Executive Summary

A visit was made to the state of Kerala from 4th August 2019 to 9th August 2019 spearheaded by Dr. Himanshu Bhushan, Advisor PHA, NHSRC with his team viz Mr. Prasanth K S, Dr. Kalpana Pawalia, Dr. Aashima Bhatnagar and Dr. Shifa Arora. The agenda of the visit was to:

- Observe how critical areas have been planned and implemented in the State of Kerala.
- Conduct a workshop on District Health Action Plan and Orientation on Indian Public Health Standards.

The visit covered Medical College Thrissur; General Hospital Ernakulam, District Hospital Wadakkancherry, THQ Hospital Chalakudy, Taluk HQ Ho spital Kanjirapilly, Taluk Hospital Irinjalakuda, MCH wing at TH Vaikom, PHC Meloor and State Training Centre at Koratty.

Key Recommendations

- **Strengthening the Supportive Supervision, assured critical areas and clinical support areas** like Emergency, General HDU/ICU establish a model Operation Theatre, LDR, CSSD, Mechanized Laundry. Development of lay out designs at the State level taking all critical aspects into consideration is very important.
- Prepare **prospective plans of all DH & SDH** as per shifting or increasing patterns of disease burden. Avoid partwise civil, electrical and plumbing work which leads to unnecessary 'make and break' at work sites.
- **Orientation Program on RCH services at Thrissur** – focus on community based services and use of RCH register. An assessment may be undertaken by the state to see any gaps in other districts as well.
- Interaction with field based/hospital staff has indicated requirement to train them, especially on Daksh based skill sets. **Establishment of Skills lab in the State may be taken up on priority**.
- It may be imperative for the State to develop a **'State-of-the-art Public Health Laboratory'** which can serve as a model for the country.
- Interaction with state team on remodelling of DH Trivandrum. The state should prepare a **comprehensive and prospective plan for DH. While keeping the heritage buildings, critical care, OPD and specialist wings can be planned besides leaving space for Medicl College.**
- Organising a **workshop for the Medical colleges on the planning of OT, CSSD, and Mechanised Laundry& Modern Kitchen**.
- A study on **Dialysis- Protocols & Outcomes** can be conducted by NHSRC in collaboration with Thrissur Medical College and Taluk Headquarter Hospital, Chalakudy.

INTRODUCTION

Kerala is a good performer in the country Vis -à- Vis health indicators. The state serves as a model pan India for drastically reducing MMR, IMR and thereby owns an honor of near-achieving the SDG goals. The state has a population of 3.48 crores (Census 2011) with population density of 1026 person/ sq. k. m. The literacy rate is 95% and sex ratio is 1109 per thousand males which is better than the national average. The birth rate is 14. 2, death rate is 6.8 and Infant mortality rate is 10 per 1000 live births. (SRS 2017) As per NITI Aayog report on "Healthy States: Progressive India" 2017-18, Kerala state has been ranked highest in overall health outcome.

Regarding health infrastructure, Kerala has 18 District hospitals, 18 General Hospitals, 81 Taluk Hospital, 232 CHCs and 864 PHCs. To cater to the needs of advance facilities in health care, there are 9 Medical Colleges. Also, there is a separate Regional Public Health laboratory at Malappuram.

Part A- Workshop

Workshop on District Health Action Plan and Orientation on Indian Public Health Standards

A two-day orientation workshop on District Health Action Plan and orientation of Indian Public Health Standards 2019 for Engineers/ Architects /CMOs & Civil Surgeons was conducted on 6th and 7th August, 2019 at GH Auditorium, Ernakulum. The opportunity was utilized to sensitize all participants regarding the Infrastructural layout of 30, 50 and 100 bedded MCH wings.

District and Hospital quality consultants, Assistant Engineers, Civil Surgeons of all 14 districts of Kerala participated in the workshop.

Mr. Suresh (State Program Officer, Kerala) initiated the meeting with a brief note on the agenda of the meeting. He explained to the participants as to why focusing on the district health planning in coordination with the engineering officials is planned so that a better health facility can be designed holistically covering all the critical areas and patient friendly environment. This was followed by an address from Dr. Raju (Additional Director, Public Health).

Dr. Himanshu Bhushan, Advisor- PHA, NHSRC explained the objectives of the workshop followed by a presentation on principles of planning where he talked about the importance of evidence-based planning for assured critical care services. He also emphasized on the need for a robust comprehensive health action plan based on identified gaps in the districts so as to provide efficient and quality service delivery envisaged under IPHS.

Mr. Prasanth, Dr. Aashima Bhatnagar and Dr. Kalpana Pawalia from NHSRC took sessions on strengthening of primary and secondary care services of a district vitalizing the concept of District Hospital strengthening, IPHS 2019 norms and Respectful Maternity Care. The layout plans for critical care areas such as LDR, Emergency, and OT, HDU, Kitchen, CSSD and mechanized laundry were discussed with the participants. The deliberations also involved discussion on layout plans of a 200 bedded MCH wing. Emphasis was given to newer concepts of MNCU and LDR.

Box-1-Key Messages in Workshop

- Improving the quality of services and providing assured critical areas in the health facilities will help in reducing the out of pocket expenditures and will also contribute for achieving the IPHS.
- Quality can be maintained with a set of standard protocols e.g. consistent gap analysis, gap filling and monitoring.
- Allocation as per function- The concept should be adhered to while planning for any health facility.
- There must be a system to measure the outcomes and create a feedback loop for continual improvements.
- Preparing action plans for the planned work with timelines can serve as a better way to achieve the targets.
- Plan for assured services as identified for DH, SDH and FRU with referral linkages.
- Regular interaction between engineers, hospital planners and clinical staff for any hospital development activities. Such interactions should continue during the execution of plan till its satisfactory completion.
- Emphasis should be given on supportive supervision.

Box-1- Key Messages in the Workshop

The afternoon session of 7th August 2019 was planned to cognize the district priorities as part of District Health Action Plan. Each district of Kerala state presented their key priorities with a commitment to achieve it (Box-2).

Key Priority Infrastructure Plans of the District

- **Kollam**

Establishment of a 600 bedded Trauma Centre, DH Kollam Establishment of CSSD & DEIC, Govt. Victoria Hospital

- **Thiruvananthapuram**
  - The whole campus has a scattered structure where a super speciality wing is being planned. The layout plan of the campus was discussed and it was suggested to keep the heritage buildings intact but may demolish the wards and other such structures which are standalone, single story and are old. The available space can then be utilised for creating a Critical Care wing where Emergency, Obstetric & General HDU, ICU, SNCU, NICU,PICU, OTs, Dialysis Unit etc can be planned. A separate but interlinked OPD and Indoor wing with various wards, support services, diagnostics and consultation room can be planned. The super speciality wing can be adjacent or interlinked. At any point of time, if desired, NHSRC can support in designing layouts.
  - The district officials participating in the workshop also prioritised creation of Critical Care Unit.
  - Establishment of Casuality, GH, TVM

- **Wayanad**

Establishment of LDR at PHC Menangady

- **Malappuram**

Establishment of Emergency department, DH Thirur

- **Idukki**

Establishment of Operation Theatre, THQH Peermade

- **Kozhikode**

Establishment of Emergency department at Thamarassery

- **Pathanamthitta**

1. Establishment of MCH block at Thiruvalla
2. Establishment of OPD block with Emergency at Kozhenchery

- **Kannur**

Relocation of service area for DH Kannur Planned for LDR at EKNMH, Mangattuparamba

- **Kottayam**

1. At Government Hospital Kottayam, establishment of separate OPD and Emergency entrances.
2. Establishment of LDR at GH Changanassery
3. Establishment of MCH wing at Vaikom

- **Kasaragod**

1. Reorganisation of OT space
2. Expansion of DH to 400 beds
3. Expansion of General Hospital to 200 beds

- **Palakkad**

1. Expansion of ICU to HDU at District Hospital Thrissur
2. Preparing SoPs for causality department at DH Wadakkanchery

- **Ernakulam**

1. Establishment of MCH wing at GH Muvattupuzha
2. Establishment of Hemophilia unit, HDU, CSSD and MCH wing at DH Aluva
3. Establishment of LDR and NBSU, Improving dietary department at Talukh Hospital

In the concluding remarks Dr. Bhushan explained to the districts that almost all activities identified by them are important based on the need but these requirements should be in alignment with the expected improvement and service delivery targets. He also emphasized that the activities are subset of planning, so the planning has to be prospective and holistic as per Indian Public Health Standards. These activities should be prioritized within the comprehensive District Health Action Plan.

Part B- Field Visits

Visit to Thrissur Medical College

District Thrissur has one MCH Hospital, 1 District Hospital, 2 General Hospital, 6 Taluk Headquarter Hospital, 24 CHC's, 79 PHC's and 424 Sub Health Centres.

A public funded Tertiary Healthcare Institute, Government Medical College Thrissur, established in 1982 is one of the leading centres in medical education in Kerala, with bed strength of 1436.

Visits were made in the Department of Emergency, Labor Room, Neonatal Intensive Care Unit, Dialysis Unit, Central Sterile Supply Department, Hospital Laboratory and Laundry**.**

Key Observations

A Department of Emergency Medicine:

A.1.The emergency department provided comprehensive Surgical, Medical and Emergency Obstetric care.
A.2.Triaging was done but there was a mix up (Red Yellow and Green) of different zones.

B. Obstetrics & Gynaecology:
B.1.The delivery load of the facility was 250-300 cases per month.
B.2.Case sheet notes were duly filled. Understanding of Partograph filling requires improvement.
B.3.The number of maternal deaths that occurred (FBMDSR) in previous year was three.
B.4.The Labour room set up was divided into stages as labour progressed. It should develop LDR as per national protocols.

(The first stage had 10 beds and pregnant women stayed in Stage I till cervical dilatation of 10 cm. Later, they were shifted to Stage II where delivery was conducted.) This division of space has resulted in 'less than required' space available to the room where actual delivery takes place.)

B.5.Sluicing of the linen was done at the point of care.

C. Neonatal intensive Care Unit and Pediatric Intensive Care Unit:
C.1.NICU had 5 radiant warmers with a BOR of 92% and PICU with 2 radiant warmers.
C.2.There were direct admissions to these units.
C.3.Inborn admission rate to NICU was approximately 50 percent.

D. CSSD and Laundry:
D.1.The Laundry area was in the basement section of the building.
D.2. It had 3 areas- Sluicing area, Washing area and drying area.
D.3. Linen was segregated into 3 categories namely OT linen, Clean linen and Unclean linen. The OT and unclean linen were sluiced in the laundry. There were separate units for washing all 3 types of linen. It was told that any mixing between the linen was avoided.
D.4.The department had 6 heavy duty autoclaves. The autoclaved drums had sterilization indicator strips, but used only inside the drum.

E. Dialysis Unit:
E.1.There were 12 dialysis machines which were functional.
E.2.Average of 40-45 dialysis per day were done in 4 shifts
E.3.The institute has surged the capacity of Staff Nurses by training them for operating dialysis as there was limited human resource of Technicians.

F. Central Laboratory:
F.1.All departments had their own sample collection area which were transferred to the central laboratory twice in a day.
F.2.The samples were segregated at the reception area of the main laboratory and then sent to the specific laboratories.
F.3.The liquid waste management required improvement in Haematology lab and washing area.
F.4.In microbiology lab, only bacteriology was being done.

G. Other Observations:
G.1.The staff on duty was performing their duties sincerely.
G.2.The facility was clean but cleaning protocols were not available.
G.3.Also, technical protocols like Triaging, Zoning, LDR, Linen Collection & Transportation, Decontamination, washing, autoclaving, store maintenance and liquid waste management needs to be improved.
G.4.GOI guidelines on establishing & practicing protocols for various service areas need to be integrated.

Box-3

Sample Collection area in Triage area of Emergency

Entrance to Triage area of Emergency

Primary Health Centre, Meloor

A visit to Primary health Centre Meloor was made on 5th August 2019 to understand the practices in place, especially relating to engagement of community. This PHC caters to a population of 35,000 (approx.) and had 6 Sub centres under it. The daily outpatient foot fall was 70 patients on an average. There were dedicated days for Non-Communicable Diseases clinic on every Wednesday and Thursday of the week. The OPD on such days were 100 patients in a day. The number of registered pregnancies was 92 and the number of estimated pregnancies for the year was 360.

The staff posted at the PHC was 1 Medical Officer, 1 Staff nurse, 1 Pharmacist, 7 Junior Public Health Supervisor, 4 Junior Health Inspector and 1 Lady Health Supervisor. Following the Kerala Palliative Care Model, the PHC has a dedicated human resource which provided pain and palliative care at community level.

Under NCPDCS programme, screening of 25000 people was completed. The screening at the population level was done verbally and CBAC forms were not used. Regarding ANC visits, it was observed that though the 4 ANC visits were completed by pregnant women, the spacing between 2 visits was inadequate. In fact, the ANC visits were getting completed in about 28 weeks. In the pharmacy, 110 drugs out of 120 in the EDL were present at the PHC. The inventory of the drugs was stacked using First IN First OUT (FIFO) method. The store was well maintained. The Ward member from Panchayat participated in all VHSNC meetings. Consolidated report from all 17 sub-units within the PHC catchment population was being discussed in the meeting. It was heartening to know that Panchayat is closely working with PHC staff for improvement of its amenities had sanctioned.

The PHC is located in such a place where it caters to population who would otherwise need to travel to the town (about 12-15 Kms away) to access basic healthcare. Efforts have recently been made to operationalise the lab services which was critical for provision of OPD care. The PHC is functioning in a new building constructed adjacent to the old building where ‘Thanal’, a space for interaction of geriatric population is provided.

Box-7 Key Observations & Suggestions

1. The drug store and drug dispensing system was very efficient.
2. The staff is very sincere and proactive.
3. There was active participation of community representatives in HMC.
4. The RCH registers were not updated and old versions of register were in use.
5. Supportive Supervision and handholding visits by District RCH officer was limited. Same is the case with Block MO as to the support provided to JPHS.
6. On interaction with Health Supervisor, it was found that he looked after RMNCHA, NVBDCP, RNTCP and NLEP of the block. He told that the expected number of TB cases in the block was 10, out of which 7 were registered with them. 2 out of the 3 missed patients were receiving treatment from private set ups.
7. L forms in IDSP portal were not being reported as there was no In-house laboratory.
8. The PHC has not received any HMC funds in the last 4 years

Taluk Headquarter Hospital, Chalakudy

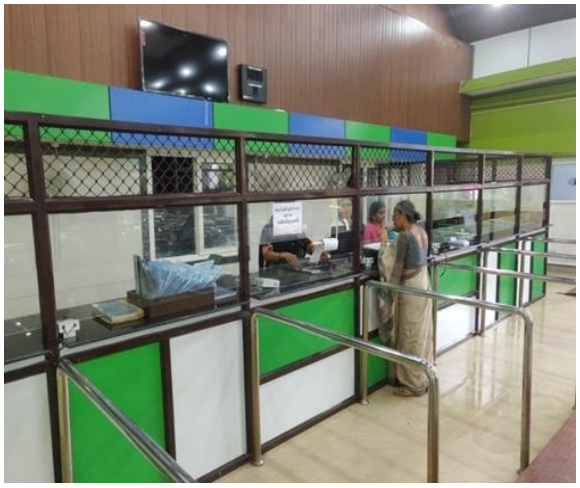
The Chalakudy THQH has 144 sanctioned bed strength whereas functional bed is 215. The bed occupancy rate was 50%. The daily OPD is 1000 patients. There are approximately 70 deliveries conducted with 40% done through C-section. There was in house laboratory facility (9 Laboratory technicians in number) with 40,000 tests done per month. The facility was NQAS and KASH (Kerala Accreditation Standards) certified. The hospital was affected by 2018 floods, where the water had reached the level of floor 1 of the building.

There were 25 sectioned post of doctors, 19 specialists (Medicine- 1, Surgery- 1, Orthopaedics- 1, ENT- 1, Opthalmology-1, Obstetrics & Gynaecology- 3, Anaesthesia-2, Pediatrics-2, and Dental-1) and 6 Casualty Medical Officers. The number of Staff Nurses posted was 26 (plus 16 contractual).

The hospital had patient calling system at Registration area, OPDs and while drug dispensing at the Pharmacy. The major departments of the hospital were color coded and coding was used to guide the patients to the respective departments from the hospital entrance. Dialysis Unit was well functional.

The hospital had developed SOPs –some developed through an internal consultation and the other protocols collated from well- evidenced practices

An organized Drug Inventory at THQH Chalakudy



An OPD facility at THQH Chalakudy

The hospital was divided into different blocks which were colour coded for ease of location for the patients in which the patient follows a colour and reaches the service delivery area. In addition, the hospital premises was neat, clean and systematically organised. The facility has a sincere and proactive leader. It should serve as a role model for the state.

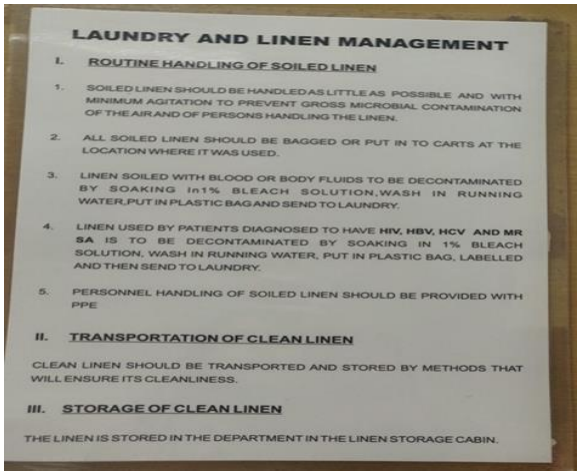
The hospital was badly affected by floods in 2018 and the way they have recuperated has become a best practice for the other states.

The level of water (marked in red) in the hospital during Kerala Floods 2018.

District Hospital, Ernakulum

General Hospital Ernakulam is a 783 bedded multispecialty hospital with 18 specialties functional. The facility has currently five OTs. The Casualty at the District hospital had 4 observation beds, 1 Operation Theatre, Sick Newborn Care Unit and Surgical ICU. The department had displayed the process flow maps at the notice board. The Red and Yellow

Zones were present in one room where all the patients were provided care. The separation, however is not well adhered to protocols. The Central Sterile Supply Department had Decontamination area, packing area and Sterilization area. The Kitchen had separate washing area, cooking area, chopping area and office. The CSSD and Kitchen have scope of improvement. (Constraints are largely related to space). A model layout design was shared for institutional Quality Assurance Committee to discuss.



Protocols listed for linen management

Dietary Department of DH Ernakulum

Other Health Facilities visited (Details in Annexure I)

The primary objective of the visit was to assess the critical care areas of these facilities in terms of infrastructure preparedness, linkage with rest of the service areas and training needs of HRH. The visits were made to the following facilities:

- THQH Kanjirappally for Emergency Services
- MCH Wing Vaikom
- State Training Institute, Koratty
- DH Wadakkancherry for Emergency & Labour Room Complex
- TH Irinjalakuda for Emergency Services

The following recommendations were given to these institutions:

For Emergency Services:

- The Emergency should be located at the most visible and accessible place of the hospital preferably in the outermost zone that is readily accessible to patient/attendants. It should have direct entrance for ambulance and other vehicles.
- Emergency should have established linkages with Labour room, emergency OT, Blood bank/storage, HDU/ICU and surgical wards etc. along with support service areas like mechanized laundry and CSSD.
- There should be areas marked for triaging, Red, Yellow and Green zones with adequately trained staff.

- In case the space on ground floor is limited, Green Zone and emergency OT can be placed on first floor and should be accessible through lift as well as ramp.
- The layout of the Emergency should be such that it allows easy movement between the zones.
- The state should plan to post persons trained in Emergency care (doctors, nurses, paramedics) who are available round the clock in Emergency.

For MCH Wing

- It is suggested that all new Labour rooms should be remodelled as Labour- Delivery-Recovery complex.
- The concept of Respectful Maternity Care should be practised.
- The MCH wing should have SNCU, Obstetric OT, and Obstetric HDU & ICU as per the GOI guidelines.

For Training Institute

- It was suggested that the state should make a Training Centre based on the Training Needs Assessment in the state
- It should identify the number and type of trainings to be provided in this Training centre.
- The layout of the centre should be as per the type of trainings to be provided.
- The accommodation in the centre should be both for faculty and participants.
- For Ernakulam district, State Training Institute, Koratty can be developed as the Training Centre.
- The Leprosy Sanatorium Koratty has about 600 acres of land and state can think to utilise the space innovatively for creating a Centre of Excellence in Ayurveda and Alternate systems of Medicine through their own resources. This can be made viable since Kochi attracts many national and international tourists.

Annexure-I

THQH Kanjirappally

Kanjirappally THQH is one of the 5 Taluk hospitals of District Kanjirappally. THQH Kanjirappally has 142 sanctioned beds with monthly bed occupancy rate of 66%. The average daily OPD is 19 and OPD load is 850-1000 per day. The number of average daily emergency cases ranges from 400-500 including MLC and accident. It has 11 specialties. The delivery load was 25-30 per month. Visit was made to its new building which was under construction, as requested by workshop participants.

Box-4 Key Observations & Suggestions

The superstructure is already in place. Due to the difference in the floor levels on both sides of the building, and some other buildings nearby, the entrance to the emergency has been fixed (well, it would have been better to shift it but the terrain and already built superstructure would not allow it). The ground floor has emergency services planned. The problem is that between the zones (Yellow, Red, and Green) there are walls or other forms of obstructions that would prevent smooth flow. Suggestions were given to alleviate some of these, based on the existing layout design. Further suggestions can be given if revised layout design is shared.

Under construction building THQH

Deliberations of NHSRC team with MS THQH Kanjirappally

MCH Wing Vaikom

A visit to the building under construction of MCH Vaikom was made on the same day to foresee the progress of its MCH wing. MCH Vaikom caters to a population of 3,10,414 and has 272 functional beds (in old building). The bed occupancy rate was 180-200% and a new building with 5 floors is under construction. The district officials had invited the team to oversee if the building construction was as per the guidelines or any modification was required.

The floor wise plan as discussed by contractor/other team members;
GF- OP, Pharmacy, Casuality, administration.
G1-USG, Lab services, scanning, blood bank, OT.
G2- LR, Gynecology OPD, OT, NICU.
G3- Wards. G4- Wards.

G5- Deluxe private rooms.

Box-5 Key Observations & Suggestions

The building had OT on two floors; both of them constructed similarly and hence had encountered similar issues. The entry from the corridor provided access to the clean zone of the OT and it was suggested that a barrier be created to create a protective zone. The OT wall was opening into the dirty corridor which needs to be closed. A provision to take out the waste from the OT needs to be created by way of a hatch box with UV radiation to prevent bio- magnification.

The contractor for civil work is completing the work in a matter of weeks. The contract for electrical work is yet to start. This will result in breaking of tiles and walls to create provisions for electrical points. The contractor for plumbing is 'awaiting' his turn as well. It is better that a coordinated work is instituted to avoid unnecessary 'break-and-build' process. The design and layout plan is not as per the GOI guidelines on MCH wings.

MCH building under construction at THQH Viakom

Interactions with Architects, Quality manager and MOs regarding Infrastructure at THQH Viakom

State Training Institute, Koratty

There is only one state level training Centre in the state of Kerela which is located in Trivandrum. The participants have to travel long distance to reach the Training Centre. So, the state had decided to establish one more Training centre in district Thrissur for the convenience of the participants which reduces the travel time to 50%. DPM, Thrissur had invited the team from NHSRC to visit the construction site and give their inputs on the layout. On 9th August a visit to the state training institute was undertaken to see the progress of the construction and layout plan. The construction is expected to be completed in about 6 months' time. The infrastructure as of now has planned only for accommodation of faculty. The training centre is located in the sanatorium campus which is located about 10 Kms from the nearest town (Chalakudy). It would be better if accommodation facilities for the participants/trainees are also arranged within the same campus which has space for new construction. All Academic requirements were present but it was recommended that a library should be set up for further strengthening.

Premises of Training Centre Koratty

DH Wadakkancherry

The visit was requested by the district to oversee the construction of Emergency and Labour Room complex, which are being newly constructed. The district hospital has 117 beds. The average OPD is 1000 and IPD is 100. About 8 specialities are operational. There are 18 specialist doctors and 31 GDMOs in place. The hospital is planning to redo the labour room complex. There is also an adjacent building coming up for Emergency. It was suggested that the new labour rooms be modelled as LDR. The lay out design of the complex was discussed with institutional level team for necessary modifications. The building for management of emergency has been constructed and is awaiting operationalization. The space management for receiving the patient, and spread of zones (yellow, green and red) has been compromised. Suggestions for movement within the space were discussed. But scope for a major change in a newly constructed building is bleak.

Visit to TH Irinjalakuda

Before finalising the Emergency, the district officials wanted the recommendations of team from NHSRC on the layout designs as the new building being constructed has some space constraints. The hospital has 216 beds with 11 specialities functional. There is also a ‘one stop crisis centre’ established within the premises. The new building coming up was located in such a way that on one side the road level opened to the OPD block while the entrance from the other side gave access to the emergency block. The construction will take place in two phases

Box-6 Key Observations & Suggestions

The construction in the lower floor is nearing completion and the other floors are also coming up. The emergency department is planned in such a way that in the same floor (ground) Yellow, Green and Red zones are planned along with OT. The corridor which leads to these service areas is the same. It was suggested that in order to implement zoning the emergency rooms with three zones be planned on the other side of the OT (from the entrance). There is also a requirement to close / restrict the entry (say, as fire exit). Details have been shared on site with the facility team.

with a total cost of 19 crores. The building also had lab, pharmacy and X-ray facility. For an upcoming cancer centre, budget has already been assigned by the municipality.

THQH Irinjalakuda

Sakhi one stop centre at Irinjalakuda