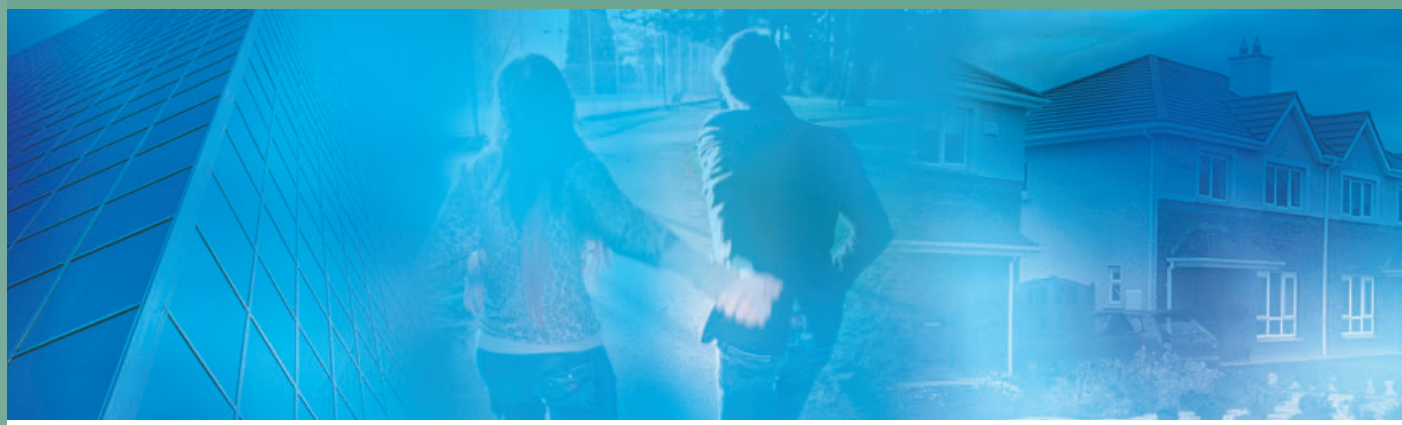
Health Impacts of the Built Environment

a review



Institute of Public Health in Ireland

THE INSTITUTE OF
PUBLIC HEALTH IN IRELAND

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Prepared by
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Institute of Public Health in Ireland
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Foreword

The Institute of Public Health in Ireland was established in 1999 to promote cooperation for public health across the island. It aims to improve health in Ireland by working to combat health inequalities and influence public policy in favour of health.

One of the objectives of the Institute is to provide clearly interpretable, easily accessible information on public health. In recognition that the main determinants of health are influenced by social, economic and environmental circumstances, the Institute has previously produced two review documents focusing on the health impacts of transport and the health impacts of employment.

This review is the third in the series and illustrates how the built environment impacts on health. It also highlights the unequal distribution of these impacts on different sections of the population. It is aimed at a wide audience, including policy-makers, advocates in the community sector, and public health practitioners. We hope it will help inform debate about the links between the built environment and health and be a useful resource for those working to influence public policy for health at local and national level across the island.

Jane Wilde
Director
Institute of Public Health in Ireland

1. Introduction

The influence of place on health is not a new concept. As far back as 500BC, Hippocrates described swamps as unhealthy places and sunny, breezy hillsides as healthy places[1]. Industrial workers in the 19th century were often exposed to overcrowded conditions, poor lighting and ventilation and inadequate sanitation both at home and at work, leading to diseases such as typhus, yellow fever, tuberculosis and cholera[2]. The Public Health Act of 1848 (UK) served as a foundation for disease control through urban planning initiatives such as sewerage, garbage collection, rodent control and mosquito abatement. As scientific knowledge became more advanced and more influential, the focus shifted to exploring means by which disease could be prevented. In terms of urban planning, this meant, for example, ensuring that living quarters had adequate light and ventilation and, more recently, minimizing exposure to toxins such as asbestos and lead. The concept of zoning, introduced early in the 20th century, aimed to improve health through the deconcentration of populations and the separation of residential and business areas[3].

However some of these measures may now be contributing to the chronic health problems of the 21st century. There is growing recognition that the leading causes of illness and death, including heart disease, cancer, cerebrovascular disease, chronic lower respiratory diseases and injuries, may be exacerbated by elements within the built environment which contribute to sedentary lifestyles and harmful environments. The evidence suggests that the burden of illness is likely to be greatest in lower socioeconomic groups and minority/vulnerable populations. Furthermore it has been argued that planning policies have resulted in fragmentation by emphasizing the needs of the individual over those of the community, making it difficult for people to develop and sustain social support networks. In other words, “urbanization and industrialization have decreased the likelihood that supportive social relationships can exist, even though they have created the conditions for a higher standard of living in material goods and improved sanitation” [4].

Place and health are thus inextricably linked but it is increasingly understood that health is determined by a range of social, environmental and economic factors and that decisions made in these areas strongly influence health[5]. The particular role of the built environment in determining health and well-being is demonstrated by the following model:

Figure 1: The determinants of health and well-being in our neighbourhoods[6]

Diagram by Barton, H & Grant, M, 2006, derived from Whitehead, M & Dahlgren, G, The determinants of health and well-being, 1991.

The model identifies a number of elements in the built environment, including buildings, places, streets and routes, which can influence health. However as well as structures, the relationship between people and the built environment has a strong influence on health. Hence "the built environment encompasses all buildings, spaces and products that are created or modified by people. It impacts on indoor and outdoor physical environments as well as social environments and subsequently our health and quality of life"[7].

This review draws together key findings from a diverse evidence base which demonstrate how the places in which we live, work and play affect our health. It is not intended to be a systematic review of all the available evidence but rather a summary document which highlights the many pathways through which the built environment may influence health. It presents the evidence in a clear, accessible format, in order to stimulate dialogue between people from different sectors whose work impacts in these areas. Addressing health inequalities is an overarching principle of the Institute's work therefore inequalities between the experiences of different groups within the population are also highlighted throughout the document.

Chapter 2 examines how the design and maintenance of buildings as well as their location can influence health. Chapter 3 explores the links between health and open spaces as well as the networks that exist within the built environment. Chapter 4 summarises the findings and reviews current trends and policies on the island of Ireland.

2. Buildings

"We shape our buildings and thereafter they shape us"[8]

Buildings are used for many functions including employment, education, accommodation, business, entertainment and recreation. Indeed the indoor environment is where people spend most of their time; it has been estimated that the average person in the developed world spends up to 85% of their life inside a building or an enclosed form of transport travelling from one building to another[9].

This chapter examines the influence of the internal environment, including housing and other buildings, on health. It highlights design issues both in terms of the individual building and of the immediate environment and explores how physical and socioeconomic factors impact on health.

The World Health Organisation, in recognition of the role that housing conditions play on health, has dedicated a specific topic area to explore this relationship. It suggests that the interplay between housing and health can be understood in a number of different dimensions including environment, community and economics[10].

Well designed buildings are those which are fit for purpose. The design of homes, schools, hospitals and other buildings can impact directly and indirectly on health. For example, well designed hospitals which take into consideration patient and staff requirements can have a positive impact on patient outcomes, staff performance and staff and patient safety[11,12]. Good school design, as well as directly impacting on the health of children, has been linked to improved educational attainment, better job prospects and a higher income in adult life[13]. Physical activity can also be affected by building design, for example many modern buildings have conspicuous lifts while staircases are hidden or unappealing. The return of prominent, attractive staircases may encourage people to exercise with resulting health benefits[14].

Improved standards in building design and materials have contributed to better health through addressing issues such as air quality, thermal growth and inadequate lighting. However, while modern standards exist, not everyone benefits from them, particularly people living and working in older or poorly maintained buildings. In the UK, an independent inquiry into inequalities in health (the Acheson report) showed that older people and children are more likely to be affected by poor housing conditions than other sections of the population[15]. The report illustrated that as well as biological vulnerability, those at either end of the life cycle are also more likely to be at risk of economic hardship and lack money to improve or maintain homes to incorporate best available materials and design[16].

Home ownership is widely used as an independent indicator of improved health however a number of factors may influence this relationship. For example, difficulty in meeting mortgage repayments may negatively impact upon health, particularly mental health[16,17]. Lack of financial capacity to choose or change place of residence has been also been linked to depression and anxiety[18].

Air quality

The quality of indoor air can directly affect health. Five main harmful substances in indoor air have been identified by the World Health Organisation: radon, environmental tobacco smoke (ETS), cooking pollutants, volatile organic compounds and asbestos, all of which have been linked to respiratory diseases including asthma, lung cancer and mesothelioma[18] (see table 1). Radon and ETS have also been identified as health risks associated with indoor air quality in the UK, along with house dust mites and carbon monoxide[19]. A Canadian review, found that the health effects from exposure to asbestos and radon in buildings were difficult to quantify[20].

Table 1: Health aspects of indoor air pollution

Indoor air pollutant	Definition	Health impact
Radon	A radioactive gas that is released by uranium, a natural substance found in soil and rock. Radon is captured in indoor air by moving through the ground to the air above.	Impacts: • Damage to lung cells • Leads to lung cancer
Environmental tobacco smoke (ETS)	Mixture of smoke from the burning end of a cigarette, pipe, or cigar and smoke exhaled by the smoker (also second hand smoke or passive smoking).	ETS is particularly harmful to infants and children and effects include: • Asthma • Sudden Infant Death Syndrome • Bronchitis and pneumonia • Other respiratory diseases Passive smoking may also lead to: • Lung cancer • Eye, nose and throat irritation • Potential effects to the cardiovascular system
Cooking pollutants	Cooking with solid fuels on open fires or traditional stoves.	Impacts on children: • Respiratory illnesses including pneumonia Impacts on adults: • Respiratory diseases and infections • Increased susceptibility to asthma • Changes in lung function
Volatile organic compounds (VOCs)	Compounds that vaporize (become a gas) at room temperature. Common sources which may emit VOCs into indoor air include housekeeping and maintenance products, and building and furnishing materials.	Some VOCs are known carcinogens and other harmful effects to health include: • Eye, nose, and throat irritations • Headaches • Dizziness • Visual disorders • Memory impairment
Asbestos	Natural material that is made of tiny threads, or fibres and used as fireproof material indoors and in consumer products for example ironing board covers. The fibres can enter the lungs as a person breathes.	Impacts: • Asbestos • Cancer

Young children are more susceptible to certain environmental threats than healthy adults. The average adult breathes 13,000 litres of air per day; children breathe 50% more air per pound of body weight than adults[21]. The elderly and those with pre-existing respiratory disease are also more susceptible to illness caused by poor air quality[22].

Temperature

Indoor temperature has major implications for human health. A UK report on the social and environmental determinants of excess winter deaths in England over a 10 year period found an association between low indoor temperature and increased mortality particularly in the elderly and those living in older homes[23]. Similar findings were reported in an earlier review conducted in Northern Ireland[24]. It has been suggested that temperature extremes generated by poor housing conditions are an underestimated part of the global burden of disease, contributing to increased home accidents, infectious diseases and general ill health[25]. An examination of the impacts of indoor temperature, conducted by the Large Analysis and Review of European housing and health Status (LARES) project showed a significant association with cardiovascular and arthritic problems[18].

The LARES project, a World Health Organisation initiative, provides a large database on a variety of housing and health problems. Specific project areas include mental health, asthma and allergies, mould related diseases and fear of crime. It was conducted during 2002/2003 in eight European cities and covered 3373 dwellings and 8519 people. The high number of participants allows statistically significant factors relating to housing and health to be identified even after compensating for major personal factors.

Humidity

The association between damp and mouldy homes and respiratory ill health, allergies and skin problems has been widely reported in the literature. Cold temperature is one of the contributing factors to dampness, along with poor ventilation, substandard building materials and inadequate heating[17]. A UK study which reviewed literature on damp homes and respiratory health over a 15 year period found a small increased risk of respiratory symptoms particularly among children[26]. An earlier review conducted in Northern Ireland found an association between dampness and mould growth and poorer health in children and a probable association with poorer health in adults, particularly in relation to

respiratory illness[24]. In addition to allergic and respiratory problems, new research has found significant associations with fatigue, headache, chronic anxiety and depression. Furthermore there are some indications that there is an increased risk for cerebral stroke, heart attack and hypertension associated with mouldy homes but these results require further confirmation[27].

Noise

The impacts on health can be difficult to quantify particularly when noise levels cause annoyance rather than actual damage to hearing. This is partly due to the subjective nature of annoyance which includes personal preferences and tolerance levels. A report on noise effects and illness showed a causal chain between health, annoyance and illness but the links were mainly associated with how the individual experiences the noise and the control they exert over their environment[28]. Other research has found noticeable differences between annoyance impacts on different age groups. For adults, the main symptoms included depression and impacts on the cardiovascular, respiratory and musculo-skeletal systems. The main symptom experienced by the elderly population was an increase in stroke, while for children the effects of noise were primarily seen in respiratory symptoms[29]. Night time noise is thought to be particularly problematic as it can affect sleep with subsequent impacts on health[10.] Furthermore, research in the UK found that noise levels contributed to an exacerbation of asthma where city dwellers where unable to sleep with their window open because of noise[30].

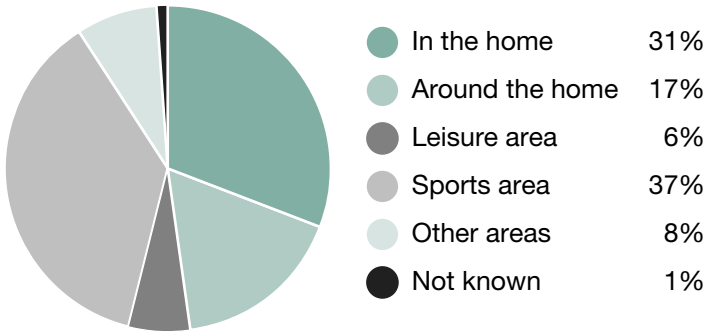
Light

Levels of illumination, particularly the amount of daylight exposure, can impact on psychological well-being. An association has been found between depression and lack of adequate daylight[18]. Furthermore, there may be an association between the amount of natural light in schools and pupil motivation and effective learning time[12,14].

Safety

Across the EU, over 20 million home and leisure injuries require medical attention each year, about 10% require hospital admission and 83,000 deaths result[31]. Dwelling design is one of the main contributors to accidents in the home[18].
The most recent statistics available from the European Home and Leisure Accident Surveillance System in Ireland (EHLASS) identified that in and around the home accounted for 48% of all accidents (table 2).

Table 2: **Most frequent places of home and leisure accidents in the Republic of Ireland in 2002[32]**



The elderly and young children are the age groups most at risk with the most common accident types being falls, burns and scalds[32,33].

Those living in houses of multiple occupation (defined as a dwelling occupied by more than one household) are at higher risk of injury and death from fire, burns and scalds[17,34]. A UK report on housing and health revealed that children in the lowest socioeconomic group are three times more likely to suffer injury than those in the highest group[35].

Space

Adequate provision of space has also been linked to health outcomes. An association has been found between poor mental health and lack of space within the home as well as lack of social space for interaction inside and outside the home[18]. Multi-occupation dwellings and flats, particularly high rise flats, are the housing risk factors most strongly associated with poor mental health[17]. An association has also been found between a high number of occupants and mould growth due to the increased generation of moisture[18,24].

Children are at particular risk of poor health as a result of limited space and overcrowding. Children who live in high rise housing tend to experience restricted access to play areas which may be linked to more behavioral problems, increased mental health problems and generally poorer health than children living in low rise or single family housing[36]. The provision of space is not solely related to housing;

the space allocated per child in schools may also be linked to pupil motivation and effective learning time[12].

Accessibility

Accessibility has been defined as the complete use of a dwelling and immediate environment. Elderly people are most likely to experience accessibility problems and these increase with age. Accessibility problems have been linked with low subjective well-being, poor perceived health and poor psychological well-being[18]. The concept of design for life acknowledges the changing needs of building occupants throughout their lives and ensures that homes are accessible and adaptable for people with mobility problems whether they are temporary or permanent.

Immediate surroundings

The design of the immediate environment surrounding the building can influence health[37]. For example views from a hospital, school or home window have been linked to health outcomes. Views of nature are thought to be particularly beneficial with numerous studies demonstrating that patients whose hospital rooms had views of 'nature' experienced faster recovery times than those who did not[12,38]. Nature views have also been associated with decreased mortality among senior citizens, fewer sick call visits among prisoners and lower blood pressure and less anxiety among dental patients[14]. Studies conducted in schools showed that children who have access to or sight of the natural environment show higher levels of attention than those who do not[14,36].

The location of home entry points can influence the development and maintenance of socially supportive networks. The probability of social interaction is greater when entrances to residential units are adjacent to or face one another, or are directly connected to major pedestrian paths or meeting areas[18]. Other features of urban planning that enhance a sense of community include those which encourage visual coherence, afford sufficient privacy, ensure residents have easy access to amenities, parks, recreation facilities and a town or neighbourhood centre, offer pedestrian-friendly spaces, provide streetscapes so that houses have views of the surrounding neighbourhood, encourage open verandas and low fences and restrict motor traffic[39]. However a UK study highlighted the importance of having boundaries between private and shared space with features such as shared recreational space, multiple access and fewer private gardens being associated with higher levels of depression[40].

The relationship between area design and crime has received much attention however different theories exist on how crime can be designed out. The concept of defensible space, shown through cul-de-sacs and segregated neighbourhoods, works on the principle that excluding strangers will reduce crime[36]. More recently it has been asserted that this actually makes a place more vulnerable by concealing it from public gaze and that feelings of safety are enhanced if more people move through an area[41]. Thus designs that increase site visibility, such as housing configurations that facilitate 'eyes on the street', and remove negative environmental cues such as abandoned buildings may reduce crime[42]. Good design can encourage ownership and greater involvement of communities and can reduce negative effects such as vandalism and the under-use of facilities[43].

Locality

There is increasing recognition of the links between neighbourhood deprivation and individual health. Thus the overall 'area effect' may impact directly on ill-health, even when behaviour and socioeconomic status are controlled for[15,17]. For example availability of and access to services may be more limited in some areas with subsequent impacts on both physical and mental health[44,45].

Housing improvements

Extensive research has been carried out in relation to the health impacts of improved housing. Significant associations were shown between improved housing, mental health and respiratory symptoms. Adverse health impacts were also identified highlighting the potential indirect association through increased housing costs and reduced disposable income available for food and heat[46-48].

3. Public spaces and networks

"City residents need a breath of fresh air, a visual and mental escape into the countryside within an urban setting of parks and surrounding parkways"[49]

Public space is interpreted here as any open space within the urban built environment that is not privately owned and incorporates both green spaces and civic spaces. Green spaces include parks, gardens and green corridors while civic spaces encompass marketplaces, town squares, pedestrian streets and transportations interchanges (bus and train stations). The notion of connectivity or networks is used to capture the fundamental role that transportation infrastructure plays in linking together spaces and places within the urban built environment.

This chapter examines the evidence linking health to public spaces and networks within the built environment. It explores factors that influence use of public space and movement around the built environment including availability, attractiveness and safety. Overarching influences such as the design and use of land and transportation systems are also considered. The health impacts of transport have been addressed in a previous publication by the Institute of Public Health in Ireland, which explored a number of areas including road traffic injuries, air and noise pollution, physical activity, effects on community and social inclusion[50]. The focus in this chapter will therefore be on factors that influence transport choice and usage.

Public spaces and networks influence physical, mental and social health in a number of ways. Access to good-quality, well-maintained public spaces, efficient, modern public transport systems and walkable neighbourhoods can encourage physical activity, increase the likelihood of social interaction and contribute to better air quality.

Physical activity

Physical activity reduces the risk of obesity, cardiovascular disease, diabetes and stress, but according to the World Health Organisation, 60% of the world's population do not achieve the minimum amount of daily physical activity needed to bring about health benefits[51]. A review of the economic benefits of green space estimated that provision of greenspace to bring about a 1% change in the sedentary population could have an economic value ranging from £479 million to

£1442 million per year depending on whether older people (75+) were included or excluded in the analysis. The report concluded that while the impact of physical activity on cardiovascular disease, musculo-skeletal diseases, stroke and cancer was measurable, the impacts on psychological health were more difficult to quantify[52]. However, evidence from elsewhere suggests that the presence of green spaces can be beneficial to mental health[53,54].

Urban environments that lack public gathering places can encourage sedentary living habits, while the provision of attractive parks and open spaces can facilitate opportunities for exercise[43,55,56]. The likelihood of being physically active may be up to three times higher in residential environments that contain high levels of greenery, and the likelihood of being overweight or obese may be up to 40% less[57].

Green spaces can have a positive impact on health through providing:

- A space for communities to meet and interact
- A place to exercise
- A place to relax
- A pleasant visual experience
- A barrier to reduce environmental noise
- A filter to improve air quality

Incorporating physical activity into everyday life is likely to be the most effective way of reaching the recommended guideline of 30 minutes per day[51]. Public transport impacts upon physical activity levels as most trips begin and end with some form of physical activity to access the service. One study found that the average trip included 19 minutes of physical activity, almost two-thirds of the recommended minimum[58]. Conversely, a study on the association between time spent in cars, physical activity and obesity found that each additional hour spent in a car per day was associated with a 6% increase in the likelihood of obesity[59].

Street design facilitates or hinders walking and cycling. A study of Los Angeles residents found that those living in areas laid out in a 'traditional grid system' were up to 25% more likely to regularly walk to work compared with residents in socioeconomically similar areas that were laid out specifically for cars[60]. Other environmental features influencing mode of transport choice include the availability of cycle and pedestrian lanes, preferably separated from other road users and other measures to calm motorised traffic[61].

In examining how the built environment influenced physical activity, the US Transportation Research Board, acknowledged that this is a complex relationship which functions through many mediating factors, including socio demographic characteristics, personal and cultural variables, safety and security, and time allocation[62]. Factors that can facilitate or impede physical activity are summarised in table 3.

Table 3: Facilitators and barriers to physical activity

Land use	Land use density Land use mix
Accessibility	Distance from destination or facilities
Design	Design features Aesthetics
Transportation infrastructure	Sidewalks (pavements) Grid pattern streets
Attitudes and motivations	Individual factors Interpersonal factors

Air quality

The health effects of exposure to poor air quality have been extensively studied. Long-term exposure to high levels of air pollution can reduce life expectancy by a year or more[3,22]. Traffic pollution has been identified as one of four major triggers for asthma[30]. There is also increasing evidence that air pollution impacts on the cardiovascular as well as the respiratory system[22]. Furthermore, those who live close to busy roads may be at increased risk of exposure to potentially carcinogenic pollutants from diesel[63].

Some population groups are more vulnerable to air pollutants, including very young children, the elderly, those with cardio-respiratory disease, those who are exposed to other toxic materials that add to or interact with air pollutants, and the socioeconomically deprived[22]. Children are particularly at risk, partly because of their immature metabolism and physiology, and those at greatest risk are young infants (under one year)[64]. Disadvantaged urban areas tend to be characterized by high traffic volume, leading to increased levels of air pollution[15].

Green spaces can positively influence health through their contribution to improved air quality. Vegetation removes pollutants, whether gases or dust-related and this effect is seen on all sizes of particulate pollution and with all traffic-related pollution[53]. For example, broad leaved woodland can reduce ambient air pollution by 17%[65].

Social networks

The influence of social networks on health is an area of growing interest. Fewer social networks may be associated with a number of health outcomes including obesity, cardiovascular disease, mental health problems and increased rates of mortality[66,67].

Some neighbourhood designs enable or encourage community connections, whereas others do not. Neighbourhood designs most likely to promote social networks are those that are mixed use and pedestrian oriented, enabling residents to perform daily activities without the use of a car[68]. Studies have shown that as traffic volumes increase, people's sense of neighbourliness decrease. In residential streets, people on 'light traffic use' streets considered the whole street to be their territory and reported more social networks than those living on 'heavy traffic use' streets[69]. The availability of parks and civic spaces also increases the potential for social interaction and community activities[53].

Safety

Road accidents are one of the leading causes of years of life lost in most European cities. Elderly people are particularly vulnerable, as pedestrians, passengers and drivers[70]. Children are a group at high risk of pedestrian injuries, especially when the amount of walking done by children is taken into consideration[71].

Disadvantaged urban areas tend to be characterized by high traffic volume, with residents being at increased risk of road traffic accidents, often without the benefits of access to private transport[72].

The risk of injury, especially for child pedestrians, increases with traffic volume, traffic speeds over 40kph and a high density of kerbside parking[73]. The design of roadways contributes to safety: streets that are wide, smooth and straight encourage motorised travel at fast speeds and discourage travel by foot or bicycle, while streets that are narrow and irregular have the opposite effect[61].

The impacts on health go beyond risk of injury, particularly for children. Perceived traffic danger may lead parents to stopping children playing in the street and walking or cycling to school with subsequent impacts on activity. As patterns of physical activity established in childhood are a key determinants of adult behaviour, this has the potential to have far-reaching implications for health[74].

The issue of safety is also relevant to use of public spaces, but is more often related to crime or fear of crime. Overall, people are more likely to maximise use

of outdoor space if the area is perceived as safe[75]. Street lighting improvements show crime reduction effects and increase confidence of residents at night-time[76]. The British Crime Survey (2001) revealed that 13% of people felt very unsafe and 20% felt a bit unsafe walking alone in their area after dark. 30% said they never walked alone in their area after dark, rising to 43% of women and 66% of those aged 60 or over. Fear of crime rather than crime itself was the reason cited[77]. Chronic anxiety can have a detrimental effect on quality of life and this fear can be as serious as the problem of crime itself [39,69]. A study on the impact of perceived safety on levels of physical activity demonstrated that the likelihood of being physically active is 50% less in residential environments that contain high levels of incivilities, and the likelihood of being overweight or obese is 50% greater[57].

Quality of life and safety of physical environment are particularly important for healthy child development. Children who live in 'unsafe' neighbourhoods may be exposed to greater risks of developing problem behaviours such as hyperactivity, aggression or withdrawal[69].

Attractiveness

Deteriorating physical features of urban environments such as dilapidated environments, vandalism, graffiti and litter can harm health. Studies have highlighted how such environments can impact on both mental and physical health through reduction in physical activity, increased anxiety among residents and increased social disorder[54,56,57,78]. People are more likely to exercise if sidewalks are present, attractive, unobstructed and maintained and if the scenery is enjoyable[61,62,75].

An assessment of public parks in the UK found that people in disadvantaged areas are most likely to be losing out on the benefits of good quality parks and green spaces. In the 100 most deprived authorities, 40% of all parks were in decline and 88% of parks already judged to be poor were in further decline[79]. Outside of parks, graffiti and vandalism are disproportionately found in disadvantaged areas[43].

Accessibility

The likelihood of using public open space for physical activity increases with increasing ease of access[52]. Qualitative research has found that access to free facilities is an important factor influencing activity[61].

Lack of access to transport is experienced disproportionately by older people, disabled and those with low socioeconomic status. These groups can find their access to services such as shops and health care is reduced and may spend a higher proportion of their resources on transport[15]. They are likely to be especially vulnerable in environments dominated by private car use[61].

Distance

Land use practices that isolate employment locations, shopping and services and housing locations can encourage car use, particularly where public transport options are not available or attractive alternatives[80]. Where urban development is unplanned or uncontrolled and spreads out into areas adjoining the edge of a city - commonly known as urban sprawl – car dependency is likely to be increased[81]. Evidence from the United States suggests that people living in sprawling communities drive three to four times more than those who live in efficient, well-planned areas[82]. Compared to those living in compact areas, people living in sprawling areas walk less for exercise, have higher weight levels and are more likely to have high blood pressure[83]. Long commuting times can also impact on mental health, family life and social networks, with people having less time for civic engagement[42].

Urban sprawl can impact on health by increasing:

- Obesity
- Air pollution
- Road traffic injuries
- Stress
- Isolation

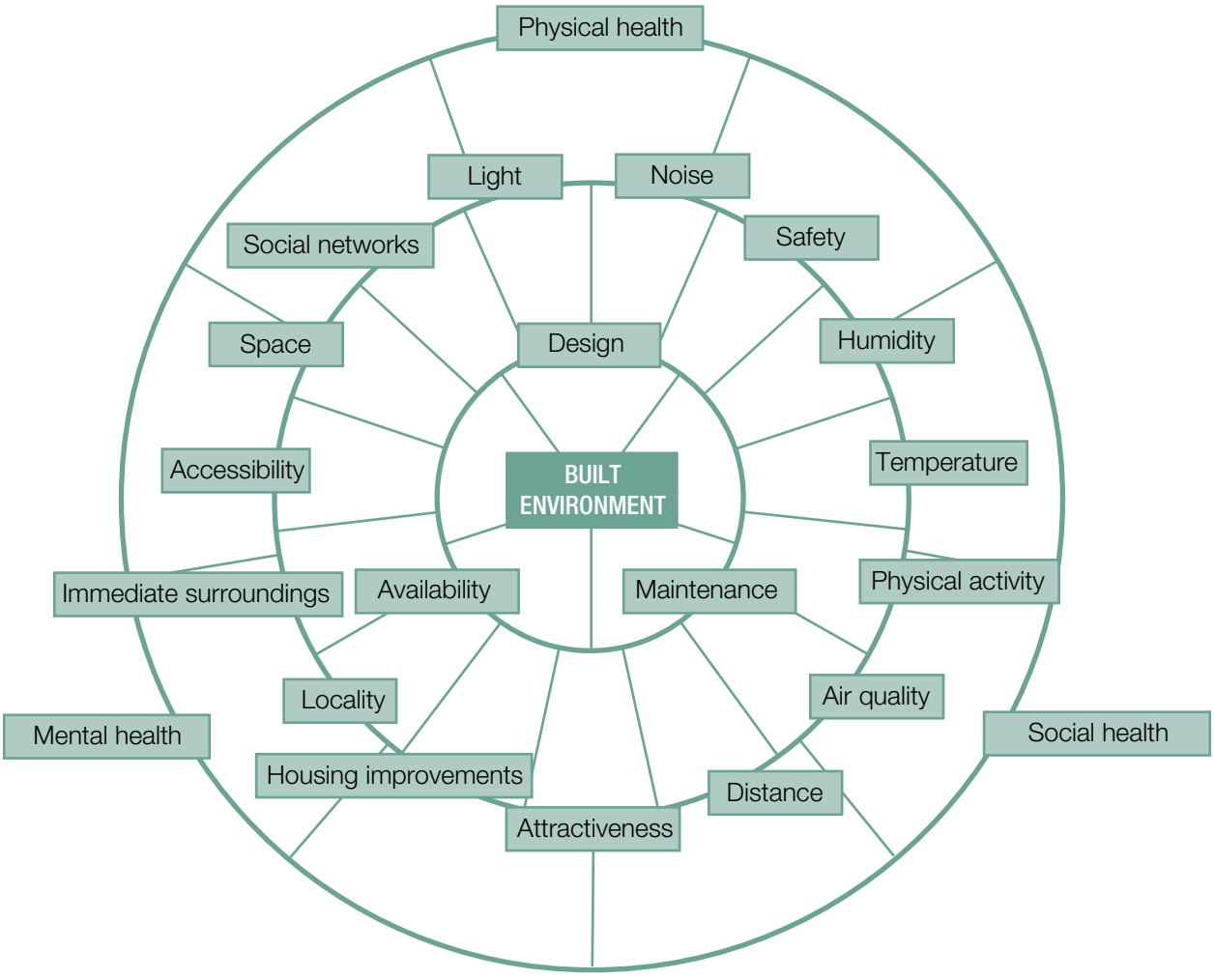
4. Conclusion

This review demonstrates the huge impact which the built environment has on health. At macro level this includes spatial planning, land-mix use and transportation infrastructure. At local level, the design, maintenance and use of buildings, public spaces and transport networks are all important.

Design of street networks, the availability of open spaces, and the perceived and actual safety of an area as well as personal resources are important environmental and social influences. For example, encouraging people to walk and cycle around a neighbourhood means making streets safe and attractive, ensuring it meets the needs of all users, not just drivers. A well designed park attracts people, this in turn attracts others, encouraging them to stay longer and undertake more activity.

The influence that the built environment and its many components have on health is illustrated in the diagram below:

Figure 2: How the built environment influences health



Inequalities in health

Of particular importance is the fact that a disproportionate burden of ill-health associated with the built environment is borne by certain groups within the population. It has previously been highlighted that the least well-off people in society suffer poorer health[66]. This report adds further evidence to this perspective. Poor people are more likely to live in poor quality built environments and this contributes to poor health. The report identifies children and the elderly as being particularly vulnerable not only because of a biological vulnerability but also because of the significant numbers of children and elderly who are poor.

Public health challenges

Neighbourhoods are the localities in which people live and evidence shows they are vitally important for health and well-being. Combating heart disease, respiratory problems and mental illness means ensuring opportunities for healthy exercise, air quality and local social networks, all of which are influenced by the physical nature of localities.

Effective planning for public health involves much more than planning curative services. It is about healthy human habitat and supportive social structures[74]. Public health challenges related to the built environment include quality of and access to schools, economic opportunities, access to health and social care, creating strong social networks, good air and water quality, and opportunities for physical activity. These all depend on our ability and commitment to creating a healthier built environment.

Policy development

The need for a robust policy and legislative framework to guide future development has been recognised and there are currently policy drivers in both Northern Ireland and the Republic of Ireland which review the strategic needs of the region over a set period of time.

Shaping our Future, Regional Development Strategy 2025, sets out the policy context for future development in Northern Ireland. This policy guides physical development by outlining housing, transport and infrastructure demands and provides the strategic direction for future needs[84].

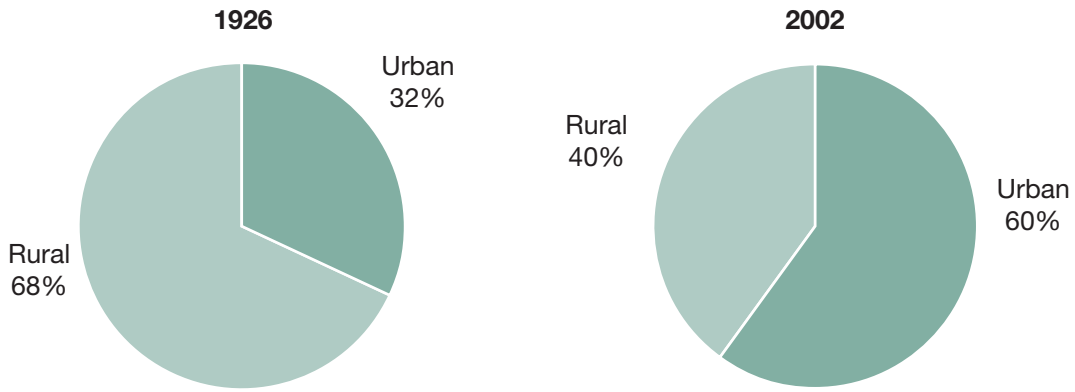
The National Spatial Strategy 2002 – 2020 sets out a framework to deliver more balanced economic, social and physical development in the Republic of Ireland[85]. Other relevant plans include the current National Development Plan and Transport 21[86,87].

These policies offer major opportunities to address serious public health challenges.

Urban development

Ireland is becoming an increasingly urbanised society. The percentage of the population living in an urban area increased from 32% in 1926 to 60% in 2002[88].

Figure 3: Urban/ rural distribution of the population of the Republic of Ireland



In Northern Ireland, the current distribution is similar with 65% of the population living in urban areas and 35% in rural areas[89]. The outward spread of cities and towns is reflected in recent statistics showing a decline in the populations of Belfast and Dublin but significant increases in surrounding areas[90,91]. A number of economic, social and political factors have contributed to insensitive development across the island including a decline in industry and the effects of the Troubles in Northern Ireland[92]. Reviews of travel patterns between home and work in both Northern Ireland and the Republic of Ireland show that the average commuting distance is growing[93] and the most frequent mode of transport is by car[94]. The potential health impacts of urban sprawl have been highlighted and must be addressed.

Housing

A review of housing conditions across 14 European countries from 1994-1997, based on the European Community Household Panel found that Ireland and the UK (separate figures for Northern Ireland were not available) have the highest rates of seasonal mortality in northern Europe, which was partly attributed to inadequately protected, thermally inefficient housing stocks in these countries. Other factors examined in the analysis include both objective and subjective measures such as overcrowding, dampness and satisfaction with housing[95]. The number of new homes being built in both jurisdictions presents an important opportunity to ensure that issues harmful to public health are tackled.

Table 4: Number of new homes built[96,97]

Period	Republic of Ireland	Northern Ireland
1996-2000	211,240	53,599
2001-2005	337,027	67,653

Collaboration and dialogue

There is a clear need for collaboration between planners and those working in public and environmental health. As well as those outside the health arena becoming aware of the impact of their actions on health, those working within health need to understand the planning process and policy environment to input in an appropriate and timely manner. Ideally this would be at an early stage when new plans are being drawn up and a real difference can be made. Health Impact Assessment is a systematic tool which can facilitate this engagement.

Health Impact Assessment

Health Impact Assessment (HIA) is a combination of procedures, methods and tools by which a policy, programme or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population[98]. The aim of HIA is to maximize the health and minimize the health loss of the population affected by the proposal. This review will provide a useful resource for those conducting HIAs on proposals affecting the built environment where new developments are being planned or in the regeneration of inner city areas.

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