Rapid Assessment of Tele-Ophthalmology Services in Tripura

Preface and Acknowledgement:

The "Rapid Assessment of Tele-ophthalmology Services in Tripura" was undertaken to evaluate the accessibility, affordability, acceptability, and effectiveness of the Tele-ophthalmology services offered through the Vision Centres and assess the overall impact and outcome of the project had in the community. The present evaluation was carried out in five out of eight districts of Tripura.

At the outset, I offer my sincere gratitude to Ministry of Health & Family Welfare, Government of India for entrusting the responsibility of undertaking the "Rapid Assessment of Tele-ophthalmology Services in Tripura." I am also grateful to National Health Systems Resource Centre for constant guidance and valuable suggestions extended during the evaluation.

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(Dr. Ashoke Roy)
Director, RRC-NE

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Abbreviation

BCC	: Behavioural Change Communication
CHC	: Community Health Centre
CME	:Continuing Medical Education
DH	: District Hospital
DBCS	: District Blindness Control Society
EDL	: Essential Drug List
EMR	: Electronic Medical Record
IEC	: Information, Education & Communication
IGM Hospital	: Indira Gandhi Memorial Hospital
IL&FSETS	:Infrastructure Leasing & Financial Services Ltd. Education & Technology Services
MDMOU	: Multipurpose District Mobile Ophthalmic Unit
NPCBVI	: National Program for Control of Blindness & Visual Impairment
NHM	: National Health Mission
OOPE	: Out of Pocket Expenditure
PHC	: Primary Health Centre
PPP	: Private Public Partnership
RBSK	: Rashtriya Bal Swasthya Karyakram
RIO	: Regional Institute of Ophthalmology
SoP	: Standard Operating Procedure
STG	: Standard Treatment Guideline
UPHC	: Urban Primary Health Centre
VC	: Vision Centre
VTA	: Vision Technician Assistant
HWC	: Health and Wellness Centres

Contributors:

Evaluation Team: RRC NE Team

1. Dr. Joydeep Das, Lead Consultant, RRC – NE
2. Sh. Bhaswat Kr. Das, Sr. Consultant, HCT, RRC – NE
3. Dr. Pankaj Thomas, Sr. Consultant, PHP&E, RRC – NE
4. Iqbal Hussain, Consultant, HCT, RRC – NE

Evaluation Team: State Team, Tripura

1. Dr. Rabindra Das, State Programme Officer, NPCBVI,
2. Sh. Suvodeep Lodh, SPM I/C, NHM, Tripura
3. Sh. K. Sanamatum, NGO Advisor, NHM, Tripura
4. Sh. Arindam Saha, NHM, Tripura

Reviewers:

1. Maj Gen (Prof) Atul Kotwal, SM, VSM (Retd), Executive Director, NHSRC
2. Dr. Ashoke Roy, Director, RRC – NE
3. Dr. Neha Dumka, Sr. Consultant, KMD, NHSRC

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Executive Summary

The country has been largely successful in bringing down significantly the incidence and prevalence of preventable blindness through the interventions and activities of the National Programme for the Control of Blindness and Visual Impairment (NPCBVI) which was launched in the year 1976 as a fully centrally sponsored scheme. The NPCBVI functions in a decentralized manner with a majority of the interventions / activities being conducted from the Districts level through the District Blindness Control Societies (DBCS) with the States receiving grant-in aid from the Ministry of Health & Family Welfare, Government of India through the NHM as per the activities proposed in the Annual Program Implementation Plans.

The activities / interventions of the NPCBVI are targeted at the primary, secondary and the tertiary levels of the State / District Health Facilities with active participation / involvement of the community, peripheral health workers and NGOs. The activities and interventions range from IEC / BCC activities at the community levels to screening for refractive errors with prescription of corrective lenses at the primary levels to cataract and eye other surgeries at the secondary levels to specialized surgeries, training and technical assistance for the programme being made available at the tertiary level through **Centres of Excellence**. One of the objectives of the programme is strengthening and up-gradation of Regional Institutes of Ophthalmology (RIOs) to become centre of excellence.

India has a significant proportion of its population still below the poverty line and most of this populace inhabits the rural and hard to reach areas of the country. Often the Out of Pocket Expenditure (OOPE) incurred by this populace, which is mostly dependent on daily wages, can be catastrophic if there is a lack of a strong and reliable public health facility servicing these communities with a dependable referral mechanism. 'Hub and Spoke Model' of healthcare delivery through the public health facilities is a model which has been successful in providing for the healthcare needs of such populace in the country through various programmes of the NHM often with partnerships of NGOs / Private Service Providers.

The state of Tripura has implemented the **Tele-ophthalmology Project** leveraging **Information Technology in delivering Eye Care services** to the un-reached rural citizens of the State since April 2007 by setting up Vision Centres (VC) across the state. As there was acute shortage of Ophthalmologist in the state, so to tide over this shortage especially in the periphery, the state started with setting up of Vision Centres at Block level through Public Private Partnership (PPP) mode on pilot basis. After successful implementation in the Melaghar Block, the project was scaled up by setting up VCs across 44 Blocks linked with 2 (two) Nodes at **Indira Gandhi Memorial (IGM) Hospital in phases.** This initiative could address the shortfall of the availability of Ophthalmologist in the state by providing eye care services utilizing the Tele-ophthalmology platform.

At present, the state has 19 Ophthalmologist of which 7 are in Medical College, 6 are in IGM Hospital and 5 are in 5 District Hospitals. As per RHS, 2020 there are 12 Sub-Divisional Hospitals and 22 CHCs which do not have any Ophthalmologist.

Regional Resource Centre for North Eastern States (RRC-NE) undertook a rapid assessment to evaluate the overall impact and the resultant outcome the Tele-Ophthalmology project of Tripura has had on

the communities it has catered to since 2007. The project was started under Public Private Partnership (PPP) mode on pilot basis through **IL&FS ETS** (Infrastructure Leasing & Financial Services Ltd. Education & Technology Services) as the Implementing Agency of the Project and it continued till September 2019. From February 2020 a new agency viz. Ramky Foundation started implementing the project. The operation by the new service provider continued till October 2020 and thereafter it stopped because of lack of funding.

A mixed methodology approach was undertaken to assess and evaluate the stakeholders (service providers at various levels and the beneficiaries) to arrive at a conclusion about the relevance of the project vis-à-vis the community it serves.

The overall findings indicated that the project had a positive impact in the community by catering to a majority of their eye care needs and hereby significantly reducing their out of pocket expenditure (OOPE) and man hours lost in seeking eye care at secondary level health facilities. The VCs set up in the periphery hospitals and blocks under the project has one Optometrist for clinical examination of the patient and has one Vision Technician Assistant for community outreach activities. The Optometrist in the VCs is equipped with Snellen's chart, vision drum, trial box, ophthalmoscope, retinoscope, Slit lamp, laptop and printer. They do clinical examination and share the findings of the patient to the Hub which is in the IGM Hospital, Agartala through software. The Ophthalmologist from the Hub reverts to the VCs providing necessary prescriptions and suggestions through the software. The non-availability of ophthalmic medicine in the VCs and cessation of free distribution of corrective lenses since 2018-19 has adversely impacted the intended outcomes of the project by actually imposing an expenditure on the beneficiary as they have to procure them from the open market. The community largely has a positive perception about the project with the belief that the project has indeed benefited them by providing reliable and quality eye care services at their community itself with a dependable referral and follow up mechanism established with the IGM Hospital, Agartala.

Introduction

The endeavour to control preventable blindness has been a long drawn and successful effort for India with the **National Programme for Control of Blindness and Visual Impairment (NPCBVI)** being launched in the year 1976 as a fully centrally sponsored scheme. The overall Goal of the NPCBVI is of reducing the prevalence of blindness in the country to 0.3% by 2020. With the launch of National Rural Health Mission (now National Health Mission – NHM) in 2005, the fund sharing under the program is in the ratio of 60:40 between Centre and State for all States except Jammu & Kashmir, Himachal Pradesh, Uttarakhand and North-Eastern States including Sikkim, the sharing pattern is 90:10 between the Central Government and the States.

Keeping with the goal the NPCBVI has set the following objectives:

1. To reduce the backlog of blindness through identification and treatment of the blind
2. To develop comprehensive eye care facilities in every district
3. To develop human resources for providing eye care services
4. To improve quality of service delivery to the affected population
5. *To secure participation of voluntary organizations/private practitioners in eye care*
6. To enhance community awareness on eye care
7. To provide best possible treatment for curable blindness available in the district/region.
8. To set up the mechanism for referral coordination and feedback between organizations dedicated to prevention, treatment, and rehabilitation

The areas of intervention and activities planned and implemented by the NPCBVI at the various levels of the public health system are:

1. Free Cataract Surgeries
2. Emphasis on Diabetic Retinopathy, Glaucoma, Corneal Transplantation, Vitreo Retinal Surgeries and Childhood Blindness.
3. Active screening of population above 50 years of age.
4. Screening of school children for identification and treatment of Refractory Errors
5. *Coverage of underserved areas for Eye care through Public-Private Partnership*
6. Capacity Building of Health personnel
7. IEC activities for the Community
8. Strengthening of Regional Institute of Ophthalmology (RIOs) and Medical Colleges of States and District Hospitals

And the NPCBVI in its continued efforts through decentralized interventions and activities through the District Blindness Control Societies has earmarked the following objectives to achieve maximum reduction in avoidable blindness through optimal utilization of available resource:

1. Provision of free glasses in presbyopia patients
2. Provision of spectacles for school children by conducting Eye Testing Fortnight every year in the month of June
3. Provision of Multipurpose District Mobile Ophthalmic units (MDMOUs) in all districts all over the country

4. To promote Eye donation and to urge the Eye banks to perform better in the forthcoming years
5. Hospital Cornea Retrieval Programme – inclusion of mandatory required request for Eye donation from those who are deceased in the cause of death certificates issued by Hospitals need to be firmly put into practice

Plan of action of the NPCBVI for India in concurrence with the Vision 2020 initiatives through decentralized interventions / activities has been planned with the following initiatives based on levels of public health service delivery system:

At the Primary level: Vision Centres, with an initial target of 20,000 vision centres to be set up across the nation with the following services:
1. Screening & referral services
2. School eye screening programme
3. Primary eye care
4. Refraction & prescription of glasses

Secondary level: Service Centres, initial target of 2,000 to be set up across the nation with the following services:
1. Cataract surgery
2. Other common eye surgeries
3. Facilities for refraction
4. Referral service

Tertiary level:
1. **Training Centres,** initial target of 200 to be set up across the nation with the following services:
   a. Tertiary eye care
   b. Retinal Surgery, Corneal Transplantation &Glaucoma Surgery
   c. Training & CME
2. **Centres of Excellence**– initial target of 20 to be set up across the nation with the following services:
   a. Professional leadership
   b. Strategy development
   c. CME
   d. Laying of standards & quality assurance
   e. Research

The NPCBVI has recognized the importance of availability of quality screening, early diagnosis, and referral services at the peripheral levels especially among underserved communities and geographically difficult to reach areas. This is extremely relevant where most of India's population still resides in rural and often hard to reach areas especially in context to the States of the North East. There is a perennial shortage of trained health workforce in the Indian Public Health System which prevents their optimal distribution among all the health facilities; it becomes imperative that alternate models of healthcare delivery need to be adapted. One of such novel approaches is the introduction

of the 'Hub and Spoke Model' of healthcare delivery where there is a Hub where all required specialized healthcare is available with a sub-set of connected / supported health facilities (spokes) located nearer to the community with a system of providing quality primary care and a robust referral and follow up mechanism to the Hub to ensure continuum of care. For such a model to be optimally utilized, a dedicated & trained health workforce with the required infrastructure / equipment at the health facilities, a robust referral and follow up mechanism and a reliable internet-based telecommunications system (internet-based patient support centre/cloud-based software linking health facilities/ audio-visual system for patient information sharing etc.) are essential.

In February 2018, Government of India launched its flag ship programme Ayushman Bharat – Health and Wellness Centres (HWCs) which would be created by transforming existing primary level health care facilities (Sub Health Centre / Primary Health Centre in rural and urban areas) to deliver Comprehensive Primary Health Care (CPHC) spanning expanded range of services including eye care. The Operational Guidelines for Eye care at HWCs were launched in December 2020, as a part of CPHC. The HWCs are envisaged to provide primary eye care, and strengthen referral networks to eliminate avoidable blindness. The service delivery framework for the eye care at HWCs is designed to strengthen the services at the community and primary level; and intended to complement and supplement existing interventions under the NPCB&VI. Under CPHC, the primary eye care services would be provided at the community level, HWCs and Vision centres along with the referral facilities depending on the state context. Primary eye care services span community level awareness building, undertaking active screening for blindness and refractive errors, management of basic eye conditions, and enabling referral and active follow up.

With the roll out of CPHC by operationalizing HWCs to deliver expanded range of services at primary level and establishing strong referral linkages with higher centres, the eye care services in the state would be strengthened to ensure effective coverage through preventive, promotive and curative care across all levels of care and address all categories of eye conditions and visual impairment.

Initiatives taken up by the State of Tripura in tune with the Activities of the NPCBVI

The Government of Tripura through the NHM in continuation of the activities and interventions to control blindness and visual impairment has launched the **Chief Minister Mission Dristi Program** on the 12th of March 2021.

The Overall Goals & Objectives of the Chief Minister Mission Dristi Program of Tripura are:

1. Providing high quality eye care services to the affected population
2. Expanding coverage of eye care services to the underserved areas
3. Reducing the backlog of blindness by identifying and providing services to the affected population
4. Developing institutional capacity for eye care services by providing support for equipment and material and training personnel

To achieve the Goals & Objectives of the **Chief Minister Mission Dristi Program** the following activities are being undertaken through the District Blindness Control Societies**:**

1. Cataract Surgeries
2. School Eye Screening Programme
3. IEC / BCC Activities
4. Eye Banking Activities
5. Development of Infrastructure for IOL Facilities

The Hospitals identified by the State of Tripura for Secondary and Tertiary Level Eye care are under NPCB&VI:

1. Indira Gandhi Memorial Hospital, Agartala, West Tripura
2. Agartala Government Medical College and Hospital, Agartala, West Tripura
3. Rajiv Gandhi Memorial Hospital, Unakoti
4. Tripura Sundari District Hospital, Gomati
5. Kulai District Eye Hospital, Dhalai
6. Khowai District Hospital, Khowai
7. Melaghar Sub-divisional Hospital, Sepahijala
8. Sabroom Sub-divisional Hospital, South Tripura
9. Amarpur Sub-divisional Hospital, Gomati
10. Kanchanpur Sub-divisional Hospital, North Tripura

Tele-ophthalmology services in Tripura

Tripura is a small state in the North Eastern Region with a population of 36,71,032 (Census 2011), majority of which is rural (83%) with a tribal population of 31.8 %. The projected population for the year 2021 is 40,81,000 (National Commission on Population, MoHFW, 2019). The state is geographically isolated from other States and 74% of the state's land is hilly, remote and inaccessible. Furthermore, the rural inhabitants have socio-economic problems mainly characterized by poverty, gender inequity and low participation in developmental initiatives which also includes access to quality and affordable health care.

Providing ophthalmic services with limited trained manpower and infrastructure in primary health care settings was a big challenge for a small state like Tripura. Most of the Ophthalmologists and Ophthalmic Assistants were clustered in urban areas leaving the rural areas devoid of any primary ophthalmic services. Tertiary level facilities like Medical College and State Hospital were grossly overburdened, due to inadequate availability of basic eye care services at the periphery resulting in increased demand for health seeking at these higher levels facilities. In addition, high OOPE was being incurred by the community in rural areas including transport and loss of wages, to seek and avail eye care services at the higher centres.

To reduce the increase in patients' out of pocket expenditure (OOPE) and case load at the secondary and tertiary levels, the Government of Tripura initiated the Tele-ophthalmology services acting as a gate keeper, thus ensuring timely interventions at primary level to prevent unnecessary or irrational care, thus reducing the high out of pocket expenditure being incurred due to treatment including transportation and indirect costs like loss of daily wages, etc. The initiative was designed to provide services through Vision centres with an objective "to provide primary & preventive eye care to the rural population of Tripura using advanced information & communication technology."

Tele-ophthalmology produces the same desired clinical outcome as the traditional system of face-to-face clinical examination. Remote portals allow specialists to provide care over a larger region, thereby improving health outcomes and increasing accessibility of specialty care to a larger population. A high satisfaction level and acceptance is reported in most of the studies because of increased accessibility and reduced travelling cost and time. *(Tele-ophthalmology: improving patient outcomes; Clinical Ophthalmology, 10 Feb 2016), Tele-ophthalmology: A Model for Eye Care Delivery in Rural and Underserved Areas of India, Indian Journal of Family Medicine, April, 2011)*

In past, challenges like lack of awareness/knowledge and limited internet connectivity have been reported as key barriers to such ICT interventions for health care services. However, with a systematic approach to designing the best suited technology, these barriers can be overcome, and user-friendly platforms can be created. Furthermore, the demand and use of tele-consultation had increased presently in this time of pandemic, where face to face consultations have been reported as a challenge given the redesigned health care services to prevent the transmission of virus and protect both service providers and the beneficiaries. Recent survey conducted by the All-India Ophthalmological Society also reveals that many ophthalmologists who have not used Tele-ophthalmology in the past have shown interest in using the technology. *(Tele-ophthalmology: Need of the hour, Indian Journal of Ophthalmology, April, 2021).*

The state has implemented Tele-ophthalmology Project leveraging Information Technology in delivering Eye Care services to the un-reached rural citizens of the State since April 2007 by setting up a Vision Centre (VC) at Melaghar Block under Public Private Partnership (PPP) mode on pilot basis through **IL&FS ETS** (Infrastructure Leasing & Financial Services Ltd. Education & Technology Services) as the authorized Implementing Agency of the Project. After successful implementation in the Melaghar Block, the project was scaled up by setting up VCs across 44 Blocks linked with 2 (two) Nodes at **Indira Gandhi Memorial (IGM) Hospital in phases**. A total of 8, 66,565 nos. of beneficiaries have benefited under the project since its inception up to their continuation period till the 30th September 2019**.**

During 2018-19, the state Government decided that a fresh Agency is to be selected based on competitive bidding procedure for continuing Operationalization and Maintenance of all the existing 44 Vision Centers and 2 Nodes. Accordingly, a new Agency was identified namely Ramky Foundation, Gadchibowli, Hyderabad and Contract Agreement was signed on 6th February 2020. The Tele-ophthalmology services restarted from March 2020 and a total of 20,840 patients availed the services from April to October 2020 at the Vision centers.

The contract value as per the agreement with Ramky Foundationfor46 Vision Centres including 2 Nodes is Rs.51,908.20per month per centre and this includes comprehensive operation & maintenance cost including human resources, capital infrastructure deployed, internet transmission cost and other expenditure.

As per the agreement, the Service Provider has to deploy an optimum number of certified and trained Ophthalmic Assistants or Vision Technicians and Multi-Tasking Workers or General Duty Assistant or home health aide in the Vision Centres to assist the Ophthalmologists for real-time online Tele-consultation.

The state in its agreement with the Ramky Foundation has outlined the Indicative list of minimum services to be provided by these VCs:

1. Primary and secondary eye care
2. Screening for blindness and refractive errors.
3. Counseling and support for care seeking for blindness, other eye disorders
4. Community screening for congenital disorders and referral
5. Screening birth defects related to eye.
6. Diagnosis of Screening for blindness and refractive errors.
7. Identification and treatment of common eye problems –conjunctivitis, acute redeye, trachoma; spring catarrh, xerophthalmia as per the Standard Treatment Guideline (STG)
8. Screening for visual acuity, cataract and for refractive errors,
9. Management of eye injuries.
10. First aid for injuries/ stabilization and then referral.
11. Removal of Foreign Body in Eye.
12. Support in management of all Acute and chronic eyes problems.
13. Post surgical care for eye.
14. Management of Cataract, Glaucoma and Corneal ulcers.

15. Diagnosis and management of blindness.
16. Data entry on electronic medical record (EMR/EHR).
17. Slit lamp examination, refraction, IOP test, fundus photography, optical dispensing.

As per the agreement the Service Provider has to provide free spectacles to the patients requiring vision correction. Cost for free distribution of spectacles for all age groups will be reimbursed on quarterly basis. The rate (Rs.350/- per spectacle) for reimbursement will be as per the NPCBVI Guidelines, Ministry of Health & Family Welfare, Govt. of India.

Service Provider also has to perform operation and maintenance of all the medical equipment available at Nodes and Vision Centres.

Vision Centres:

Tele Ophthalmic network (Vision Centres) in Tripura has been established in the following health facilities /hospitals/block office. All the required information about the patient, their history, ocular images are being registered and entered from the VCs through Digitization, Transmission and Reporting in the software designed for the program which is connected to the two nodes established at IGM Hospital, Agartala. The lists of Vision Centres are as follows:

Table 1: List of Vision Centers

Sl.	Name of District	Centre Name	Location of Vision Centre (Spokes)
1.	Dhalai	Ambassa	Ambassa PHC
2.		Chawmanu	Chawmanu CHC
3.		Dumburnagar	Gandacherra SDH
4.		Manu	Manu CHC
5.		Salema	Salema PHC
6.	Gomati	Karbook	Karbook CHC
7.		Killa	Killa PHC
8.		Matabari	Tripura Sundari SDH
9.		Ompi	Ompi CHC
10.		Shilachari	Shilachari PHC
11.		Amarpur	Amarpur SDH
12.		Kakrabon	Kakrabon Block Office Building
13.	Khowai	Khowai	Khowai DH
14.		Padmabil	Baijalbari PHC
15.		Teliamura	Teliamura CHC
16.		Kalyanpur	Kalyanpur CHC
17.		Tulashikhar	Tulashikhar PHC
18.		Mungiakami	Mungiakami Block Office Building
19.	North Tripura	Dasda	Dasda PHC
20.		Kadamtala	Kadamtala PHC
21.		Panisagar	Panisagar CHC
22.		Jampui Hill	Jampui PHC
23.		Jubarajnagar	Jubarajnagar Panchayat Office Building

Sl.	Name of District	Centre Name	Location of Vision Centre (Spokes)
24.		Damcherra	Damcherra Block Office Building
25.	Sepahijala	Bishalghar	Bishalghar SDH
26.		Boxanagar	Boxanagar PHC
27.		Kathalia	Kathalia CHC
28.		Melaghar	Melaghar SDH
29.		Jampuijala	Jampuijala PHC
30.	South Tripura	Bakafa	South Tripura DH
31.		Hrishyamukh	Hrishyamukh CHC
32.		Jolaibari	Jolaibari CHC
33.		Rajnagar	Rajnagar PHC
34.		Rupaichari	Rupaichari PHC
35.		Satchand	Manubazar CHC
36.	Unakoti	Pecharthal	Pecharthal PHC
37.		Gournagar	Rajiv Gandhi Memorial SDH
38.		Kumarghat	Kumarghat Block Office Building
39.	West Tripura	Jirania	Jirania CHC
40.		Mohanpur	Mohanpur CHC
41.		Dukli	Kanchanmala PHC
42.		Hezamara	Hezamara PHC
43.		Lefunga	Lefunga PHC
44.		Mandai	Mandai Block Office Building
45	**West Tripura**	**IGM Hospital**	**Node 1**
			Node 2

Out of the list of 44 VCs, 2 are in District Hospital, 6 are in Sub Divisional Hospitals, 13 are in Community Health Centres, 17 are in Primary Health Centres and 6 are located in Block Office. Of these, 10 located in the PHCs are also Health and Wellness Centres (HWC).

Methodology:

Objective of the Evaluation:

To evaluate the accessibility, affordability, acceptability, and effectiveness of the Tele-ophthalmology services offered through the Vision Centres (VCs) particularly to underserved populations and assess the overall impact / outcome the project has had in the community. The evaluation process involved the following parameters:

1. To evaluate performance of the Tele Ophthalmology services in Tripura.
2. To evaluate the service provider compliance to the prescribed clauses in the agreement signed between State NHM and service provider.

Methodology utilized for the evaluation process:

A mixed methodology (qualitative and quantitative) approach had been undertaken for the evaluation process where the following activities were undertaken:

1. Secondary data review at VCs for the facility-based records maintained to understand the evolution of the programme, including quality of reporting, analysis and feedback.
2. Interviews with Service providers in the designated Vision Centres and its nodes to understand the context of use, assess the referral and follow up mechanism essential for maintaining continuum of care, and barriers and enablers to optimum service delivery by the VCs.
3. In-depth interviews of the State Program Nodal Officer and Service Provider were undertaken to understand the policy and programmatic implications
4. Facility assessment focussing on the Infrastructure of the VCs and the Hub at IGM Hospital, Agartala.
5. Interview with the beneficiaries to understand the quality and accessibility of the service.

Sampling Design and Sample Size:

The evaluation was conducted –

(a) In the 2 nodes in the Hub (IGM Hospital) and
(b) 36% (16 nos.) of Vision Centres out of the total of 44 VCs to have an adequate representation of the state population.

1. 16 VCs were surveyed from 5 districts of Tripura out of total 8 districts. The five selected districts were West Tripura, Khowai, Gomati, North Tripura and Unakoti.
   (a) North Tripura and Unakoti were selected as these are the furthest district from the Hub to know the beneficiary coverage through VCs.
   (b) Khowai and Gomati are the districts nearby to the Hub and were selected to know the utilization of VCs.
2. The VCs selected from the districts (at least 3 per district) were based on the highest and lowest coverage of beneficiaries screened / treated from April 2020 to October 2020.

However, in Khowai district, 5 of the 6 VCs were selected to assess the referral mechanism as there was no Ophthalmologist posted in the district.

3. 2 VCs were surveyed from the West Tripura where the HUB IGM Hospital is located to see the utilization of the VCs as these VCs were closer to the Hub.
4. Information regarding utilization of services and satisfaction of the beneficiaries for the availed services were collected approximately from 3 beneficiaries per VC. Limited numbers of beneficiaries were interviewed as the VCs were closed and they were specifically invited for the interaction.

Table 2: List of Vision Centers assessed:

Sl.	District	Total Vision Centres	Visited Vision Centres
1	Dhalai	5	Not selected
2	Gomati	7	1. Tripura Sundari SDH 2. Killa PHC 3. Kakrabon VC
3	Khowai	6	1. Baijalbari PHC 2. Kalyanpur CHC 3. Teliamura SDH 4. Munigiakami VC 5. District Hospital
4	North Tripura	6	1. Kadamtala CHC 2. Panisagar CHC 3. Yubraj Nagar VC
5	Unakoti	3	1. Pecharthal PHC 2. Kumarghat VC 3. Rajiv Gandhi Memorial SDH
6	West Tripura	6	1. Jirania CHC 2. Mohanpur CHC
7	South Tripura	6	Not selected
8	Sepahijala	5	Not selected

Evaluation points utilized for the assessment:

General:
1. Basic identification information about the Programme – Secondary Data Review
2. Information based on the desk monitoring i.e. 2017-18, 2018-19, 2019-20 and 2020-21: Month wise information about the services provided, facility (Vision Centre/spoke wise) wise - total number of patients screened /treated at the VC, number of patients managed/treated at the VC itself, number of patients who utilized tele-ophthalmology services, number of patients referred from the vision centre to Node, availability of trained and skilled manpower at all VCs and Ophthalmologist at node, training status of the local staff in addition to recruited HR by service provider for using the new technology, to self-sustain the program, availability of Ophthalmologist exclusively for the VCs at the Node during working hours and time slot for each Ophthalmologist catering to a number of VCs.
3. Description of the common eye problems which is expected to be managed/treated with the tele-ophthalmology services

4. Availability of real time consultation between patients and the Ophthalmologist.
5. Availability of the required equipment at vision centres and their proper maintenance.
6. Availability of standard operating procedure (SOP) for operating Tele Ophthalmology services by the Ophthalmologist, Ophthalmic Assistant, Nodal officers. Whether the responsibility of each officer is well defined; Awareness and Utilization of SoP, if any, which has been developed by the service provider.
7. Availability of Kiosk/mobile vehicle-based Tele Ophthalmology service at rural areas
8. Restricted access to patient details. To ensure privacy and confidentiality, data security (misuse and tampering). Access level restriction based on profession (data entry, Doctor, Administrator)
9. Contingency plan for provision of referral services, if required
10. Availability of system for obtaining structured feedback from patients and doctors (in case of referral).
11. Availability of incentive or recognition to exceptional performer (among whom not funded under Tele Ophthalmology project)
12. Availability of system of giving incentive or recognition for exceptional performers.

Reporting outcomes:

1. Month wise performance by age, sex and diseases wise distribution of patients who attended the Vision Centres and treatment initiated and continuum of care was assessed including referrals, diagnostics, and drugs. Distribution in term of morbidity statistics or any other clinical outcomes were also reviewed.
2. Maintenance of the recording and reporting system. Patient satisfaction was assessed taking into consideration the socio cultural and ethical issues faced by the patient. Acceptance of the services, confidence in the treatment provided, along with accessibility were also assessed.

Technology

1. Quality of internet connectivity at each vision centres with band width and its maintenance. Connection type and properties, along with the bandwidth being used.
2. Hardware being used at the referred and the referee sites. Specifications for the network devices, computers, digital cameras, and other relevant equipment.
3. Specifications of the Software being used.
4. Power supply details with back up.
5. Modality – Real time or store and forward
6. Extent of technology integration with pre-existing system.

Monitoring:

1. Monitoring/Evaluation mechanism by the State / District periodically was reviewed.

Finance:

1. User fees if any.

Limitations of the assessment

1. Skill assessment of the Optometrist could not be done as the VCs were non-functional during assessment.
2. Cost effectiveness of the project through any econometric model was not done.
3. For guiding Regional Resource Centre for North Eastern States (RRCNE) in the assessment of Tele-Ophthalmology projected as suggested by NPCBVI division, Ministry of Health & Family Welfare, Govt. of India, the Gauhati Medical College& Hospital was consulted and they were willing to support in the technical assessment. But due to COVID-19 pandemic, Ophthalmologist from Gauhati Medical College& Hospital could not be the part of evaluation team.

Field Observations:

A total of 16 VCs were assessed out of the 44 VCs along with the IGM Hospital (hub). The VCs under the present Service Provider (Ramky Foundation) were functional March 2020 onwards and continued till October 2020. The VCs assessed were specifically open only during the days of assessment.

Location of Vision centres:

In early phase of implementation (2007), the VCs were functional at the block level and were operating from the Block Development Offices as there was poor internet connectivity below block level. From September 2017 onwards, the VCs were shifted to health care facilities ranging from PHCs to DHs, and so far 38 out of 44 VCs have already been shifted and made functional at facility level. The VCs in each health facilities have a space of 150 to 300 Sq. Ft. and is within the hospital premises.

The evaluation team visited some of the VCs in the Panchayat Office and Block Level Offices, to observe that the challenges being faced at these centers are inadequate space, sitting arrangements/ patient waiting area and basic amenities like drinking/ potable water. The team visited Jubarajnagar, Mungiakami, Kakrabon and Kumarghat Vision Centres out of which Jubarajnagar VC was in Panchayat Office Building, Mungiakami VC in Block Office Building, Kakrabon VC in Block Office Building and Kumarghat VC in Agricultural Block Office Building respectively. These centers reported a low foot fall and unavailability of medicines as compared to the VCs functioning in a health care facility setting. During the interaction with the beneficiaries, the common suggestion given by all was to shift these VCs to health facilities to avail the holistic health services under one roof.

Ownership of the Vision Centers:

The Medical Officer in-charge of each health facility is aware about the functionality of the VCs. They also stressed upon the need and suggested restarting of the VCs in the Health Facilities so that the community is benefited.

HR at Vision Centers& Hub:

**Nodal Officer: Tele Ophthalmology Project:**
Dr. Rabindra Das, an Ophthalmologist of the IGM Hospital is the Nodal Officer of NPCBVI program in Tripura and is also the Nodal Officer of Tele Ophthalmology Project since October 2019. In addition, he also looks after the Eye Bank of Tripura. There is no separate assigned person from the Health & FW Department to assist him in the administrative activities.

1. There are 7 (Seven) Ophthalmologists (1 on deputation, 2 re-employment) from State Govt. in the IGM hospital and 3 (Three) out of 7 (Seven) are attending OPD six days in a week on rotation basis. 2 (Two) out of 3 (Three) Ophthalmologists used to provide Tele Ophthalmology services on daily basis to all spokes with the help of 3 (Three) Clinical Optometrist cum Coordinators from Ramky Foundation when the services were functional

2. The Tele Ophthalmology Project is managed by the Operation Head appointed from Ramky Foundation.

3. Three Clinical Optometrist cum Coordinator are posted in IGM Hospital, Agartala, West Tripura for overall coordination of the project with VCs. They also used to take attendance of all Optometrists and Vision Technician Assistants (VTAs) through live streaming. Clinical Optometrist cum Coordinators posted in IGM hospital used to consult with the

Ophthalmologist in the OPD about the history and clinical findings of all the patients whose information were sent from the VCs through software seeking requisite suggestion and treatment. The Clinical Optometrist cum Coordinator in IGM Hospital after consulting the Ophthalmologist used to provide necessary prescriptions and suggestions to all the cases as early as possible through the online platform. They also used to collect monthly reports from all VCs at the end of every month, compile and submit it to NHM and Nodal officer of tele-ophthalmology project.

4. Eight District coordinators who are also qualified Optometrist have been engaged to communicate with Clinical Optometrist cum Coordinator in the Nodal Centre (IGM Hospital – Hub) for any type of issues related to the VCs for 8 Districts. They also used to visit every VCs under his or her district at least once in a month. District coordinators also at times run the VCs when the Optometrist of a VC takes leave.

5. There is one Optometrist in each VC. Their duty includes patient registration, preliminary examination, vision testing, examination of ocular tension, duct examination and fundus examination. After they complete the examination, the information is entered in the software and is sent across to the Hub (IGM Hospital) for suggestion and prescription. Once the final prescription is sent back from the Hub (IGM Hospital), the Optometrist in the VC takes a print out and hand over to the patient with necessary counseling.

6. One Vision Technician Assistant (VTA) has also been recruited in each VC during 2013-14. Role of VTA is as follows:
   - The VTA role is to assist the Optometrist/Ophthalmic assistant for the process of eye examination.
   - They do door to door visit for awareness about different eye problems, basic screening for cataract and follow up of Cataract Operated patient for the next visit.
   - Take care of every instruments and cleaning procedure.
   - Maintaining hygienic atmosphere at VCs.

Figure 1:

Organization Chart of the Service Provider
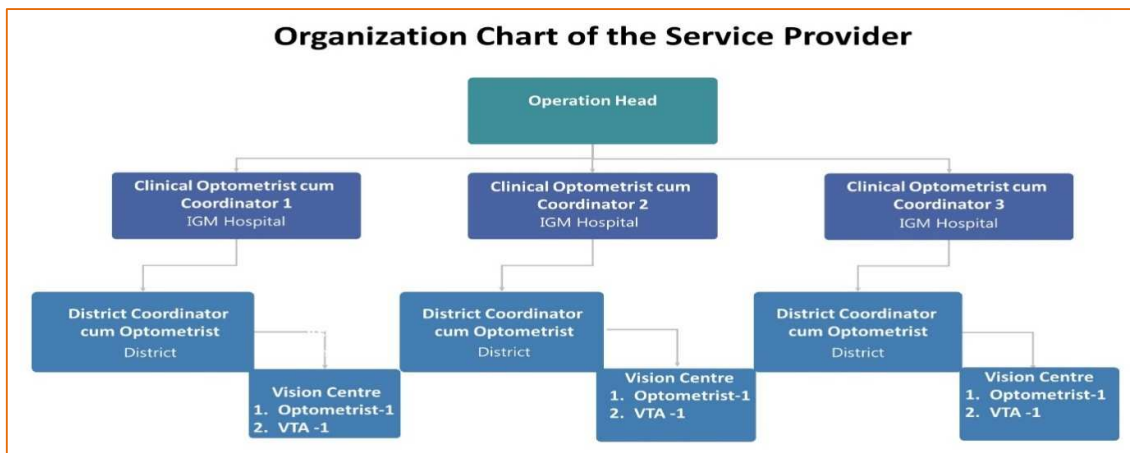
Salary of Optometrists and VTA

As per the discussions with the Service Provider and Optometrists, the salary for the Optometrists range from Rs. 12,000/- to Rs. 25,000/- per month. The variation is attributed to educational qualification and years of experience. The salary of the VTAs ranged from Rs. 6,000/- to Rs.7000/- per month. However, it was learnt that the VTAs were not provided any travel allowance for the field visits to conduct awareness, screening and follow-up of post-operative cataract cases.

It was also found that that the average salary of Ophthalmic Assistant and Optometrist of DEIC supported by NHM is Rs. 19,465/- month and is Rs. 30,068/- month respectively. The Ophthalmic Assistant under State Government Payroll is Rs. 12,230/- - Rs. 34800, Grade Pay RS. 4,400/- (Level 11)

Ophthalmologist &Ophthalmic Assistant in Health Facilities from State Government:

In the state there are 19 Ophthalmologists, of which 7 are in Agartala Medical College& Hospital, 7 are in IGM Hospital and 5 are posted in 5 District Hospitals. Ophthalmologist is not available in the Khowai and Sepahijala District Hospital.

During the assessment, out of visited 16 (Sixteen) Vision Centres, in the VCs located in Teliamura CHC, Panisagar SDH, Jirania CHC and Tripura Sundari SDH One Ophthalmic Assistant recruited under State Govt. is also providing services. The Ophthalmic Assistants in these hospitals were providing services jointly with staff of the VCs (when they were functional) except in Teliamura CHC.

In Khowai DH which does not have an Ophthalmologist, one Ophthalmic Assistant recruited under State Govt. is providing services in the same room where the VC is housed in Khowai DH.

There are 22 Ophthalmic Assistant from State Govt. and 25 under NHM are providing services in 41 PHCs, UPHCs, CHCs, SDHs and DHs. In addition, 5 (Five) Ophthalmic Assistants from State are posted in the IGM Hospital. Out of the 44 VCs, in 9 VCs, viz. Kanchanmala PHC, Jirania CHC, Bishalgarh SDH, Sonamura SDH, Melaghar, Kalyanpur CHC, Khowai District Hospital, Teliamura SDH, Amarpur SDH, Panisagar PHC and RGM Hospital, there is Ophthalmic Assistants posted from the State Govt. However, in remaining 35 (Thirty-Five) Vision Centers the Ophthalmic services are being provided by Optometrists recruited under the project where Ophthalmic Assistant or Ophthalmologist from the department are not available.

The team during evaluation did not use any econometric model to find out the cost effectiveness of the project.

Table 3: Distribution of Health Facilities supported Ophthalmic Assistant under NHM by Ophthalmic OPD & Total Allopathic OPD

District	PHCs	2020-21			2019-20		
		Allopathic-OPD	Ophthalmic - OPD	% of Ophthalmic - OPD	Allopathic-OPD	Ophthalmic - OPD	% of Ophthalmic - OPD
Dhalai	Marachara PHC-HWC	2051	23	1.1	4480	0	0.0
	Manikpur PHC-HWC	1814		0.0	2910		0.0
Gomati	Garjee PHC	1733	65	3.8	4137	197	4.8
Sipahijala	Bishramganj PHC	5705	234	4.1	13542	655	4.8
	Dayarampara PHC	2062	151	7.3	3976	209	5.3
	Madhupur PHC	7318	301	4.1	14464	191	1.3
	Takshapara PHC	913	10	1.1	2646	3	0.1
South Tripura	Shahid Birchandra Nagar Memorial PHC-HWC	1872	48	2.6	4052	61	1.5
	Nalua PHC-HWC	2892	149	5.2	5541	90	1.6
	Matai PHC-HWC	3433	174	5.1	5602	108	1.9
West Tripura	Bamutia PHC	3408	338	9.9	8243	159	1.9
	Ranirbazar PHC	18656	1951	10.5	28441	1275	4.5
	Paschim Bhubanban Urban PHC-HWC	2070	0	0.0	3205	2	0.1
	Nandannagar Urban PHC-HWC	2864	147	5.1	1902	5	0.3
	Madhya Pratapgarh Urban PHC-HWC	2611	219	8.4	2076	351	16.9
	Asharampara Urban PHC-HWC	2730	382	14.0	2397	132	5.5

As per RHS 2019-20 Bulletin, 112 PHCs, 22 CHCs, 12 SDHs and 7 DHs are in the State. It implies that 112 health facilities do not have a single Ophthalmic Assistant. Populations of these areas either go to the VCs or District Hospital or IGM hospital to avail ophthalmology services.

Qualification of the Optometrist & Vision Technician Assistant:

All Optometrist under Service Provider have either Diploma or Degree in Optometry. Most of the Optometrist is providing services in VCs since 2006-07. The Optometrists who joined in the initial years when the project started in 2006-07 received two & half months training in Haldia Netra Niramoy Niketan, West Bengal. The Optometrist who joined later in the project got 1 month training at IGM hospital, Agartala. The initial trainings provided by the service providers were of a longer duration because the set-up was new and the staff required more hand holding support. But gradually as the services of the of the Hub and the VCs got streamlined, the training duration was reduced to lesser duration.

The VTAs who have been recruited in the VCs do not have uniform qualification. It has been observed during the assessment that the qualification of the VTAs differs starting from 10[th]standard pass to graduate. The VTAs appointed during 2013-14 got 1-month training and those who joined after 2017-18, got 1 week training in the VCs.

2 (Two) Clinical Optometrist cum Coordinator of Hub and 3 Optometrist of VCs have completed their Masters also.

OPD timing:

OPD timing of Vision Centre is same with OPD timing of health facilities i.e. 9.00 AM to 4.30 PM. The same OPD timing is also at IGM Hospital, the Hub.

User fee:

There is no user fee for availing OPD & Tele Ophthalmology services at the VCs. All the services are provided free of cost to the patients.

Standard Operating Procedure (SoP):

The service provider has developed General Operating Procedure and SoP during COVID-19 pandemic period. SoPs to be followed during COVID-19 period have been pasted in the wall of each visited VCs.

Drugs and Free spectacles:

As per the state Essential Drug List (EDL), at PHC level, Tobramycin eye drop, Tobramycin eye ointment and Atropine Sulphate eye ointment, and at CHC and SDH level, Neomycin + Betamethasone eye drop and Ciprofloxacin + Dexamethasone eye ointment are to be available. But during the assessment, no eye care medicine was available in the visited health facilities. Patient has to buy the ophthalmic medicine from private medicine store incurring OOPE.

Free spectacles were provided till 2017-18 to the patients who visited VCs during consultation for correction of refractive error, presbyopia and in post cataract cases. The Service providers used to provide the glasses and were reimbursed under the Tele-ophthalmology project @ Rs. 350 per spectacle. This free distribution has stopped from 2018-19 as the State Govt. decided to start the Chief Minister Mission Dristi Program under which free spectacles are supposed to be provided to the

presbyopia patients. The Chief Minister Mission Dristi Program was launched in March 2021. Since 2018-19, the patients are not getting any free spectacles under the project for refractive error, presbyopia and post cataract cases.

Software utilization for Tele Ophthalmology Services:

Tele Vital, a cloud-based software developed by the present Service Provider is being used for Tele-Ophthalmology services. The software has features to generate patient unique ID, provision for recording history of the patient, transfer the images from vision center to the Hub, online prescription generation etc. The file of each patient can be accessed in subsequent visit to the VC by searching name, phone number, patient ID etc. There is a provision in the software to access the patient information from other VCs as well, but it is blocked at present for patient privacy. Therefore, a patient needs to be re-registered again with a new patient ID if they visit another VCs.

A dashboard also has been developed to monitor day wise vision center wise performances. The dashboard is linked with State NHM Website and information regarding the Tele-Ophthalmology can be accessed from the NHM web portal. (https://nhmtripuratvc.in/vitalware4/MISDashboard.html).

The software has been developed by Ramky Foundation. All the patient data from March 2020 are available for follow-up. The data of the patient treated earlier in the VCs when the project was run by IL&FS ETS is not available with the present service provider as it was not handed over by IL&FS ETS (earlier service provider) to Ramky Foundation (present service provider).

Registration of patient in OPD at Vision Centre:

It has been found that a patient registers first in general OPD counter of the health facility and next registration is done in the VC, but it is not uniform for all centers. In few hospitals, patients directly go to the VC for the consultation.

Uniform patient registration system has to be followed i.e. first registration in the general OPD then to visit the VC to assess the foot fall at the health facilities as per HMIS.

Internet connectivity, Mode of Operation between Hub (IGM Hospital)& Spoke (VCs),:

All visited VCs are using Dongle, Mobile Hotspot or broadband. The speed of the internet connectivity in the VCs could not be tested as the services of the VCs have been shut down since November 2020. The provision of internet is the responsibility of the Service provider and is not related to the Telemedicine services provided under Comprehensive Primary Health care program. It was revealed that by the Optometrist, approximately 3 to 5 minutes is required to enter all relevant information for each patient and within 15 minutes they get the prescription from the IGM Hospital. The Optometrist in the VCs is not writing any prescription to the patients. They are generated from the IGM Hospital and are digitally signed by the Ophthalmologist.

Generally, store and forward mode is used by the VCs &IGM Hospital for patient treatment. The fundus image is captured with the slit lamp, 78 Dioptre lens and digital camera and is loaded in the software for sending it to the IGM hospital for necessary suggestion and prescription. Fundus camera is available only in two VCs viz. Kumarghat Block Agricultural Office VC and Tripura Sundari SDH VC.

The fundus camera in Tripura Sundari SDH has been supplied in 2015 and since then it has not been utilized due to software problem. Video conferencing is also conducted if necessary, for real time monitoring by the Ophthalmologist. Post cataract operation follow up is being done at the VC through tele-consultation with hub.

There are three OPD chambers of the Ophthalmologist in the IGM Hospital. The Hub in the IGM Hospital is located in the two OPD chambers where two Ophthalmologists provide services to the general OPD patient and Tele Ophthalmology Services every weekday from 9.00 AM to 4.30 PM. Clinical Optometrist cum Coordinators posted in IGM hospital discuss with the Ophthalmologist in the OPD the history and clinical findings all the patients whose information are sent from the VCs through software seeking requisite suggestion and treatment. Refraction error, other common ailments like conjunctivitis etc. are managed by Clinical Optometrist cum Coordinator and for other eye ailments like corneal injury, corneal ulcer, cataract, etc. they consult with the Ophthalmologist for diagnosis and prescription. There is computer set with LED monitor within the OPD chamber to view the history, images, etc. by Ophthalmologist. The Clinical Optometrist cum Coordinator in IGM Hospital after consulting the Ophthalmologist provides necessary prescriptions and suggestions to all the cases as early as possible through the software.

Optometrist in the VCs is not prescribing any medicines on their own. All the prescription including the refractive error report is sent from IGM hospital with digital signature of Ophthalmologists. The Ophthalmic Assistant recruited under the State Govt. and NHM and posted in the health facilities are prescribing medicines to the patients directly.

The assurance that diagnosis and the treatment provided by the Optometrists at the VCs is endorsed by Ophthalmologists at the IGM hospital which instills a sense of trust and reliance on the quality of the services among the beneficiaries.

Flowchart of Treatment Procedure at Tripura Vision Centre

Figure 2:
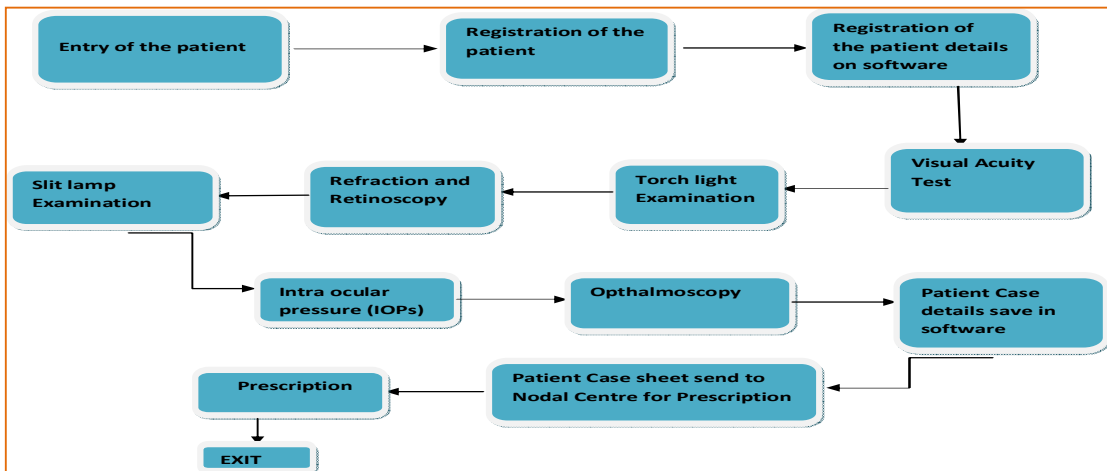
Referral Mechanism:

Around 2 to 3 patients from each VC every month were referred to the IGM hospital for direct consultation with the Ophthalmologist. The Clinical Optometrist cum Coordinator helps the referred patients to avail the services from Ophthalmologist directly. The referred patients are not provided with facilities like transportation charge, free food or wage compensation. The previous history of the patient can be retrieved at the Hub which is saved during the consultation with the VC.

Referred patients treated at IGM are further advised to get follow-up treatment from the nearest VC. Moreover, Optometrist & VTA follow-up such patients as per the contact details captured during registration at the VC.

Available Equipment:

It was found that all equipment including many laptops was purchased during initial period of the project from 2006 to 2008 by the Tripura Govt. The same equipment has been handed over to Ramky Foundation to operate. Most of the equipment needs to be repaired / replaced to improve the quality of the services.

The available equipment found in the visited VCs were—one each of Snellen Chart with Vision Drum, Ophthalmoscope, Retinoscope, Schiotz Tonometer, Slit Lamp, Trial Box, 78D Lens, Digital Camera, computer & printers. In few of the visited VCs, the retinoscope, ophthalmoscope, bulb of the slit lamp, laptop, inverter and digital camera were out of order. Fundus camera is available only in two VCs viz. Kumarghat Block Agricultural Office VC and Tripura Sundari SDH VC. The fundus camera in Tripura Sundari SDH has been supplied in 2015 and since then it has not been utilized due to software problem.

Sub Optimal image is very rare as per the Ophthalmologist of the IGM Hospital. Optometrists of the VCs are well skilled to take fundus photo with the help of Slit Lamp & Digital Camera.

It was observed that foreign body removal kit and first aid kit are not available in all visited VCs. The Optometrist is using "Cotton Buds" to remove foreign body.

Table 4: List of equipment to be available in the Vision Centers as per the Memorandum of Understanding with the State Government

Chart / Equipment to be available	Available in Vision Centres	Functionality Status
Snellen Chart	Available in all 16 VCs	
Vision Drum	Available in all 16 VCs	
Ophthalmoscope	Available in all 16 VCs	16/16 bulbs are out of order due to not in use for long time.
Autorefractometer	**Not available**	
Lensometer	**Not available**	
Trial Lens Set (Optometry Equipment Trial box)	Available in all 16 VCs	
Foreign body removal kit	Available in all 16 VCs (Only cotton buds)	
Retinoscope	Available in all 16 VCs	16/16 bulbs are out of order due to not in use for long time.
Tonometer	Available in all 16 VCs	
Slit lamp	Available in all 16 visited VCs	Functional in all 12 VCs, Slit lamp non-functional due to fused bulb in Mohanpur, Pechartal, Jirania and Baijabari VCs.
Fundus Camera	Available in 2 VCs; Kumarghat and Tripura Sundari SDH	Functional in Kumarghat only
Digital camera	Available in 13 VCs Panisagar, Kadamtala and Kumarghat VCs not available	Functional old model with low resolution of around 12 to 15 years old. Out of order in Killa VC.
Computers	Available in all 16 VCs	Out of order in Killa VC.
Printer	Available in all 16 VCs	

The VCs under the project are equipped with the equipment as per the Essential equipment list of Vision Centers, Operational Guideline for Eye Care at Health and Wellness Centers, GoI.

Maintenance of the Equipment:

Ramky Foundation is maintaining the equipment as per the agreement. None of the equipment has been taken under Biomedical Equipment Management and Maintenance Program (BMMP).

Data Reporting System:

There is no uniformity in the hospitals and the VCs regarding registration of the patients. In few of the hospitals, the patient registers first in the general OPD and then go the VCs, whereas in few VCs, they directly go the VCs for consultation.

Uniform patient registration system has to be followed i.e. first registration in the general OPD then to visit the VC to assess the foot fall at the health facilities as per HMIS.

Clinical Optometrists of the IGM hospital collect monthly routine data from the VCs at the end of month, compile and submit it to NHM and Nodal officer of tele-ophthalmology project. It was observed that each VC has displayed the monthly performance like total patient, glass prescription, medicine prescription, total referred patient and referred cataract patient.

All the information of the patient as and when uploaded online through the software application from the VC is auto updated in the dashboard. In the dashboard, real time information on website is linked to public domain under NHM. The website depicting real time information, have key performance indicators like human resource deployed in each Vision Center, type of clinical services and number of services provided in each facility, number of free spectacles, number of tele- ophthalmology consultation conducted with IGM Hospital.

As vision centers are part of the health facilities, OPD cases in the VCs should be counted under OPD cases of the respective health facility. Performance of the regular Ophthalmic Assistant can be easily assessed as VCs performances are separately maintained.

Monitoring Mechanism:

1. NPCBVI / IGM Hospital: There is no structured monitoring mechanism from the NPCBVI program or from IGM Hospital (Hub). The Nodal Officer has visited some of the VCs as and when the Mission Director, NHM directed. Ophthalmologist from the IGM Hospital (Hub) visits the VCs to screen the cataract cases at times during the cataract camp.
2. District Coordinator of the Service Provider regularly visits the VCs in their respective district.

Services at Community level:

During the assessment it has been revealed that the patients from the Sub Centers and nearby PHCs where no ophthalmology services are available were referred to the VCs for consultation. Since the VCs started functioning from 2007 onwards so the community, staffs of the sub-centers and the PHCs are aware of these VCs and they avail / refer the patients for eye-care services to the VCs whenever required. RBSK team also refers patient to the VCs for treatment. The Vision Technician Assistant works closely with the ASHA / ASHA Facilitators for awareness generation among the community about the services being provided in the VCs. They do preliminary screening of cataract patient for further examination at VCs and follow up after post cataract operated cases.

Figure 3:
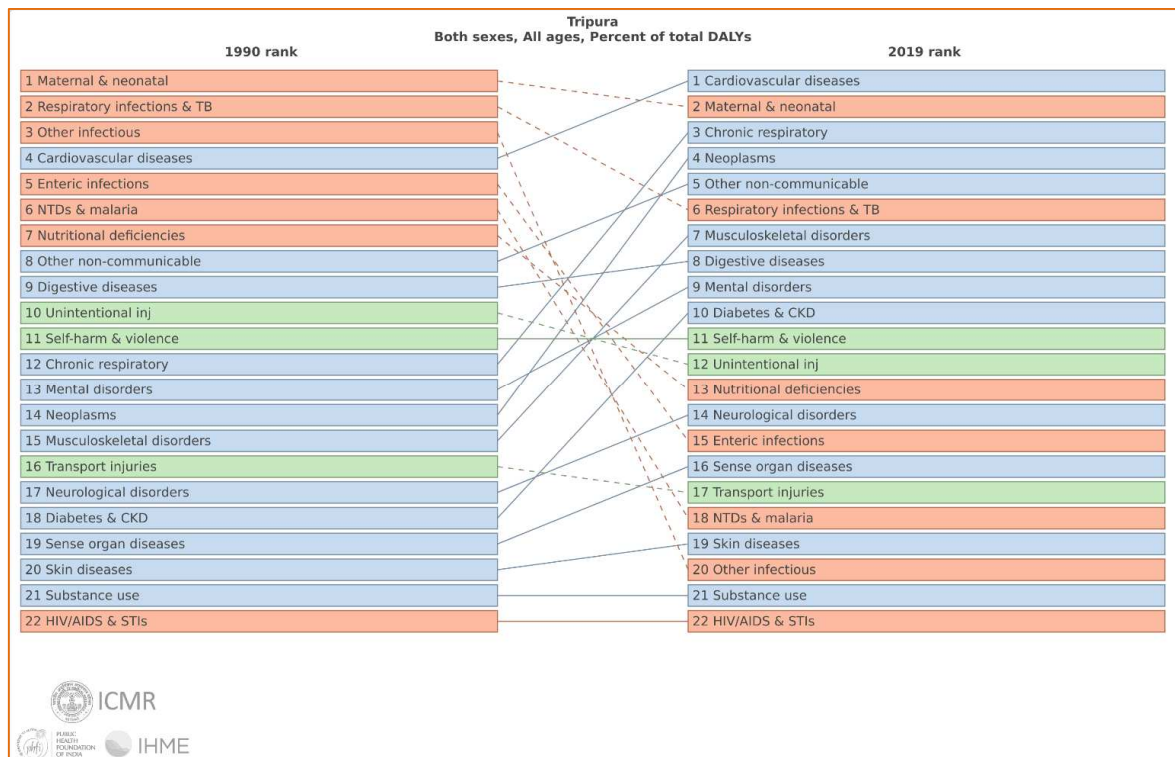
Global Burden of Disease: ICRM, PHFI & Institute of Health Metrics and Evaluation, 2019

National Diabetes and Diabetic Retinopathy Survey report (2015-19) also revealed that, prevalence of diabetes in India has been recorded at 11.8% in the last four years, prevalence of known diabetes cases is 8% and new diabetes cases is 3.8%.The prevalence of any form of diabetic retinopathy (DR) in diabetic population aged up to 50 years has been found to be 16.9%.

High prevalence of Diabetic Retinopathy is reported in the state of Tripura. DALY's due to Diabetic & CKD increased from 1.42 % to 4.55% during 1990-2019 in Tripura. (As per ICMR report)

The findings show mild retinopathy was most common with prevalence of 11.8%, whereas 7% participants had some form of diabetic maculopathy and 3.6% has diabetic retinopathy.

The prevalence of any form of diabetic retinopathy (DR) in diabetic population aged more than 50 years was 16.9% as per the findings of the National Diabetic Retinopathy Survey (2015-19) conducted in 21 selected districts of the country under NPCBVI. Diabetic retinopathy, if not diagnosed and treated on time, can lead to permanent blindness. Further, uncontrolled diabetes can also lead to diabetic retinopathy.

Screening of Diabetes and Hypertension under NCD program of Health & Wellness Centre has been started in most of the centers. Vision Centre need to take a pivotal role in the screening, treatment and follow up of the patient.

Out of Pocket Expenditure:

Out of Pocket Expenditure (OOPE) is usually incurred from travel, consultation with private service provider, drugs, diagnostics and indirect cost such as loss of wages due to non-availability of services in the Govt. health facilities near the community

During the assessment, an attempt was made to find out the travel cost of the beneficiary if the required services are not available in the nearby health facility either through State Govt. Ophthalmic Assistant or Vision Centers.

Ophthalmic medicines are listed in the State EDL but during the assessment no ophthalmic medicine was available in any of the VCs. Approximately Rs. 150/- to Rs. 250/-has to be spent by the patients to purchase medicines from outside which are prescribed in the VCs. Also, as free spectacle distribution has ceased from 2018-19, the patients have to bear the cost of spectacles which ranges from Rs. 400/- to Rs. 600/-.

Travel cost also depends on the distance of the community from the Health Facility or VC. Also, in case of far flung areas, due to limited availability of public transport the cost incurred on transportation is high as compared to areas with better access.

Table 5: Facility wise distribution of approximate travel cost

Visited Vision Centres	District	Nos. of Govt. Ophthalmic Assistant Available	Availability Ophthalmologist in the District	Need to visit the Health Facility if Vision Centre is not	Min. Travel cost both way for 1 person by bus / shared tempo
Killa PHC	Gomati	Nil	Yes	10 KM	Rs. 40/-
Baijalbari PHC	Khowai	Nil	No	40 KM	Rs. 150/-
Pecharthal PHC	Unakoti	Nil	Yes	30 KM	Rs. 80/-
Kalyanpur CHC	Khowai	1	No	IGM Hospital, 4 Hr. journey 1 way	Rs. 250/-
Kadamtala CHC	North Tripura	Nil	Yes	14 KM	Rs. 80/-
Panisagar CHC	North Tripura	1	Yes	16 KM	Rs. 60/-
Jirania CHC	West Tripura	1	Yes	20 KM	Rs. 80/-
Mohanpur CHC	West Tripura	Nil	Yes	20 KM	Rs. 60/-
Tripura Sundari SDH	Gomati	Nil	Yes	5 KM	Rs. 30/-
Teliamura SDH	Khowai	2	No	IGM Hospital, 45 KM one way	Rs. 160/-
RGM SDH	Unakoti	1	Yes		
Khowai District Hospital	Khowai	1	No	IGM Hospital, 3 Hr. journey 1 way	Rs. 250/-
Kakrabon VC	Gomati		Yes	15 KM	Rs. 60/-
Munigiakami VC	Khowai			IGM Hospital, 65 KM	Rs. 200/-
Jubarajnagar VC	North Tripura		Yes	8 KM, no direct means of public transport	Rs. 200/-
Kumarghat VC	Unakoti		Yes	40 KM	Rs. 150/-

On an average a patient spends approximately Rs. 200/- to Rs. 250/- on medicine and Rs. 200/- to Rs. 500/- (to & fro) as traveling cost along with one attendant if he or she has to visit the nearest DH also coupled with loss of man-days. In addition, the patient along with one escort needs to spend at least Rs. 200/- only for lunch or refreshment due to timings of public transport. The expenditure becomes more when a patient has to travel from Khowai or Sepahijala district (where no Ophthalmologist is available) to IGM Hospital in Agartala to avail service.

Patient / Beneficiary Feedback:

As part of the Rapid Assessment process of the Tele-Ophthalmology services being provided at the community level in the State of Tripura under NHM via the PPP mode, interview of the beneficiaries were undertaken to arrive at an in-depth conclusion of the overall impact and the resultant outcome the Tele-Ophthalmology services had in the served communities.

The interviews with the beneficiaries at several VCs assessed resulted in the identification of the following themes based on the open-ended questionnaire utilized:

Perception of the beneficiaries about the range and quality of services provided at the Vision Centres:

1. Of the 45 beneficiaries interviewed, all had unanimously agreed that the quality and range of services provided at the VCs were able to address a majority their eye care/ailment needs which primarily included refractive errors / vision corrections, red eye / eye allergies / eye infections, foreign bodies in eyes and screening / referral for cataract surgeries.

2. It was also observed during the discussion with the beneficiaries that the dropping of the scheme to provide free spectacles which was effective till 2017-18 under the Tele-Ophthalmology services has resulted in an expenditure ranging from Rs. 400/- to Rs. 600/- to buy the prescribed lenses from the open market. Three beneficiaries who were prescribed corrective lenses by the VCs around August to September 2020 were unable to buy them till date due to the lack of money.

3. The efficiency of the Optometrists posted at the VCs along with the assured mechanism of software based direct near real time tele-consultation services with IGM Hospital (Hub) with verification of the diagnosis and a signed prescription from an Ophthalmologist from the Hub has instilled in the beneficiaries a high level of trust in the services provided by the VCs.

Perception of the beneficiaries about the referral and follow up mechanism of the Vision Centres:

1. Of the 45 beneficiaries interviewed, 4 had their cataract surgeries done at the IGM Hospital via referral from the VCs. They were satisfied with the process of consultations at the VCs involving Ophthalmologists from the Hub and subsequent referral to the IGM Hospital where the cataract surgery procedure was conducted.

2. The beneficiaries were also queried on whether there were any follow up services provided by the VCs following consultations. Few of them responded in the affirmative stating that either they had a visit or a telephone call from the VTA from the VCs following their consultations.

3. The beneficiaries interview pointed out that along with the screening, diagnostic and referral services provided by the VCs, the authorities should also ensure that free drugs and prescription glasses are also need to be provided to the beneficiaries as buying them from the open market involves an expenditure to the range of Rs. 400/- to Rs. 600/- for a pair of prescription glasses and Rs. 100/- to Rs. 150/- for the medicines prescribed by the VCs.

Recommendations:

The tele-ophthalmology project under PPP mode is very promising and has benefitted the community at large.

1. The tele-ophthalmology project may be operationalized with relocating the 6 VCs from the Block Office to the nearby Health facility to avail the holistic health services under single roof.
2. The equipment in the VCs should be repaired and that which are beyond economic repair (BER) have to be replaced with new ones. New equipment purchased under the project must have Annual Maintenance Contract. Foreign body removal kit and first aid kit needs to be provided to the VCs.
3. The eye care medicine under the EDL should also be made available in the VCs to reduce the OOPE.
4. Free spectacle distribution under the Tele-ophthalmology project must be restarted and the patients needing spectacles for refractive error, presbyopia and post cataract cases are to be provided with free spectacles. **Chief Minister Mission Dristi Program needs to be implemented in such a manner so that it brings benefit to the people,** who actually are in need.
5. Access of patient information from Tele Vital software should be made available at each VC to utilize the history of each patient without any duplication.
6. The Vision Technician Assistants in the VCs should prepare a monthly activity plan in coordination with ASHAs and HWCs for awareness generation, door to door screening and follow up of cases and they should be provided with monthly travel allowance for field visit.
7. There should be pay parity between the Ophthalmic Assistants recruited under NHM and Optometrists under the Tele-ophthalmology project.
8. State and District Nodal Officers should have a regular monthly monitoring plan and the performance of the project should be reviewed during the monthly District and State level Health Society review meeting.
9. Uniform patient registration system has to be followed i.e. first registration in the general OPD then to visit the VC to assess the foot fall at the health facilities as per HMIS. The OPD performance of the Ophthalmic Assistants must be uploaded in the HMIS monthly report.
10. State may use existing defined output/ outcome indicators for an effective monitoring mechanism and new indicators may be developed to also reflect the National Health Policy and SDG goals.
11. It is suggested that for long term sustainability, the focus should be on strengthening the existing health systems to ensure delivery of primary eye care as envisioned under NPCBVI programme across the levels of health care facilities.

Annexure – 1

Performance of Vision Centers:

Table 6 (a):   Surveyed Vision Centre & Health Facility wise distribution of Total OPD, Ophthalmic OPD as per HMIS and OPD in Vision Centre

Visited Vision Centres	Nos. of Govt. Oph. Assistant Available	2019-20 (April to August)				2020-21 (April to October)			
		Total Allopathic OPD	Oph. OPD	OPD in Vision Centre	% of Total OPD	Total Allopathic OPD	Oph. OPD	OPD in Vision Centre	% of Total OPD
Killa PHC	Nil	2793	0	421	15.1	1698	0	124	7.3
Baijalbari PHC	Nil	2941	0	217	7.4	1870		86	4.6
Pecharthal PHC	Nil	6367	0	1076	16.9	1945	0	334	17.2
Kalyanpur CHC	1	8552	0	986	11.5	5718	0	556	9.7
Kadamtala CHC	Nil	24178	1054	1052	4.4	15475	1272	1256	8.1
Panisagar CHC	1	8828	1806	1805	20.4	4622	1174	717	15.5
Jirania CHC	1	23841	1831	1836	7.7	15060	2324	2118	14.1
Mohanpur CHC	Nil	22546	2483	2493	11.1	11777	731	533	4.5
Tripura Sundari SDH	Nil	26730	2972	2972	11.1	12255	1726	1009	8.2
Teliamura SDH	2	25875	1516	1410	5.4	19833	1357	491	2.5
Rajiv Gandhi Memorial SDH	1	23173	0	1261	5.4	11781	0	410	3.5
Khowai District Hospital	1	18504	2532	2532	13.7	14646	1207	956	6.5
Mungiakami	Located at Block Office			173				77	
Kakraban				789				188	
Kumarghat				1878				557	
Jubarajnagar				610				184	
IGM Hospital		172516	29790			204351	14584		

Table 6 (a) shows that Ophthalmic OPD in HMIS report in few facilities and nil in few other health facilities where State Govt. Ophthalmic Assistant is not available. e.g. Killa PHC, Baijalbari PHC, Kadamtala CHC, Mohanpur CHC etc.

Table 6 (b): Surveyed Vision Centre & Health Facility wise distribution of Total and Ophthalmic OPD as per HMIS and OPD in Vision Centre

Visited Vision Centres	Nos. of Govt. Oph. Assistant available	2017-18				2018-19*			
		Total Allopathic OPD	Oph. OPD	OPD in Vision Centre	% of Total OPD	Total Allopathic OPD	Oph. OPD	OPD in Vision Centre	% of Total OPD
Killa PHC	Nil	7878	0	1256	15.9	7501	0	1152	15.4
Baijalbari PHC	Nil	5670	42	1203	21.2	6438	0	621	9.6
Pecharthal PHC	Nil	8794	18	2751	31.3	12161	3	2765	22.7
Kalyanpur CHC	1	15517	511	3368	21.7	21492	0	2561	11.9
Kadamtala CHC	Nil	49736	2789	2974	6.0	55798	2862	2728	4.9
Panisagar CHC	1	17515	5095	6561	37.5	21588	4839	4691	21.7
Jirania CHC	1	47062	1750	4233	9.0	57925	4481	4751	8.2
Mohanpur CHC	Nil	45217		5517	12.2	50150	5217	5327	10.6
Tripura Sundari SDH	Nil	56366	4370	4477	7.9	64172	6995	6756	10.5
Teliamura SDH	2	32938	2662	2714	8.2	38669	3728	3152	8.2
Rajiv Gandhi Memorial SDH	1	39438	0	4421	11.2	47776	0	3473	7.3
Khowai District Hospital	1	45924	8808	8828	19.2	45293	5736	6105	13.5
Mungiakami	Located at Block Office			402				426	
Kakraban				2412				1526	
Kumarghat				4401				3967	
Jubarajnagar				2135				1055	
IGM Hospital		479018	57029			427934	56667		

Table 6 (b) shows that Ophthalmic OPD in HMIS report in few facilities and nil in few other health facilities where State Govt. Ophthalmic Assistant is not available. The OPD footfall in the VCs is significant high compared to the total OPD in the respective health facilities.

Performance of July, 2018-19 of the Vision Centers could not be collected; it is taken as average of the other 11 months.

Table 7 (a): Total Vision Centre & Health Facility wise distribution of Total OPD, Ophthalmic OPD as per HMIS and OPD in Vision Centre

SI	Vision Centres	Oph. Assistant from NHM /Govt.	2017-18				2018-19			
			Total Allopathic OPD	Oph. OPD	OPD in Vision Centre	% of Total OPD	Total Allopathic OPD	Oph. OPD	OPD in Vision Centre	% of Total OPD
1	Ambasa PHC		14756	317	2435	16.5	17206	281	1395	8.1
2	Salema PHC		17093	1192	3319	19.4	19117	1828	1992	10.4
3	Silachari PHC		6475	0	1269	19.6	7041	54	931	13.2
4	Killa PHC		7878	0	1256	15.9	7501	0	1152	15.4
5	Baijalbari PHC		5670	42	1203	21.2	6438	0	621	9.6
6	Tulasikhar PHC		5045	160	1194	23.7	4220	0	849	20.1
7	Dasda PHC		5671	109	4699	82.9	11087	934	2186	19.7
8	Jampui PHC		3918	0	472	12.0	4147	212	295	7.1
9	Jampuijala PHC		2506	0	1752	69.9	4880	1147	1161	23.8
10	Rajnagar PHC		6031	3113	3279	54.4	9902	2430	2390	24.1
11	Rupaichari PHC		2791	0	2114	75.7	4174		1358	32.5
12	Pecharthal PHC		8794	18	2781	31.6	12161	3	2765	22.7
13	Hezamara PHC		1230		998	81.1	2936		696	23.7
14	Kanchanmala PHC	1	6501	20	927	14.3	7837	973	1395	17.8
15	Lefunga PHC				1140				838	
16	Manu CHC		15868	1845	2577	16.2	20157	1640	1533	7.6
17	Chawmanu CHC		8752		2888	33.0	10767		1605	14.9
18	Ompi RH		9469		2045	21.6	6640	892	2057	31.0
19	Ramkumar Naraiha CHC		10248		2066	20.2	8361		1618	19.4
20	Kalyanpur CHC	1	15517	511	3368	21.7	21492	0	2561	11.9
21	Kadamtala CHC		49736	2789	2974	6.0	55798	2862	2728	4.9
22	Panisagar CHC	1	17515	5095	6561	37.5	21588	4839	4691	21.7
23	Boxanagar CHC		16863	273	3189	18.9	19944	2779	2769	13.9
24	Kathalia CHC		16125	2573	4427	27.5	16461	3345	3373	20.5
25	Hrishyamukh CHC		15906	2444	2806	17.6	14827	2122	2177	14.7

SI	Vision Centres	Oph. Assistant from NHM /Govt.	2017-18				2018-19			
			Total Allopathic OPD	Oph. OPD	OPD in Vision Centre	% of Total OPD	Total Allopathic OPD	Oph. OPD	OPD in Vision Centre	% of Total OPD
26	Joliabari CHC		17253	0	4043	23.4	21043	158	2410	11.5
27	Manubazar RH		4890	177	1985	40.6	7429	885	1543	20.8
28	Jirania CHC	1	47062	1750	4233	9.0	57925	4481	4751	8.2
29	Mohanpur CHC		45217		5419	12.0	50150	5217	5327	10.6
30	Gandacherra SDH		25551		1864	7.3	27003		1473	5.5
31	Amarpur SDH	1	38586	2462	3860	10.0	44984	2880	2821	6.3
32	Tripura Sundari SDH		56366	4370	4477	7.9	64172	6995	6756	10.5
33	Teliamura SDH	2	32938	2662	2714	8.2	38669	3728	3152	8.2
34	Bishalgarh SDH	1	54048	0	9322	17.2	58827	0	9628	16.4
35	Melaghar SDH	1	55727	2148	4476	8.0	57757	2334	5371	9.3
36	Rajiv Gandhi Memorial SDH	1	39438		4421	11.2	47776		3473	7.3
37	Khowai DH	1	45924	8808	8828	19.2	45293	5736	6105	13.5
38	DH South		44026	4395	8067	18.3	55153	4321	7232	13.1
39	Mungiakami in Block Office				402				426	
40	Kakraban in Block Office				2412				1526	
41	Kumarghat in Block Office				4401				3966	
42	Jubarajnagar in Block Office				2135				1054	
43	Mandhai in Block Office				953				997	
44	Dhamcherra in Block Office				1448				620	
Hub	IGM Hospital	5	479018	57029			427934	56667		

Table 7 (b): Total Vision Centre & Health Facility wise distribution of Total OPD, Ophthalmic OPD as per HMIS and OPD in Vision Centre

SI	Vision Centres	Oph. Assistant from NHM /Govt.	2019-20				2020-21			
			Total Allopathic OPD	Oph. OPD	OPD in Vision Centre	% of Total OPD	Total Allopathic OPD	Oph. OPD	OPD in Vision Centre	% of Total OPD
1	Ambasa PHC		7257	0	663	9.1	2485	0	426	17.1
2	Salema PHC		7577	673	693	9.1	2543	452	324	12.7
3	Silachari PHC		4434	2	497	11.2	1145	235	160	14.0
4	Killa PHC		2793	0	421	15.1	1698	0	124	7.3
5	Baijalbari PHC		2941	0	217	7.4	1870		86	4.6
6	Tulasikhar PHC		2401	0	253	10.5	1467	0	154	10.5
7	Dasda PHC		4425	1111	1113	25.2	1635		280	17.1
8	Jampui PHC		2326	78	202	8.7	2141	0	0	0.0
9	Jampuijala PHC		1812	470	451	24.9	1944	179	0	0.0
10	Rajnagar PHC		5776	881	881	15.3	2995	239	231	7.7
11	Rupaichari PHC		2299		642	27.9	1266	0	208	16.4
12	Pecharthal PHC		6367	0	1076	16.9	1945	0	334	17.2
13	Hezamara PHC		1597	51	301	18.8	1095		136	12.4
14	Kanchanmala PHC	1	3525	535	626	17.8	2719	608	440	16.2
15	Lefunga PHC				329				204	
16	Manu CHC		9056	609	601	6.6	3716	575	205	5.5
17	Chawmanu CHC		5110		612	12.0	1810		74	4.1
18	Ompi RH		6052	924	922	15.2	3079	451	178	5.8
19	Ramkumar Naraiha CHC		4072		569	14.0	3288		87	2.6
20	Kalyanpur CHC	1	8552	0	986	11.5	5718	0	556	9.7
21	Kadamtala CHC		24178	1054	1052	4.4	15475	1272	1256	8.1
22	Panisagar CHC	1	8828	1806	1805	20.4	4622	1174	717	15.5
23	Boxanagar CHC		7987	1257	1268	15.9	5900	407	19	0.3
24	Kathalia CHC		7310	1345	1345	18.4	3522	508	478	13.6
25	Hrishyamukh CHC		6771	766	894	13.2	2955	502	295	10.0
26	Joliabari CHC		7561	800	854	11.3	4681	477	440	9.4
27	Manubazar RH		3732	827	846	22.7	1810	413	148	8.2
28	Jirania CHC	1	23841	1831	1836	7.7	15060	2324	2118	14.1

Sl	Vision Centres	Oph. Assistant from NHM /Govt.	2019-20				2020-21			
			Total Allopathic OPD	Oph. OPD	OPD in Vision Centre	% of Total OPD	Total Allopathic OPD	Oph. OPD	OPD in Vision Centre	% of Total OPD
29	Mohanpur CHC		22546	2483	2493	11.1	11777	731	533	4.5
30	Gandacherra SDH		10985	671		0.0	6061		402	6.6
31	Amarpur SDH	1	17397	1410	876	5.0	6315	882	318	5.0
32	Tripura Sundari SDH		26730	2972	2972	11.1	12255	1726	1009	8.2
33	Teliamura SDH	2	25875	1516	1410	5.4	19833	1357	467	2.4
34	Bishalgarh SDH	1	28317	4231	0	0.0	23246	2699	3247	14.0
35	Melaghar SDH	1	21125	2587	849	4.0	11687	772	1103	9.4
36	Rajiv Gandhi Memorial SDH	1	23173	1261		0.0	11781		410	3.5
37	Khowai DH	1	18504	2532	2532	13.7	14646	1207	956	6.5
38	DH South		26203		3577	13.7	17587	415	1485	8.4
39	Mungiakami in Block Office				173				77	
40	Kakraban in Block Office				789				188	
41	Kumarghat in Block Office				1878				557	
42	Jubarajnagar in Block Office				610				184	
43	Mandhai in Block Office				308				162	
44	Dhamcherra in Block Office				189				64	
Hub	IGM Hospital	5	172516	29790			204351	14584		

Annexure – 2

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Annexure – 3

Questionnaire

Nodal Officer, NPCB, Govt. of Tripura

1. Name of the State Nodal Officer:
2. Since when he/she is looking after the programme:
3. Any other additional programmes:
   If yes, name the other programmes:
4. Any other officials / support staff to look after the programme (description):
5. Is there any designated Nodal Officer at the vision centre:
   If yes, designation:
6. Availability of tele-ophthalmology standard operating procedure for Doctors, Technicians, Nodal officers:
   Is the responsibility of each officer is defined:
7. Is the orientation / training done for all staffs at the vision centres from the State (SBCS):
   Category of HR wise orientation / training:
   Who did the orientation / training?
   Any other staff in addition to the Vision Centre also trained:
8. Any information about orientation / training done for all staffs at the vision centres from the service provider:
9. Whether Vision centre wise, node wise, type of services etc. monthly performance reports is submitted by the service provider:
10. Any analysis done based on the information:
11. Whether the monthly / quarterly Performance review meeting takes place with the service provider:
12. Whether Hub i/c is present during the meeting:
    Whether vision centre i/c is present during the meeting:
    When was the last review meeting done?
13. Do you have any structured monitoring mechanism / mentoring visit plan :(visit the plan if any, and collect the information for last one year):
14. Performance audit mechanism (description):
15. Number of Ophthalmologists in the IGM hospital:
16. Number of Ophthalmologists engaged in the node of the IGM hospital:
17. Management of Ophthalmologist at node (description):
18. Roster duty / define time slot for each Ophthalmologist against defined vision centre:
19. Additional hub established by the service provider:
20. Number of ophthalmologists at the Hub (SP):
21. Training of the HR at the Hub:
22. Electronic gadget used in the node:
23. Is the budgetary allocation for this initiative regular (Year wise funding & utilization:
24. Any payment due to the earlier service provider:
25. Details about payment mechanism: (Fixed payment / performance-based payment etc.)
26. Any penalty amount for the non-compliance:
27. What are your views about sustainability of this tele-ophthalmology:
28. Any information (evidence based) about the reduction of OOPE:
29. Observation about the new service provider in comparison to the earlier one:
30. Is unfamiliarity with tele-ophthalmology a barrier for both the patient and doctor:
31. About accuracy of the treatment, any Grievance Redressal mechanism about the services:
32. Process of settlement:
33. About the ownership of all equipment's used for the project:
34. About the ownership of data generated by the service provider:
    Available of earlier data about the performance:
    Available of earlier performance data in the new portal:
35. Any exit plan from outsourcing mode to in-house mode:
36. Present difficulties in implementing the project
37. Any other information:

Name of other Ophthalmologist work in the Hub:

1. Whether the node is in the Ophthalmic department premises of IGM hospital:
   If not, time taken to walk from ophthalmology department to node:
2. Number of Ophthalmologists in the IGM hospital:
3. Number of Ophthalmologists engaged in the node of the IGM hospital:
4. Management plan of Ophthalmologist at node (description):
5. Roster duty / define time slot for each Ophthalmologist against defined vision centre:
6. Whether any specific Ophthalmologist / specific room / specified day at the node are for the referred patient from the vision centre (Process of registration in the Ophthalmology Dept. of IGM for the referred patients):
7. Additional hub established by the service provider:
8. Number of Ophthalmologists at the Hub from Service Provider:
9. Training of the HR:
10. Bio Medical Equipment's available in the node:
11. Details about maintenance process, calibration of the equipment:
12. Electronic gadget used in the node:
13. Is there any requirement of smart phone in the project:
    If yes, describe about utilization:
14. internet connectivity at hub:
15. Quality of the image:
16. Any sub optimal image from any Vision Centre:
    If yes, list the vision centres:
17. Software used in the Centre:
    Image transfer:
    Real time consultation:
18. Average number of cases handled per day:
19. Number of pending cases per day, if any:
20. Is there, more cases due to COVID-19 pandemic:
21. How long patient's images are stored in the system:
22. Is there any backup for the data (for system failure)?
23. Any other observation:

1. About the organization:
2. When did your organization sign MoU with Govt. of Tripura for Teleophthalomology services:
3. How many centres are you covering: Hubs: spokes:
4. What infrastructure / furniture / equipment (list hub/spoke wise) / IT solution (software, computer, printer, etc) you have added in the Hub and spokes?
5. Did you get any furniture / (list hub/spoke wise) / IT solution (software, computer, printer, etc) from previous service provider?
6. What type (s) of internet connectivity are you using in the Hub and spoke? (2mb / s)
7. What is the internet speed in Hubs and spokes?
8. What is the uptime / downtime (internet connectivity) in the Hubs and spokes? Where is the information available? (90% uptime)
9. What kind of staffs did you deploy in spokes?
10. Were these staffs in the spokes retained from the previous service provider?
11. What training did you provide to different category of staffs after you took over?
12. What kind of staffs did you deploy in the Hub (From IGM or outsourced) (Ophthalmologist and other support staff)?
13. Is the performance data shared with the state Govt / NHM – how frequently – real time basis?
14. Do you have a dashboard, if yes how frequently performance of the spokes and hubs are uploaded?
15. Do DHS/SHS/NPCB officials have access to dashboard & can they download performance data?
16. Are you providing spectacles to the patients (for refractive error, post cataract)? Time lapse to provide spectacles (15 days)? Record maintenance? Is it reimburses, how frequently, at what rate (Rs. 350)?
17. How do you follow up treated cases in the VC?
18. Do you have SoP on clinical protocols used by ophthalmic technician / assistant for preparing investigational diagnosis or interpretation of ocular images/data and protection of patient privacy?
19. Do you have SoP for ophthalmology Technicians on Teleophthalmology?
20. Do you have SoP on preparation of structured prescription, diagnosis & treatment report?
21. Do you have SoP on transmission of Ocular images or EMR data or investigational report to and fro from the public health facilities (Vision Centre)?
22. Do you have SoP for transferring all the data captured and reports interpreted at the time of termination of contract?
23. Do you have SoP on operating and maintenance of medical devices, digitizer, IT hardware and software?
24. Do you have records of
    (i)   Digital cases register.
    (ii)   Attendance register of HR per day per Vision Center/Nodes
    (iii)   Details of free spectacles distributed
    (iv)   Maintenance and management register on Medical equipment and IT equipment
25. How do you monitor the performance of the Hub and spokes (virtual / physical) – frequency?
26. Who goes for monitoring visits? Feedback mechanism?
27. Any IEC activities taken up in / from Hubs and spokes?

Evaluation of Vision Centre

PART – A

Name of the Vision Centre: District:

Name of the responder (Optometrist):

1. Population covered:
2. OPD timings of the Vision Centre:
3. Schedule displayed – (Yes – 1, No- 0)
4. Fee structure (if any) displayed– (Yes – 1, No- 0), If no fee: NA
   OPD waiting area with sitting arrangement:
5. Drinking water provision:
6. Toilets for patients:
7. Monthly OPD load of the health facility:
8. Separate registration for the Tele Ophthalmology services: (Yes – 1, No- 0)

If yes continue,

   7. A. Is it through online system (*it is expected in each centre*)? (Yes – 1, No- 0)
9. Which software is being used in this Centre:
10. Is the software integrated with (Yes- 1, No-0):
   A. HMIS
   B. Hospital MIS
   C. NPCB Software
   D. Any other _____
11. Number of patients who availed tele-ophthalmology services in the:

	Disease / OPD	Screened	Treatment at Spoke	Referred
2017-18				
2018-19				
2019-20				
2020-21				

12. Integration with existing delivery systems and additional workload involved in using the new system, a view from MO i/c and other staffs:
13. Availability of tele-ophthalmology standard operating procedure for Doctors, Technicians, Nodal officers:
   Is the responsibility of each officer defined?

Human Resource:

14. Availability of HR in the health facility
   Specialist (Other than Opth):
   Ophthalmologist:
   MO:
   Staff Nurse:
   ANM:
   Lab Tech:
   Pharmacist:
   Ophthalmic Technician:
   Ophthalmic Assistant:
   Optometrist:
   Any Other related to ophthalmology: (Specify)

15. Availability of HR in the Vision centre:
   Ophthalmic Technician:
   Ophthalmic Assistant:
   Optometrist:

Vision Technician Assistant:

Any Other: (Specify)

16. Role of Ophthalmic Technician /Ophthalmic Assistant / Optometrist (If any, from health facility):

17. Optometrist & Vision Technician Assistant (From service provider) is working since (as per the agreement the new service provider may engaged the previous OT/OA):
    a. Optometrist:
    b. Vision Technician Assistant:
    c. Any Other: (Specify)

18. Training received during the service period:

Category of staff	Type of training	Duration
Optometrist		
Vision Technician Assistant:		
Any Other: (Specify)		

19. Availability and adequate use of diagnostic devices connected with tele-ophthalmology unit:

Chart / Equipment	Available in numbers	Functional in numbers	Utilizing by the centre	Photo & report stored automatically computer
Snellen Chart				
Vision Drum				
Ophthalmoscope				
Autorefractometer				
Lensometer				
Trial Lens Set (Optometry Equipment Trial box)				
Foreign body removal kit				
Retinoscope				
Tonometer				
Slit lamp				
Fundus Camera				
Digital camera				
Computers				Internet connectivity:
Printer				

PART – B

1. About equipment maintenance: Are this equipment registered under NHM BEMMP: (Yes – 1, No- 0):
2. If no, whether calibration of the equipment is done regularly (try to verify with calibration certificate or tag mark in the equipment):
3. Description about the internet connectivity:
4. Software used for sending images:
5. Availability of video conferencing facility / software for real time consultation:
6. Availability of computerized video recording system (Web Cam) for patient's disease information / others for store & forward mode:
7. Is there any User ID generated by system for each patient – (Yes – 1, No- 0) :

If yes, Can the same User ID be used in the next visit to retrieve the information?
   Whether the same User ID can be used in other Vision centres? (Yes – 1, No- 0)

8. Whether any test images are provided to the patients? (Yes – 1, No- 0)
9. how long it is stored in the system (in years): _____
10. Is there any backup for the data (for system failure)? (Yes – 1, No- 0)

Process of Screening / Treatment (mention details):

11. Services being provided - Description of the health problem of the patients expected to use the tele ophthalmology application.

Services	Yes – Y No – N	Remarks
General screening		
Screening for blindness and refractive errors		
Counselling and support for care seeking for blindness, other eye disease		
Community screening for congenital disorders and referral		Refer from RBSK & HWC or any other Health Facilities
Screening birth defects related to eyes		
Identification and treatment of Conjunctivitis		
Identification and treatment of Acute Red eye		
Identification and treatment of Trachoma		
Identification and treatment of Spring Catarrah (vernal Keratoconjunctivitis)		
Identification and treatment of Xerophthalmia		
Screening for visual acuity and for refractive errors		
Screening for Cataract		
Management of eye injuries		
First aid for injuries/ stabilization and then referral		

Services	Yes – Y No – N	Remarks
Removal of Foreign Body in Eye		
Support in management of all Acute and chronic eyes problems		
Postsurgical care for eye		
Management of Cataract, Glaucoma and Corneal ulcers		
Diagnosis and management of blindness		
Slit lamp examination IOP Test		
Slit lamp examination Fundus photography		
Slit lamp examination Optical dispensing		
Diabetic Retinopathy		

12. Cases which can be managed at the centre are they being provided any prescription: (Yes – 1, No- 0)
    26. A. Describe: _____
13. Which mode is using by the centre? (Real time – 1, Store & forward – 2)
14. Is there any time slot mentioned about the live consultation with the node – (Yes – 1, No- 0) : Description about the process of sending image, waiting time of reply from node, real time consultation etc.
15. Maintain referral register or online system (mention):
16. Any tracking system of the referred patients whether attended or not (Yes – 1, No- 0):
17. Any follow up with the treated patients (referred) at the node:
18. Post-surgical care for eye (description-process and how managed):
19. Any plan / schedule for visiting Ophthalmologist to the vision centre for mentoring the activities of Ophthalmic Technician /Ophthalmic Assistant / Optometrist: (Yes – 1, No- 0)
20. Is the performance report reflected in HMIS? (Yes – 1, No- 0)
21. Is the monthly performance report with segregated data shared with state NHM? (Yes – 1, No- 0)
22. Is the performance report linked with any payment mechanism? (Yes – 1, No- 0)
23. Is the Vision centre linked with RBSK program? (Yes – 1, No- 0)
24. Any other observation during the visit:

Evaluating Patient Perceptions

Name of the vision centre: Name of the District:

1. Name of the patient:
2. Age:
3. Sex:
4. Religion:
5. Distance from the residence to vision centre (In KM) and time taken (In Hour):
6. Distance from the residence to any secondary eye care centre (In KM):
7. Narrate the discomfort:
8. Number of visit(s):
9. Waiting period from registration to consultation with Ophthalmic Technician /Ophthalmic Assistant / Optometrist (in minutes):
10. Screening / Treatment completed at Vision Centres: (Yes – 1, No- 0)
    If no, do you need (or have done) any consultation with the Doctors of IGM:
11. Is there any direct communication (Live) with the Specialist (Ophthalmologist) during the examination – (Yes – 1, No- 0) :
12. Waiting period to consult with Specialist (Ophthalmologist) after consultation with Ophthalmic Assistant:
13. The consultation with Ophthalmologist is completed / will be completed:
    On The Same Day – 1
    Due for Any New Date- 2
14. Are you satisfied with the service provided in the Vision centre? (Yes – 1, No- 0)
    14. A. Give reasons: _____
15. Which method is more preferable (choose any one):
    Visit to Vision Centres by Utilizing Tele Ophthalmology Services - 1
    Visit to IGM Hospital Directly - 2
    Visit Any Other Private Practitioner - 3
16. Do you know the name of Doctor with whom consulted, if any:
17. Are you willing to avail the Vision Centre (Tele Ophthalmology) services again
    (Yes – 1, No- 0)
    17. A. Give reasons: _____
18. Will you suggest others in need for eye problem to attend the Vision Centre (Tele Ophthalmology) services?
    (Yes – 1, No- 0)
    18. A. Give reasons: _____
19. About the user fee (in rupees):
    Consultation:
    Diagnostic:
20. Whether free drugs are available at the facility / Vision Centre:
21. Whether free spectacles are available at the facility / Vision Centre:
22. *Details about the OOPE if any:*

Photo Gallery

Vision Center in Panisagar CHC

RRC-NE team in Mohanpur CHC

Slit lamp with applanation Tonometer module

Fundus Camera at Kumarghat VC

Vision Center in Jirania CHC

Free spectacles