Healthy Places in the Built Environment

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ABSTRACT **Although the impact of the built environment on human health is significant, architectural and urban design still does not take sufficient account of its relevance, due to the lack of interdisciplinary knowledge and collaboration of planners and designers with the healthcare workers, environmental health professionals, and other relevant experts and stakeholders who need to be included into planning and design processes. To assist in bridging the knowledge gap, this review paper first analyses the relationship between the built environment and human health, and then considers the concept of a 'healthy place'. The impact of the built environment on human health is explained through a set of health-related determinants, whose spatial determination and description bring even closer the consideration of the right size of a 'healthy place' in the built environment. Health-related determinants of the built environment cannot be generalised, so planning and design must be adapted to the particularities of every individual place, in order to make it 'healthy'. Despite the determination by definition and the approximation of its optimal scale, the concept of a 'healthy place' remains partially abstract, because of the individual differences among its users, and well as the lack of possibility to measure the levels of health and wellbeing in relation to the built environment. Therefore, this paper opens a new debate about the threshold of a healthy place, as well as about the upper limit of a healthy place ('just healthy enough' level) above which some negative social implications, such as gentrification, could occur.**

KEYWORDS built environment, health, determinants, healthy place, neighbourhood

1 Introduction

Broadly speaking, the built environment can be understood as a system of spatial and physical conditions for human activities and the satisfaction of human needs and desires. Whether in the house, at the workplace, or during recreation, people are surrounded by elements of the built environment. Having regarded the reciprocal relationship, the impact of the built environment on its users has evolved into a distinct field of research.

Almost 2500 years ago, Hippocrates spoke in his treatise *On Airs, Waters and Places* about the importance of the impact of environment on human health (Hippocrates, n.d.). While the shaping of the built environment in accordance with the 'sense of place' represented a common practice in the past, technical-technological and socio-economic development altered the possibilities of transforming the natural into the man-made environment, and simultaneously changed mutual influences between built space and its users.

Different studies have reported that there is a close relationship between human environment and human health. The air that people breathe, the water they drink, the features of space in which people stay, the way in which built space is used, and even social interactions, are all deeply interwoven with the built environment.

The elements of built environment can both improve or impair human health, by influencing behaviour, habits, and feelings, and by direct impact on physical health. Built environment can thus be brought into relation with a growing number of chronic diseases (e.g. Perdue, Stone, & Gostin, 2003), obesity, diabetes (WHO, 2016), as well as cardiovascular diseases. On the other hand, the healing potential of a materialised space has also been reported (e.g. Leibrock & Hariss, 2011). Further, built environment can nourish human physical activity, which is directly related to health and wellbeing (Audrey & Batista-Ferrer, 2015; Carlson, Aytur, Gardner, & Rogers, 2012; Frank, Kavage, & Devlin, 2012; Wells, 2016), and can influence eating habits (Booth et al., 2001; Sallis & Glanz, 2006), social wellbeing (French et al., 2014; Wood et al., 2008), as well as mental health (Evans, 2003; Halpern, 2013). Therefore, "making health an explicit component of planning is critical" (Wells, 2016, p. 1).

The need to address the impact of a man-made environment on health through an interdisciplinary approach has resulted in the integration of scientific disciplines. *Health geography*, as a sub-discipline of *human geography*, uses the principles of geographic science to explore health issues (Hussain, 2016). *Environmental health* appears as a branch of *public health* that deals with all aspects of the natural and built environment that may affect human health. According to one definition, environmental health comprises those aspects of human health, disease, and injury that are determined or influenced by environment factors (Srinivasan, O'Fallon, & Dearry, 2003, p. 1446). These environmental factors involve various chemical, physical and

biological agents, as well as housing, urban development, land use, transportation, industry and agriculture.

While researchers and different organisations are trying to develop strategies, plans, and projects for the built environment that will not have a negative influence on human health, or will even have a positive impact, practicing professions that are directly involved in creating the built space often do not pay enough attention to this aspect. It is important that urban planners, designers, and architects, in collaboration with policy makers, environmentalists, public health advocates, health practitioners, and health promoters, address the issue of environmental impact on human health more profoundly. For this to happen, education is necessary. To that end, this paper aims to build a knowledge regarding the relationship between built environment and human health, primarily by exploring and explaining the main health-related determinants of the built environment, and considering the definition and the optimal spatial scale of a 'healthy place'.

2 Health-Related Determinants of the Built Environment

The state of health, as defined by the World Health Organisation in 1946 (WHO, n.d.), refers to "complete physical, mental and social wellbeing and not merely the absence of disease or infirmity". From contemporary point of view, different authors (e.g., Last, 2009; Mirowsky & Ross, 2003) criticise or try to upgrade the basic definition of health by the World Health Organisation. Bircher (2005), for example, defines health as "a dynamic state of well-being characterized by a physical, mental and social potential, which satisfies the demands of a life commensurate with age, culture and personal responsibility" (Bircher, 2005, p. 336).

Physical, mental, and social aspects of health are influenced by different circumstances that exist within the built systems. The negative impact of the urban environment on health is well described in the literature (e.g., Lederbogen, Kirsch, Haddad, & Meyer-Lindenberg, 2011; Okulicz-Kozaryn, 2015; Schaller, 2012). Furthermore, the studies have shown that the rise in poverty, inadequacy, and the lack of work affect people's dissatisfaction with rural life and impact their wellbeing (Kovács, 2009; Perz, 2000), in spite of benefits such as having a close connection with nature and a more peaceful lifestyle. Similarly, the quality of life in the in-between territories, when compared to urban and rural areas, is not improved (Adams, 1992; Kährik, Leetmaa & Tammaru 2012).

To determine more closely the impact on human health, it is necessary to identify influencing factors originating from the built environment. These factors are understood as determinants of the built environment that affect human health (Table 2.1).

IMPACT	DETERMINANTS OF THE BUILT ENVIRONMENT
Variable	Conditions at location in which a place is "set"
Variable	Resilience of place/Preparedness for disaster
MS	Residential density
MS	Built space typologies and distribution of physical structures
PM, S	Land use and spatial organisation
PM, S	Incorporation of nature contact into built tissue
P, M	Air, water and soil quality
P, M	Allergens and other biological contaminants
M, S	Municipal noise
P, M	Accessibility to other places/facilities, especially to health care services
P, S	Transportation
PM	Walkability and bicycle use
P	Infrastructure
M, S	Open space design and dimensioning
S, M	Common space design
S, M	Social life and common activities
PM	Green space design and dimensioning
PM, S	Sports/recreation and other spaces for physical activity enhancement
M, SP	"Intended" spaces (e. g., healing corners, educative spaces or child care community places)
M, S	Spatial equipment
P, M	Safety in relation to injury/accident occurrence
PM	Ease of moving
Variable	Safety in relation to crime, violence and social disorders
M	Flexibility and adaptability of the design
S, M	Social structure, justice and inclusion
PM	Actions and programmes for health promotion (healthy lifestyle, nutrition, obesity, physical activity, substance abuse, targeted or future predicted (e.g. Davies, 2015) sickness prevention, etc.)
S, M	Promotion of positive social values and relations
M, S	Image of the place: aesthetics/attractiveness/identity/diversity
M, S	Perception of the place (pleasant, attaching, hoping, supportive, healthy, happiness enhancing, etc., vs depressive, dark, cold, strange, etc.)
M	Scent of place as memory trigger
M	Capacity of place for support in emotional crisis and the stress absorption
M	Spiritual dimension of the place
PM, S	Hygiene
PM	Indoor environmental quality (including comfort aspects)
P	Chemical content of construction materials
PM	Quality of construction
Abbreviations: P – physical health; M – mental health; S – social health.	

TABLE 2.1 Health-related determinants of the built environment *(Kosanović, Vaništa Lazarević & Timotijević, 2015, p. 82)*

The built environment affects human health and wellbeing at different spatial scales and in different ways, primarily through the built forms, land use options, and the organisation of functions.

Infrastructure and transportation options can influence walkability, generation of air pollution, noise, and related stress, as well as the injuries, and even death outcomes during car accidents.

Traffic-related improvements are achieved by improving street lighting and connectivity (ease and safety of street crossing), traffic calming, efficient and affordable public transportation, and the practice of active travel (Audrey and Batista-Ferrer, 2015; Bunn et al., 2003; Davies, 2015; Dobbins & Tirilis, 2011).

Ease of moving and accessibility to different places/facilities in the built environment affect human health and wellbeing in various ways. The continuity of sidewalks and bicycle paths and the attractiveness of space encourage people to increase walking and cycling while reducing driving, and thus to become more physically active. Such behavioural change in turn improves social relations and public security, and reduces stress, number of fatal accidents, and crime rates (Kent & Thompson, 2012; Super Church, 2014; Audrey & Batista-Ferrer, 2015). On the contrary, in an environment that is not conducive for walking and cycling and in which the use of private vehicles dominates, people suffer more from higher body weight and obesity, as well as the chronic diseases that go with these conditions (Giles-Corti, Macintyre, Clarkson, Pikora, & Donovan, 2003; Papas et al., 2007). Besides an adequate street layout, and presence of sidewalks and bicycle paths, physical activity is enhanced through the adequate design of common open spaces, such as playgrounds, parks, and sport/recreation spaces.

Density, and spatial organisation and use (such as singular or mixed-use options) account for important qualities of the built environment, especially when it comes to the consideration of the quality of life, and health and wellbeing. Good quality design and sufficient provision of open spaces (such as public squares, ceremonial places, and public structures) and green areas reduce social isolation and estrangement, and bring multiple other benefits to the users, from enhanced physical activity, to emotional relief (Lau, Gou, & Liu, 2014; Semenza, 2005).

Green open space has been assigned particular importance in the built environment, having regarded that it provides contact with nature, acts as an ecologically significant agent, and represents a spatial platform for numerous activities with positive outcomes for physical, social, and mental health aspects. Maas, Verheij, Groenewegen, Vries, and Spreeuwenberg (2006, p. 587) have found that "the percentage of green space in people's living environment has a positive association with the perceived general health of residents". Therefore, the prevention of mental, emotional, and physical health problems could be improved by providing access to the natural environment (Pryor, Townsend, Maller, & Field, 2006). Besides open spaces (e.g., parks, community gardens, etc.), contact with nature could be strengthened with some design-specific measures at a building scale, such as biophilic design, provision of sufficient size and good position of windows on envelopes, as well as by the greening of envelopes, which is particularly relevant in densely built parts of urban environment (Frumkin & Fox, 2011; Stamenković, Miletić, Kosanović, Vučković, & Glišović, 2017). Frumkin and Fox (2011, p. 229) have noted that, besides direct benefits on human health, "providing nature contact could also yield co-benefits such as more energy-efficient buildings, improved access to healthy foods, and conservation of natural resources".

Physical and social characteristics of the built environment can both foster and harm human health. Lower socio-economic status results in poorer health and increased levels of crime and violence, which raises the risk for depressive/anxiety disorders (Morenoff & Lynch, 2004; Stockdale et al., 2007). "Crowded, noisy and dangerous places have a variety of negative impacts on people and their psychological states." (Sullivan & Chang, 2011, p. 106) The feeling of unsafety can further be related to reduced physical activity and health-aggravating conditions (Centers for Disease Control and Prevention, 1996). On the other hand, an adequately shaped, well maintained, distinctive, and safe built environment may promote social ties and values among the members of a community and hence contribute positively to the social aspect of health (Sullivan & Chung, 2011; Glasgow Centre for Population Health, 2013). To that end, the 'third places' - informal meeting places outside of home ('first place') or work ('second place'), seem to have an important, although yet insufficiently understood role for the health and wellbeing (Manuel & Thompson, 2006). Third places could be coffee shops, pubs, parks, streets, trails, squares, or any other places of informal socialisation within the built environment (Fig 2.1).

FIG. 2.1 Japanese pavilion in Slovenj Gradec, Slovenia. The result of the workshop with professors Tadej Glažar and Hiroto Kobayashi *(Image by Vid de Gleria, 2017)*

Image and perception represent another health-related determinant of the built environment, from design and materialisation of interior spaces and building envelopes, to the density of dwelling, to the perception of safety, to the appearance of built forms and their relationship with users (Kemp & Baker, 2007; Jorgensen & Stedman, 2011; Roessler, 2012; Ochodo, Ndetei, Moturi, & Otieno, 2014; Schaller, 2012). Built space typologies and distribution of physical structures influence individual's emotions and behaviour in various ways (e.g., Schaller, 2012; Roessler, 2012). Simultaneously, the spiritual dimension of a place, scent of a place as memory trigger, capacity of a place for support in emotional crisis, and stress absorption all play important roles in creating a sense of wellbeing (e.g., Smyth, 2005).

Excessive utilisation of private vehicles, increment of population concentrations, inadequate waste management, insufficiently developed infrastructure, presence of other biological and chemical contaminating factors, etc. cause the deterioration of the quality of air, water, and soil – three main elements of human environments that directly affect physical human health. With the development of connectivity, public transportation, pedestrian and bicycle lanes, and greening measures applied to different scales of the built environment, the number of vehicle uses and accordingly the level of air pollution from traffic sources could be notably reduced (e.g., Galea & Vlahov, 2005; Commission for Architecture and the Built Environment, 2009). These measures should further be combined with the promotional measures for using biofuels and transition to more efficient, less polluting vehicles (Frank et al., 2012), as well as with measures for the utilisation of renewable energy sources.

Together with an adequate level of hygiene (e.g., Prüss-Üstün & Corvalán, 2006), good air quality must be achieved at all scales of the built environment, from the settlement level, to the indoor environment of singular buildings, where the right choice of building materials, effective ventilation, optimal humidity, ways of indoor space utilisation and maintenance, provision of all types of comfort, and occupants' behaviour account for the most relevant influential factors. The role of sustainable building design in reducing potential negative impacts of a built space on the health of its users is significant, both directly and indirectly, for example through reduced energy consumption and hence reduced air pollution.

By composting organic waste and recycling other waste types, burning waste for useful energy, recycling or reusing the wastewater, securing flood protection, reducing contamination of water bodies and reduced utilisation of pesticides and fertilisers, utilisation of biodegradable products, etc., soil and water pollution are also reduced (e.g., Galea & Vlahov, 2005; Backer, 2011; Glasgow Centre for Population Health, 2013).

Furthermore, the resilience capacity of a place, i. e. the preparedness of the community for disasters, is a determinant that can make a significant contribution to health when it comes to unexpected outcomes of natural disasters (e.g., Beatley, 2011).

Actions and programmes for health promotion within the built environment are necessary in order to raise awareness about health issues, enhance social health, and educate users about nutrition, physical activity, possibilities of sickness prevention, etc. (e.g., Aboelata, 2004; Galea & Vlahov, 2005; Prüss-Üstün & Corvalán, 2006; Davies, 2015). These actions and programmes, as well as the design and production of 'intended' spaces in the built environment (e.g., healing corners, education spaces, or child care community places) are important because they encourage people to change their habits and adopt healthier lifestyles.

3 Healthy Place and its Scale

The term 'healthy place' was introduced in response to the established relationship between the built environment and people, meaning the established impact of the built environment on human health. Bearing in mind variable context specificities, and the fact that the same environment does not affect all people in a same way, the definition of a healthy place, and more importantly, of its properties, creates a complex challenge.

Generally, Frumkin, Wendel, Abrams, and Malizia (2011) have defined healthy places as "places where people can grow up, live, work, play, study, pray and age in ways that allow them to be safe and healthy, to thrive and to reach their full potential" (p. 5). By taking the medical science perspective, Kosanović et al. (2015) have studied whether the healthy places could be hierarchically characterised as basic – preventive, promotive, and curative places, in accordance with the health protection gradation. Similarly, Roslyn (1985, p. 18) has argued that a healthy place needs at least to "provide a range of opportunities for their inhabitants to shape the conditions that affect their lives…and do no harm". According to the presented observations, the threshold of a healthy place could, in a simplified way, be perceived as 'without negative impact on human health and well-being'.

However, theoretical considerations offered by different authors, as well as the definitions and interpretations of a healthy place, have not yet been largely applied in practice. A basic fact that aggravates the precise determination of a healthy place is an inability to ascertain all impacts of the environment on human health. Therefore, the following questions are kept open: What are the minimum qualities that a place should possess in order to be called 'healthy'? What is the optimal scale of a healthy place? To that end, the basic assumption that assists in drawing the answers is that a geographically scaled environment allows for a more precise determination of the impact of a place on its users. With a right, defined scale of a healthy place, it seems possible to improve the quality of living environment.

The spatial framework in which people live represents an important determinant. Living environment is highly correlated with the quality

of schools, transportation, municipal services, health care and services, and employment opportunities (Cubbin, Pedregon, Egerter & Braveman, 2008), as well as with social-economic conditions, place attachment, sense of belonging, etc. As such, a spatial framework shapes behaviour and influences human health in different important ways (Cubbin et al., 2008).

For these reasons, different authors adopt the scale of a neighbourhood as optimal for studying the health-place relations. To describe the geographic extent and environmental determinant of health, Spielman and Yoo (2009) have introduced the term 'effective neighbourhood', that is formed by complex interaction between the characteristics of people, problems, and places. The main characteristic of effective neighbourhoods, according to Spielman and Yoo (2009), is that they are defined relative to the unit of analysis and not using global criteria. For the purpose of this paper, neighbourhood should be understood as a geographically small, inhabited area, with specific natural, built, social, and symbolic characteristics (Gesler, 2003) that determine relationship between human health and place. "The geographical limits defined by the residents who identify with a specific area are an important element when differentiating themselves from others who do not live there. The clearer the physical limits of the neighbourhood, the stronger the identification". (Uzzell, Pol, & Badenas, 2002, p. 35-36). Solidarity, cohesiveness, social interaction, and a sense of belonging usually characterise such a place. In these social conditions, a neighbourhood becomes a territory for therapeutic process that is perceived as communal act (Moughtin, McMahon Moughtin, & Signoretta, 2009).

Morenoff, Sampson, and Raudenbush (2001) have argued that the neighbourhoods with higher levels of collective efficacy have lower levels of violent crime. Roslyn (1985) has explained that social support contributes to people getting less sick, taking as one example those individuals who have a sense of belonging to the community. In their review on social capital and mental wellbeing in older people, Nyqvist, Forsman, Giuntoli, and Cattan (2013, p. 394), show that "family and friends at the micro level are crucial in generating social capital and well-being in older people". Numerous other studies show that the social character of a place, such as good social relations, social support, and fulfilment of social needs are important for health improvement (e.g., Fitzpatrick & LaGory, 2002; Thoits, 2011; Klijs, Mendes de Leon, Kibele & Smidt, 2017). Places that have the greatest potential to meet social needs and therefore improve human health are the neighbourhoods, due to the specific and unique relations amongst their dwellers.

Regardless of all determinants given from the professional position for the purpose of spatial planning and design, the importance of the 'individual' should not be neglected, which is why the relations between place and health, presented in this paper through the determinants of the built environment that affect human health (Section 2), must be understood as being somewhat generalised. In addition, the perception of the scale of a specific neighbourhood (seen as an area comprising private and shared spaces) varies among individuals and

depends on their age, occupation, interests, etc. (Spielman & Yoo, 2009). Health remains both a collective and an individual issue, and its consideration in planning and design, besides its greatest importance for the neighbourhood, must be differentiated between other spatial scales, from the micro-level of residential units, to the macro level of built settlement systems.

4 Discussion and Conclusions

Human health represents an indispensable part of sustainability and resilience concepts. Bearing in mind that "resilience is a capacity as old as our origins, otherwise we wouldn't be here" (Wheatley & Frieze, 2011, p. 126), it can be argued that throughout history people have always been, at a certain level, resistant - individually, collectively, and globally. Personal resilience implies a person's ability to deal with shocks, and to bounce back from adversity, such as disease, injury, climatic disasters, family member loss, job loss, or any other surprising or unsurprising changes on an individual level. At the community level, resilience considers the ability of a group of people to cope with expected or unexpected changes. Just as individual resilience doesn't guarantee community resilience, a resilient community doesn't guarantee global resilience, and vice versa. To achieve resilience, it is important "to find a way for people and institutions to govern social-ecological dynamics for improved human wellbeing, at the local, across levels and scales, to the global" (Folke, 2016, p. 1).

Wellbeing is an indicator that is relevant to both sustainability and resilience (World Commission on Environment and Development, 1987; Biggs, Schlüter, & Schoon, 2015; Folke, 2016; United Nations, 2012). Even though the state of wellbeing can be described as "the combination of feeling good and functioning well" (Huppert & Johnson, 2010, p. 264), i.e. as a subjective evaluation of one's life, moods, and emotions (Deiner & Lucas, 1999, p. 213), it cannot be achieved without an objectively good state of health. On the other hand, the state of health is influenced by the conditions in which people live, their educational, recreational, and leisure opportunities, their homes, communities, villages, and cities, as well as their individual characteristics such as social status, age, gender, values, genes, etc. In other words, environmental, economic, and social determinants of sustainability and resilience are simultaneously the determinants relevant to human health and wellbeing. Finally, "people who are healthy are better able to learn, to earn and to contribute positively to the society in which they live" (United Nations, 2012, p. 3).

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