The Health Consequences of Urban Planning

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The Presage

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SYNOPSIS

> "Prevention is better than the cure, and indeed, very many of the things that we're dealing with now particularly in the aftermath of COVID, were entirely predictable."
> —Sophie Howe, the Future Generations Commissioner for Wales

As the title of this book indicates, the material provided is intended to serve as a warning. Failure to address the underlying causes of relatively recent and significant increases in preventable, predictable non-communicable disease will result in the continued erosion of the health of inhabitants of urban environments.

In the past 20 years, three major global developments have occurred. The first is rapid growth of the world's population living in urban environments. The second is a rapid shift in the volume of diagnosis of non-communicable disease (NCD) that has overtaken infectious disease. The third is the economic underpinning that supports the development of urban environments.

This triad has been made worse by a reactive approach to designing the built environment. Research has shown that this is the source of explosive rates of premature deaths among city dwellers.

The intention of this book is to present evidence on the way in which specific designs of urban environments cause illnesses, predominately NCDs. Of equal importance is to provide an informed alternative for designing truly resilient environments fit for the future. A fundamental omission in the design of urban environments is the fact that humans are animals with specific requirements for survival. It is crucial that the human habitat provides those elements. The basic instincts of our ancestors have been culturally modified for an urban existence over a relatively short time. For thousands of years, humans were nomads, living in groups and communities. Those primordial instincts allowed humans to not only survive but thrive. Ironically, after thousands of years, *Homo sapiens* has only spent a mere 1% of that time in the artificial domain of an urban environment. The relatively recent increase in NCDs reflects the effect that the built environment has had on human physiology. This increase in NCDs provides evidence that the fundamental design of the urban habitat is

eroding the ability of societies to function, survive and thrive like our ancestors. In order to achieve this goal, it is imperative to recognise the connection between habitat and health and the detrimental effect of design choices. The relationship between them is the underlying cause of NCDs, occurring at ever increasing rates. Evidence provided in the following chapters gives details of new areas of study that emphasise the urgent need for a change in the status quo. This would be achieved through innovation that would enhance human health. As more people can return to full participation in society this would be reflected in increased productivity resulting in a more robust economic model.

GLOSSARY

Active design: a design approach that seeks to increase physical activity in all aspects of daily life and can be applied at multiple built environment scales.

Biophilic design: a human centred approach to design that incorporates and mimics forms found in the natural world with the aim of improving health and well-being.

Standards and assessment tools: systems for evaluating the quality of new or refurbished buildings and communities beyond the minimum level set by building regulations.

Non-communicable diseases or chronic diseases: "…tend to be of long duration and are the result of a combination of genetic, physiological, environmental and behavioural factors. The main types of NCDs are cardiovascular diseases (heart attacks and stroke), cancers, chronic respiratory diseases (such as chronic obstructive pulmonary disease and asthma) and diabetes." (1)

Climate change: "a statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer). Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use." (2)

Green infrastructure: "the network of natural and semi-natural areas, features and green spaces in rural and urban, and terrestrial, freshwater, coastal and marine areas, which together enhance ecosystem health and resilience, contribute to biodiversity conservation and benefit human populations through the maintenance and enhancement of ecosystem services". (3)

Health: "a complete state of physical, mental and social well-being, and not merely the absence of disease or infirmity." (4)

Healthy city: "one that is continually creating and improving those physical and social environments and strengthening those community resources

which enable people to mutually support each other in performing all the functions of life and achieving their maximum potential." (5)

Health Impact Assessment (HIA): "a combination of procedures, methods and tools by which a policy, program 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." (6)

Mental health: "a state of well-being in which every individual realises his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community." (7)

Pocket parks: small parks consisting of plants and possibly furniture (e.g., chairs or tables) sometimes created on vacant land or portions of streets.

Social value: "wider financial and non-financial impacts of programmes, organisations and interventions, including the wellbeing of individuals and communities, social capital and the environment." (8)

Street connectivity: "characterises the ease of moving between origins (e.g., households) and destinations (e.g., stores and employment) within the existing street and sidewalk–pathway structure. Connectivity is high when streets are laid out in a grid pattern and there are few barriers (e.g., walls, freeways) to direct travel between origins and destinations." (9)

Sustainable buildings: buildings which have been designed to reduce their impact on the environment (e.g., through materials and energy use) while also contributing positive social and economic impacts throughout construction, use and demolition phases.

Urban health advantage: a phenomenon in which urban populations have experienced better health outcomes than their rural counterparts.

Urban heat island effect: a phenomenon where urban areas are several degrees warmer than neighbouring rural areas due to the heat retention of buildings and paved surfaces compared with areas of vegetation.

Well-being: "has been defined as the combination of feeling good and functioning well; the experience of positive emotions such as happiness and contentment as well as the development of one's potential, having some control over one's life, having a sense of purpose, and experiencing positive relationships." (10)

PREFACE

A series of themes has been developed to provide a framework for the extensive amount of material included in this book. Although there are many themes, one very important one is related to the effects of rapid urbanisation and health. A change in perspective of professionals working on the built environment came about after decades of work on designs for environmental improvement in Central London. A greater awareness of the effects of the environment on health also had ramifications for the development of public health projects with an emphasis on biophilic design, a more human centred approach that would provide increased access to the natural world. This change in perspective has provoked a seismic shift in understanding the interchangeable connection between health and environment. The importance of a healthy environment was also borne out by a growing body of research. Public health workers in London, the heart of one of the most global and diverse economies, provided first-hand accounts of the complexity of health threats shaped by the dynamics of urban living. Although a daunting challenge, it was important for those involved to create a health promotion program for all areas of public health that would identify potential problems and design solutions. Just like the struggle to reach the top of a steep hill to appreciate the view, the goal of these programmes, although challenging, was to better understand the needs of those living in the built environment.

An extensive study was undertaken on the impact of environment on health in local neighbourhoods to provide a greater understanding of the extent to which factors influence outcomes. These factors gradually became interlinked to form a template. This provided a trajectory for the development of designing possible solutions to reverse the effects of rapid urbanisation at the neighbourhood level.

London attracts 20 million visitors annually. For many of these visitors, London is a historic, dynamic, and wealthy metropolis. Understandably, wealthy boroughs such as Westminster, Kensington and Chelsea, and Hammersmith and Fulham, for example, are viewed as being among the most desirable places to live and work. These London districts attract people with some of the highest proportions of personal wealth who are able to purchase the most expensive accommodation in the world. As an example,

in 2012, the most expensive flat in the world was purchased by a person who bought the penthouse flat of One Kensington Gardens for £137m. (11)

In contrast to this ultra-wealthy group there is another world that is unseen by most people. Westminster for example, as one of the most densely populated areas in Britain can simultaneously claim under-occupancy as well as overcrowding. (12) This borough also has the highest number of deaths for men aged 15-24 in the UK and 30% of its children live in poverty (13) while almost 6000 are homeless. (11)

Regardless of age, gender or income level, people come to these neighbourhoods for a wide range of reasons including work and housing. Others require a range of assistance that includes medical treatment. Many are attracted to the famous night life, the theatres, restaurants, clubs, and sex. What is not as well-known are the ramifications of the social problems that exist as a result. It is not a coincidence that Europe's largest HIV clinic is in Soho. Human trafficking is a serious situation involving women initially brought to Soho and then moved to one of London's thirty boroughs. Eighty per cent of these women are foreign nationals. (14) They are part of an active sex trade servicing 1 in 9 men in London who buy sex. As foreign nationals these women speak numerous languages. For health workers and other professionals wanting to provide support, the language barrier is an additional complication, magnifying the problems in densely populated city blocks.

Among other examples of the impact of rapid urbanisation is the increased demand for health services in less affluent neighbourhoods. This is reflected in differences in longevity between men and women. In boroughs such as Chelsea and Westminster, there are major differences in life expectancy between affluent and deprived areas as well as the difference between mens' life expectancy and womens'.

Rapid urbanisation and its effect on health has many facets and has resulted in an expanding number of issues. For example, substance abuse provides another discrepancy: the difference between the recovery rates of men and women. The detrimental effect of the environment on recovery becomes apparent when data show that fewer women than men recover. Women are less likely than men to recover due to the complexity of their circumstances. Higher rates of poverty among women, often single parents and primary carers, limit their ability to succeed. The crucial element is the urban environment, one that is not conducive to behaviour change. Recovery units for these vulnerable women were, ironically, in some of the most prestigious

locations around the borough. Although these women had a strong desire to rebuild their lives, the environment in which they lived deprived them of the tools required for behaviour change.

Another important element in understanding the intricacies of human behaviour and health has been the explosion of the human population. Over thousands of years, there have been gradual changes in the health of people around the world. Human behaviour has been modified by the desire to live in communities rather than as nomads. No longer hunters and gatherers, an unfortunate result of urbanisation has been the reliance on the consumption of convenience food and the need for immediate gratification. Our ancestors were aware of the importance of what they ate. It was crucial for their survival. The same cannot be said for modern civilizations. Human behaviour has gradually adapted to urban living, preoccupied with the purchase rather than the production of food. Pervasive sedentary lifestyles, exacerbated by technological advances, such as computers and available modes of transportation, combined with unhealthy eating habits have resulted in changes in human health, all elements associated with rapid urbanisation. Easy access to processed food with high levels of sugar, salt and fat has resulted in the rise of self-inflicted diseases such as diabetes and obesity that are so prevalent in modern society. Changes to human behaviour that facilitates a healthy lifestyle in our environment must be a priority for designers of the urban landscape. Factors that helped our ancestors to lead healthy lives and survive are missing from the present environment in our neighbourhoods, our cities. There are elements in the human instinct for survival that have been compromised or completely eroded with rapid urbanisation. Of these crucial elements, social capital, belonging to a community is paramount. A sense of purpose is also needed to replace the hunter gatherer role of our ancestors. A varied diet combined with physical activity and a lifestyle intrinsically linked to the natural environment were elements eroded by the urban environment. It is imperative that future urban spaces reflect the components required to enable healthy human behaviour as well as the resilience that is needed to withstand the challenges that exist in the present urban environment.

The effect of these missing elements is evident in the recent surge in comorbidity across global populations. For our ancestors, being part of a community was an important factor for survival. For women and men in today's urban environment social capital is critical. However, the intrinsic structure of modern society limits the opportunity for social engagement. Current employment practice is more service oriented and a rise in working from home also increases social isolation. The cost of living has meant that

many work longer, for several jobs. Post pandemic, many of those who are active in the work force are leaving early due to poor health. Competition between men and women both at work and in the public sphere has further eroded opportunities to access social capital. Changes in traditional roles in society in urban settings have also resulted in changes in participation in the community. There are pervasive elements that have caused a societal perception of male and female identity, with social isolation further limiting access to social capital. The effects of these elements of rapid urbanisation on human behaviour have reached epic proportions. This is a challenge that requires urgent solutions from professionals in all areas of society.

INTRODUCTION

The motivation to write this book was to counter a pervasive lack of awareness of the interconnectedness of the environment and health. A better understanding of the importance of this connection is imperative for professionals involved in public health and the planning of future urban spaces. To address the paucity of research on the environmental influence on health, the aim of this book is to add to the current body of knowledge. Evidence is presented that will illustrate how it is possible to protect both global health and the economy and to prevent future health-related problems. Without drastic changes to the design of the urban environment these health-related problems will have the potential to decimate human populations. The material gathered here will provide a different perspective for professionals in health and the built environment. With a change in emphasis, beginning with the evidence behind the root causes of upstream ill health, and how prevention is implicit to the decisions made in the fragmented designs of the built environment specifically, transport, housing and urban design.

To illustrate the magnitude of the effect of the environment on health, the following section presents some of the global statistics that clearly indicate how these two sectors are related. Epidemics and trends provide a very clear picture of the current scale of the problem around the world and serve as a warning of what is to come in the absence of any meaningful solutions.

- 70-90% of our lives is spent indoors.
- One-third of the world's urban population live in slums. (15)
- The availability of affordable housing and poor housing directly impacts mental health (depression and anxiety). (16)
- More than 300 million people are now living with depression, an increase of more than 18% between 2005 and 2015. (17)
- Insufficient physical activity is one of the leading factors for death worldwide. (18)
- 1 in 4 adults and 80% of those aged 11-17 are physically inactive. (18)
- More than 50% of the world's population live in urban environments.
- 71% of all mortality is due to (preventable) non-communicable diseases. (19)

At the present time most people in the world live in urban environments. This is a comparatively recent phenomenon as world populations have increased significantly and moved to urban centres in the last few decades. The relatively recent rapid migration of rural inhabitants to cities has prevented the implementation of adequate planning for their re-location. The impact of the increase in rapid urbanisation has contributed to the collapse of the social and economic structures of previous decades. An added problem is the effect of climate change, one that has demonstrated catastrophic consequences for rural and urban dwellers equally. This global transformation of the population is an indication as to how the health of society has suffered. Studies have shown that 71% of all deaths are from non-communicable and preventable diseases. This is a clear indication that when large numbers of people live within inappropriately designed environments, there is an increased risk of contracting and dying from a preventable disease, otherwise referred to as epigenetics.

One of the serious failures in public health policy over the last few decades that has resulted in this state of human health is an absence of evidence linking the effects of types of urban environment on human health. The impacts of urbanisation on health, has remained absent from the built environment sector as a whole

The rate of expansion from urbanisation is more to do with an emphasis on current economic demands rather than fostering the sustainability of the population's well-being. As a result, the cost of productivity is borne by the population in terms of how well the balance between health, equality and productivity is maintained. It is only when a sense of equilibrium is achieved that communities can flourish. In an ideal world, for an economy to be sustainable, the population needs to be to be healthy and productive, with access to physical and social conditions that are available for everyone. Working towards urban spaces that provide the necessary social, equitable and environmental conditions will enable residents to live healthy lives, with less stress, important factors that contribute to a sustainable and resilient community and economy.

Progress has already been made to create healthier cities. This progress is exemplified by the policy shifts to support sustainable infrastructures that include improved public transport, quality housing construction, more efficient drainage and protected networks of natural infrastructure. Despite this apparent progress, the majority of humans continue to live in urban environments that are detrimental to both physical and mental health. This trend towards rapid urbanisation has only occurred in approximately the

past one hundred years but has accelerated in the last few decades. Factors such as climate change and globalisation have placed human health at a precarious point. Maintaining a balance between these entities presents challenges that previous epochs did not always achieve.

Epidemiology can provide evidence of the impact that these factors have on health.

Research continues to demonstrate that the underlying cause of unhealthy urban communities is the basic design of the environment in which people live. Paradoxically, it can also provide the solutions. These will be provided in the following chapters. The collapse of past societies is evidence that maintaining the integrity of our social, environmental, and economic fabric is crucial and will determine the resilience of the inhabitants of future urban communities.

However, the ecosystem of interconnected elements of a community requires equilibrium between health, the impact of the planet's climate and the equality or inequality of community members. Achieving this balance is a monumental task for this generation.

There can be no doubt that the state of the planet, the global economy and human health are in crisis. However, to actively correct one is to actively balance it with others. For an economy to function sustainably, key elements are required such as a healthy, productive population to sustain a viable economy and the ability to stay ahead of innovation. This level of productivity is only achievable when individuals can work, free of illness, while they are enjoying life and feeling secure. This is only possible when members of communities are living in an environment that promotes well-being, enabling them to function at an optimal level. When urban spaces are designed to produce social, environmental, and economic resilience, then a chain reaction of sustained security and enhancement can be achieved.

Addressing a problem of this scale requires a combined approach, to create a holistic system in which there is a combination of evidence, history, and measurements. The WHO Healthy Cities movement is now 30 years old. (20) The question arises as to what progress has really been made. It is clear from the global statistics on non-communicable diseases that there is no acknowledgement of responsibility by the built environment sector. The WHO is faced with serious challenges involving the implementation of the principles that contribute to the healthy city. There will be no progress without government enforced regulation, rather than mere guidelines. In

addition, the negative effect of the built environment on global health and the economy does not appear to be worthy of mention despite its importance and relevance.

A gradual transformation of human society has occurred and with it a rapid increase in population. This transformation emerged from what was an abundance of natural resources including food with the absence of financial need as compared to the present situation where over population, the creation of financial capital and a scarcity of natural resources (21) have transformed the planet. Unfortunately, it is only recently, that people have begun to realise it is not only the critical role that the natural world plays in the advancement of human society but also the way in which it is intrinsically linked to individual well-being.

Although most of the world's population continues to migrate to urban centres hoping for a better life, they are more likely to face poverty. This leads to unforeseen problems, degrees of deprivation that compromise their physical and mental health. A major contributing factor in this situation is that the built environment has not been designed or constructed to accommodate a large influx of people in a relatively short space of time. A fundamental failure of the built environment has been to address the existing social challenges. Added to these increasingly unhealthy urban conditions are the devastating effects of climate change.

The role of the urban designer in these situations is complex. They are responsible for providing effective solutions that produce beneficial outcomes for urban dwellers. Understanding the complexity of an urban environment requires systematic study. By utilising a system approach, designs can be developed that enable prevention and securing human health and well-being. Healthy, secure individuals are also more productive workers, a benefit not only for the community but also for the economy. In the following chapters an analysis will be provided. The purpose will be to emphasise the impact of the built environment on health, highlighting problems and potential solutions. This contribution aims to increase the understanding of those who design such environments, empowering professionals so that their work may have a significant impact on the future for built environments and the population they impact.

There has been long-held misconceptions and underestimation of the effect the built environment had on the power to dictate healthy or harmful outcomes, this is no longer the case. Instead, there are a growing number of examples including Vancouver beginning the 1980s. A series of events,

ranging from Expo 86 to spike immigration patterns led to a re-evaluation of the ways to cultivate sustainable, liveable urban conditions in Vancouver. These lessons were the legacy of far-sighted individuals who worked for the City of Vancouver at that time. They initiated the progressive redesign of Vancouver that the mayor of Vancouver later continued. The vision and success of these individuals have placed Vancouver as the top of the list of the world's most liveable and desirable cities, not only then but up to the present day. These early examples of successful urban design have since been supported by accumulative research on the role the design of the environment has on human health.

In London, as with all global historic cities, the recalibration of spatial efficiency in response to population growth leads to large developments proliferating to varying degrees of quality. London, therefore, provides ample examples that showcase the effect of the environment on health. This volume of consistent development provides a spectrum in which to view a proliferation of policies and land use rationales that reflect the absence of human performance-measured evidence. It highlights developments of inappropriate scale and designs that have been shown to be harmful to human health. London, Vancouver, and other cities that will be discussed demonstrate how urbanisation continues to replicate all the harmful conditions responsible for the shift in the global diagnosis of NCDs. Without intervention, the urban environment will amplify existing disadvantages in terms of health or social mobility.

Despite increased awareness and research, these developments will continue to contribute to climate change, global inequality and decreasing productivity. The lack of understanding among professionals involved in the built environment is of great concern. Seemingly oblivious of the effects of rapid urban development on health there seems to be no change in either policies or land use allocation. To address this critical situation, this book will provide a compendium of current research, as a contribution to the present body of knowledge. Providing a systematic study of the key issues is of paramount importance. The challenge for professionals engaged in the pursuit of future built environments is to design healthy urban environments that enable inhabitants to live productive lives and contribute to society.

It is no longer acceptable to exist in isolation where decisions are made with no calculation of the ramifications of the effect of today's urban environment on future civilizations.

Society, as well as individuals, has an obligation to protect the environment to the best of its ability, regardless of the magnitude of the challenge. The future of human health, planetary health, and economic sustainability depends on this commitment. Current knowledge about the environment should provide an impetus for individuals to take responsibility for positive change in their own urban environment.

CHAPTER 1

CONNECTING RAPID URBANISATION TO GLOBAL HEALTH

> "Because cities are now the dominant human habitat, it is essential for health that they are fit for purpose {…} No single model exists for sustainable and healthy urban development. {…} Importantly, urban development is a political process and addressing the maladaptive political economy at play in many cities is fundamental to planetary health." (22)

An article in the July 2015 issue of the Lancet on planetary health, provided sobering evidence from the study of global disease. It stated in unequivocal terms that non-communicable diseases were responsible for most causes of premature death. The Global Burden of Disease project also stated that "The myth that non-communicable diseases affect mainly affluent and aged populations was dispelled." (23) Evidence was provided from numerous countries measuring the "loss of healthy years of life due to a specific cause based on detailed epidemiological information". In 2008 non-communicable diseases accounted for "an estimated 86% of the burden of disease in high-income countries and 65% in middle-income countries and a surprising 37% in low-income countries." (23) The 2015 Lancet report also indicated that food production was "as responsible for an estimated 32% of global emissions compared with those from all land, sea and air transport combined." (24) The lesson learned is that the human production and consumption of food results in an exacerbation of climate change. These articles indicate that there is an urgent need to create what has been referred to as "synergies between the Global Action Plan for the Prevention and Control of NDCs {and} the Sustainable Development Goals." In 2015 the UN's Development Goals identified this synergy as a potential solution for the power of cities in pursuit of "economic and social progress." (25) Goal 11 of the UN Development Goals 2015 aims to "make cities and human settlements inclusive, safe, resilient and sustainable." (26) This goal can only be realised by designing urban environments where food is produced locally, affordably, and naturally. This would ensure healthy connections between people and nature to optimise circularity. Decades of urban design failure and success have demonstrated the power of an effective urban

environment. This is achieved by ensuring a balance between better health, environmental, economic and social outcomes.

Demographics

The following section provides an in-depth analysis of the effect of rapid urbanisation on three specific age groups. As will be shown, each group has a very different response to the changes in their environment.

The computing era of the 1990s brought with it the affordability of convenient technological advances for greater numbers of urban dwellers. At the same time, the globalisation of financial institutions was causing unprecedented growth and increasing demands on the services, banking, and development sectors. This conflagration of global geographic, demographic, and economic spatial reorganisation led to a rapid change in urban life. This forced most of the world's population to move into urban environments not conducive to optimum human habitation. For generations prior to the 1990s, people lived with the reality of infectious diseases, a precarious situation that threatened the health of the very young and very old. The rapid increase in global urban living, however, has had a different impact on various age groups. As an example, in inner city boroughs the higher rate of premature deaths in the group aged 30-69 due to non-communicable diseases, is not seen in the other groups. The "phenomenon of the 'epidemiological transition' is a phrase that has been coined to describe the long-term change in leading causes of death from infectious and acute to chronic and degenerative conditions." (27)

Emerging vulnerabilities appear to be manifesting themselves differently in the following age groups: Category 1) 0-29; Category 2) 30-70; and Category 3) 70-100+. It is apparent that the difference in the impact of rapid urbanisation on each age group is a result of health reserves or accumulated health assets that exist. However, in the case of category 1, these assets are missing altogether.

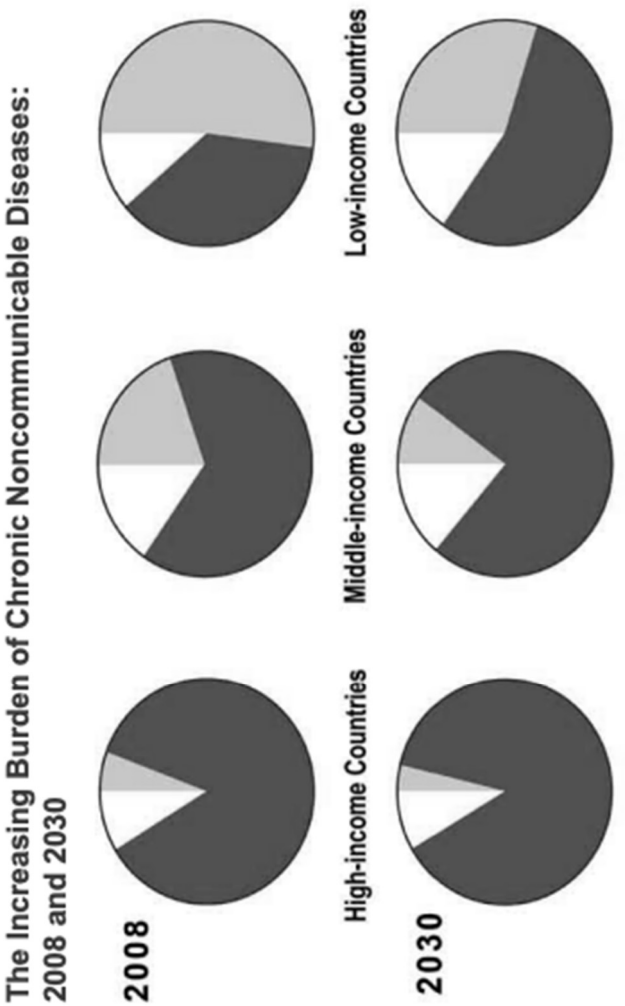
The Increasing Burden of Chronic Noncommunicable Diseases:
2008 and 2030
2008
2030
High-income Countries
Middle-income Countries
Low-income Countries
Communicable, maternal, perinatal, and nutritional conditions
Noncommunicable diseases
Injuries
Source: World Health Organization, Projections of Mortality and Burden of Disease, 2004-2030.
Available at: http://www.who.int/healthinfo/global_burden_disease/projections/en/index.html.

Figure 1 (27)

Category 1: 1-29

Since 2010, rates of NCDs have increased in prevalence according to the April 2021 British Medical Journal. Obesity numbers in those aged 5-19 years have more than doubled (from 2.9% to 6.8%). An alarming statistic indicates that 21% of children aged 10-11 are already obese. This number increases to 27.5% in more deprived areas. Most UK households are more impoverished financially now than before the pandemic. Consequently, many families are having to buy cheaper and more calorie-dense foods. (28) The prevalence of children under 5 years of age who are overweight has increased in most countries and income groups since 2000. (29) The global child obesity epidemic reflects several urban transformations. There has been a universal increase in the consumption of readily available ultra-processed foods (UPFs) by children and youths. In 1980, the consumption of convenience foods was 26%. In many first-world countries, children are consuming up to 80% of UPFs. (30) In 2021, less than 0.1% of the UK population follows healthy diet guidance. (31) Another urban transformation is the increase in value of urban square footage. Land allocation and property rights have determined that the present designers of the built environment cannot achieve even the most basic "human long-term objectives". (32) This sudden loss of access to green space occurs where global populations are most dense. This has a profound impact on the current generation of urban children and youth. Again, it is the most vulnerable who will continue to be deprived of any normal experience of the natural world. As it has been shown, the ability to have access to nature during childhood is crucial for shaping sustainable decision-making processes in adulthood. Human beings use their memories of previous experiences to interpret current experiences. Psychologists refer to changes in childhood experiences of an urban nature as baseline shifts. These occur when each generation of humans tends to take the current condition of an ecosystem as the non-degraded state: "the 'normal' experience, disregarding the fact that ecosystems might have changed considerably over time." (32, p.5)

The absence of access to nature in the lives of urban children and youth has vast and hugely underestimated impacts. One example is the lifelong effect on food consumption patterns, as it removes the effortless reward and education of foraging while being outside for play. This hinders the development of a holistic understanding of naturally grown foods and their true tastes and origins. By removing the effortless reward and education of foraging, urban children are deprived of those essential life skills. The ability to play outside provides opportunities for these children to explore

their environment, perhaps even fostering a natural curiosity to find wild berries or an apple growing in the hedgerows. These are familiar experiences to many people who have childhood memories of playing outside, particularly those born in the 1970s or earlier. This is a disturbing statistic that indicates how, in a single generation since the 1970s, children's radius of activity was reduced to just the area around their home. This was the only place they were allowed to play unsupervised. Even this degree of freedom related to unsupervised play has declined by almost 90%. "In 1971, 80% of seven-and-eight-year-olds walked to school, often alone or with friends, whereas two decades later fewer than 10% did so – almost all accompanied by their parents." (33) The result of this change in children's activity has been defined as the nature deficit disorder. (33) Lack of exposure to nature has created generations with a total disconnect towards nature of any kind. Growing up in the confined space of compact homes, and being saturated with a worldview defined by television, the internet, and UPFs are factors that have had a profound effect on young healthy minds and bodies in this age group. However, the most influential aspect of this age category is the rise in mobile phone dependency. The iPhone 4, launched in 2010, was the first to include an outward-facing camera. In 2012, Facebook acquired Instagram and this was followed by the introduction of selfies. The rise of "stranger danger" in the 1980s led to a cultural safety concern in the 1990s. This collective of societal shifts has created a very narrow realm of society in which this younger generation exists, one that has proven counter-productive to health.

Category 2: 30-70

This group represents the economically active age.(34) The WHO's accepted definition is the working-age population or those who are economically active. (35) Typically, this refers to those people who are between the ages of 15 and 65, from the age of leaving school up to and including the age of retirement. The definition is based on two assumptions. The first is that youths can obtain work. Globally, in 2021 this is, broadly speaking, simply not the case. The second assumption is that retirement is universally possible at 65. This is also outdated as many people cannot afford to retire, or choose not to. However, for the purpose of analysing the impact of rapid urbanisation on those who fall within Category 2, the cohort definition of the WHO will be used. The WHO's reporting of NCDs indicates that most cases were found in the economically active age group of Category 2 and represented seven of the top 10 leading causes of DALY in 2019. "The Disability Adjusted Life Year refers to the sum of potential

life lost compared with the standardised life expectancy" (34), "15.0 million (or 38%) of these were people between the age of 30 and 70 years." (36)

The people of this age group grew up in an era when the food consumed contained fewer processed ingredients and access to outdoor activity was less restrictive with fewer perceived risks. This promoted greater independence and less reliance on adult involvement in children's activities. The observed impact of rapid urbanisation on this demographic has been the dwindling of personal time and outdoor activity. This is the result of increased work-related time, a critical element that is needed in order to afford urban living. Consequently, the spike in premature deaths in this age group reflects a surge in preventable "risk factors of alcohol consumption, tobacco smoking, physical inactivity and obesity". (34) This behaviour is typical of people unable to cope with the complexity of demands in their lives.

Category 3: 70-100+

According to the WHO's report on global health and ageing, "among the 60-and-over population, non-communicable diseases already account for more than 87% of burden in low-, middle-, and high-income countries." (27) The majority of individuals experiencing poor health and disability is most evident among those aged 65 years and older. (34) Spatially speaking, in the majority of countries around the world "the elderly tend to concentrate in a few areas in each country." (37) In the developed world, the older demographic concentration is in predominantly car-dependent sprawling suburban or rural areas. (38, 39) The result of these factors is an imbalance between those who provide care to those who need care. There is also the added hurdle of distance in terms of accessing care when needed. Typically, rural hospitals and care services struggle financially. (40)

Evidence obtained from the global COVID pandemic indicated there were higher numbers of deaths in rural compared to urban areas. This illustrates the importance of proximity to health services. Among those aged 65 and older, the major causes of death were identified as "two main disease groups, both linked to the circulatory system, namely cerebrovascular disease such as strokes and respiratory diseases." (41) For the first group, Alzheimer's disease is among the top 10 leading causes of death worldwide "ranking 3rd in both the Americas and Europe in 2019".(42) Of the individuals in this category, women are disproportionately affected. Globally 65% of deaths from Alzheimer's and other forms of dementia are among women. (42) Dementia is among the most disabling of all chronic

diseases and the number one contributor to years lived with disability. (43) A contributing factor is that as people age, the number of pharmaceuticals used increases. In addition, there has been a socialisation of the general approach to the treatment of illness that is attributed to medicalisation. This can be described as "a process through which various 'problems' get defined in medical terms, using medical language, understood through the adoption of a framework, or 'treated with a medical intervention'." (44)

With the advent of medicalisation "85-90% of all new drugs that have come on to the market since the mid-1990s have provided few or no clinical advantages for patients, pushing medicine use beyond clinically defined need." (44) With an ageing population there has been an unforeseen increase in patient demand for treatment, which shortens the limited time for consultations per patient. This coincides with varying population attitudes that influence the widespread demand for an immediate solution. This development is acerbated by "social labelling" in the process of deciding which types of prescribing should take place. However, it is of great importance to note the following… "It is vital not to lose sight of the value of increasing public awareness on the environmental drivers that underpin much medication use. Most used long-term medications are now consumed, because of the complex relationship between the changing natural environment and changes to human lifestyles. Increasing use of statins and diabetes medicines for example, can be linked to the increasingly sedentary lifestyles inherent within expanding levels of urbanisation." (44)

It has been shown that the ageing population in the age group 70-100+ tends to take more than one medication at a time. This has been referred to as "leading to polypharmacy, usually defined as the concurrent use of five or more medications." (45) There is growing concern with regard to over-diagnosis and over-medicating that result in adverse health problems. Increases in longevity are factors that are often not considered.

Cardiovascular drugs are among those taken most frequently by people aged 65 and older, specifically medication for diabetes and hypertension. Over the past two decades, the number of those over the age of 65 who are taking more than five medications has "quadrupled from 12% to 49%". (45)

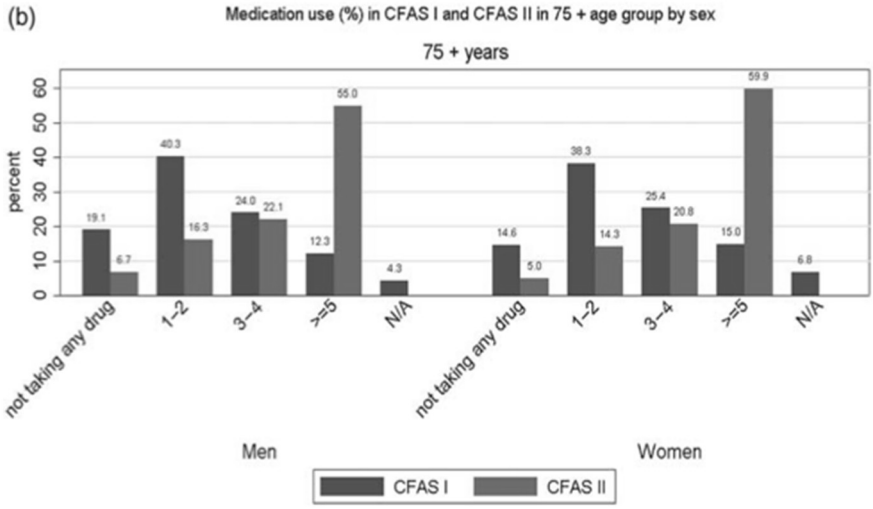

Figure 2 (45)

The group of individuals aged between 70 and 100 years old grew up in a highly medicalised society, supported by the proliferation of the pharmaceutical industry. The promotion of medication as a panacea has increased the reliance on pharmaceuticals by many people. This situation has been worsened by "changes in medication and the rules governing those who have the authority to prescribe, rules that have led to increased access to medications". (46) This same age group has been led to believe that physical activity for the elderly should be reduced. This misconception is compounded by a high reliance on vehicle dominated environments that promotes inactivity and as a consequence, an overall loss of self-efficacy. As an added factor, this age group has been exposed to chemical pollution in the environment (air and water). Research has shown that "although the extent and type of life-long chemical exposure may differ from country to country however, a common feature is that all nations worldwide have increasingly large populations of elderly citizens. These individuals are likely to have raised body burdens of contaminants." (44, 47) Over 100 contaminants have been proven to cause a negative impact on the functioning of the brain and the body. This can be seen in the form of cognitive and memory loss, much of which is identified in the spike in diseases such as dementia. (44)

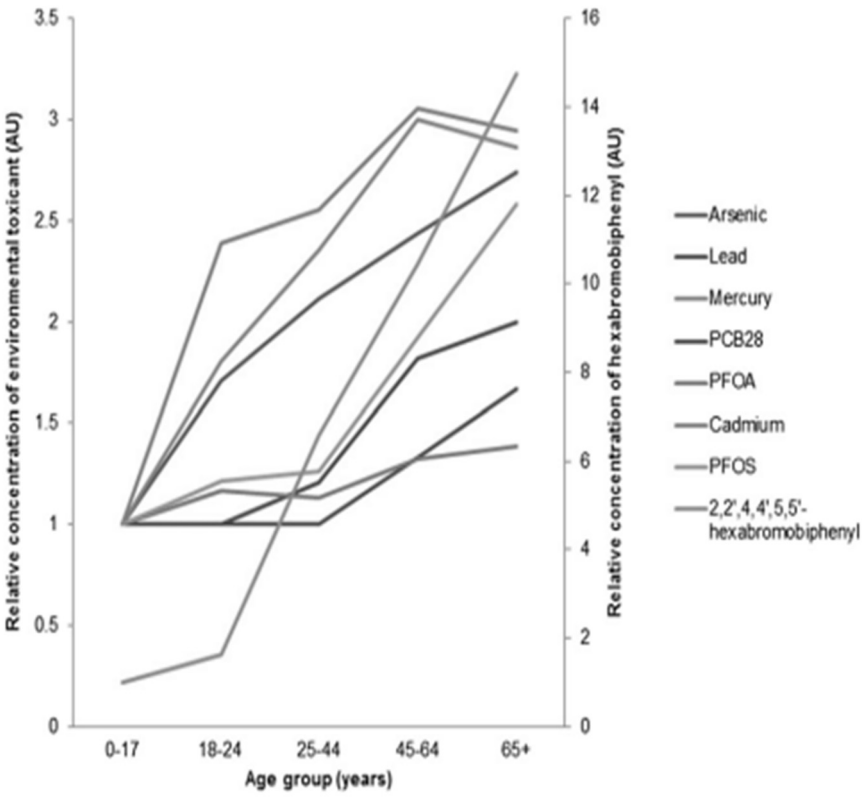

Figure 3 (44)

Unfortunately, the deleterious impact of rapid urbanisation on the health of those in Category 3, although significant, is a combination of both slight amounts and a slow accumulation of toxic chemicals in the environment and water supply. These factors, combined with the excessive medicalisation of health issues perpetuated by sedentary lives, are reinforced by car-dominated cities. Collectively, these factors create a proliferation of NCDs found especially among this age group.

The effect of rapid urbanisation varies significantly between different demographic groups. The previous section discussed the differences between age groups. The following section will explore issues related to the effect of rapid urbanisation on gender.

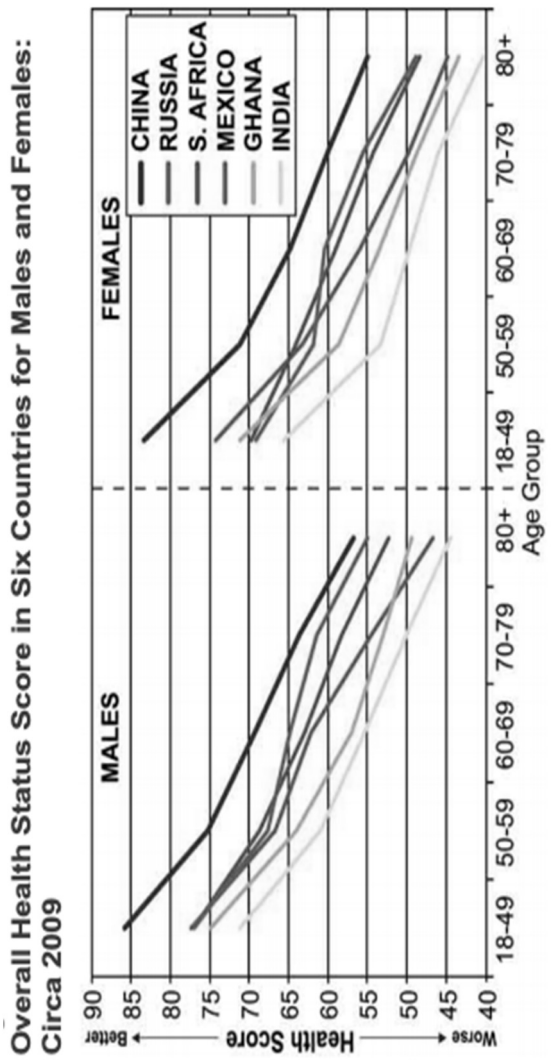

Figure 4 (27)

An examination of the causes of rapid urbanisation and the effect they have on health illustrates the proliferation of global inequality. Most people who are severely affected by inequality are those already in poverty, the most vulnerable members of society. This situation has never been more acute