50 to 60 litres) 1	1	0	1	N	NA
Needle cutter (manually operated) 1	1	0	1	1	1
Laboratory table- Portable 1	1	1	1	N	NA
2 computers- laptop preferred 1	1	0	1	N	NA
Laser Printer 1	1	0	1	N	NA
Broadband Internet Data Card 1	1	0	1	N	NA
Digital camera 1	1	0	1	N	NA
Speaker 2	2	2	2	2 (inbuilt in vehicle)	2
Amplifier 1	1	1	1	1	NA
LCD Projector 1	1	1(TV)	1	N	NA
Water Purifier 1	1	0	1	1	1
Foldable Half Bench	2	2	2	1	1
Foldable seats for staff	4	4	4	4	4
Waste Collecting bins, as per Biomedical waste Management Specifications		Y		Y	Y
Stool	4	1	4	3	3
Cot	1	0	1	1	1

Examination table	1	1	1	0 (cot is used)	NA
Brackets for oxygen Cylinder with adjustable straps	2	Y	2	Y	Y
Detachable stretcher	1	1	1	N	NA
Hooks for an intravenous bottle	4	Y	4	N	NA
Chairs	5	4	5	5	5
Generator	1	0 (inverter present)	1	Inverter 1	1
AC, Fan	1	1	1	1	1
Transfusion Bottle Hoo	2	N	2	N	NA
Dvd Player	1	1	1	1	NA
Fire Extinguisher	1	0	1	1	1
View Box	1	1	1	1	1
Digital clock	1	0	1	N	NA
Height Measurement Instrument	1	N	1	N	NA
Stainless Steel Cabinet	3	0	3	2	2
Water Storage Tank	1	1	1	1	1
Extension box	2	0	2	2	2
Screen (for privacy)	2	N	2	N	NA
Emergency light	2	N	2	Y inbuilt on top of vehicle	Y
Soap Container	3	3	3	Y	
Towel Holder	2	N	2	N	N
Semi-Auto Haematology analyser (3 part)	1	Y	1	Y	In MCH centre
Test tubes	1	Y	1	Y	In MCH centre
Auto pipettes	1	Y	1	Y	In MCH centre
ophthalmoscope	1	N	1	N	NA
Auto scope	1	N	1	N	NA
Examination Torch	2	Y	2	Y	Y
Mobile Lab	1	Y	1	N	NA
12 LED ECG Machine	1	Y	1	N	NA

Financial implications

		Kanchipuram	Thiru
	Capital	Cost	Cost
1	Mobile van for staff		
A	Vehicle	Not available	Not available
B	Mobile unit with essential accessories	Not available	Not available
2	Vehicle		
A	Equipment	Not available	Not available
B	Generator	Not available	Not available
C	Microscope	Not available	Not available
D	Autoanalyzer	Not available	Not available
E	Portable X-ray	NA	NA
F	Portable Ultra sound machine	NA	NA
G	Portable ECG machine	NA	NA
	Recurring		
3	Manpower	MO 65000/- per month SN 14000/- per month Driver 11500/ per month Helper 347/- per day Lab tech 8000/- pm	(Monthly salary) MO 65000/- (Govt.) SN 15000/- (contractual) Driver 9400/- (contractual) Helper 8500/- (contractual) Lab tech sanctioned but not functional
4	Drugs	Rs. 1,50,000/- per year extra drugs from PHC	Rs. 1,25,000/- per year
5	Training of Manpower	Not available	Not available
6	Maintenance and repair of vehicles	Rs.5,000/- per year	Rs.10,000/- per year
7	Fuel	Rs.10,000/- per month	Rs.10,000/- per month

