

A sustainable future for Healthcare design

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The COVID-19 crisis has brought to the forefront the shortcomings of India's current healthcare system. While we need 15 doctors and 20 hospital beds per 10,000 people, we only have about half of those numbers, which means that over 70 crore people are underserved by the system. There's also a huge disparity between urban and rural areas in terms of access to specialised care. These gaps need to be bridged urgently.

REINFORCING THE SYSTEM

The initial course of action should be to reinforce the primary layer of healthcare in urban slums and rural areas, and offer preliminary remedial assistance. Smaller, cost-effective primary healthcare centres and medical sub-centres can be set up as an initial shield in every village, branching out to well-equipped speciality hospitals in every district to cater to the rural population from each of the district's talukas. Such a system would help relieve the strain on healthcare infrastructure in cities and make it affordable to the masses.

The design of the current stock of healthcare facilities also needs to be looked at through the lens of disease control—and changes made accordingly. Several studies over the past few months have shown that the spread of COVID-19 within closed-off, compact and poorly-ventilated spaces is higher than in open spaces. But most hospital campuses today exist as hermetically-sealed, integrated units with deep floor-plates, which results in poorly-lit and poorly-ventilated indoor spaces connected via shared circulation elements like lobbies, double-loaded corridors, and elevator banks. Additionally, dependency on air conditioning has increased so much that 90 percent of the air is recirculated within the building and only 5 percent fresh air is brought in. This increases the possibility of cross

infection and contamination significantly, while simultaneously inducing high operational energy costs and maintenance problems.

The better design alternative would be to segregate functions into multiple, separate building wings with reduced widths, and to add buffer zones in between. This would aid natural cross ventilation within indoor spaces, reducing the risk of infection by increasing the rate of air exchange. It'd also avoid interference of services and maintenance areas with procedure areas, allowing for greater isolation of diseases. Independent buildings would need to be zoned responsibly too, and functions segregated within sections or floors by creating general, semi-sterile and sterile zones (for example, waiting areas to OPDs to ICUs). In order to dilute and remove contaminated indoor air, air conditioning systems will need to be upgraded to incorporate a three-stage filtration process with UV treatment in the AHU (Air Handling Unit) or ducts. Integrating automation through technological solutions will also be crucial to limit physical interaction and aid safe distancing.

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SUHRC 2019: Large courtyards in the building create buffer zones and naturally ventilated areas



SUHRC 2019: HVAC systems to ensure apt air circulation



SUHRC 2019: Minimal AC units because of biophilic design interventions



SUHRC 2019: Section A



SUHRC 2019: Single corridors



SUHRC 2019: Ventilation across the buildings to allow how increased rate of air circulation



Designed around courtyards resulting in ample natural light and ventilation.



With lesser depth of each side, the daylight penetrates into major areas and are naturally ventilated wherever required.



Concepts of healing garden, improves quality of healthcare thus reducing patient's recovery time and building energy consumption.



Compressed sun dried earth blocks produced on site renders natural textures and improves thermal performance.



Post tension system provides flexibility of larger spans to adapt to different future service requirements.



Facade and Fenestration designed in a way to add thermal comfort and reduce on the energy consumption.



New Age Technology, helped in achieving and improving the performance, sustainability targets, and value for money targets.

SUHRC 2019: Environmental approach

DESIGNING FOR WELLNESS, NOT DISEASE

Today, healthcare is one of the fastest-growing industries globally. As new medications and technology change methods of diagnosis and treatment, there is a need to rethink our model of healthcare design as well—to support health and overall wellbeing, rather than simply treating illnesses. We must strive to put the patient's experience at the core of design schemes for healthcare facilities, with solutions that respect user and cultural preferences and anticipate innate human behaviour—solutions that promote a preventative approach rather than a responsive one, with mental well-being incorporated as a key component of physical health.

Within healthcare facilities, the interdependence between the built environment and wellbeing takes on a very important role. Good designs can aid the patient's healing process, while bad ones can worsen health conditions, making hospitals the hotbeds of disease transmission and cross infection. Even the simplest of design choices—such as the placement of a window, the colour of a wall, the texture of the floor beneath our feet, or the height of the ceiling—have a bearing on our physiological and psychological health, in both positive and negative ways. Sick Building Syndrome (SBS), for instance, is a health condition that is scientifically proven to afflict people living or working in poorly designed buildings.

One solution that shows promise is basing designs on the theory of biophilia, which seeks to connect buildings and occupants

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more closely with nature. For instance, maximising daylight, natural ventilation, view of the outdoors, and incorporating green courtyards and water bodies can create a more therapeutic built environment for recovery. Designing the building with an East-West orientation to improve daylight, incorporating centralised courtyard landscapes to provide passive evaporative cooling, and adding solar panels to reduce dependency on conventional forms of electricity, are some ways to optimise building energy consumption and improve efficiency. Also, designing decentralised micro-service zones that run parallel to various departments can help make regular servicing and maintenance easier and quicker.

Going forward, as our understanding of



SUHRC 2019: Single patient room



Plan — Single patient room



Sastur Hospital 1996: Green courtyards with single corridors and natural ventilation



Hinduja Hospital 1980: Designed with large spans on the lower floors to allow for flexible use of spa



Sastur Hospital 1996: Community welfare hospital for the disadvantaged. Greens promoting healing

health and wellbeing evolves, new construction technologies will provide limitless possibilities in this sector. Building Information Modelling (BIM), for example, which can determine the optimal geometry of buildings in response to selected parameters, can not only help create healthier built environments but also aid in pre-empting problems and shortening the time of construction to save costs. On the other hand, 'temporary and transformable' architecture has enabled emergency mitigation like never

before. Imbibing such innovations within healthcare design holds the key to streamlining our systems for better performance—from accessibility of essential public services and improved patient care to the wellbeing of our economy. ✚

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