

The Past, Present, and Future of Healthcare Architecture

How have pandemics and societal issues changed and will continue to change the design of healthcare architecture?

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Over the last century, healthcare design has molded to the needs of society. Hospitals were being designed alongside the growth of technology and a new knowledge of diseases. Healthcare design has greatly adapted throughout the century and will continue to change as our society faces the coronavirus pandemic.

A Century Ago

Within the last century, the design for healthcare facilities has changed numerous times. In the late 19th century, hospitals were bright, clean, and airy. As a response to the plague, they were not only seen as a functional medical space but also as a therapeutic space. This design was in response to the plague. It was believed that diseases were spread through dark, stagnant spaces because the plague started in overcrowded neighborhoods rather than open, airy neighborhoods. Designing like this was not efficient and began to change when technology improved. From the late 19th century, into the early 20th century, hospitals focused on a ward system. The Nightingale ward system was popularized by nurse Florence Nightingale. The design focused on one large room with beds placed six feet apart, a distance too great for patients to touch one another. As long as hospital staff maintained hygiene and had close supervision on patients, this design worked well. In 1918, when the Spanish flu hit, this ward design quickly became unpopular because the dangers of packing patients became a problem. In the decades to follow, hospital design began to shift to single patient rooms to help minimize the spread of diseases among patients. In the 20th century, the advancement of germ theory and urban growth caused hospital design to focus more on efficiency. The idea of windows in every room was no longer feasible. If every room had a window it meant that the building could be not wider than two rooms wide. Charles Neergaard, a hospital design consultant, changed the way hospitals were designed. In 1942 he proposed that nursing units share the same windowless space that overlooks the patient rooms. While all patient rooms still had windows, removing windows from staffing areas allowed for a larger internal area and reduced the amount that nurses had to travel to access all patients. Throughout a century, the design of hospitals changed immensely but concepts from each of these phases of hospitals have remained in designs today.



Nightingale Ward System

A Decade Ago

Within the last decade, healthcare architects have designed with hypotheticals in mind. After terrorist attacks such as 9/11 and the Boston Marathon bombings, architects were more concerned with hypotheticals and have designed to allow for hospitals to be more equipped for mass casualty events. With these hypothetical situations at the forefront of our society, architects designed healthcare facilities to work in flux. This allowed for healthcare buildings to be better equipped to change over the coming decades so that the building did not become obsolete but instead could have a longer life. Hospital design accounted for the change of spaces for a short surge of patients. In doing so, some new hospitals have the ability to expand both the emergency department capacity and the number of isolation rooms when needed. It was important for hospitals to have those flux spaces to accommodate for unforeseen circumstances. There are numerous situations where a hospital needs



Converted Hospital Bay in Parking Deck

to be able to quickly adapt or the pressure of the current issue will overwhelm the hospital and its staff. Although architects incorporated flux spaces in design for events, such as mass casualty situations, they did not account for the larger surge of patients a pandemic can cause. A pandemic is also an unforeseen situation but as seen in the recent months, it has a substantially longer and greater effect on the healthcare system. Hospital design reflected our societal needs a decade ago when architects were not thinking about the hypotheticals of another global pandemic, rather they were focused on issues that were happening everywhere in the world.



Isolation Triage Bay at Rush Medical Center



Isolation Nurse's Station at Rush Medical Center

Now

Hospital designs need to be able to accommodate societal changes, whether it be from a pandemic or a mass casualty event. What both of these have in common is the necessity for the hospital to adapt quickly and expand capacity. While there are regulations and preparations in place for mass casualty situations, the system is lacking the plans they need for pandemics. Hospitals are not equipped to physically change at the scale they need in order to manage the surge of a pandemic. The Rush University Medical Center, is a prime example of a healthcare facility that is equipped to work in flux. This medical center has 40 negative-pressure rooms that help prevent the spread of infectious diseases through the air. When COVID-19 became an issue, they were able to convert an additional wing into a negative pressure ward as well as 3 pods, that house 20 beds. These quick adaptations allowed for the Rush Medical Center to be ahead of the curve.

The future of healthcare will be molded by the Coronavirus. In hospitals, you can expect to see the spaces be able to expand and contract with the needs of society. Design will begin to be focused on spaces that will be used for

a wide range of acuity. With negative pressure rooms being of high necessity during COVID, there will be an increased sensitivity to including negative pressure rooms into flux design. Healthcare design will also focus on efficiency and less contact facilities. There will be less entry points with the Emergency Department not housing a large waiting room, rather the ED will rely heavily on technology to triage patients and have smaller individual spaces where people are in a “pause” phase. There will be an increase of barriers between healthcare providers and patients that will aid in security for the healthcare providers while also reducing risk. With the increase of technology for medical purposes there will also be an increase in technology use with patient interaction as well as touch free control over lighting, temperature regulation, and opportunities for patients to interact with family via video chat. Not only will design change the way spaces are configured but also what they are built from. There will be increased research in building materials that are less hospitable to microbes, like copper, that can reduce the risk of surface transmission. There are numerous ways that we will begin to see healthcare facilities change over the next few years, with flexibility, efficiency, and low contact being at the forefront of design.

Closing

Throughout the design of hospitals, technology and pandemics have shaped the way that we use these spaces. Throughout the last century, healthcare design has been shaped by pandemics, technology, and mass casualty events. Hospitals have been improved by these issues we have faced and have provided incredible learning opportunities for architects and designers. COVID-19 will have an everlasting impact on the way architects design healthcare facilities. We can already begin to see the impact that this global pandemic has had on architecture but in the coming years the built world we begin to wholly reflect the changes brought on by Coronavirus.