

Position Paper
on
**Sustain and Support Operating Healthcare
Infrastructure to reach the Last Mile**

The CPR group and IIITH's Raj Reddy Center organised a closed door brainstorming roundtable meeting on 'Sustain and Support Operating Healthcare Infrastructure to the Last Mile'. The objective of this roundtable is to table prevailing challenges, identify gaps and explore possibilities to sustain and support the existing infrastructures through building ICU critical care centers with skilled healthcare frontline workers and other technology powered solutions. This was a deliberation between NGOs, government agencies, technologists, medical practitioners, med-tech startups and other healthcare executives, around how these solutions can help interventions in public health.

Grassroot healthcare, especially in rural settings, is a hard problem. Even as funds are given and infrastructures are built for providing critical care in emergency cases, in the long term all these infrastructures are left abandoned. Though governments and non-profit entities continue to implement effective operating programs or structures, actual on-ground availability of care is very minimal. Therefore to understand the prospect the roundtable was broadly on 3 crucial topics: (a) 3 Major healthcare gaps to sustain the existing critical care infrastructures; (b) Ideas on how/what will ensure support & sustainability of those infrastructures cost-effectively at the doorstep (rural); (c) Thoughts on how to optimize costing of critical care delivery and how to raise funds for critical care operations

A. Major gaps in sustaining the critical care systems at place

The ICU critical care initiative started as a response to COVID to build sustainable hospital infrastructure. This was not just for the current pandemic situation, but also for future health emergencies. During the pandemic many successful ICU bed projects were implemented, which also threw light on the extent of the infrastructure shortage problem (e.g., about 60,000 ICU beds required in India). The major challenges in solving these issues are:-

Logistics issues are more challenging than the monetary need while setting up critical care infrastructure

Identifying the right location for setting up critical care infrastructures is more of a challenge than getting monetary support for setting one up. Though the need is all around, there are

certain locations where, if it is set up, can actually meet the urgent need and can be optimally used. Sometimes, already set up places lay idle while need arises in other locations. Therefore, being able to spot that particular location before even setting up is crucial for sustaining it in the long-run.

Three major delays that hampers the critical care facilities available at the last mile

The 3 delays that are crucial to deal with even before setting up a critical care center are: (a) Delay at home due to inefficient decision making; (b) Delay due to insufficient referral transport; (c) Delay at the diagnostic center. To deal with the listed delays, the program requires outreach and education programs to solve the issue. Also, the requirement of diagnostic equipment, availability of medicines, capacity building for HR, etc needs to be taken care of.

Decline in Sustainability due to decline in the need of critical care in case of no emergencies

Expertise is atrophied due to not being able to maintain the skill levels. This is due to lower patient traffic in rural areas when the need comes down for a certain period of time. This problem also has a vice versa effect. During a critical emergency need, timely treatment is not available because of lack of access to specialists within close geographic proximity in rural areas. But the problem can also become the other way round when there is expertise available but no demand for it on ground at the last mile.

While the adoption of technology is a challenge in the rural, adaptation becomes more tough in the long-run

Two major areas to look out for are adoption and adaptation of technology to make critical care reach the rural. Certain major affecting factors for Infrastructure and Sustainability to the last mile are as follows:-

- Price premium to operate in rural areas for both personnel and equipment.
- Shortage of skilled staff in rural areas due to lack of justification in employing highly skilled individuals in short traffic flow environments.
- How to incentivize the move to rural work setup for highly skilled.
- Lack of quick decision making due to the imposed financial burden on the patient's family in long stay cases where the cost quickly builds up.
- Lack of access to quick/emergency money avenues such as trusted money lenders and insurance (economic exploitation is a highly concerning factor).

B. Suggestions on supporting & sustaining the built infrastructures cost-effectively at the doorstep of the rural

While there are a lot of explorations done by different entities to make critical care operations sustainable and scalable models, there are few existing already & few suggested which are able to/have the potential to bring impact on ground.

Exclusive critical care training for the supporting staffs at the frontline can support the infrastructures

Passionate staffs/individuals can help drive the whole system sustain, but being passionate will not meet the need. In a country like India, where critical care is not considered as a separate field to train the healthcare staff for, it is very much possible that in emergency cases patients lose their life. Hence, the first and foremost need in this situation is to train those staff, specifically for providing critical care treatment to a patient who requires immediate critical treatment. For which they need to be aware of the critical conditions and immediate care needed for the same.

Self-driven and Self-determined doctors and staffs required to ensure existing operations sustain

In the first level, the frontline workers are not trained or skilled enough to be able to give enough treatment to a critical patient. This requires a central and state level monitoring to staff, qualified and self-aware head doctors who are willing to operate in a rural environment while being aware of his, his staffs', and the resource limitation. The doctors should also have access to a network of other skilled doctors within geographic reach to address different expertise requirements in the critical care centers.

A monitoring system is required for tracking the usage of critical care medical equipments to put it at its best use

The capacity utilization of installed medical equipments is seen as a key performance indicator for any critical care center. This is because the large capital expenditure incurred in setting up the system can only provide a return if the equipment is used frequently. It is important to make sure that these systems are utilized as much as possible, while being subjected to regular downtime and maintenance, as recommended by the manufacturer. Thus, there is a need for central monitoring of resource utilization for ICU/hospital beds, etc to direct patients in a

timely manner. If the hours of usage of these systems, and their existing location is known, then those could be safeguarded against any theft, under usage, left idle, and etc, conditions.

A hub & spoke model can be effective along with the complete chain of non-medical services to sustain the system in place

The adoption of a hub & spoke model is needed, where admission and care can happen at a lower tier spoke hospitals and then there can be a shift to the higher tier hub hospital when the need for experts/specialists arises. In this model, the communication should be tiered, with central training for the staff. Facilitators assigned/hired to this hub & spoke system, can guide the patients to the required resources, be it money from govt/trusted agencies, medicine, emergency facilities, etc, to help the patient with the necessary support.

Technical interventions developed to support the infrastructure can act as a catalyst to sustain the system in long-term

The software and hardware solutions designed and implemented must take a long-term perspective for their development to avoid repeated and frequent changes to the deployed system. Any upgrades in the developed solution/platform should not necessitate the relearning of equipment usages or workflow modifications. The intervention designed must ensure that the technology is the right solution to the problem and is sufficient to solve it. Unified technology systems that are open to use by all parties and not walled by any private entities. Therefore, all the activities must have a well defined scope of work and plans of action.

Public-Private Partnership model can become revolutionary to support and sustain the existing/new models

Collaboration is required between various private parties to make any solution impact larger populations and have fewer walls against widespread use. Solution development and implementation should be through public-private partnership to enable the optimal use of their respective skillset. The main contribution from the public (govt.) side should be in the allocation and provision of land for construction of hospital infrastructure. The private health provider and related entities must be allowed to utilize this pre-existing infrastructure.

The development process should be done with a long-term perspective, with government involvement in the rollout process, and the planning should account for possible real-world hurdles that could impact the development and rollout process.

Summary and Next Steps

The CPR group along with the Raj Reddy Center will take up the efforts to have another brainstorming meeting to have a comprehensive discussion on the same topics. The purpose of the continuous brainstorming meeting is to identify, define and design a perfect model to build the critical care centers. Identify non-for-profit stakeholders who can play a bridge role to train the required manpower needed for sustaining the infrastructure. Building ICU critical care service centers for the benefit of the underprivileged.

Participants:

We greatly appreciate the time and insights from our panelists:

Ramkrishnan Balakrishnan (Care India); Dr. Prasad Sistla (Care Foundation); Dr. Satish Ghanta (Choice Foundation); Renuka Bodla (Novartis); Mahesh Iyer (Paraxel); Varma Konala (INAI); Prem Kumar Vislawath (Marut Drones); Emmanuel Murray (Caspian); Renu John (IIT); Dr. Ambuj Chaturvedi (IKP Knowledge Park); Dr. G Kiran (Medico); Geeta Bora (Spherule) and 8 others.

Moderator: Uday Kumar

About:

Compassionate Patient Response (CPR) was formed in April 2021 by Dr. Satya Garimella, an electrophysiology cardiologist and healthcare entrepreneurs Krishna Kottapalli and Uday Kumar all based out of the USA. The purpose was to provide ICU and emergency equipment to not-for-profit rural healthcare centers in India that offer critical care to those who cannot afford it. The CPR group funded a state of the art 10 Bed ICU at AIIMS Bibinagar in Nov 2021 and more recently another 10 Bed ICU at Maa Sharada hospital in Vikarabad, Telangana in March 2022. The CPR group seeks to undertake a few more such critical care projects in other parts of rural India.

Raj Reddy Center for Technology and Society (RCTS) is an initiative of IIITH to enable research and emerging technology-led solutions for grassroots education and public health, with specific emphasis on rural areas. It will identify a few socially relevant themes and take up projects in them to create a sequentially linked amplification of impact. It will take a wholesome view of the problem addressing all aspects, technology and otherwise, through to realising value on ground. Sustainability and Scalability are the key concerns in all engagements at the Center. It aspires to be a global hub to bring the latest research to solve societal problems.