

## QUALITY OF HOSPITAL DESIGN IN HEALTHCARE INDUSTRY: HISTORY, BENEFITS AND FUTURE PROSPECT

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### ABSTRACT

In this modern day, Hospitals are considered as the integral part of healthcare industry including health as whole (Public Health), Pharmaceuticals and other associated fields. Making patient and employee friendly hospitals setup and environment are the big challenges nowadays. Quality interventions have given a new insight and scope for improvements, not only the services of the hospitals but also to make great structure. Few accreditation agencies in the field of Hospital accreditation are working day and night to help healthcare providers directly to improve the hospital services qualities and make a healthy and safe environment hospital-wide and set a benchmark for other hospitals. Few of better examples of great infrastructures can be seen in the developed and developing countries. But there are still a lot of improvements and initiative required for quality hospital infrastructure and design. Most healthcare designers accept the fact that designing a hospital is a complex task: both functional and psychological. Apart from building services, healthcare designers are expected to conform to various requirements provided by the Ministry of Health (MoH) which includes medical specialist requirements and equipment both for diagnostics and for treatment in the respective countries.

**KEYWORDS:** Hospital Management, Healthcare Service Management, Healthcare Administration, Healthcare Quality, Hospital Infrastructure

### INTRODUCTION

It is widely recognized that the Quality Management Standards are important in the evaluation of hospital infrastructure. Together with frequency conducted user satisfaction studies, such evaluation gives a proper insight into how healthcare system functions from the prospective of important other stakeholders. However, the validity of satisfaction or experience studies debated, and evidence for an association with other widely used measures of institutional performance would strengthen and validates of such performance.

The sustainability in the healthcare system is a paradoxical situation. Does it treat sickness or promote the condition of health? In hospital building, it is difficult to conceive the link and benefit of sustainability in contributing to the patients' health outcomes. Perhaps, to explain this, discussion evolving sustainability in healthcare facilities should embrace the notion of creating a supportive environment in hospital design (i.e. healing environment) that is physically healthy and psychologically appropriate. As a matter of fact, it should be the aim of designing a hospital. For this, it is an

imperative for the physical aspects to be considered in hospital buildings. The physical aspects (i.e. day lighting, window design, thermal conditions and others) should be cleverly designed to achieve the balance and the principles of economic, social and ecological sustainability without compromising the functionality of hospital building (Linda, 2004). This paper emphasizes on important aspects that lead to sustainability in hospital design and quality.

## **WORLD HEALTH ORGANIZATION EXPLANATION OF HOSPITALS**

WHO has given a good understanding of hospitals; Hospitals play an important role in the health care system. They are health care institutions that have an organized medical and other professional staff, and inpatient facilities, and deliver medical, nursing and related services 24 hours per day, 7 days per week. Hospitals offer a varying range of acute, convalescent and terminal care using diagnostic and curative services in response to acute and chronic conditions arising from diseases as well as injuries and genetic anomalies. In doing so, they generate essential information for research, education and management. Traditionally oriented on individual care, hospitals are increasingly forging closer links with other parts of the health sector and communities in an effort to optimize the use of resources for the promotion and protection of individual and collective health status.

## **HOSPITAL DESIGN HISTORY AND QUALITY ISSUES**

Verderber & Fine (2000) identified six periods in history through which hospital design has evolved. These include the Ancient era, the medieval period, the Renaissance, the Nightingale era, the Minimalist Mega hospital and the Virtual Health scope. Among the first four periods, the Nightingale era is most relevant in terms of room layout and occupancy. St Thomas Hospital in London, which opened in 1871, was the first hospital that used her guidelines in the planning of its wards (Verderber & Fine, 2000).

People from the upper income groups wanted privacy during their healing process, so they created a demand for single-occupancy rooms. Gradually, private and semi-rooms replaced multi-bed large wards in hospitals and, by the mid-twentieth century, the Nightingale ward was a dying template (Miller & Swensson, 1995). However, in the 1950s and 1960s, many hospitals still favored open smaller wards over private rooms because of the staff efficiency issue. Even in the early 1970s, advocates of multi-occupancy rooms were stating that patient privacy (in single occupancy rooms) meant a sacrifice of continuous supervision. They attributed the trend towards single rooms in hospitals to the general movement towards privacy in all aspects of 20th century life (Thompson & Golden, 1975). The all-private-room argument was waged mainly as a reflection of societal progress rather than on the basis of strictly rationalized medical justification (Verderber & Fine, 2000). Private patient rooms gained popularity in the latter half of the twentieth century.

## **HOSPITAL DESIGN AND ENVIRONMENT**

Hospital is an institution where the sick or injured are given medical or surgical care. Hospitals are complex in a nature itself. In hospital buildings, where patients seek medical treatment and staff provides continuous support, creating healing environment with appropriate physical aspects is an imperative to sustainable design. Nevertheless, the restoration of health and well-being is not merely a matter of physical science (Day, 2007). The aspects of healing environment in hospital design are primarily important and relevant within the context of sustainability in healthcare facilities. The term 'Healing Architecture' (Lawson, 2002) is adopted to invoke a sense of a continuous process; in creating an environment physically healthy and psychologically appropriate. A healing environment with appropriate physical aspects

would indirectly contribute to patients’ outcome such as shorter length of stay, reduced stress, increased patients satisfaction and others (Ulrich et al., 2004). One may agree to the idea that sustainable hospital design in the form of healing environment is achieved if these measurable outcomes could be quantified through appropriate design of physical aspects. Apparently, most scholarly literature does acknowledge that the existing physical environment we live in has an effect on our well-being (Lawson, 2002; Day, 2007 and Todd, 2007).

In order to ensure that hospital services are appropriate for the health needs of all sections of society, it is important that planned changes to hospitals buildings are robust and that unplanned perturbations in the way care is provided can be accommodated.

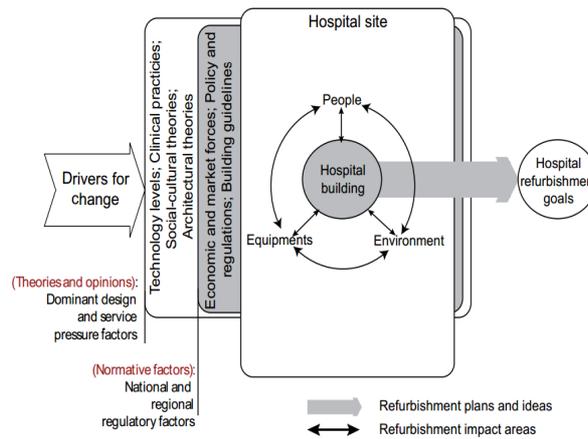


Figure 1: Hospital Building and Facilities

**FACTOR AFFECTING THE HEALTHCARE SERVICES FACILITIES**

- **Extreme Weather**

This limits a hospitals ability to maintain service quality. Severe weather can restrict staff travel and availability and affect equipment function, in addition to seriously limiting patient access and comfort. Patients with critical medical conditions are particularly vulnerable to the effects of extended heat waves (Cadot et al., 2006). The demand for hospital cooling is increasing rapidly and most are barely able to cope with existing weather patterns (Baillie, 2010). Any further climate change will present significant problems (Lomas et al., 2009).

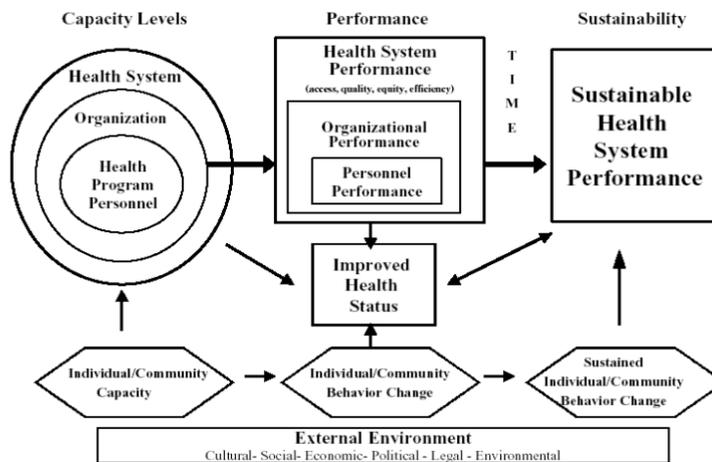


Figure 2: External Environment

- **Anthropology**

Over the years, there has been a considerable demographic change across the world and this has had significant impact on healthcare provision. Some hospitals are already being modified in response to changing demographics. It was argued for various hospitals that the existing building was no longer able to provide efficient health care due to changes in the local population due to the increased localized disease. It was considered that refurbishment was necessary to enable the hospital to deliver a satisfactory standard of care to the changing profile of the local population.

- **Medical Services**

Generally, change is clinically driven and it is important that hospital buildings accommodate a wide range of clinical services optimized for each particular model of care. This presents a challenge for managing patients with multiple care needs. Major initiatives such as reducing the level HAIs (Hospital Acquired Infections) and integrating patient centered-care, there are other clinically driven priorities, such as the need to improve the condition of hospital buildings and the need to embrace advances in technology. Clearly the adoption of advanced care technology must be accompanied by cost/benefit evaluations.

- **Patient Centered Care**

The delivery of patient-centered care is strongly linked to buildings and facilities. There is growing body of literature on “evidence-based design” whose finding suggests that patient recovery rates are improved by the quality of their environments (Vischer et al., 2008). Arguments in support of patient-centred care are partly driven by the need to improve the whole patient's experience. For this reason, modifications should ensure that the building environment supports the entire patient journey efficiently (Phiri, 2003).

In particular, hospitals are now required to provide adequate facilities for clinical isolation (as required) and gender segregation. The option of providing single rooms for patients is being tested in a number of studies (Phiri, 2003). Example: NHS Building Note 04-01 (2009) recommends that the proportion of single-bedded inpatient accommodation should be increased to 50%. The current total percentage of single rooms provided in hospitals falls below 20%.

- **Infection Control**

Controlling the spread of infection has historically had a significant influence on hospital design. The introduction of air-conditioning, the creation of specialist function rooms such as anaesthetics, and the separation between dirty and clean areas came about through the attempts to minimise infection spread in hospitals. Hospitals are expected to keep pace with advances in infection control or risk being perceived as failing to protect patients. A suitable infection control strategy may require specific changes to hospital buildings and a refurbishment and/or redecoration strategy may be necessary to facilitate the ease of cleaning and maintenance to improve the perception of cleanliness.

## **CURRENT ADVANCEMENT IN HEALTHCARE TECHNOLOGY**

There is considerable pressure for clinicians to adopt the latest technology to improve diagnosis and treatment and reduce the need for invasive procedures. Advance Medical imaging technology can now enable non-intrusive analysis for many conditions. Other incentives for uptake of new technology include financial incentives such as lower cost of operation and maintenance. Decisions on when to upgrade existing systems are influenced by factors such as; the speed at

which new technologies are developed; the added medical benefits of upgrading, the condition and adequacy of existing systems; and the affordability and demand for new technologies.

Adhering may provide the opportunity for such changes in operational functionality. The availability of self-care equipment and self-diagnosis tests may influence the way future health provision is organized.

## HEALTHCARE QUALITY AND HOSPITAL FACILITIES FOR FUTURE

A central goal of health care quality improvement is to maintain what is good about the existing health care system while focusing on the areas that need improvement. Improving the quality of care and reducing medical errors are priority areas. For some people, that definition revolves around whether they can go to the doctor or hospital of their choice. For others, it means access to specific types of treatment. In recent years, there has been a great deal of attention paid to defining health care quality so that we, as a nation, can work together to improve care.

Doctors and nurses, architects and designers all say the room setting has an important but largely neglected role to play in the delivery of quality care and outcomes. Consider infections. One out of every 20 patients admitted to a hospital picks up an infection while there, according to the Centers for Disease Control and Prevention. These infections can be serious and deadly, and they cost the U.S. \$10 billion a year. But recent studies indicate that at least half can be avoided. And the design of patient rooms is one of the best places to start.

## FACILITY SAFETY DESIGN PRINCIPLES

Design around Latent Conditions:	
•	Noise reduction
•	Scalability, adaptability, flexibility
•	Visibility of patients to staff
•	Patients involved with care
•	Standardization
•	Automate where possible
•	Minimize fatigue
•	Immediate accessibility of information, close to the point of service
Design around Precarious Events/Active Failures:	
•	Operative/post-op complications/infections
•	Events relating to medication errors
•	Deaths of patients in restraints
•	Inpatient suicides
•	Transfusion related events
•	Correct tube-correct connector-connect hole
•	Patient falls
•	Deaths related to surgery at wrong site
•	MRI hazards

Figure 3

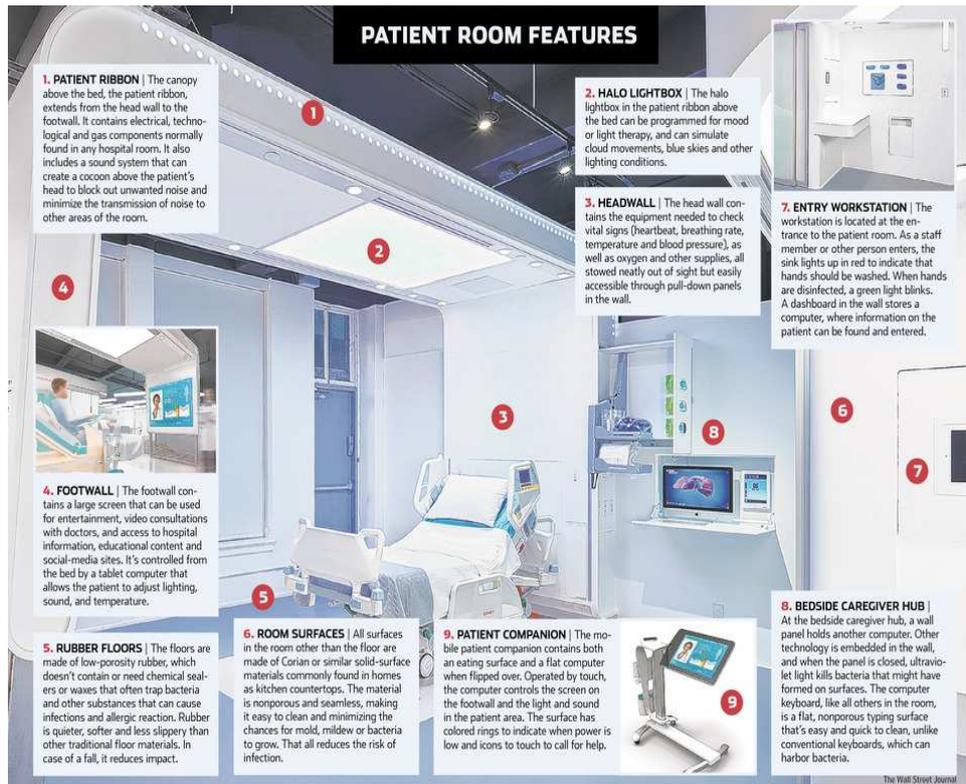


Figure 4: Patients Room Features, Source: The Wall Street Journal

## CONCLUSIONS

“We shape our buildings and afterwards, our buildings shape us.”—Winston Churchill

When we talk about quality, we talk for Structure, Process and the Outcome. So the hospital structure design needs a lot of attentions of healthcare providers, caregivers and promoters. The hospital, as it is known today, has undergone various changes throughout past centuries. Even though staff costs account for around 70 percent of the running costs of hospitals, hospitals are still being built and modernized, not with smooth care processes or savings in operational costs in mind, but in accordance with age-old space and operational models seeking to minimize building costs. Noted that creating a healing environment is not like building up a garage workshop, where cars are sent for repairs before continuing their journey. It is an imperative for a hospital environment however, where ‘repair’ of the body (i.e. healing) is the concern, to have the optimum level of comfort and care physically, socially and symbolically. Healthcare construction cost expenditures have gradually increased over the years. Good hospital design may lead to success of great business outcome as patients are looking for quality of care with minimum cost, their safety and environment. There is a lot of scope of improvements in future related to hospital design.

The question how the design of health care facilities affects the quality and safety of patient care? It's need to be discuss further.

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