

HOSPITAL OUTDOOR SPACES - THERAPEUTIC BENEFITS AND DESIGN CONSIDERATIONS *

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Abstract. *The awareness of positive influences of outdoor environment on patients' healing process has long been present in hospital architecture. Despite the fact that economic factors had the greatest impact on hospital design during the past century, which caused a neglect of possible restorative benefits of hospital surroundings, recently developed and integrated healthcare systems are more focused on patients' needs regarding the effects of treatments and services on their satisfaction. With the aim to reduce costs of medical therapies without sacrificing their quality, this new approach resulted in a substantial shift in planning and designing of both indoor and outdoor hospital spaces. This paper presents an analysis of various aspects that need to be taken into account while planning of hospital outdoor spaces. It proposes a list of design considerations that may contribute to achieving a healing environment with positive effects on patients' well-being and outcomes of their medical treatments, while simultaneously raising the overall hospital's efficiency. Having in mind specific organizational structure and functional flows that an institution of this type comprises, these considerations are determined, preconditioned and set up to meet strictly defined norms, regulations and criteria. The purpose of this research is to examine which elements and features and to what extent may assist in generating a supportive, inviting, secure and non-threatening atmosphere of the outdoor hospital surroundings that discharges negative reminiscences, experiences or assumptions on how unpleasant the stay in a hospital may be.*

Key words: *hospital outdoor space, healthcare outcomes, healing environment.*

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1. INTRODUCTION

Hospitals that comprise buildings and their surrounding outdoor spaces are amongst the largest and most complex of all public institutions. They are generally considered as 'frightening areas', thus spatially detached from the rest of urban fabric in one's mind and entered in case of emergency or solely if necessary. However, by implementing a new approach in designing, it may be possible to soften their psychological borders through introducing new contents that would change its public perception. Given that current trends in hospital planning replaced the old philosophy of regarding these institutions solely as *machines à guerir* [1], they now emphasize the importance of creating a concept of patient-focused hospital as therapeutic environment which provides physical, emotional and spiritual comfort to all groups of users. This shift in practice does not apply only to indoor spaces, but to outdoor surrounding as well.

If the space were to be characterized by its meaning, significance and the impact it may have on human life, for the purpose of this paper hospital outdoor space was identified with an envelope enclosing distinctive but temporary human psychologies. As patient's perception while staying in a hospital is frequently distorted, limited and influenced by various external factors, it is in constant need of a greater support than in everyday circumstances. Thus, with the intention to change the negative image of hospitals as medical fortifications, the openness of their outdoor spaces should transmit a message of acceptance, while making them less isolated fragments of an urban network of public spaces. [2]

The emphasis in this research was given to various planning aspects and design considerations that may assist in generating a supportive, inviting, secure and non-threatening atmosphere of the outdoor hospital surroundings. Creating an environment that would be supportive, friendly and less stressful for patients and their visitors, and simultaneously more creative and restorative for hospital staff are the key elements and issues that need to be addressed during planning of hospital outdoor spaces. Moreover, due to their specific function and multifaceted structure, all interventions need to be planned and designed according to certain norms and regulations and with the most concern.

2. HISTORICAL BACKGROUND

While reviewing the development of hospitals through history, it may be noted that the awareness of positive influence of outdoor environment on patients' healing process has long been present in hospital architecture. Evidence of planned restorative gardens can first be found in the European medieval monastic hospices, where patients' cells bordered and had a direct access to arcaded courtyard (Fig. 1).



Fig. 1 St. Catherine's Garden in the monastic infirmary, London, 1154;
 Fig. 2 Central courtyard of the Ospedale Maggiore Ca Granda, Milan, begun in 1456;
 Fig. 3 Garden Lodge of the Royal Hospital, Dublin, 1730.

Throughout the 14th and 15th centuries, hospital buildings have been surrounded by rich gardens in traditional style (Fig.2). The emergence of scientific medicine during the 17th and 18th centuries confirmed the positive impact of nature upon patient's body and soul, which resulted in construction of large city hospitals that incorporated courtyards with long rows of trees (Fig. 3). The pavilion- and sanatoria-type, with vast green areas between pavilion wards, became the predominant form in the 19th and early 20th centuries, while hospitals were regarded as civic monuments. [3]

The 20th century was the period of technological advances in both medical science and building construction. The recognition of possible restorative benefits of nature has started to disappear as the emphasis of hospital design shifted towards increasing staff's efficiency and away from creating a therapeutic environment. Thus, hospitals erected during the Modern Movement resemble high-rise office buildings, with large parking lots that replaced traditional gardens (Fig. 4 and 5).



Fig. 4 27 storeys of the *Cornell Medical Center*, New York, 1933; Fig. 5: *Hôpital Beaujon*, inspired by the American hospital architecture, Clichy, 1932-1935.

Evident reversal of this trend happened during the last decades of the 20th century. Newly developed and integrated healthcare systems were more focused on patients' needs, with the aim to reduce costs of medical therapies without sacrificing the quality. Considering that numerous studies proved that a patient-orientated hospital environment has a positive impact on clinical outcomes, it was concluded that investments directed toward developing, redesigning and improving the outdoor surroundings would eventually pay-off. [4] Consequently, these spaces that have previously been subordinated to the architectural design and considered only as unavoidable annexes to hospital buildings, became their logical extension and a healthcare factor that is almost equally influential as various medical treatments.

3. URBAN INTEGRATION AND PUBLIC IMAGE

Hospitals have been hidden behind high walls and fences for centuries, which substantially influenced patients' perception of the environment they felt as forced into. Their strictly defined borders were clearly segregating 'the sick' from a healthy population, both physically and psychologically. In contrast, today's hospitals are regarded as integral fragments of the urban fabric that are open to the community, same as other public buildings, while their outdoor spaces, as an extension to the existing urban landscape, act as mitigating public spaces between the city and hospital environment. This new approach in planning and designing of both indoor and outdoor spaces has achieved a shift in hospital's public image. Originating from overlapping of patients' impressions while staying in, a more positive image thus creates possibilities for various personal interpretations of its physical and/or psychological boundaries that may, to a great extent, reduce experiencing a hospital as a secluded environment isolated from the rest of society.

4. BENEFITS OF CREATING A POSITIVE HEALING ENVIRONMENT

As previously mentioned, medical and economic benefits have had the greatest impact on the hospital design in the past century, while recently, evidence regarding the effects of treatments or services on patients' satisfaction gained much more importance. Some studies indicate that all hospital users experience positive health outcomes from connection to natural environment and access to daylight and landscape views. [5] A research project, based upon a survey conducted in the USA a decade ago, deals with what inpatients expect from the hospital outdoor spaces. [6] Its results outline the significance of acknowledging the outside world through sights and scenes from nature, as well as the need for homely (particularly in a long-term patients' care), attractive, cheerful and relaxing surroundings with positive distractions. From the psychological point of view, the purpose of recognizing the hospital outdoors as a supportive environment lies in the fact that it symbolizes a bordering space of patients' awareness of the outside world that they would eventually plunge back into. Thus, these spaces should offer an experience that is in an absolute contrast to being inside and, as such, they might have a significant impact on one's health improvement.

Benefits of creating a supportive outdoor environment may vary, but they generally refer to the measures of patients' medical conditions or indicators of healthcare quality.

They include: observable medical signs of improvement, subjective measures, such as reported satisfaction of patients, visitors and staff, and economic benefits. [7]

When discussing the objective measures of health improvement, it is important to emphasize that a disease is not just a function of virulent pathogens. Many other factors in the physical and social environment may stress the patient and thus help determine the prevalence of a disease or strengthening body's immune system.[8] There are plenty of conclusions that the influence of poorly managed hospital surrounding may be negative - various researches in behavioral sciences has confirmed that "healthcare settings may in themselves slow recovery and induce emotional problems". [9] In relation to the subjective measures of health improvement, some studies pointed out that the use of nature in hospital environment reduces stress and depression, supports anger and pain management, and promotes a sense of overall well-being. [10] To illustrate, in an evaluation of four hospital gardens in San Francisco, a team of experts used a combination of behavioral observation and interview methods. [11] The results showed that, after spending time outside, 79% of the patients felt "more relaxed and calmer", 25% sensed "refreshed and stronger", 22% were "able to think and cope" and only 5% did not feel any particular change. Restoration from stress, including an improved mood, was by far the most important category of individual experiences derived by nearly all the users. Accordingly, it may be concluded that people's judgments and feelings about their environment have a strong impact on healthcare outcomes as well.

Regarding the economic aspect of implementing natural surroundings in a hospital design, it should be stressed out that each hospital management is under a strong pressure to control and reduce costs, yet increase the quality of care. Since some studies indicated that creating a stimulative outdoor environment yields long-term benefits including shorter patients' stays, reduced staff turnover and improved staff longevity [12], it may be concluded that additional investments of this kind are financially viable.

Concerning the aforementioned, in order to achieve a high performance healing environment with proven effects on patients', visitors' and staff's well-being, better clinical outcomes and raised efficiency, one of the key issues represents a functional integration of outdoor space in hospital's overall design.

5. GENERAL DESIGN CONSIDERATIONS

Planning of hospital outdoor spaces that would support, enhance and promote positive healthcare outcomes relies on the design considerations set up to meet strictly defined norms, regulations and criteria. They provide information and achievable measures which need to be incorporated as early as in the conceptual phase in order to fully integrate the use of outdoor space into a hospital's routine.

5.1. Potentials of the Site

Hospital's site is certainly one of the most significant generators of its form in many aspects. Numerous analyses and investigations need to be undertaken by the design team with the aim of truly understanding its advantages, disadvantages and potentials.

In an ideal case, optimal distribution of the total site area of a hospital complex should be the following: 30% for the buildings, 15% for internal communication routes and

parking, 50% for vacant area (25-30% in case of hospitals with a limited capacity for future growth) out of which 10% is reserved for recreational areas [13].

While planning suitable locations for different types of outdoor areas, there are several issues that need to be taken into account, such as: environmental factors (e.g., orientation, insolation, wind exposure, views); distance from distractions (e.g., urban noise, parking lots, mechanical systems); physical configuration of the complex; internal traffic system and its access points; specific needs of different user groups; etc. Proper acknowledgment and implementation of these factors may generally enhance beneficial value of the outdoor space.

5.2. User groups and their needs

There are three distinctive groups of users of both indoor and outdoor hospital spaces – patients, employees and visitors, each having its own requirements and patterns of use.

First and foremost is the patient group which consists of various categories depending on type of patients' disabilities, their length of stay (e.g., short-term and long-term inpatients or outpatients) and physical and psychological needs (e.g., pediatric, geriatric, orthopedic, rehabilitation, psychiatric or post-surgery patients, those with sunlight sensitivity or with immune suppression). Specific demands of each subgroup greatly determine the choices made in the outdoor environment.

Employees, varying from the medical to administrative and supporting staff, are a critical group of users since they spend every working day within the hospital environment. All of them use outdoor space as an effective means for achieving a restorative escape from stressful jobs and aversive conditions in the hospital.

Visitors as the third user group are also in need of positive distractions while spending time with their family members or friends. These visits are frequently reassuring, but may as well be emotionally intense, and thus require a supportive environment.

5.3. Types of experiences

When setting up the design principles, it is essential to base them on the premise that the hospital outdoor spaces need to accommodate various types of activities and experiences which are in a close relation to the users' particular needs. In brief, they should be planned according to following requirements: (1) to create opportunities for movement and exercise; (2) to offer a choice between social interaction and solitude; (3) to provide both direct and indirect contacts with nature and other positive distractions. [14]

- (1) Active experiences are both physically and psychologically beneficial since they improve patient's cardiovascular fitness and reduce stress and depression. In addition, physical therapy and rehabilitation undertaken in a natural environment may enhance positive results of various medical treatments.
- (2) Given that, while staying in the hospital, a majority of patients is constantly under a strict regime, they frequently experience a loss self-esteem or control over their lives. Therefore, passive experiences of being able to select between seeking privacy and socially interacting may be beneficial from a psychological point of view.
- (3) Direct or indirect sensory experiences of connection with nature and positive distractions involve stimulating one or more of five senses, calming the mind, reducing stress and encouraging person's own healing resources. This also applies to

indirect contact with outdoors by viewing a distant and nearby nature through the window of patient's room.

5.4. Variety of spaces and their interrelation

Crucial programming and designing objective is to provide a variety of hospital outdoor micro spaces, targeting different needs of their users. Series of diverse smaller squares and meeting points conventionally located to one another can create a cozy atmosphere and variety of experiences rather than a large one (Fig. 6). These spaces must offer a choice – places for both group and solitary occupancy; places in the sunlight or shade; places to pause and experience natural surrounding; places with open or closed views, etc. (Fig. 7) Some spaces may also awaken all the senses, but there is a necessity for incorporating areas with limited sensory stimulation. [15]

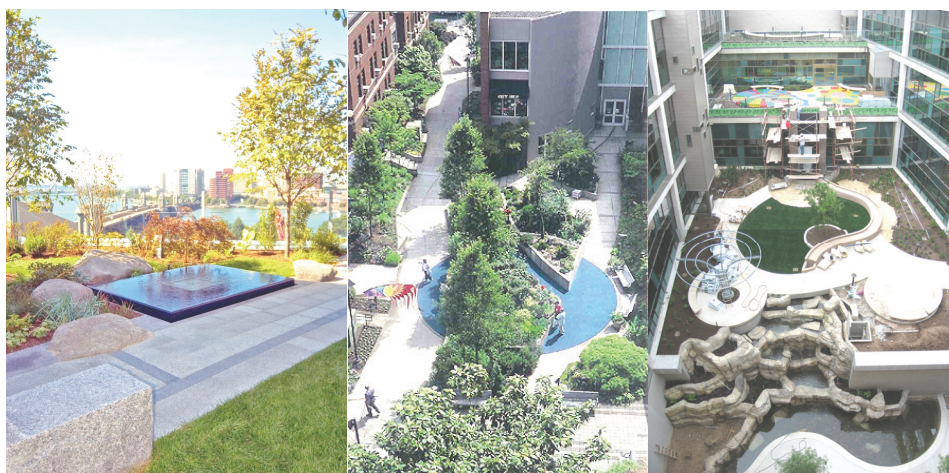


Fig. 6 Meditation square in the *Massachusetts General Hospital*, Boston;
 Fig. 7 Variety of micro-spaces in the *Legacy Good Samaritan Hospital*, Portland;
 Fig. 8 Playground in the *Dell Children's Medical Center*, Austin.

Since the patients are the most sensitive group of users, by making their own decision on how they are going to spend time outside, their dignity, confidentiality and sense of control and autonomy may subtly be reinforced, leading to lowering stress level. A part of outdoor spaces should also be designed to encourage suitable type of exercise. This can be achieved by including looped pathways for shorter or longer routes, settings for physical therapy, playgrounds, meandering garden layout for contemplative walking and jogging trails (Fig. 8).

It is also essential to plan very clear physical and psychological links between these micro spaces in order not to confuse already stressed patients. Comprehending the way spaces relate to one another and being able to feel the organizational principles of the circulation systems are of vital importance to every patient. Providing a constant sense of direction, course or point of reference may as well ease the wayfinding, especially in hospitals with a more complex organizational structure.

5.5. Positive and negative distractions

Current studies on design of hospital outdoor spaces also suggest featuring of restorative and positive distractions that may effectively induce health restoration [16]. Emphasis on natural features as grounding points, such as the use of plants, rocks, wood or water, can only be beneficial to recovery (Fig. 9). Given that art, according to Ted Hughes, represents "a psychological component of the auto-immune system that gives expression to the healing process", [17] implementation of carefully chosen art pieces should also be encouraged (Fig. 10 and 11).



Fig. 9 *Labyrinth Garden* in the *Duke Integrative Medicine Center*, Durham;

Fig. 10 *Sculpture Garden* in the *Bethesda Rehabilitation Center*, St. Paul;

Fig. 11 *Olson Family Garden* in a children hospital, St. Louis.

Negative distractions and intrusive stimuli on the other hand may hamper recovery and aggravate stress, such as abstract and ambiguous sculptures or designs that can be interpreted in multiple ways. It is documented that patients feel more vulnerable to experiencing stressful rather than positive reactions to these features. [18] Environments that are mysterious or complex to understand can be interesting and challenging to the healthy, but to ill they usually provoke counter-indicated effects.

5.6. Accessibility, familiarity and security

All hospital outdoor spaces must be designed to be physically secure and accessible to people of all ages and abilities, thus contributing to their positive psychological perception. When feeling stressed or depressed, many users search for environments that seem familiar and safe. This applies to implementing visual amenities which are rooted in the subconsciousness of the majority of users and creating outdoor spaces that are human-scaled and evoke memories. Furthermore, constant monitoring by the nursing staff and provision of additional medical support (e.g. oxygen outlets) may allow their extended use and lead to a higher degree of comfort.

5.7. Planting

5.7.1. Green areas

The key element of a positive healing and therapeutic environment is the presence of greenery. In general, exposure to nature can have a significantly beneficial effect on people's emotional state - "the more the setting evoked an image of a rich, green garden, the more it was used and appreciated as a place to recoup in complete to the high-tech, hygienic, fluorescent-lighted hospital interior". [19] According to the Green Guide for Health Care [20], implementation of healthy ecosystems in hospital outdoor spaces has significant social, psychological and physical benefits derived from physical and visual connection to natural environment (Fig. 12 and 13). This guide also suggests the following formula for the calculation of the required green area: $Natural\ Habitat\ Area = (Site\ Area \times Site\ Size\ Factor) / Floor\ Space\ Ratio$, where $Floor\ Space\ Ratio = Gross\ Constructed\ Area\ including\ all\ service\ spaces\ and\ excluding\ parking\ areas / Site\ Area$ and $Site\ Size\ Factor = (\sqrt{Site\ Area} / Site\ Area) \times 10$ (usually around 0.15).



Fig. 12 Meditation Garden,
City of Hope Cancer Center, Duarte;



Fig. 13 Peter's Garden of Hope,
Fletcher-Allen Hospital, Burlington.

Calculated area can even be increased to reserve a portion of the site for future developments. In case of reconstruction and/or revitalization of an existing hospital, it is necessary to conserve, preserve and enhance the site's existing greenery or natural features and restore damaged areas, no matter how small they are.

5.7.2. Plant material

A selection of plant material for hospital outdoor spaces should be carefully made in order to associate certain users' needs, particularly patients' requirements, to plants' specific characteristics and features. For instance, a horticultural therapy as an unconventional treatment that is recognized by professional medical staff relies directly on creating sensory stimulating environments by using plants selected for their fragrance, texture and color.

Due to the fact that the patients need to have at least a constant visual communication with the surroundings all year round, the percentage of planted larch trees and shrubs should be higher than in other city quarters, while the rest of applied material needs to display seasonal habitat and change. Furthermore, the use of plants with a higher phyton-

cide emission, like oak and pine trees, may contribute to better treatment outcomes, as this organic volatile substance is bactericidal. [21] Plants may also be unconsciously experienced as various metaphors - "tree can provide a metaphor of solidity, strength and permanence; perennials of persistence and renewal; annual of growth, budding, blooming, seeding, decay and transformation". [22] However, when making a choice, it is necessary to consult hospital's infectious diseases control specialist since exposure to certain plants that are high pollen producers may cause severe allergic reactions.

5.8. Healing vs. therapeutic garden

The term *healing garden* applies to the gardens that promote recuperation from illness. In this context, 'healing' does not necessarily refer to curing, but to the overall improvement of well-being. While these gardens are more focused on spiritual, psychological and physical aspects of health restoration [23], *therapeutic gardens* as a new trend in hospital outdoor spaces' design relate to specific curative therapies, such as the allopathic method in which a disease is treated by producing effects or conditions different from those caused by the disease itself. Consequently, gardens are also becoming the location and means of treatment.

5.9. Green roofs

There are many examples of using flat roofs as additional outdoor places of respite, especially in the hospitals within city quarters with a high construction density. Their use may influence and enhance the general quality of healthcare environment. Depending on the hospital's physical configuration, one of the options in case of limited site area is to create accessible or inaccessible roof gardens visible from the upper floors of higher buildings in the vicinity (Fig. 14). Not only that green roofs accommodate places for contemplation and relaxation, but they also minimize energy consumption – they reduce heating loads by adding mass and thermal resistance value and lower cooling loads through evaporation. [24]

5.10. View out

The outdoor hospital areas should be visible from patients' rooms, interior public spaces and corridors, for both security and medical purposes. View out is also psychologically therapeutic, since it reduces feeling of isolation and claustrophobia by providing a constant contact with the outside world (Fig. 15). It may also add patient's interest to the surrounding environment, leading either to immediate use or a decision to visit it later.

When building new or reconstructing an existing hospital with budget restrictions or a limited site, one of the solutions is to incorporate an indoor 'viewing garden' – a small garden that cannot be entered, but may be seen from the building interior. If there is enough space, an alternative is to apply 'a walk-in garden', which is accessible to a certain number of people (Fig. 16).



Fig. 14 Viewing roof garden, *Harrison Memorial Hospital*, Bremerton
 Fig. 15 View from a patient's room, *Hitchcock Medical Center*, Dartmouth
 Fig. 16 Walk-in garden in the lobby, *St. Vincent Hospital*, Worcester.

5.11. Successful wayfinding

People need to find their way around a hospital that frequently has a very complicated functional and organizational structure. Successful wayfinding system is a powerful navigation tool which provides necessary information, enabling decision making and planning of routes. Good design of strategically placed levels of information can alleviate disorientation as one of the major sources of frustration among patients and visitors.[25] Once a route to final destination is selected, patients and visitors need to have continuous access to information or visual clues along their way, thus all the information must be constantly repeated and prioritized at crucial points, which can be enhanced by utilization of specific urban landmarks or site features.

Style of communication elements, including material, color, contrast and text, has to be consistent, carefully implemented in an overall hospital design and should not be tampered out with. On the other hand, too much information may overload visual communication and confuse the patient, which can induce puzzlement and fear in an already stressful environment. [26]

6. CONCLUSION

Integration and unity of hospital buildings and their surrounding outdoor spaces contribute to creation of hospital as a 'small city within a city', with its own specific patterns of use. Features that are relevant for the quality evaluation of any public space may also apply to these spaces, since they should be considered and experienced as a vital part of urban landscape. What makes them different from other public spaces are their physical characteristics, determined and preconditioned by specific contents, functional units and communication lines that all need to be planned and designed according to strict requirements of modern medical technology.

The approach in design proposed in this paper is structured upon the premise that the primary function of the hospital outdoor space is creation of calming environment which represents an additional healthcare amenity that provides therapeutic benefits and positive health outcomes. The list of features that a hospital outdoor space may comprise was also

given as an illustration of various aspects that need to be taken into account in order to generate a new and more positive image of a hospital as a non-threatening place. In relation to patients' experience, the essence of presented approach may be found in a possibility of creating a common and familiar everyday environment within a space that a majority perceives as psychologically bounded. Experiencing these spaces as islands isolated from everyday life occurrences may, among others, lead to a loss of faith in curing or complete recovery, thus the true worthiness of the outdoor spaces of modern hospital facilities is based on their appropriate and diverse program, social, psychological, environmental and ambient characteristics, which can be valued upon daily presence, positive experiences and satisfaction of patients, as well as other user groups.

In a long-term sense, the role of a design team is to integrate hospital outdoor space into a hospital's routine in a manner that would help compensate extra costs by reducing the length and cost of therapies.[27] This leads to improvement of general effects of timely diagnostics and treatments and contributes to healthcare promoting qualities, but requires a more complex hospital infrastructure and poses additional considerations to the outdoor planning process.

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SPOLJAŠNJI PROSTORI BOLNIČKIH USTANOVA - TERAPEUTSKI UTICAJ I ASPEKTI PLANIRANJA

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Svest o pozitivnom uticaju bolničkog okruženja na proces ozdravljenja kod pacijenata već dugo je prisutna u arhitekturi zdravstvenih objekata. Uprkos činjenici da su bolnice tokom prošlog veka projektovane na način koji bi obezbedio da njihov rad bude prvenstveno ekonomski isplativ, čime je značaj njihovih spoljašnjih prostora potpuno zanemaren, savremeni sistemi zdravstvene zaštite se sve više usmeravaju na zadovoljenje potreba pacijenata, sa dodatnim ciljem smanjenja troškova medicinskih terapija uz održavanje visokog nivoa kvaliteta svih usluga koje se pružaju. Ovaj nov pristup u promeni prioriteta ogleda se i u planiranju i projektovanju kako bolničkih objekata tako i njihovih otvorenih prostora.

U radu je predstavljena analiza različitih arhitektonskih i urbanističkih aspekata koji mogu biti uzeti u obzir prilikom projektovanja i planiranja spoljašnjih prostora bolničkih kompleksa. Njihovim razmatranjem i primenom moguće je ostvariti psihološki podsticajnu sredinu koja može da poboljša efekte medicinskih tretmana i ubrza proces lečenja, čime se istovremeno posredno povećava i efikasnost celokupnog zdravstvenog sistema. Cilj istraživanja bio je da se ispita na koji način i u kojoj meri različiti arhitektonski i urbanistički elementi mogu da doprinesu u stvaranju kvalitetnih spoljašnjih bolničkih prostora kao terapeuskog okruženja koje ima pozitivan uticaj na zdravstvene ishode.

Ključne reči: *spoljašnji prostori bolničkih ustanova, zdravstveni ishodi, terapeusko okruženje.*