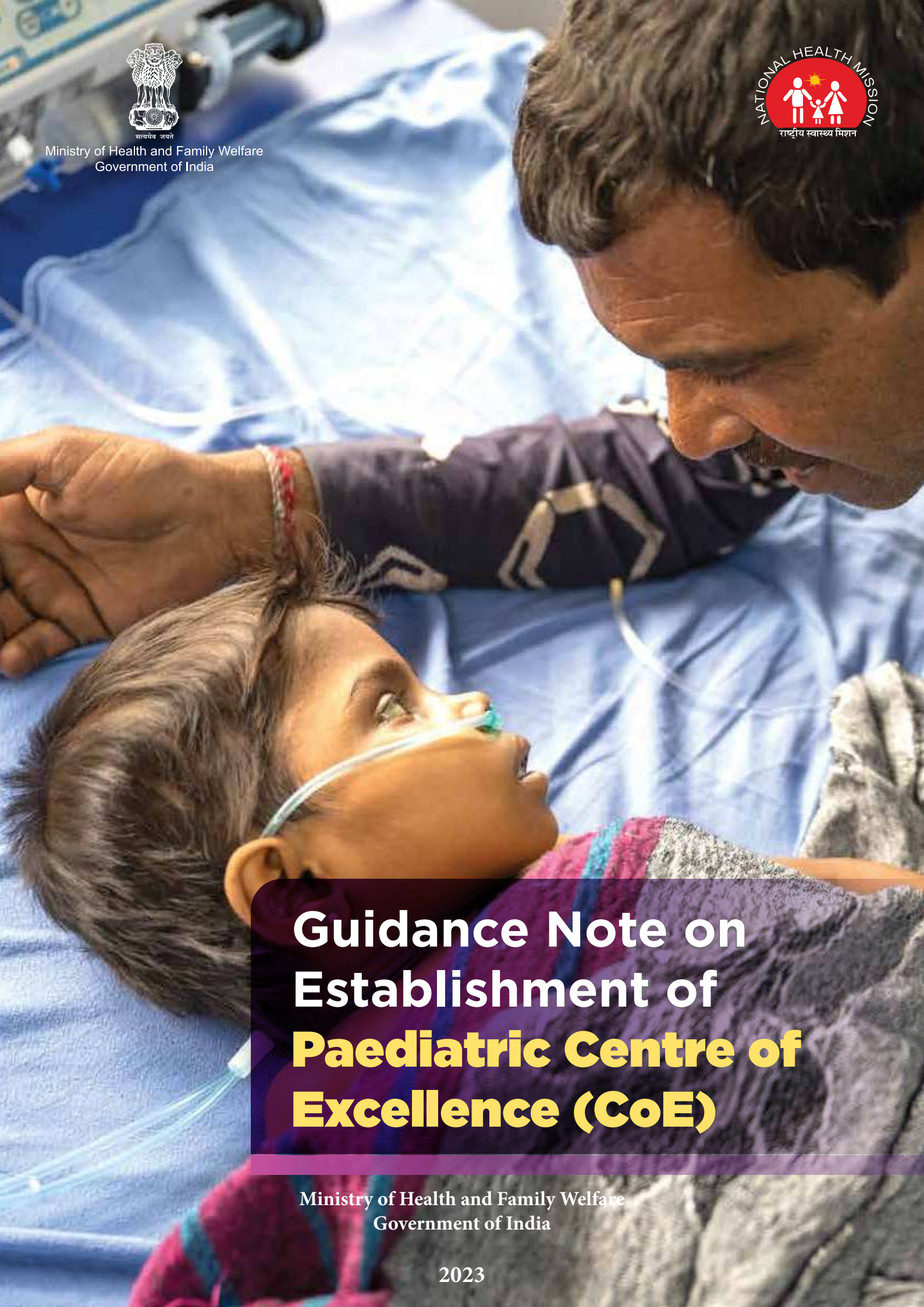

सत्यमेव जयते
Ministry of Health and Family Welfare
Government of India

NATIONAL HEALTH MISSION
राष्ट्रीय स्वास्थ्य मिशन

Guidance Note on Establishment of Paediatric Centre of Excellence (CoE)

Ministry of Health and Family Welfare
Government of India

2023

सत्यमेव जयते

Ministry of Health and Family Welfare
Government of India

NATIONAL HEALTH MISSION
राष्ट्रीय स्वास्थ्य मिशन

Ministry of Health and Family Welfare

Government of India

Guidance Note on Establishment of Paediatric Centre of Excellence (CoE)

2023

एल. एस. चाँगसन, भा.प्र.से.
अपर सचिव एवं मिशन निदेशक (रा.स्वा.मि.)
L. S. Changsan, IAS
Additional Secretary & Mission Director (NHM)

सत्यमेव जयते

भारत सरकार
स्वास्थ्य एवं परिवार कल्याण मंत्रालय
निर्माण भवन, नई दिल्ली - 110011
Government of India
Ministry of Health & Family Welfare
Nirman Bhawan, New Delhi - 110011

FOREWORD

At various global platforms, India has reiterated its commitment to lead the child survival initiatives in the region. Under National Health Policy (2017), India has set-up more ambitious target to reduce Under 5 Mortality Rate i.e. 23 per 1000 live births by 2025 in comparison to target set under Sustainable Development Goals (25 per 1000 live births by 2030). India stands committed towards these targets and to work towards ending all preventable deaths in children.

Under Emergency COVID Response Package II, Ministry of Health and Family Welfare (MoHFW) has provided technical and financial support to States/ UTs to establish and strengthen Paediatric care services at various level. Paediatric Centre of Excellence (P-CoE) has been set-up in Medical Colleges to establish linkage with district and sub-district level facilities and provides hands-on support to further strengthen paediatric services to reduce childhood morbidity and mortality.

The Guidance Note on Establishment of Paediatric Centre of Excellence (CoE) is a welcome step in the direction of setting standards for paediatric facilities and service delivery. I am optimistic that this would be helpful in strengthening paediatric services at the district hospitals and sub-district hospital level that are envisaged as the hub of effective curative care for children and contribute in a significant way to reducing preventable child mortality in the country.

I wish you the very best for your efforts and look forward to your continued support as we move together to improve child survival and their quality of life.

(Ms. L S Changsan)

'A' Wing, Nirman Bhawan, New Delhi-110011
Tel. : 011-23061723, 23061773, e-mail : lschangsan@nic.in

NATIONAL HEALTH MISSION
राष्ट्रीय स्वास्थ्य मिशन

सत्यमेव जयते

भारत सरकार
स्वास्थ्य एवं परिवार कल्याण मंत्रालय
निर्माण भवन, नई दिल्ली-११००११
GOVERNMENT OF INDIA
MINISTRY OF HEALTH & FAMILY WELFARE
NIRMAN BHAVAN, NEW DELHI-110011

डॉ. पी. अशोक बाबू, भा.प्र.से.
संयुक्त सचिव
Dr. P. Ashok Babu, IAS
Joint Secretary

PREFACE

Providing quality paediatric care services through the public health facilities is one of the mandates of the National Health Mission. Health systems strengthening over the last decades have brought considerable improvement to the infrastructure and availability of human resources, while ensuring better availability of drugs, equipment and ancillary services.

These Guidance Note on Establishment of Paediatric Centre of Excellence (CoE) is intended to provide specific guidance to State Programme Managers of the National Health Mission for strengthening paediatric services in the States/ UTs. This is an important step in addressing the linkage of various facilities across the States/ UTs to improve child health services which are the leading causes of under-five mortality. It will also helpful to build the capacity and empower healthcare providers (doctors and nurses) in the acquisition of paediatric critical care skills, rationale treatment, monitoring and follow-up.

The document has been developed to guide States/ UTs to establish Paediatric Centre of Excellence to strengthen the delivery of acute care, promote learning opportunities (workshop, capacity building and mentoring) and encourage multidisciplinary collaboration with research institutes.

We earnestly hope that the Guidance shall be used constructively at State level for strengthening provision for facility based paediatric care and providing timely and quality care to the large number of children for whom hospital services are sought. We would like to thank all the technical experts who participated in the discussions during the formulation of the guidance document and shared their valuable experiences and suggestions.

(Dr. P. Ashok Babu)

Room No. 243 (A), 'A' Wing, Nirman Bhawan, New Delhi - 110011
Tel. : 011-23061447 E-mail : jsrch-mohfw@gov.in

DR. SHOBHNA GUPTA
Deputy Commissioner Incharge
Child Health & RBSK
Telefax : 011-23061218
E-mail : shobhna.gupta@gov.in
drshobhna.mohfw@gmail.com

GOVERNMENT OF INDIA
MINISTRY OF HEALTH & FAMILY WELFARE
NIRMAN BHAVAN, MAULANA AZAD ROAD
NEW DELHI - 110011

ACKNOWLEDGEMENT

As we reflect on our journey thus far, it fills me with immense pride to witness the remarkable impact we have made in the lives of countless children and their families. Our country has achieved Under 5 Mortality Rate of 32 per 1000 live births in 2020 and we are on track to achieve targets set under Sustainable Development Goals (25 per 1000 live births in 2030).

As we celebrate our achievements, let us also remember the challenges we have faced and overcome together. The COVID-19 pandemic presented unprecedented obstacles, testing our resilience and adaptability. However, despite the adversity, National and State/ UT team stood strong, displaying exceptional professionalism, compassion, and perseverance to further strengthen Child Health Services to achieve better health outcome.

During pandemic, Paediatric Care strengthening stands as a shining beacon of hope, providing top-tier medical care to our young patients with unparalleled expertise and compassion. From routine check-ups to complex surgeries, from critical care to rehabilitation, Health Workers have consistently demonstrated an unwavering commitment to delivering exceptional care at every step.

Considering the need, Ministry of Health has developed guidance document on Paediatric Centre of Excellence and its linkage with District and sub-district level paediatric units, encourage research and innovations on paediatric care and lot more.

Cont'd on next page

This would not be possible without the collaborative efforts of experts, NHSRC Team, State/ UT Team, development partners and specially Child Health Team led by Dr. Sumita Ghosh [Ex- Additional Commissioner (Child Health)] who supported and played a crucial role in developing this guidance document. Your commitment to excellence, attention to detail, and compassionate approach make a significant difference in the lives of those we serve.

Looking ahead, I am confident that our Pediatric Centre of Excellence will continue to thrive and reach new heights. Together, we will forge ahead, driven by our shared passion for providing the best possible care to our young patients. Let us embrace the future with optimism, knowing that our dedication to excellence will guide us through any obstacles we may encounter. Together, we are shaping a brighter and healthier future for our community.

(Dr. Shobhna Gupta)

LIST OF CONTRIBUTORS

MOHFW

- Ms L S Changsan, Additional Secretary & Mission Director (NHM), MoHFW
- Mr. Vishal Chauhan, Joint Secretary, MoHFW
- Dr. P. Ashok Babu, Joint Secretary – RCH, MoHFW
- Dr. Shobhna Gupta, Deputy Commissioner – CH
- Vishal Kataria, National Technical Consultant –CH, MoHFW
- Dr. Vaibhav Rastogi, Lead Consultant – CH, MoHFW

National Health System Resource Centre

- Dr. Himanshu Bhushan, Advisor – PHA, NHSRC
- Dr. Aashima Bhatnagar, Sr. Consultant – PHA, NHSRC
- Dr. Kalpana Pawalia, Consultant – PHA, NHSRC
- Dr. Ashutosh Kothari, Consultant – PHA, NHSRC

Experts

- Dr. Sumita Ghosh, Ex-Additional Commissioner – CH, MoHFW
- Dr. S. Ramji, Ex- Dean MAMC New Delhi
- Dr. M. Jayashree, Professor, PGIMER Chandigarh
- Dr. Rakesh Lodha, Professor, AIIMS, New Delhi

Development Partners

- Dr. Vivek Singh, Health Specialist – UNICEF India
- Dr. Vandana Bhatia, Health Specialist– UNICEF India
- Dr. Priyanka Singh, UNICEF India
- Dr. Ashfaq Bhat, Director – NIPI
- Dr. Deepti Agrawal, NPO – WHO India

Mission

To offer dynamic, comprehensive, and innovative learning and consultation experience that will enable healthcare providers to expand their knowledge and enhance their professional skills to meet the healthcare needs of acutely ill children in facilities with a HUB and SPOKE Model.

Objectives of CoE

To guide the States/UTs in planning and operationalizing an Intensive care unit (ICU)/Hybrid HDU having invasive/mix of invasive and Non-invasive beds.

To provide expertise in operationalization of paediatric Tele-intensive care unit/ tele-consultation services in HUB and SPOKES.

To build the capacity and empower healthcare providers (doctors and nurses) in the acquisition of paediatric critical care skills, rationale treatment, monitoring and follow-up.

To facilitate timely referrals and safe transport of complicated cases to appropriate facility.

To establish the mechanism of continued education, mentorship and promoting research in paediatric emergency and intensive care.

The Paediatric CoEs would continue to mentor and support paediatric critical care at District Hospitals.

To achieve the above objectives following points need to be considered

- The CoE can be established in a Medical College or in Institute of National Importance (INI) such as AIIMS, PGIMER, JIPMER, etc. or at a Tertiary Level State Government Hospital.
- The CoE as HUB will be providing tele-ICU services to the District Hospitals as SPOKE facilities, mentoring and technical handholding to District Paediatrics unit(s).
- Under ECRP II, the State/UT has been supported for software development. The State/UT may also opt for tele-ICU software developed by CDAC; wherever, existing software is being used, it should be continued for teleconsultation.
- Support to the District Hospitals or District Paediatrics units will be based on the number of such units created or available, and connected to the CoE.

Operational framework

- Departmental Head would oversee the Paediatric CoE and may nominate Paediatrician as Nodal person for operational aspects.
- Paediatrics CoE would also be supported by nursing personnel posted at newborn and SNCU unit as per the need-and-decision of the In-charge.
- Overall coordination between HUB and SPOKES would be carried out by CoE coordinator (hired on honorarium basis) and maintain the records.
- Specialist (Paediatrician/Neonatologist) may be hired for teleconsultation support on need basis and may be paid consultation fee as per budgetary norms of ECRP II.
- All the data (clinical and research) will be shared with the State/UT health department and Central Ministry.

Proposed components of CoE programme

A. Establishment of CoE

B. Training of healthcare personnel

C. Mentorship for SPOKES (DH/SDH/CHC) by HUB (Medical colleges/tertiary care institutions)

A. Establishment of Centre of Excellence Tele-PICU

A Centre of Excellence for paediatric care is a functional unit at the medical college or tertiary care institution which has a defined number of paediatric beds, non-invasive and invasive care units.

It should have all requisite HR i.e., paediatrician, neonatologist, trained nurses, paramedical staff along with support services and staff. The unit should have all essential equipment, drugs, and consumables for the effective delivery of neonatal care and services in paediatric wards, HDUs and ICUs.

Such units of the medical college must be established as HUB for supporting and building the capacity of service providers functional in the SPOKES i.e., DH/SDH/CHC or any other facility equivalent functional at that level. These units should be capable to guide and mentor the services in all the attached SPOKES. The existing infrastructure in the HUB or the SPOKE needs to be modified/upgraded with the required number of beds for which States/UTs need to mobilize resources through ECRP II or other State's/UT's own resources.

The various important components of this unit shall be:

I. Tele-Paediatric Intensive Care Unit

A comprehensive gap analysis may be undertaken for all the facilities to strengthen the tele-ICU in a time-bound approach to plan for the necessary procurement related to equipment and consumables. While undertaking the facility level gap analysis, the equipment which are in position as per the latest IPHS/as per the eICU concept note/e-sushrut/e-sanjeevani in District Hospitals/Sub-district hospitals are needed to be taken into consideration to avoid duplication.

II. Suggestive models of tele-ICUs

Three types of eICU or tele-ICU care models are available in the literature:

- **Continuous care model –** Remote monitoring of patients in distant ICUs on a continuous basis for a defined period which may be 24/7 or any other as agreed by both organizations. This model uses an operational centre staffed by a team of ICU physicians or Intensivists, trained Nurses, and other healthcare workers. It requires State/UT -of-the-art technology backup with the active support of IT professionals.
- **Episodic care model or Scheduled care model –** Remote care that has a periodic predetermined schedule (daily rounds, shift changes).
- **Responsive (Reactive) care model or case-based –** Reactive, episodic care, which occurs when a remote consultation is prompted by an alarm or telephone call and is usually unscheduled.

The above models can be delivered through two structures, a centralized or a decentralized tele-ICU

1. In the **centralized tele-ICU**, there is a remote physical setting in which physicians and other staff connects to one or more multiple facilities. Ideally, establishing a centre of excellence as centralized tele-ICU is desirable.
2. In the **decentralized tele-ICU**, one or more physicians and/or nurses are not located in a defined structure and have access to the ICU patient utilizing computers or mobile devices from any location.
    - Ideally, a continuous monitoring model is desirable to ensure round-the-clock tele-services and effectively monitor the emergency cases at the SPOKE.
    - However, of the care models available and considering the constraints, the scheduled care model appears to be the workable solution. In this, a team of Intensivists and other healthcare professionals may assemble in a central location (HUB) and be connected to different locations (SPOKE) at a predetermined schedule. They can thus serve multiple locations on the same day. A separate smaller team may also be constituted to attend emergency calls emanating from any location. This will help in

the orderly delivery of services. The actual number of HUBs and SPOKEs will depend upon the ICU beds and their occupancy, acuity of care required and availability of human resources.

a) The process of establishing various modalities of telemetry services at HUB and SPOKE may be elaborated owing to veracities in the field while its implementation.

b) In every District, a teleconsultation HUB is being supported separately which can be utilized for undertaking teleconsultation for any programme including capacity building in critical care. Tele-ICUs are primarily for training on clinical skill demonstration, however, since ICUs are not a place for bringing too many people or learners, their use is selective for guidance on the management of critical cases only.

c) Thus, it is suggested that both in HUB and SPOKEs, facilities for teleconsultation and tele-ICUs can be available while SPOKEs for teleconsultation can be in any number of health facilities where the capacity building of services providers for various programmes is required. However, SPOKEs for ICUs shall be limited to the facilities where ICUs/ hybrid HDUs are established.

Figure 1: Illustration of the varied type of services available at HUB and SPOKE

III. Scope and advantages of Tele-PICU

- Telemedicine is being increasingly used for the delivery of paediatric expertise in remote emergency departments, in-patient wards, and intensive care units.
- Telemedicine technologies involve real-time, live, interactive video and audio communication and allow paediatric critical care physicians to have a virtual presence at the bedside of critically ill children.
- Telehealth technologies allow specialists, including paediatric emergency physicians and intensivists to extend their expertise more quickly and easily by eliminating time and geographic barriers.
- With the current pandemic, the adoption of telemedicine technology ensured a continuum of care for several ailments.

- In India, considering the shortage of trained paediatric critical care providers, tele-PICU will help in providing the expertise to remote areas.
- Tertiary care facilities where State/UT -of the-art PICUs is concentrated will be less over-burdened with premature/inappropriate referrals if timely stabilization is achieved by tele-PICU.
- Diagnostic assistance and actionable decision support by tele-PICU would preserve golden hours of initial stabilization and improve outcomes.
- Hospitals linked with Tele-PICU can thus enhance efficiency and will be a cost-effective venture.
- Tele-PICU will also establish a network between the mentoring and mentee ICUs in the region, thus going a long way in streamlining the process of referrals and back-referrals.
- Tele-PICU will serve as an excellent platform for continuing education, interaction, and quality improvement.

IV. Range of services to be provided by Tele-PICU

a. Critical Care Consultations for Hospitalized Children

Teleconsultation can be structured as follows:

Virtual rounds of linked PICUs: These detailed rounds (including any additional need-based consultations) will oversee the diagnostic studies, medications, other interventions, and clinical status of patients admitted to PICU. Respiratory support including mechanical ventilation, inotrope/vasoactive therapy, dialysis, and other organs supportive care will be supervised with decision support and suggestions. The plan for the day will be reviewed and inputs will be provided.

b. Teaching and training of acute care providers

1. **Case-based interactive sessions:** Real-life case-based scenarios will be conducted between mentee and mentor hospitals twice weekly to ensure cross-learning and selecting appropriate treatment plans.
2. **Guidelines updates:** Time-to-time updates of recent management guidelines related to COVID-19 in children and MIS-C.
3. **Infection prevention and control (IPC):** Sensitization of doctors and nurses towards IPC practices, biomedical waste, and antibiotic stewardship principles.
4. **Acute care skills:** Skills training will be imparted on important topics, like, oxygen therapy, High Flow Nasal Cannula use, CPAP and non-invasive ventilation, basics of mechanical ventilation, inotrope/vasoactive drug therapy, use of a defibrillator and cardiopulmonary resuscitation.

V. Pre-requisite for a telemetry setup

(a) A secure internet connection with a broadband connection having a speed of a minimum of 100 Mbps.

(b) A video platform which may be direct to consumer system PC-based and app-enabled smartphone technology.

(c) Technology support for tele-ICU - software compatible with the other critical lifesaving devices in the proposed ICU.

(d) Electronic Medical Records (EMR) of the patients being treated.

(e) Video-conferencing facility with a recording device.

(f) Peripherals & video assist devices, like 'Telemedicine Cart'.

Tele-ICU platform requires high definition, scalable, centralized platforms that extend offsite, care resources to bedside teams through video conferencing and real-time data streaming in multiple locations. When the centralized care model is implemented, it would require a tele-ICU platform with

medical devices integrated that makes viewing & capturing medical data, and vital parameters easy. The system consists of tele-ICU bedside Tablet plus PTZ high-resolution camera designed to provide the offsite team with complete access to the patient and the bedside team. The ICU bed is equipped with a PTZ camera & a patient monitor that allows the offsite team to interact with the patients and view monitoring devices. In case of loss of connectivity or screen display issues, the camera can zoom and record medical vitals.

VI. Physical infrastructure for Tele-ICU

- Room Temperature should be maintained between 18 to 25 deg C, preferably using split AC, for less background noise during video conferencing.
- The room should have an adequate number of electrical outlets for connecting various equipments and a very good earthing pit. There should be proper arrangement of the power supply during an emergency.
- The UPS should be available of appropriate backup capacity commensurate with the ICU equipment load.
- The room should have good illumination, to get good picture quality for video conferencing, also good acoustics for audio clarity and noise reduction.

VII. Operationalization of SPOKE facilities

Under ECRP II, the support to District Hospitals/District Paediatrics Care units as SPOKE[1] is recommended for the Honorarium of a coordinator at SPOKE, IT infrastructure and equipment, Renovation/contingency etc.

To operationalize such District Hospitals/SDH as SPOKEs, the following possible situations should exist:

- Availability of critical care staff that is intensivist, nursing staff, etc.
- Specialists other than intensivists such as paediatricians, obstetrics and gynecologists.
- Non-availability of either ICU intensivist or specialist.

Considering the situation above, the health workforce may be trained at HUB facilities via:

- Capacity building by case-based discussion.
- Schematic planning for upgrading the SPOKE facilities by the temporary posting of ICU staff.
- For other specialists, identifying the areas which require skill upgradation, and skill practice by on-site training at the HUB facility.
- Periodic deputation of doctors and nurses from SPOKEs to HUB for skill enhancement/upgradation.

VIII. Ancillary/Support services for CoEs

Ancillary/Support services like a lab, radiology, dietary, CSSD, and mechanized laundry are ideally available in the facility and hence, the ICU/hybrid HDU should be linked to them.

IX. Quality assurance and research

- Monitoring of delivery of clinical services and quality indicators particularly to paediatric case management at mentee PICUs.
- To generate data to understand the local epidemiology that will help in future planning and resource allocation.

X. Streamlined referrals

- Timely transmission of pre-referral information between mentee and mentoring facilities.
- Providing feedback regarding referred children and help in back-referral if needed.

[1]As per the supplementary guidance note for ECRP II, the support for Rs.7.0 lakh per SPOKE for 30 SPOKES is provided.

B. Training programme

The programme aims to provide training to nursing personnel, paediatricians, and healthcare providers in the areas of Emergency management and Intensive care management of critically ill children. It will include a hybrid mode (online + in-person if feasible) of training coupled with theory classes, demonstrations, and modules under the guidance of resource persons to enhance the knowledge and skills of trainees. Thus, enabling the trainees to manage paediatric emergencies and critically ill children with moderate to severe cases in a more efficient and competent manner.

Hybrid training model for nursing professionals, paediatricians, and health care providers on emergency management of paediatric cases may not be restricted only to CoEs and DH as HUB and SPOKE respectively. The training programme is also to be utilized for health care professionals in public health facilities (at CHCs, PHCs). Periodic refreshment training for the same also needs to be planned in the training calendar. Overall, the structure needs to be institutionalized in due course of time.

During peacetime, routine training of all SPOKE human resources may be undertaken. Under ECRP II, the remuneration/incentives to the specialists for tele-consultations are supported. The incentivization should be directly linked to the monitoring indicators.

Observership

A plan for observership can be developed by each CoE for healthcare personnel of the mentee units. A combination of short-term and long-term observership can be initiated; the former for a rapid scale-up. Teams of nurses and paediatricians/medical officers could be posted for Observership in PICU and Paediatrics Emergency in the CoE.

Apart from the clinical exposure, personnel will benefit from:

1. Participation in 'Paediatric academic activities' at CoE.
2. Participation in daily bedside rounds by Faculty.
3. Observation during bedside procedures and interventions.
4. Separate daily academics for observers by Medical and nursing personnel.
   with a focus on:
   a. Interpretation of bedside tests
   b. Monitoring modalities in acutely ill children
   c. Ventilation & vaso-active therapies
   d. Case-specific management protocols
   e. Prevention of healthcare-associated infections, etc.

C. Mentorship for District Hospitals & Medical Colleges

To create a pool of experts to improve the delivery of acute care, promote learning opportunities and encourage multidisciplinary collaboration with CoE and other participating centres.

I. Responsibilities

1. Physical visits to the Centre (need-based, it is desirable that monthly visits by one of the faculty from the HUB be made to the SPOKES during the initial setting-up of the units).
2. Skills training: Demonstrating proficiency in performing PICU procedures, invasive monitoring and implementing appropriate treatment plans.
3. Short workshops on the basics of invasive ventilation and troubleshooting.
4. Simulation exercises on common acute care scenarios and communication skills with patients and parents.
5. Oversee data collection and research initiatives.

II. Measuring the output of Paediatric CoE and the impact of the programme

The programme should envisage the measurement of output of the Paediatric CoEs and also try to assess the impact of the programme. Some suggested the output parameters could be:

1. The numbers of nurses and doctors trained.
2. A number of tele-consultations per month.
3. A number of referrals managed at Paediatric CoE.
4. The number of cases-based interactive sessions conducted per month.
5. A number of virtual visits conducted by HUB facility to SPOKE facilities per month.
6. Response rate for emergency calls/patients.

The impact of the programme may be evaluated over a period by assessing:

1. The number of admissions in paediatric facilities before and after the implementation.
2. Bed occupancy rates (defined as the number of children admitted divided by the number of beds multiplied by 100).
3. Number of critically ill children managed at the mentee units; numbers needing respiratory support (oxygen, HFNC, NIV, and mechanical ventilation).
4. Numbers of referrals.
5. Outcomes of critically ill children: mortality (adjusted for severity of illness).

III. Data repository

1. At the HUB and SPOKE facilities, a proper log of documentation of the consultations held, reports, images, diagnostics, and data (e.g., phone logs/e-mail record/video interaction logs etc.).
2. It is suggested that after the one-time support under ECRP is over, a such database may be served as a repository but also continue to add the monitoring data on process and outcomes for all paediatric cases either at SNCU/PICU/Paediatric ward/NRC/DEIC.

IV. Financial assistance

Under ECRP II, the funds are approved to the State/UT to establish a Paediatric Centre of Excellence (CoE) under new prefab construction or GreenField at the State/UT medical college/AIIMS-like institutions @ ₹5 crores for each State/UT and ₹2.73 crores for brownfield construction.

MInistry of Health and Family Welfare
Nirman Bhavan, New Delhi-110011
W: www.mohfw.gov.in