

# *Designing new healthcare facilities in a European frame*

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Healthcare is one of the most important occupational sectors in Europe, as well as a catalyst for substantial investments (up to 50% of national spending), but few studies are aimed at assessing the social and economic repercussions of health policies; if it is true that the priority objectives for the health sector are centered on therapeutic efficiency, the awareness begins to take shape that the benefits induced in other sectors such as social well-being and economic stability are of great interest and that, therefore, the health care system plays a key role in inclusive and equitable growth and development at the national level (Zsuzsanna Jakab, WHO 2018). Even the common ideology that associates

competitiveness with efficiency and which, consequently, encourages the private sector, appears to have been greatly reduced already by the analysis of the 2009 WHO report *Investing in Hospital of the Future*, in which the opportunity emerges to abandon the criterion of beds for sizing hospital investments and enhancing the hospital's relationship with local services. Hospitals should not be considered exclusively infrastructures for the provision of health services because they play a central role in the economy and in the development of the territory, they support research and training programs and are integrated into the local settlement by activating a flywheel of activity

that conditions the social structure and the economic growth.

Taking a step back in history we can see how the relationship between the hospital and the territory has changed over time, passing from little more than lazarets, with very high mortality rates still in the mid-nineteenth century, to specialized health resorts, already at early 1900s, following developments in anesthesia, infection control, medical science and technology (Komesaroff 1999 and Black & Gruen 2005).

After the Second World War, investments in the health sector significantly increased, thus changing the reality and consistency of healthcare facilities in Europe and the scenario of the rapid and constant evolution of medical care and assistance models clearly emerged; a complex process articulated on many coalescing factors such as the aging of the population, the change and evolution of pathologies, the labor force in the health sector, the introduction of new medical and pharmaceutical technologies, the increase in public and political expectations and new funding mechanisms (Bernd R. et al, WHO, 2009). The evolutionary trend of health care conditions the architecture of hospital structures at the same time, imposing urgent transformations which are increasingly difficult to cope with within existing resilient hospitals.

The evolutionary trend of the last few years is characterized by the increasing compression of

the length of hospital stays, by the ever increasing assertion of market mechanisms within the health system, by the growth of outpatient care and home care; these developments are the result of the joint action of the evolution of pathologies, demographic changes and technological developments, factors that are not all predictable in the same way. Demographic dynamics, indeed, take long periods to produce significant impacts for the purposes of mutations in pathologies, similarly, social changes can affect the feasibility or difficulty of the domiciliation of care over time; on the contrary the technological innovation has immediate, far-reaching impacts, thus decreeing the obsolescence of infrastructures and services very quickly. In the architecture of healthcare facilities it is a priority to subordinate constructive choices to the best support for the effectiveness of care and assistance functions and, in view of the rapidity of changes, there is a need to think about health architecture in terms of absolute flexibility, rejecting all the preconceived schemes, which for the past have influenced the design choices, and aiming at the goal of the total transformability of the structure (Bernd R. et al, WHO, 2009). Over the last thirty years there has been a contraction in hospital receptivity in terms of beds in favor of strengthening activities outside the hospital (home and outpatient activities or day hospital) and reducing hospitalization times.

Among the factors of greatest attention for the adaptation of the health system are to be considered: the quality of life and the residency within the reception structures and the centrality of users such as patients, caregivers and health personnel (Ciaralo, F ., Geddes, M., 2009).

A design aimed at flexibility involves the possibility of freely changing both the interior spaces and the functions within a given area with respect to the pre-existing volume. However, it is very difficult to adapt the pre-existing structures to the flexible model; for a long time the adjustments of the health structures have transformed the old rigid models into new rigid models up to ascertain that the speed of the transformations required a radical change in the approach to the design; moreover, the times of realization are often not suitable to the times of innovation and the new structures risk to be obsolete even before coming into operation (Tartaglia, 2006).

European architecture has for centuries been inspired by the concept of durability in the sense of stability over time and resilience to transformations, today the architecture of hospitals, as well as of all those functions strongly conditioned by technological evolution, requires a revision of the concept of durability aimed no longer at providing constant performance over time but at allowing the use destinations to remain, accepting both logistic and constructive changes.

When the acceleration of changes for the same function exceeds the time of the construction site, it is perhaps legitimate to speak of the architecture of temporariness and, as such, to rethink the requirements of the new model.

On the basis of these considerations an extremely interesting field of research opens up in terms of architecture technology, which investigates the relationship between needs and performance in relation to the specific functions of a destination of use; flexibility requirements involve requirements related to assembly systems, disassembly, replaceability, recovery and recyclability of materials in the short term; the adaptability of the systems in relation to different volumes and layouts which is the main obstacle to the reshaping of the space is extremely important for the flexibility of the healthcare environment.

The group of scholars of different nationalities, who have been dealing with this issue for some time, brought together in the present work the experiences and acquisitions gained in the field of their research conducted with particular reference to the specificities of architectural technology in relation to the new needs of the health care building.

The affirmation of the performance approach decrees the overcoming of the architecture based on pre-established models that have so far oriented healthcare construction and that have proved inadequate to sustain the tension of continuous innovation; the sanitary building is the synthesis product of relations between

functions that can be reorganized differently at each occurrence, it is a unique product that represents the solution to health needs of a specific place and a given moment, based on conditions that are not always predictable, therefore it can be controlled only by applying multi-variable systems with different weights and priorities. The factors that most affect the need to restructure the care and assistance structure can be grouped into three categories: the demographic composition of populations, the types of diseases, medical technologies and the therapeutic environment.

#### **Population demographic composition**

The demographic composition of populations is a discriminating factor for the demand for health services and, in Europe, the most significant demographic trend is aging. If we consider that the elderly population engages about 50% of the workload in the hospitals, it is understandable that the aging of the population over time leads to an increase in hospital stays and an increase in demand for health services related to diseases of the third age, health services will have to be restructured for episodic care of single conditions very often characterized by multi-pathologies; at the same time; furthermore with the lengthening of the average life, there will be a longer stay in good health conditions and therefore a decrease in the demand for treatments for pathologies specific to the average and youth age (WHO, 2009).

#### **Types of diseases**

The types of pathologies in the course of history have changed due to the disappearance of some diseases and the onset of new ones, this thanks to the improvement of treatments, prevention, vaccines but also of the intensification of exchanges and displacements that put in contact distant populations and consequently produce importation of new diseases. According to WHO projections for 2030 will increase the percentage of people who die from non-transmissible diseases; the change in lifestyles, work and food will lead to new diseases or will increase diseases that were previously not widespread and, furthermore, the effects induced on emerging diseases will be caused by new forms of pollution and climate change (WHO, 2009).

#### **Medical technologies**

The new patient-centered approach to health care performance involves abandoning traditional configurations towards a redesign of care pathways aimed at personalizing the patient's path through all levels of care in different specializations. Technological progress is one of the most important factors in these transformations: ever more specialized imaging diagnostic shortens hospital stay and allow some investigations and treatment to be moved outside the hospital when the patient's condition permits; some equipment tend to become less and less bulky and therefore more easily transportable

thus avoiding the displacement of patients, some monitoring services for chronic diseases can be carried out remotely, thus lightening the burden of prolonged hospital stays, many procedures are no longer centralized in hospitals but can be delocalized in the territory; these technological developments make it possible to provide services closer to the patient and, at the same time, have a key role in the organization of the contemporary hospital where the reduction in hospital stays and the lightening of logistics leave space for a new internal organization that improves quality therapeutic environment both for the patients and for the health personnel. For the past, the obsolescence of the structure has often been resolved with the relocation of the functions to other sites, but this has also led to distortions of the territorial balance with respect to the connection system, with respect to the flywheel triggered in the urban context by the presence of the hospital and still with respect to social integration with the surrounding urbanized areas (Tartaglia, 2006). Today the delocalization is based on the principle that only acute pathologies must be treated in the hospital, where the centralization of services is necessary to have more resources available simultaneously. This strategy also has an impact in terms of management of the built heritage because the downsizing of the central hospital structure makes it possible to maintain the locations inside the urban center and therefore also to

maintain all the relationships already structured in a given context.

It is foreseeable that further developments in robotics and information and communication technologies will soon subvert the current modus operandi but the importance of human involvement in some transactions and procedures should not be overlooked.

### **Therapeutic environment**

From the performance point of view the overall quality of the building is evaluated in relation to the ability to satisfy the needs of all users, direct and indirect. In recent years what concerns the perceived quality, that represents a design approach centered on the needs of users, is becoming more important than the assessment of the constructive quality of the structure and of the provided services, especially with regard to hospital building. The perceived quality refers to the consent of the end users: patients, medical and health staff and family members, it depends on the suitability of the project to convey feelings of reliability, safety, serenity and familiarity, to create a micro-environment that induces users to be receptive and sympathetic, an attitude that has been shown to have a significant impact on the outcomes of the therapies administered and on the quality of the services provided. An environment is defined therapeutic if it is shown that there is a direct correlation between the characteristics of the environment and the beneficial effects on the patient.

Many factors contribute to the composition of a therapeutic environment that is able to act on the physical and psychological well-being of the patient; among the most relevant are considered: the human scale, thermal comfort, air quality, the quality of natural light, privacy, noise control, embellishment, the quality of the external landscape, the possibility of reception for family members, ease of orientation in hospital paths, art and color. Many studies are conducted on health care and education to assess the incidence of environmental conditions on the effectiveness of care and academic performance, based on the assumption that specific favorable conditions can amplify the expected effects. The famous study conducted by Ulrich in the 1970s on a suburban hospital in Pennsylvania has scientifically shown that patients in the post-operative phase, hospitalized in rooms overlooking the garden, required less often the intervention of nurses and the administration of painkillers compared to patients in rooms overlooking the walls; however in most studies only a few factors are considered and are analyzed individually, it is not known exactly which is the combined action of several factors in relation to different cultural and social contexts (Glanville, R., Nedin, P., 2009). Another beneficial factor is the involvement of personnel in the design of the work context; doctors and health professionals spend much more time in the hospital than patients and often work in conditions of great tension; being

able to express their expectations has beneficial effects on the morale and overall performance of the new structure.

At the base of today's hospital design the spatial dimension is therefore conditioned by a series of priority factors with respect to standardized schemes or stylistic values, the project must be based on the "Setting based approach" model, an approach that is not limited to considering the physical and structural characteristics of an environment but which first of all takes into account:

- of its organization;
- of the people who frequent it and their expectations;
- of the objectives it pursues;
- of the behaviors and relationships that take place there;
- of the rules and values that govern it;
- of explicit and implicit mandates received from the entire community.

To this examination we must add the difficulty, barely hinted at in these brief notes, of intervening on buildings conceived according to completely obsolete models in which the modern and rational demands of flexibility are always a compromise with the resilience of the structure, which however, in many cases it retains its symbolic value and plays a significant role in social and urban terms, a complex value made up of quantitative but also qualitative components that are difficult to measure but very influential for the success of the project.

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