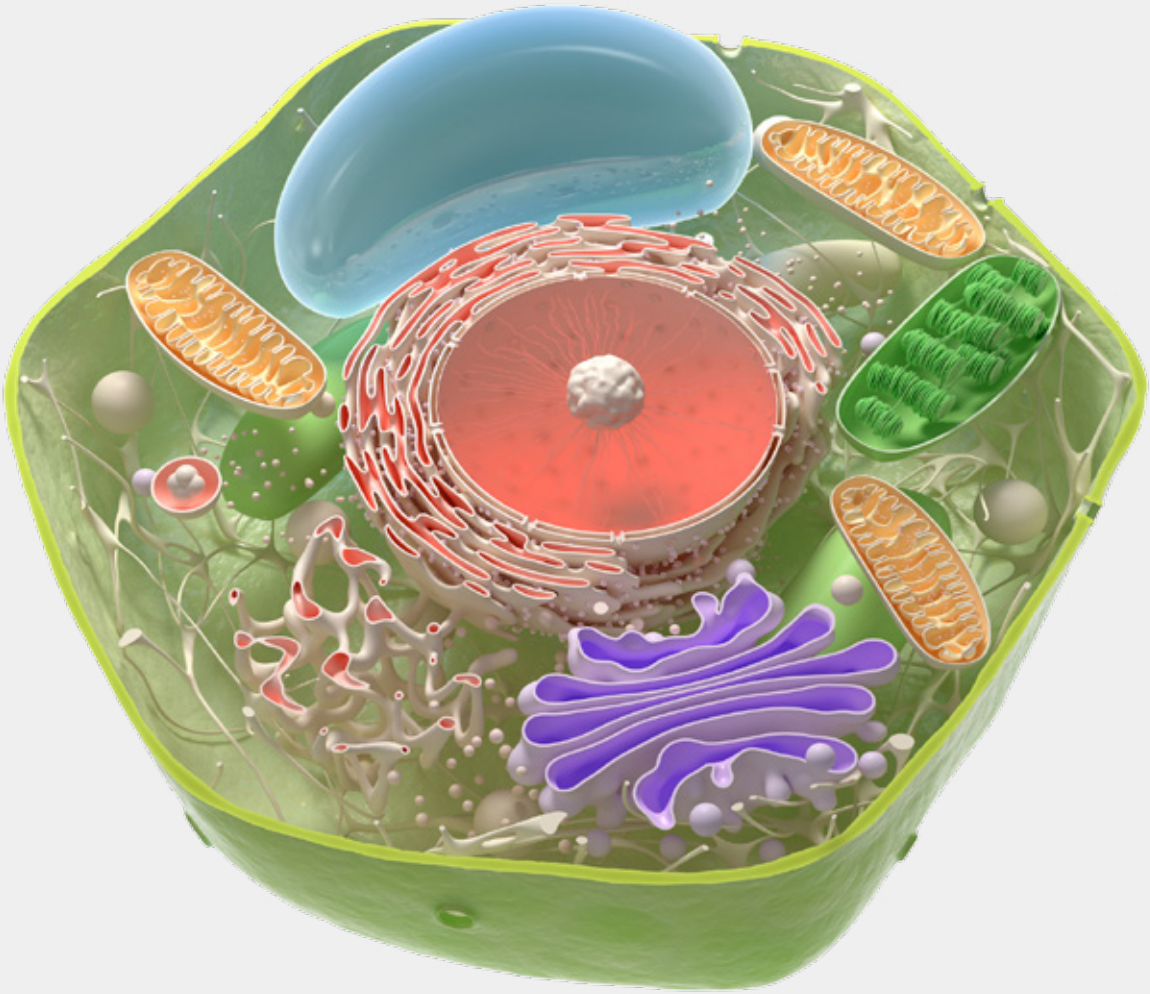
WALKABILITY, ACCESSIBILITY AND HEALTH

EVIDENCE SUPPORTING THE BENEFITS OF WALKABLE NEIGHBOURHOODS



THE PRINCE'S FOUNDATION

CLARENCE HOUSE

An essential part of growing the Building a Legacy movement is being able to convince local authorities, investors and developers that Legacy development not only makes financial sense, but that it delivers social and environmental dividends as well. I am afraid that in a world where disciplines have been divided up into silos, the impacts or benefits of one thing over another are often overlooked or lack sufficient evidence to be able to make the case for change. There is perhaps no greater area for a lack of joined-up thinking than in the way we plan and build houses and the impacts that has on people's health and wellbeing. Being a keen walker myself, it seems very clear how restorative a walk can be for physical, social and even mental health. When walking, you have time really to take things in, be that a bud waiting to flower in Spring, the details around a door case of a house or a distant view to the landscape beyond that both connects you to the natural world, but also reminds you of your own scale, natural rhythm and pace.

This is why I am so delighted that, this year, my Foundation has partnered with Kellogg College, Oxford and the new Global Centre on Healthcare and Urbanisation to gather the evidence that exists between walking, accessibility and health and to make the strong case for why new places need to be designed around those principles. When I first read the report I was staggered not only by the amount of evidence that has been compiled, and the depth of the research that exists, but also by some of the statistics. One study that jumped out, perhaps because of my own personal circumstance, is that walking just an hour a day reduced mortality risk by 70% in elderly men! So if places are designed with all of the shops, schools, work places and parks sensibly distributed in amongst the homes then people can enjoy significant health benefits just by going about their daily lives without having to make a concerted effort to exercise. This also, in turn, reduces vehicle pollution and carbon emissions and takes traffic off the streets, which makes them safer for people, and particularly children.

I can only hope that this compelling report helps the growing number of Building a Legacy landowners and their teams make the case for why their projects can deliver places of lasting benefit for people and also builds confidence amongst the investors and regulators to prioritize mixed-use, walkable communities over monocultural housing estates. The evidence seems remarkably clear.

CONTENTS

WALKABLE ENVIRONMENTS AND STRESS

— DR WILLIAM BIRD

We are designed for walking.[1] We are also designed to live in a place where we feel valued and safe[2] so that communities may thrive. As we have evolved, we have needed to stay in places that have a plentiful supply of food and water with shelter and a safe vantage point to look out for predators. This innate affinity of nature called biophilia remains with us today. Walking connects us to each other and the place we live in. When we walk, every part of our body is in harmony creating the perfect internal environment to maintain health. To understand why walking and our environment are so beneficial to our health we have to understand the underlying mechanisms that have evolved during our own evolution.

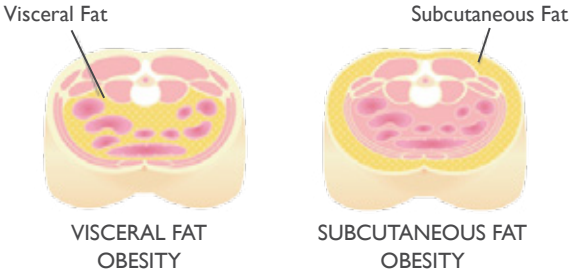
We were hunter gatherers for about 200,000 years[3] and only developed agriculture and then cities in the last 10,000 years and 4,000 years respectively. Our whole evolutionary journey has been based on belonging to small nomadic groups, in a secure and safe environment with a real purpose in our role. This can be summarised as being valued, feeling safe and having purpose. As our cities have expanded we have become more isolated, reducing the role of the supportive community, making us feel less valued and more insecure and this hostile environment is making us feel less safe. As we become more disconnected from both our environment and our community we begin to lose our purpose in life.[4]

STRESS AND OBESITY

The threat to these basic survival instincts, switches our brains into survival mode which is experienced as feeling stressed and anxious. This threat is amplified in poorly designed urban environments, with excess noise, traffic, poor air quality, limited access to greenspace, fear of crime and signs of neglect such as derelict houses.

Stress leads to an activated sympathetic nervous system with the production of adrenaline and cortisol giving us the fight and flight response. Short term stress is healthy but long term or chronic stress[5] can be damaging. When feeling stressed, our bodies immediately switch on a primitive response to ensure we secure our calorie intake. This results in the release of ghrelin from our stomach[6] which signals our brain to eat more calories and to ensure that these calories are stored as visceral fat that creates abdominal obesity. The visceral fat wraps around our internal organs such as the liver and heart as opposed to the less harmful subcutaneous fat that remains under our skin. This is one of the reasons why abdominal obesity is more prevalent in poorer areas where there is increased incidence of stress.

Chronic stress also reduces our levels of physical activity[7] due to lack of motivation. The response to chronic stress of eating more and moving less is innocently trying to help us conserve calories; very useful if you are a hunter gatherer, when there was a risk of starvation, but not so helpful today when food is in abundance.



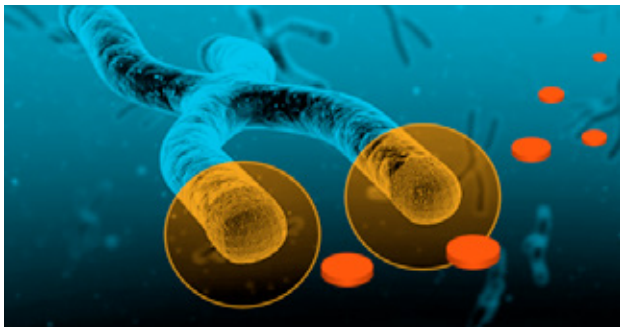
STRESS AND CHRONIC INFLAMMATION

The combination of the high calorie diet, inactivity and stress impacts the health of the billions of bacteria in our intestine called the microbiota, which are essential to our health and wellbeing.[8]

There are more bacteria cells in our body than there are cells that belong to us. These not only help digest foods that we are unable to digest ourselves but they also impact our brain function. When these bacteria are exposed to a diet of high saturated fat, low fibre and high sugar, the 'good' bacteria diminish leading to damage to the intestine wall causing what is called "a leaky gut".[9] This allows small parts of the bacteria called lipopolysaccharides (LPS)[10] to escape from our gut into our blood stream stimulating our immune system and so leading to chronic inflammation.

The visceral fat is also attacked by our immune system through mechanisms that are still not completely understood but resulting in one of the largest sources of chronic inflammation. The immune system is

a priority for our body but uses up a considerable amount of energy. This leaves less energy for our brain and muscles making us feel tired and affecting our concentration.



Telomeres are at the end of the chromosomes and shorten every time the cell divides. Free radicals accelerate the shortening of telomeres.

STRESS AND SLEEP

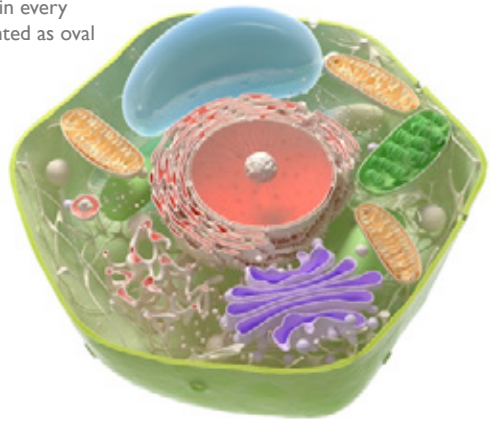
Sleep is vital for our health. Chronic stress leads to poor sleep which can be exacerbated in a poor environment with artificial light and noise. Poor sleep has a direct effect on our diet,[11] visceral fat and chronic inflammation. The more tired we become the more we become inactive and crave high calorie foods which are laid down as visceral fat. Poor sleep also affects our gut bacteria[12] leading to leaky gut - and therefore chronic inflammation.

GENERATING FREE RADICALS AND TELOMERES

All the energy in our body is generated by mitochondria that are in every cell in our body. They are the oval shaped structure in the figure below.

These are like batteries and if not used regularly and we have too many calories then they "overcharge" and generate electrons commonly known as "free radicals." These free radicals damage our DNA by shortening the telomere which is the end of the chromosome. The telomere is essential to maintain the life of a cell. When it becomes too short the cell dies and this is part of ageing. Telomeres that are shortened by free radicals will lead to faster ageing. Damage to the cells caused by these free radicals triggers an inflammatory response causing more chronic inflammation.

Mitochondria are in every cell here, represented as oval shapes.



As hunter gatherers we are designed to feel valued, safe and have purpose supported by a healthy natural environment and a strong community. Our current way of living involves more loneliness in a hostile environment which we perceive as a threat, making us feel stressed as our brain goes into survival mode. The chronic stress encourages us to eat a high calorie diet, move less and have less sleep leading to obesity and decreases the health of our gut bacteria. The release of free radicals (due to overcharged mitochondria), dying cells (due to shortening telomeres), and unhealthy gut bacteria trigger our immune system to fight against our body creating chronic inflammation. "Chronic Inflammation" is the real epidemic of the 21st century as it is the foundation to many of the diseases such as diabetes, dementia, depression, anxiety, many cancers and cardiovascular disease.

The fact that chronic stress causes inflammation which affects depression, diabetes and cardiovascular disease explains why so many diseases cluster in those living in the poorest areas.

CREATING A HEALTHY PLACE TO LIVE

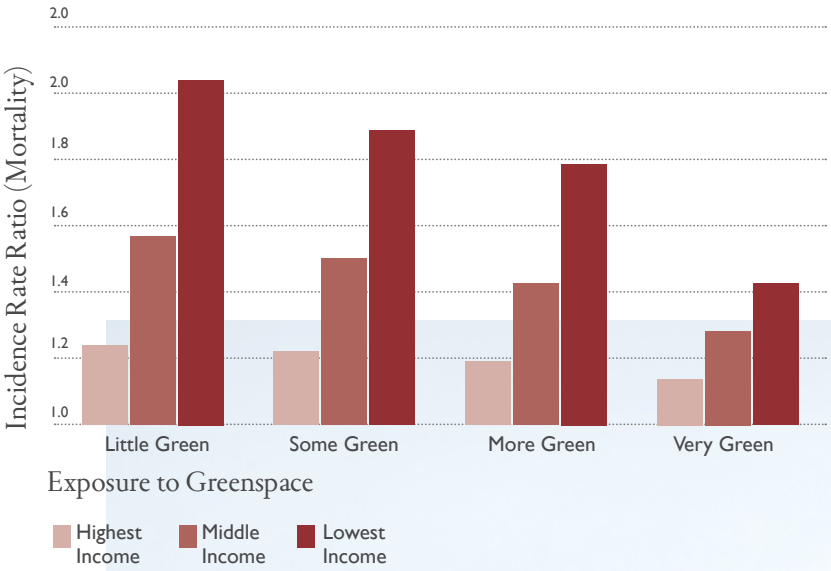
To really improve health we need to improve the places where we live to reduce chronic stress.

FEELING VALUED

To help us feel valued we need to build places that support strong communities where everyone, regardless of age, is connected and supported. This helps us have a sense of belonging. To help us feel safe we need areas with less traffic, reduced antisocial behaviour and adequate access to greenspace.

FEELING SAFE

Connecting to nature is a fundamental instinct that has helped us survive over the past 200,000 years. The need for shelter, clean water and fresh food has created a desire to be near water, amongst trees and with the sounds of nature to emphasise a safe environment. This reduces all measures of physiological stress including domestic violence and anger. New research[13] has shown that children who play in green space have longer



telomeres than those who have no contact with green space. A large UK study showed that people living near green space were more likely to live longer. However those who live in poorer areas benefit much more from greenspace than those living in affluent areas, which helps reduce health inequalities.

HAVING PURPOSE

To help us have purpose we need places where we can volunteer, work, be inspired, be creative, learn new skills and feel that we can make a difference. A walkable place built with communal areas is more likely to be vibrant and exciting, yet with a perception of safety.

Walking brings everything together. Without people walking, a place starts to fade and lose its vibrancy and energy. Walking connects people together, creates safe environments, due to improved surveillance, connects us to nature and gives us purpose. In the body, physical activity reduces chronic inflammation by releasing anti-inflammatory myokines[14] from muscles, prevents the release of free radicals from mitochondria,[15] improves our microbiota and reduces obesity. Walking also helps strengthen muscles, joints and bones.

In summary, the place where we live can define our health. Poorly designed places create chronic stress leading to unhealthy behaviour and chronic inflammation that in turn develop both mental and physical diseases. As a GP, I can only alleviate the symptoms and sometimes limit the impact of chronic diseases. As landowners and built environment professionals, you can prevent the diseases from starting in the first place.

CONGESTION
POLLUTION
LACK OF COMMUNITY COHESION
REDUCED WALKING
FEAR OF CRIME
LACK OF NATURE
WEAK RESILIENCE

↓

CHRONIC STRESS
BAD DIET
POOR SLEEP
INACTIVITY

↓

POOR GUT BACTERIA
VISCERAL FAT

↓

FREE RADICALS
CHRONIC INFLAMMATION
SHORT TELOMERES

↓

PREMATURE AGING
OBESITY
DEPRESSION
CANCER
DEMENTIA
CARDIOVASCULAR DISEASE
DIABETES
FATIGUE

The summary of how a poor environment leads to Chronic Stress then Chronic Inflammation, leading to many other diseases

DESIGNING HEALTHY PLACES

— BEN BOLGAR

With the rise of the motor car over the last century, the attraction for people to leave the polluted city in search of clean air, and a larger house with a garden and garage, in which to keep their shiny new machine, became the suburban dream. Low-income urban residents often lacked the option of affording the time and expense of commuting, while very wealthy people often had aspirations for both a weekend or holiday residence in the countryside, as well as a house or flat in the city. This led not only to the sprawl of suburbs,[16] but in many cases to the destabilisation of communities, as some residents preferred to move out of town, rather than to put down roots and stay for generations in one place; while others were displaced as real estate prices and employment landscapes changed. In many ways, cheap oil and the internal combustion engine had given the middle classes the freedom of movement, and the choice to have the best of both worlds with greater distances becoming the norm for commuting.

The Garden City movement quickly gave rise to the Garden Suburb,[17] with fewer work spaces and shops. So while residents had larger private green spaces, access to the open countryside became further and further away for those people living in cities, towns and even villages. This is often referred to as the Doughnut Effect, which describes a hollowing out of historic urban centres, as businesses and people move to the suburbs. From some perspectives, the suburbs were seen as parasites[18] of the host city, since it proved difficult to replicate the mix of land uses and activities to sustain daily livelihoods, and instead generated unnecessary traffic movement. In recent decades, some cities have become better connected, former industrial areas have become transformed to mixed-use areas, and inner-city living has once again become something that can be attractive for people looking for social mobility, and a greater choice of activities and job opportunities within close proximity. But there is still a long way to go in most cities to reduce pollution levels[19] and to make them safe, clean, and attractive places to raise a family.

In an age of climate change, resource depletion, rapid urbanisation, and not least the current pandemic, we are realising that being inefficient with land and energy is not an option. There is a need to live at higher densities in order not to concrete over the land and biophysical resources needed for growing food or managing water, but at the same time, as the pandemic has shown, there is a need for buildings with good access to natural light, fresh air and nature,[20] without residents being crammed into high-rise apartments, often far away from local green spaces. There is an ongoing need to balance the competing forces of urban density, with the efficient and fair access to, and management of, green infrastructure. What is critical in the coming decade, if we are to avoid a global heating catastrophe,[21] is to create places that are good for the health of humans, animals, plants, and the biosphere in general.

The design of healthy urban places covers many elements linked to physical, social, and even the spiritual aspects of people's lives. As The Prince's Foundation's last report on walkability and mixed-

use showed, physical health can be enhanced by placemaking design that integrates shops, schools, work places, and parks in amongst homes, so that people have direct access to walkable environments as they carry out their daily lives. Social or community health[22] can be supported by ensuring that each place is designed at the human scale, so that residents will want to walk, rather than drive to activities. This means that they may often meet people in the streets, squares, and parks as well as inside public and commercial buildings. Spiritual health can be enhanced by beautiful places[23] where nature reveals qualities of harmony. Where the human environment is also designed to reflect nature's harmony,[24] with materials, proportions, and details that all inspire people to play close attention to the intricacies, efficiencies, and beauty of that relationship.

At a practical level when planning new places, it is important to create strong local centres with a wide range of non-residential uses, ideally within a 5-10 minute walk of every home. Some cities have been implementing the 15-20 minute travel time principle,[25] which is practical in larger places that are more dynamic and have better public transport, but often less so in smaller towns and villages where unless amenities are closer, people may chose to drive. It is also important that these centres are connected by an integrated series of streets every 30-120 metres, with smaller spacing towards the centres, where more pedestrian movement is likely to occur. It is likely that main streets will need to take the majority of vehicular

ZONED SINGLE USES
AND ISOLATED BUILDINGS CREATING CAR DEPENDENCY

INTEGRATED USES AND FORMATION OF STREETS ENCOURAGING
WALKABLE COMMUNITIES

traffic, so it is a good idea to have a parallel secondary network of quieter streets that allow for easier cycle networks.

Greenspace and parks should be well distributed on the network and connected by green corridors that allow a degree of water and animal movement to encourage a healthy level of biodiversity. These natural green or blue, vegetated or water-dominated, corridors often sit well on the edge of a walkable neighbourhood, so that the centre of the neighbourhood is the most urban and the edge the most rural. This structure in turn allows for the feeling that you are never far from the countryside, even if you are in the middle of the city. Many argue that when London culverted so many of its rivers,[26] it represents a major loss today of the ability for residents to be able to walk or wheel between the River Thames and the open countryside, which would not only make the city more liveable, but help to improve the active travel corridors that have become so popular along canals and disused railways.

To make places more walkable, wheelable, and accessible, it is not just the distribution of uses, the movement network, and green infrastructure that are important, but the visual and social interest and diversity on the journey.[27] Walking through a car dependent low-density suburb, or along hundreds of metres of blank façade in a commercial district can be dull, so people are more likely to opt to drive or to take public transport. Conversely, walking down a terraced street with individual ornaments, window boxes, and planted frontages can add delight and interest to an active journey, with the added advantage of a seasonally transforming streetscape. Similarly, the frequency and number of entrances and open access onto a street

is an important factor in not only feeling safe, but adds interest and vibrancy, and in turn heightens the likelihood of people walking in those places.

There is a growing consensus, at least in the UK, about what makes a walkable place, and a very clear consensus, as evidenced in this report, that walking has many benefits to the health of all life on earth, not least by reducing pollution and carbon emissions,[28] and yet new truly walkable places are extremely rare. This must change quickly and so we hope this short report will be another important piece in the jigsaw for landowners, regulators, developers, and designers in collating the strong evidence for what the benefits are and why we need to be more innovative in our delivery of the places we build.

INTRODUCING KEY THEMES

In December 2020, a report by The Prince's Foundation and partners illustrated that walkable, mixed-use urban neighbourhoods provide a range of benefits for the local economy, and can improve the overall health and well-being of residents and workers. Positive impacts of higher levels of 'walkability' and wheelchair accessibility, combined with more mixed-use neighbourhoods, include greater quality of life, improved mental and physical health. This follow-up report provides further evidence to support the benefits of designing and retro-fitting walkable and wheelchair-accessible urban areas, indicating that effective, active travel planning, urban design and implementation are core components of the healthy cities that we wish to deliver today for tomorrow's built environments.

Reviews of relevant research literature and peer-reviewed studies were completed by the authors to provide the evidence for this report. A series of keywords were used to conduct literature searches based on key themes emerging from the earlier report on walkability. These themes, outlined further below, are: the physiological and psychological benefits of walking; walkable neighbourhoods and well-being; the 15-minute city; the impacts of building design and materials on human, and environmental health; and the historical importance of public spaces. Each scoping review was performed using the Scopus and Google Scholar online searches to survey the most relevant literature for the key themes, potential benefits, and potential problems. Reports and papers were accessed via the University of Oxford's Bodleian Libraries resources, if not available by online open access. Of the initial 600 selected research publications, 174 were filtered by relevance to the main themes, and reviewed for this summary of current evidence.

— DR DAVID HOWARD

EFFECTIVE, ACTIVE TRAVEL PLANNING, URBAN DESIGN AND IMPLEMENTATION ARE CORE COMPONENTS OF THE HEALTHY CITIES THAT WE WISH TO DELIVER TODAY FOR TOMORROW'S BUILT ENVIRONMENTS.

WALKABLE NEIGHBOURHOODS

Assessing the Evidence

— DR DAVID HOWARD

Where we walk or actively wheel is often dependent on the availability of accessible and attractive public spaces. City plazas or walkways, as well as green and blue infrastructure - trees and lakes, for example - not only help to shape our physical movements and health but can also enhance our social and shared activities. Evidence is present of how access to walkable and wheelable urban public spaces can influence standards of urban living and social relations.

Walkability is strongly associated with health benefits. Walking and active travel have been proven as prevention mechanisms against chronic disease in many populations, and for those who are already ill. The following report provides further evidence that shows significant improvement in health and well-being on adopting a regular walking routine. An aim of this report, therefore, is to assess and summarise a range of research projects which connect walkability and active travel to improvement in health, through shared or individual exercise, primarily in the UK context.

The phasing out of fossil-fuel use, and the implementation of carbon reduction targets will have a significant impact on the mode of transport that we may use, and the type of materials and heating sources employed in the built environment. Walkable neighbourhoods can be at the forefront of net zero aspirations and practice. In particular, the concept of a '15-minute' neighbourhood has evolved from an interesting concept on the margins of urban planning to become an active part of urban policy and implementation. Scoping the range of evidence on the impacts of realising '15-minute' walkable and wheelable urban settlements is the focus of the middle section of this report.

The health impacts, on people and the climate, of unsustainable building design and construction materials have emerged as a key concern. Not only is the 'walkability' of a neighbourhood a prime focus, but the materials in which this environment is built, or retro-fitted. One of the final sections assesses evidence of carbon and cost saving in designing sustainable and walkable urban settlements, for example, by connecting low carbon footprints with walkable neighbourhoods. The report assesses current evidence, which overall, clearly points to the wide social, economic, environmental, and health benefits that can be derived from investing in, and promoting, accessible, walkable urban places.

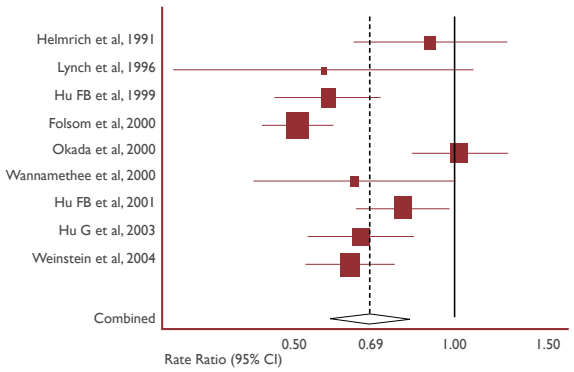

DORSET WINE


THOSE WHO REGULARLY ENGAGED IN PHYSICAL ACTIVITY OF MODERATE INTENSITY HAD 30% LOWER RISK OF TYPE 2 DIABETES AS COMPARED WITH SEDENTARY INDIVIDUALS

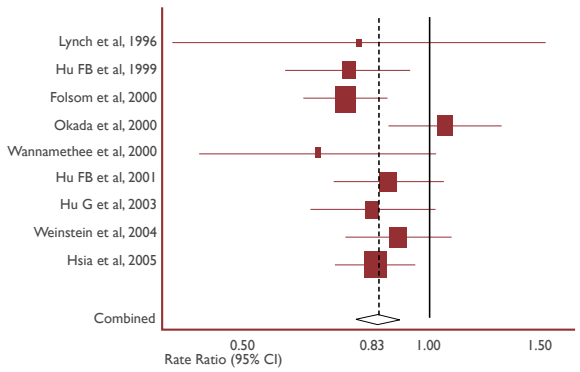
The Physiological and Psychological Benefits of Walking

— EMILY MORBEY

The The physiological health benefits of walking are well understood, and include improvements to body composition, cardiovascular fitness, diastolic blood pressure and glucose metabolism. These benefits can act both to improve existing health and to avoid disease states. Such physiological benefits extend to confer protection against common chronic diseases, such as cardiovascular disease, type II diabetes and coronary heart disease. They can also provide relief for cancer patients and survivors and improve quality of life in stroke survivors,[29] in some cases. The specifics of how walking can reduce type II diabetes risk and cardiovascular disease risk, are increasingly being revealed. For example, a systematic review in 2007[30]



Rate Ratio of Type II Diabetes Without Adjustment for BMI

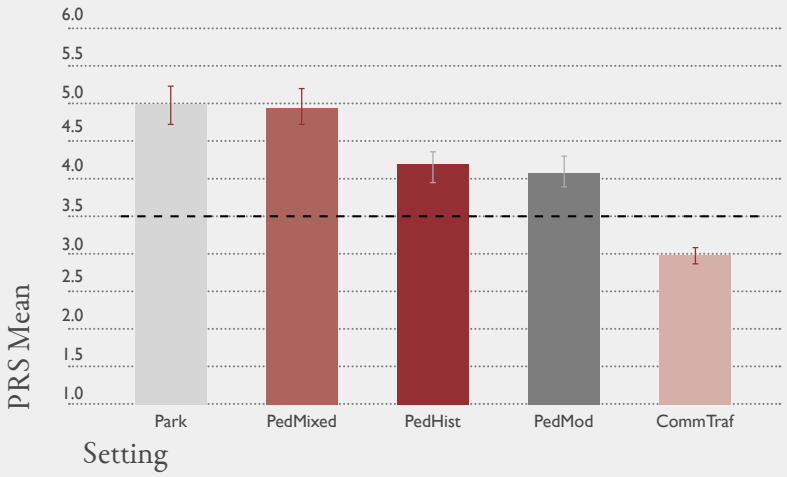


Rate Ratio of Type II Diabetes With Adjustment for BMI

showed that those who regularly engaged in physical activity of moderate intensity had 30% lower risk of type II diabetes as compared with sedentary individuals, even after controlling for BMI. In addition, a cross-sectional study of 400 individuals[31] showed that those who reported walking for at least 30 minutes on at least 5 days per week had lower levels of a number of pro-inflammatory markers which are associated with the pathogenesis of the disease. This shows that walking can reduce both the risk and severity of type II diabetes.

Walking also has health benefits specifically related to pregnancy, with the potential to reduce the risk of preeclampsia and preterm birth.[32] These benefits have been quantified in terms of reduced use of health services in socioeconomically disadvantaged older adults. A study[33] found that people who walked 120 minutes or more had significantly decreased combined emergency room and inpatient costs than those who reported no activity. This is notable because it quantifies the physiological benefits of walking and shows how ultimately, they could improve outcomes for patients and reduce long term and emergency costs for health services.

Many studies which consider the benefits of moderate physical activity (PA) on health, incorporate walking into their analysis, while others consider walking individually as a metabolic activity.[34] The latter studies have shown that walking is sufficient to produce these health benefits without more intense physical activity. For example, post-partum exercise, regardless of intensity, was shown to improve chronic disease risk factors in women, such as aerobic capacity in a 2011 study.[35] Another study showed[36] that both walking and vigorous exercise are associated with substantial reductions in the incidence of cardiovascular events in post-menopausal women. This has even been extended to suggest that walking to work and other forms of active



HISTORICAL ARCHITECTURAL STYLES IN PARTICULAR, AS WELL AS THE ABSENCE OF MOTOR TRAFFIC, COULD PRODUCE RESTORATIVE EFFECTS SIMILAR TO THOSE GAINED WALKING THROUGH NATURE

travel (AT) can produce these benefits, with various studies pointing to the fact that active commuting, when studied alone, can reduce cardiovascular disease risk.[37] This is an important finding as the commute to work could be an easier way to incorporate walking into the daily routine of urban dwelling people.

Due to exposure to air pollutants, walking has been associated with negative physiological outcomes in some urban settings. One study[38] found that short term exposure to traffic pollution prevents the beneficial cardiopulmonary effects of walking from being realised in people with and without chronic cardiopulmonary diseases. Other studies[39] have found that the benefits of active travel are outweighed by air pollution in all but the most extremely polluted environments. The mixed results as to the balance of positive and negative physiological effects of walking in urban environments, may therefore enable people to reap the physiological benefits of walking more so than others.

The psychological benefits of walking, particularly in natural environments, are well known. Research has shown that the psychological benefits of walking include relief from depression and depressive symptoms,[40] higher self-health perceptions in older adults[41] and the prevention of cognitive decline.[42] The biological mechanisms behind these psychological benefits are beginning to be understood. For example, one study[43] showed that daily, low-intensity walking is associated with preservation of hippocampal volume in older adults. Hippocampal atrophy (shrinking of the part of the brain associated with learning and memory) is a key marker of the preclinical stages of Alzheimer's disease. This study showed that an additional 10 minutes per day of walking activity was significantly associated with a 0.02cm^3 larger hippocampal volume in women. This provides exciting evidence of how walking as physical activity may protect individuals from a severe mental chronic disease through a specific biological mechanism.

It has been questioned whether there are only certain circumstances in which psychological benefits can be achieved. Recent studies have measured psychological indicators in a range of different urban settings, from urban parks to historical pedestrianised settings, to motorised streets. General results show that urban settings have the potential to produce desired effects such as improved mood, vitality, and decreased stress. For example, a 2018 study[44] showed that specific engagements with place through urban walking in Bristol resulted in positive self-reports of cognitive state improvement, even in an environment with little nature. Senses of pride, reflection and awe were triggered, as well as a sense of community and belonging based on recognition of certain buildings. This is supported by results from another study in Bristol[45] which showed that historical architectural styles in particular, as well as the absence of motor traffic, could produce restorative effects similar to those gained walking through nature. These results are not limited to the UK: studies in Poland[46] and Japan[47]

have shown that exposure to just a small amount of nature on a walk through an urban setting can permit psychological restoration. Now that studies are paying attention to the psychological consequences of urban and natural walks, the specifics of the environment which enable positive psychological outcomes can be assessed more closely for future planning.

Some of the psychological benefit which can be achieved through walking is also moderated by social and environmental contexts. For example, another study[48] showed that, dependent on the environmental context, walking alone or walking in a group may be more beneficial. In the urban setting, it was shown that walking with a friend increased the revitalisation effect, whereas in a park walking alone increased this effect. This shows that the beneficial effects of walking cannot be assumed based on the environmental context alone, and that numerous factors contribute to the realisation of beneficial psychological effects. This suggests a need for consideration for the likely interaction of different moderating factors in different settings in urban planning.

Not all psychological outcomes of walking are positive. Understanding the scope of the impacts requires understanding negative outcomes of walking in urban spaces in certain groups. Particular types of urban environments, particularly those with motor traffic and large amounts of pedestrians, could cause heightened stress among individuals with pre-existing anxiety. A 2008 study[49] showed that in individuals with persecutory delusions, exposure to the urban environment through walking increased levels of anxiety and negative beliefs about others, in comparison to participating in a mindfulness task. As with the balance between the positive and negative outcomes for physiological impacts, a broader take needs to be considered for psychological impacts and more studies exploring this are needed.

Understanding of the physiological and psychological benefits of walking has so far been limited by four key areas. Firstly, there is a lack of follow up data from the studies mentioned here and so the long-term benefits of regular walking of both low and moderate intensity are not well known. Secondly, in many of the studies here, assessment of the level of walking the participants engaged in was based on their self-reports. This produces uncertainty in the accuracy of the amount of walking done by the participants. Use of pedometers is not always useful when directly assessing walking levels as these cannot distinguish between walking and running, for example. Thirdly, the participants used in these studies were often volunteers and so there could be some bias resulting in generally healthier volunteers being used. Finally, proving that walking causes the positive outcomes seen here is challenging. Finding a causal biological link between these variables will be useful in the future to add to the existing promotion of walking as a way to achieve the recommended daily physical activity.

When considering the walkability of cities and the health benefits achieved by walking, it is necessary to also consider the impact on those with physical disabilities who require a wheelchair to facilitate active travel. To date, there have been no specific studies on the health benefits of wheelable cities, although these could fall in line with moderate physical activity in general and so the benefits of this are implied. Studies[50] attempting to understand the barriers that people relying on wheeling face regarding active travel have taken place and will be useful in creating cities which facilitate active travel for all, allowing the extensive benefits of walking to be realised by every individual.

Walkable Neighbourhoods and Wellbeing

— YANELLE CRUZ BONILLA

The coronavirus pandemic has imposed lockdowns that have severely limited individuals' ability to engage in many activities such as dining out, visiting the theatre, or exercising at a gym. These lockdowns have severely limited mobility and the need to commute anywhere, as a result, cities around the world experienced significant environmental improvements[51] and air quality increased[52] around the world. The lack of driving, commuting, and use of public transportation have led to an increase in walking[53] for many individuals across the world, making it apparent that more walkable cities and suburbs should be prioritized by localities around the world.

In the United States, state parks experienced a 30% to 50% increase in traffic[54], forcing some of the busiest state and national parks to close in the height of lockdown due to overcrowding concerns. Additionally, the demand for outdoor spaces to walk in led to a 200% increase in trail usage across the United States. The need for more compact cities and suburbs with high walkability scores has never been clearer, in addition to the demand, daily walking provides a substantial amount of physical and psychological benefits that individuals around the world can enjoy.

Over the years, many studies have examined the benefits of daily walks and the evidence has shown significant physical health benefits. A study looking into the benefits of thirty-minute walks for Type 2 diabetes patients[55] found that short and frequent walks immediately after meals reduced fasting blood glucose levels by around 10% to 12%. Another study focused on elderly men suffering from critical diseases such as heart disease, cerebrovascular disease, or cancer, as well as healthy elderly men. They found that walking at least an hour a day decreased mortality risk by 70%[56] in elderly healthy men with and without critical diseases.

Aside from significant physical benefits, many studies have found psychological benefits. A study aiming to assess the affective and cognitive benefits of daily, brisk walks in urban environments found that participants experienced reduced feelings of anxiety, depression, anger, and time pressure[57]. In addition, participants reported feeling an increase in revitalisation, positive engagement, and tranquillity by walking through urban environments and green spaces. Another study specifically focused on participants with and without mental health challenges, and findings showed that participants with mental health challenges experienced a healthy change in mindset after going on walks[58] in green and rural spaces. Additionally, researchers found that participants without mental health challenges found both rural and urban walks beneficial.

Beyond physical and psychological health benefits, providing individuals with more opportunities to walk especially at an early age can have other significant impacts. A study assessing the impact of Walking School Buses in New Zealand[59] found that individuals involved in these programs not only enjoyed improved fitness, but many experienced a higher sense of community. In addition, many reported finding it easier to form habits, behavioural changes, and children began to exhibit increased independent mobility. Researchers also found that children involved in walking school buses had a ripple effect in their families; many parents were more likely to reduce driving times in favour of

LOCKDOWNS HAVE SEVERELY LIMITED MOBILITY AND THE NEED TO COMMUTE... AS A RESULT, CITIES AROUND THE WORLD EXPERIENCED SIGNIFICANT ENVIRONMENTAL IMPROVEMENTS

walking, if their children had developed an affinity to walking due to their participation in these programs.

The overwhelming amount of positive evidence highlighting the many benefits of walking should force policymakers and government officials to prioritize the creation of more compact, walkable communities that will encourage daily walking. As the coronavirus pandemic continues to affect patterns of mobility, individuals have been encouraged to rethink the role of active transportation, so it may be that these trends are here for the longer term. However, it is important to consider an equitable approach to ensuring everyone has access to open spaces. As things stand, many communities and individuals are currently being deprived of walkable spaces[60] due to systemic inequities, but pursuing compact communities can have a ripple effect that benefits all.

Despite a growing desire among urban planners, policymakers, and local government officials to encourage Walk Score® in their communities, many of these plans have been set aside to prioritize public transportation systems and car travel. Now is an opportunity to set aside competing interests and the need to prioritize car travel should be replaced by the need to ensure localities have adequate infrastructure to allow for higher walkability. Many cities around the world have implemented short-term solutions such as expanded sidewalks, priority zones for walkers and cyclists, and street closure to create more open spaces[61] – however, this is an opportunity to ensure those short-term solutions become long-term ones.

15 - Minute Cities

— ZACHARY ELLIOTT

Imagine a city where you could meet all of your daily needs[62] within just a 15-minute walk from your home. A city where there are no long commutes, you know your neighbours, and every street is people-oriented, vibrant, and inclusive. This is the premise of Carlos Moreno's 15-minute city:[63] the idea that residents of urban areas can have a higher quality of life if they can access all the urban services they need within a 15-minute walk, wheel, or cycle from their homes. The 15-minute city idea can be a guiding light to help us imagine a liveable, healthy, and sustainable post-COVID-19 urban future. However, we need to ensure that it works to improve, rather than exacerbate, social equality in cities.

Advocated by many urban thinkers and city mayors[64], notably Anne Hidalgo of Paris[65], this approach can help us design just, sustainable, and vital post-COVID-19 cities, and offers an attractive alternative to the car-oriented, mono-functional suburbs of today. But is this a distant utopia or a feasible reality? This question is addressed below by examining the impacts and challenges of realising the 15-minute city model.

Realising the 15-minute city carries a myriad of benefits[66], because the mixed-use, medium-density, and active travel interventions involved can make cities more liveable, walkable, healthy, sustainable, and economically productive. However, it also involves a suite of challenges and equity issues,[67] meaning that the concept must be implemented critically, rather than as a panacea for all our urban problems.

First of all, the 15-minute city can improve the liveability of streets and neighbourhoods, as the human-scale and pedestrian-oriented urban forms promoted by the model invite urbanites out onto the streets[68] to walk, wheel, or cycle to nearby urban services. This means that people are more likely to bump into each other, develop weak ties[69], and build up a sense of community.[70] For example, a study[71] found that residents who described their neighbourhoods as walkable in Galway, Ireland were more likely to know their neighbours, trust others, and take an interest in social/community life. These benefits are especially relevant for older adults, as creating spaces and opportunities for incidental social contact across the city can reduce experiences of loneliness[72] in old age. However, it is important to note that too rigorous a promotion of community life can exclude[73], just as much as it can include, and strong social ties can result in conflict and irritation[74] when there is insufficient distinction between public and private life.

Aside from generating a greater sense of conviviality and community, 15-minute neighbourhoods can also be inclusive by helping to deal with urban inequalities about who can, and who cannot, access urban services. This is because in a 15-minute city people can access nearby urban services[75] regardless of whether they have access to a car, with particular benefits for non-driving low-income[76], elderly[77], and young[78] groups, who may otherwise lack independent or convenient access to urban services.

Walking, wheeling, or cycling on the streets of a 15-minute city is also a more pleasant experience, as when streets are configured as walkable, wheelable, and bikeable, rather than for cars, active travel becomes[79] a more attractive and popular option[80]. Promoting active travel through good urban design carries a suite of health benefits, as a study[81] in Atlanta, USA, found that each kilometre walked a day was associated with a 4.8% reduction in the likelihood of obesity. Another study[82] in King Country, Washington, USA, found that a 5% increase in walkability was associated with 32% more time spent doing active travel, 6.5% less vehicle miles travelled per capita, as well as about 5.5% less NOx and Volatile Organic Compounds emitted per capita, improving air quality along walkable city streets. A modal shift from cars to active travel can also substantially reduce[83] the amount of CO_2

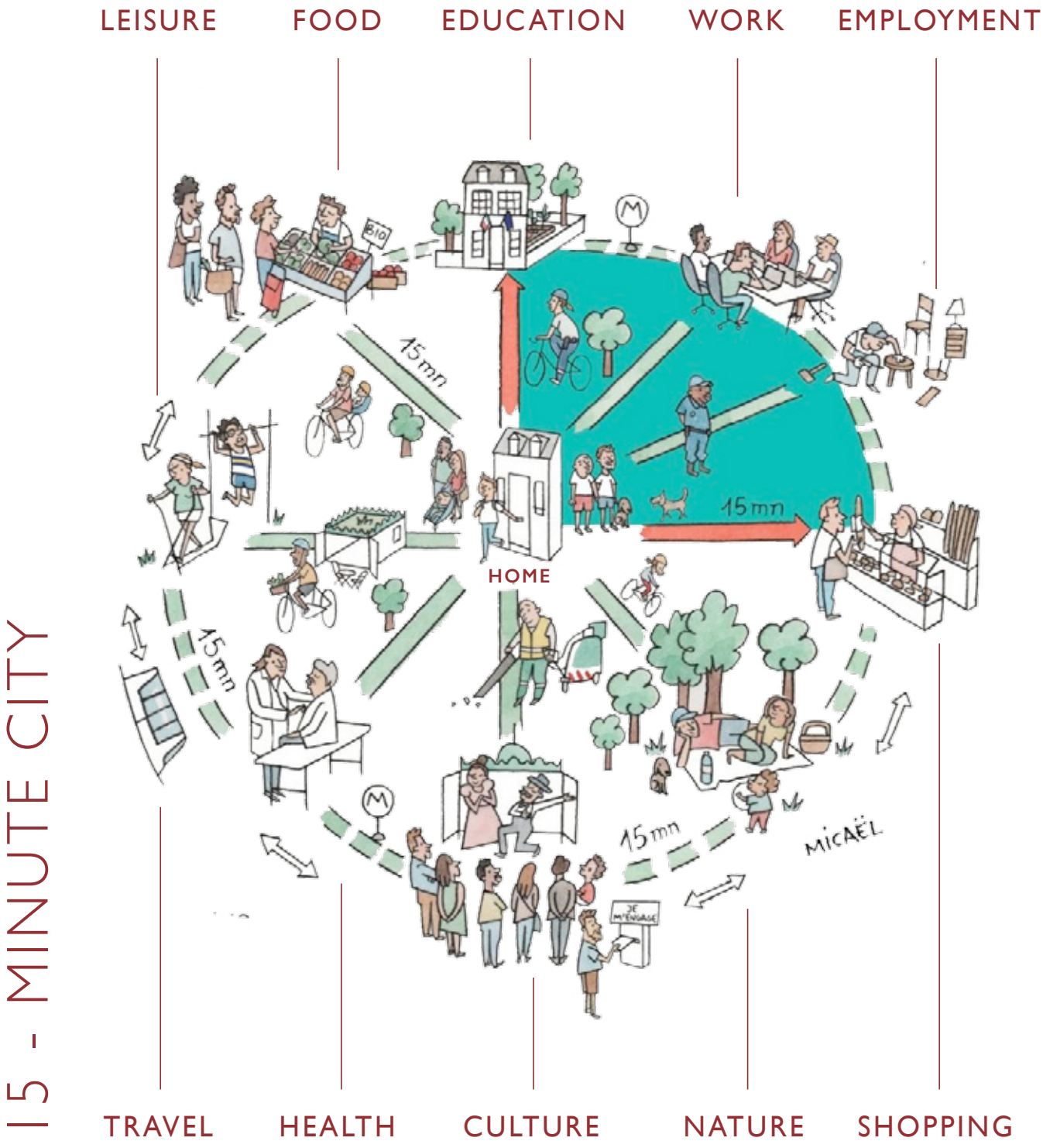


Image: Paris En Commun

THE 15-MINUTE CITY COULD REPRESENT A PARADIGM SHIFT IN WHAT WE EXPECT FROM OUR CITIES

emissions from car travel, meaning that the walkable neighbourhoods of the 15-minute city can act as a stepping stone towards net zero and healthy cities.

The 15-minute city is also beneficial for the economy.[84] Research shows that making areas pedestrian-friendly can increase the footfall of retail units bordering the street by up to 40%[85], and boost turnover by up to 25%[86], increasing commercial trading in city centres by up to 30%[87]. An additional benefit is that pedestrians and cyclists tend to spend more money per month[88] in retail areas than those arriving by car. This means that investing in making walking, wheeling, and cycling the default ways of getting around in the 15-minute city can offer high returns on investment, potentially providing up to £13 worth of benefits for every £1 of expenditure. Creating these walkable high streets[89] through a 15-minute city approach could help businesses to recover[90] from the economic slump of the COVID-19 pandemic.

However, the 15-minute city idea is not without its flaws and needs to be implemented critically for it to be an effective and just model for 'building back better' following COVID-19. A major challenge is equity, because well-intentioned plans to make neighbourhoods walkable, mixed-use, and accessible within a 15-minute journey from home can result in gentrification that prices out[91] poorer residents into less-walkable areas of the city. This can rob low-income residents of the benefits of the 15-minute city,[92] as these neighbourhoods become oriented towards high-consumption lifestyles.[93] For example, in Buffalo, New York, USA, properties in highly walkable neighbourhoods are on average five times more expensive[94] than in unwalkable neighbourhoods.

This means that it is essential to integrate adequate levels of affordable housing into 15-minute city plans[95], and to mobilise participatory planning mechanisms[96] to ensure that people's needs are met by the 15-minute city. This is being done in Paris, where 10% of city spending[97] is currently determined by participatory budgeting practices, and where there are plans to get 30% of housing stock into the public domain by 2030[98]. People can only benefit from the 15-minute city if they can[99], and want[100], to live in it.

The 15-minute city can be a guiding light to help us imagine a human-scale, liveable, and sustainable post-COVID-19 urban future. This is only possible, however, if we deal with the issues of social equity raised by the model's application to real cities. We need to ensure that 15-minute neighbourhoods have appropriate levels of affordable housing, and that people are involved in imagining the post-COVID-19 futures of their cities. If this is done, the 15-minute city could represent a paradigm shift in what we expect from our cities.

Building Design and Health

— YANELLE CRUZ BONILLA

The impact of the COVID-19 pandemic in densely populated urban areas has inspired questions around what actions can be taken[101] to ensure a healthy and just recovery that will eventually lead to a more sustainable built environment, generating a positive balance between public health, and important social, economic, and environmental aspects. Analysis conducted earlier in the pandemic found that some of the temporary measures adopted – such as improved HVAC and ventilation systems, larger pedestrian pathways, and improved open access to public spaces – could become permanent solutions[102] that will change built environments, and improve quality of life.

The built environment in which we live and work in can have a significant impact on our physical and psychological health. A case study in South Africa, found that living in an isolated and segregated neighbourhood, with limited access to economic opportunities and inadequate options for safe physical activity, or access to healthy food can lead to a higher risk of non-communicable diseases, depression and stress.[103] Greater local accessibility and access to active travel, such as walking, cycling, and transit infrastructure have been associated with more physical activity, reduced body weight and reduced blood pressure.[104]

Research across various locations in the United States found that for certain activities, combined with the awareness of related facilities – such as active commuting, recreational walking, residential land use types, and the presence of nature trails or running tracks nearby – led to participants in the study having lower Body Mass Indices (BMI).[105] Conversely, urban areas with low walkability, a high presence of fast food and dessert destinations, and a lack of green spaces led to higher BMI for participants. While the relationship between the built environment and BMI is complex, this study does suggest that having certain positive conditions in one's neighbourhood can lead to a healthier lifestyle.

The built environment can also severely affect psychological health, and mental well-being. A study in the United Kingdom found that among different urban environment contexts, living in areas with terraced housing, greater mixed land use, and better opportunities for walking, were all associated with lower risks of psychological distress in older men.[106] A separate study focusing on older adults, found that many aspects of the indoor environment – such as illuminance levels, glare control, a supply of fresh air, and adequate ventilation systems – can pose challenges to the provision of care and well-being[107] for those with dementia.

Building design is an important aspect of health and wellbeing. A study in a cluster of care homes in the United Kingdom found that design features that promote independence, control, and a social environment[108] could reduce feelings of depression in residents. Additionally, they found access to outdoor space alone was not enough to improve health overall, because residents felt constraints due to the lack of even or accessible paths, suitable seating in the garden, and restrictive requirements to gain staff permission to go outside. This shows that simply having certain conditions, such as outdoor space, might not be enough to improve well-being. More attention to detail is required when evaluating existing built environments and implementing changes, particularly when it comes to issues of limited mobility or safety of older individuals[109], in order for these changes to be inclusive.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GREATER LOCAL ACCESSIBILITY AND ACCESS TO ACTIVE TRAVEL, SUCH AS WALKING, CYCLING, AND TRANSIT INFRASTRUCTURE HAVE BEEN ASSOCIATED WITH MORE PHYSICAL ACTIVITY, REDUCED BODY WEIGHT AND REDUCED BLOOD PRESSURE

Urban design matters not only for residential space, but also for the places where we work. A study in Australia found that a new office design which consisted of various changes, particularly the addition of a central staircase, led to a decrease in sedentary behaviour, and an increase in light physical activity[110] around the building. A survey conducted in Singapore and Hong Kong found that the presence of green or planted terraces, public plazas, and other types of open spaces within workplaces contribute to better health perceptions for workers.[111]

A growing body of research seeking to determine the cost-benefit analysis of making changes to the built environment has shown that it can be beneficial to localities. A case study in the United States found that when making pavements fully accessible to all residents, the combined benefits from increased physical activity and reduced emissions[112] were estimated to be around US$99 million per year for that county. Similarly, an analysis in Australia found that the greatest economic gains can be accrued from increasing destinations, walkability and attributes of design within the neighbourhood area.[113] These results show that while initial investments may be required to implement these changes, there is a capital gain that comes from these improvements that can benefit localities.

Another major takeaway from existing literature on the subject is that governments and urban planners can begin to modify the built environment with initial small changes. A study in Manchester found that small-scale, low-cost improvements to local public spaces led to an increase in usage of the public space, longer durations of stay, and more well-being activities observed in the community.[114] The installation of more park benches particularly stood out as a valuable resource for older individuals and families living in the community. In a survey conducted in the United States, 30% of the respondents said they would walk more often[115] if more benches and water fountains were available. While larger, sustainable changes to existing environments should be the end goal, studies show that even small changes have a positive impact and can be an important first step towards improving quality of life.

However, an important consideration for governments and planners contemplating these changes should be to find ways to integrate efforts to fight against the effects of climate change. A study in the United States found that when comparing high and low walkability urban neighbourhoods, health benefits from increased physical activity were potentially offset by health risks from air pollution exposure.[116] As a result, researchers concluded all individuals, regardless of physical activity levels, experience changes in air pollution exposure. Therefore, the challenge is not solely to create built environments that are conducive to more active lifestyles. Urban planners and designers must also grapple with environmental factors that can offset any potential benefits that an enhanced built environment can provide.

Building Walkable Neighbourhoods

The Carbon Impact of Construction

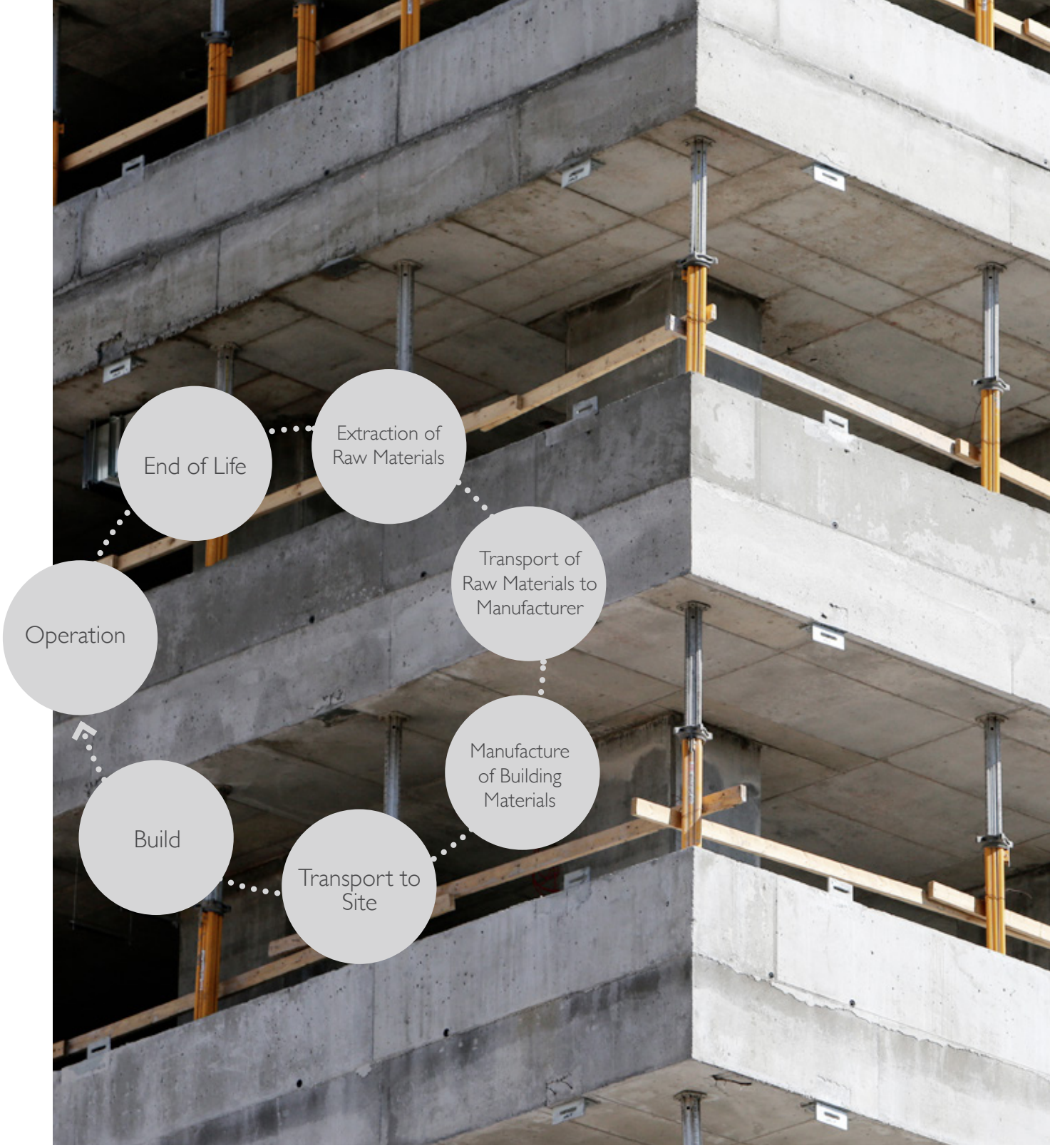
— ELIZABETH TUCK

The post-COVID urban environment, and how we might build 'healthier' cities for future populations with lower rates of carbon emissions, and pollution are increasingly the focus of today's discourse. The following chapter provides a brief overview of the carbon impact of building design and materials in walkable cities versus an 'urban sprawl' design, embodied energy in the construction process, supplementary cementitious materials (SCM), lightweight concrete (sometimes called lower density concrete), and the impact that substituting clinker in cement can have on carbon reduction.

The world's global population is expected to increase by about 2 billion people[117] over the next 30 years, leading to a population of roughly 9.7 billion in 2030 with an increasing percentage of the population living in urban settings. Rapid expansion in urban areas can result in urban sprawl[118], an approach to development characterized by low-density residential housing and, notably, an increased reliance on personal automobiles for transportation. These types of neighbourhoods often have poor public transit infrastructure and tend overall to have a very low degree of walkability.

In addition to the negative impacts of increased reliance on personal automobiles for human health and wellbeing and on carbon emissions, there are less obvious consequences of urban sprawl, namely increased carbon impacts of building materials. Walkable cities are less likely to have urban sprawl and instead are more likely to have a variety of higher density residential and commercial buildings. This approach to urban design falls under the 'smart growth' principles[119] which emphasizes both walkability and compact, higher density building design. Not only does this encourage walking/cycling as a viable means of transportation, it also decreases the amount of heat loss within buildings, it requires fewer resources in providing services (e.g., water, sewage), and it decreases the overall carbon impact of construction.

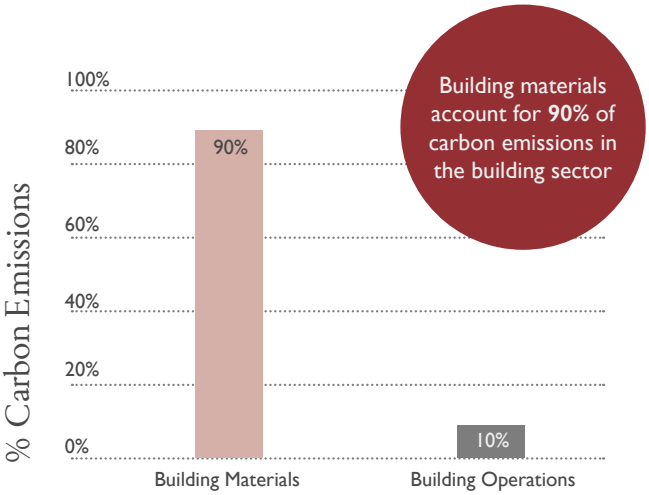
When thinking about the trend toward 'net zero carbon emissions'[120] in the discourse on the construction of both residential and commercial buildings, the overwhelming focus seems to be on operational household energy and its emissions (i.e. the energy required for everyday household operations, such as heating and waste disposal). The built environment, however, has additional sources of pollution outside of merely operational costs, namely in embodied energy,[121] or the energy used in the production of construction materials, the actual building of the structure, and the demolition and disposal of the building. Over the life cycle of a building, operational energy will statistically produce more greenhouse gas emissions. These emissions can sometimes be offset or reduced by installing things like heat pumps[122] and smart meters.[123] However, it is important to keep in mind that the capacity for offsetting is very limited.[124] Embodied energy cannot be treated in the same way- there are no green technologies that can be implemented to offset the carbon emissions from the installation of a Portland cement foundation. Reductions in operational energy are further increasing the relative proportion of embodied energy in the life cycle, underscoring the need to find sustainable alternatives[125] to standard building materials and methods.



IN 2014, THE GLOBAL CONSTRUCTION INDUSTRY WAS RESPONSIBLE FOR 6-7% OF ANTHROPOGENIC CARBON DIOXIDE EMISSIONS, THE MAJORITY OF THAT COMING FROM THE PRODUCTION OF PORTLAND CEMENT CLINKER

In 2019, researchers from the University of Victoria in British Columbia, Canada, tested the operational and embodied energy carbon impact of high-density residential, commercial, and mixed use buildings.[126] Using urban simulation tools the researchers found that in both residential, retail and office, and combined residential and retail and office spaces that both embodied and operational carbon outputs were reduced. From a building materials perspective, this reduction in embodied carbon was due in large part to the use of wooden frame construction. Wood requires relatively low energy during manufacturing as compared to alternative materials, and one 2006 study focused on Sweden and Finland[127] found that a net reduction of carbon can be obtained through the increase of wood-based building materials. A separate study considering the United States[128] came to similar conclusions, that wood-based wall systems operate with 15-16% less total energy for heating and cooling purposes than comparable buildings using steel or concrete for similar purposes.

In the research considering high density residential, commercial, and mixed spaces, carbon reduction was observed until buildings switched from using wood to using concrete during construction. In 2014, the global construction industry was responsible for 6-7% of anthropogenic carbon dioxide emissions, the majority of that coming from the production of Portland cement clinker.[129] A lead polluter during production, efforts have been made to reduce the carbon impact of cement through the use of supplementary cementitious materials (SCMs).The logic of SCMs is that by replacing clinker in cement (or cement in concrete) with alternate materials, the environmental impact of cement production will be lowered.[130] SCMs can encompass a wide array of other materials, many of which have additional properties of increased durability and strength.[131] Additionally, the appeal of using SCMs is that many of them are industrial by-products that otherwise would be disposed. The use of industrial waste[132] in this way not only lowers the emissions produced by the manufacturing of the cement, but it reduces the impact of waste disposal. One such example of an SCM is 'fly ash', the residue of



Building Sector CO_2 Emissions
New Constructions 2015-2050

the non-combustible content of coal. Thermal power plants can produce huge amounts of fly ash,[133] but less than half of this product is used. Since the 1970s, fly ash has been employed as a constituent of cement in the UK. Substituting 25% of Portland cement with fly ash has been shown to reduce greenhouse gas emissions[134] of 25 Megapascals (MPa) concrete blends by 13%, and 32 MPa blends by 15%.

Sintered fly ash is also categorised as a 'lightweight aggregate' for use in lightweight concrete. Lightweight concrete, in addition to a reduction in the use of Portland clinker and therefore lower greenhouse gas emissions, can also provide increased thermal insulation,[135] extended moist curing, and increased durability. LYTAG, the UK-based producer of lightweight aggregate, was one of the first companies to harness the power of fly ash for use as an aggregate in structural concrete. Lightweight concrete is suitable for the construction of major buildings,[136] and has been used in such construction as the NatWest Tower in London. While this report has focused on fly ash as an SCM used in lightweight concrete, there is a wide array of other SCMs, as well as other alternatives to concrete (for example, rammed earth,[137] or plant-based building materials[138]). The key takeaway is that without close attention to embodied energy and the sustainability of

the building process, net zero carbon emissions cannot be achieved.

Overall, walkable cities are more likely to use the smart growth principles in residential and commercial construction and have a lower amount of both embodied and operational energy outputs as compared to housing the name number of people in an urban sprawl scenario. The use of wood as a main building material contributes to this lower carbon output. Alternatively, the use of concrete, due to the high carbon emissions of clinker production, can offset much of the carbon reduction inherent in a densely populated building. There are alternatives to traditional Portland cement clinker that reduce its overall carbon emissions and can contribute to the construction of larger densely populated buildings that rely on concrete.

WITHOUT CLOSE ATTENTION TO EMBODIED ENERGY AND THE SUSTAINABILITY OF THE BUILDING PROCESS, NET ZERO CARBON EMISSIONS CANNOT BE ACHIEVED.

Can Public Space Shape Healthy Cities?

— IRINA KOLEGOVA

The principles and implementation of public urban space have often been considered as a stabilising force for shaping 'healthy' cities[139] – cities that provide better health, walkability, accessibility and environmental conditions for their residents. The COVID-19 crisis highlighted the importance of sharing access to public spaces, and the role of these places in shaping urban health. Over the last decades, there has been an increasing interest[140] in how the physical space of streets, squares, and avenues might be associated with factors constituting a 'healthy' city such as political mobilisation, community participation and walkability as a key factor of civic engagement. This section debates the role of public spaces in shaping a democratic, peaceful, and arguably 'healthy' society.

The civic participation (i.e., civic engagement) level as one of the key characteristics of a 'healthy' city is closely related to the quality of a public space. In areas where people have access to walkable, high-quality, well-maintained public spaces, social capital is higher – as is the level of civil engagement level, one of the criterions for healthy cities. [141] There is also a significant association between walkability measures and community participation revealed in the studies of Beard et al. (2009), Bowling & Stafford (2007), Richard et al. (2009) and Richard et al. (2013). The features of the environment such as good street connectivity, level sidewalks, curb-cuts, transportation, positive attitudes toward people with disabilities, supportive relationships, and public programs and services[142] may pose many barriers to civic participation. Additionally, the lack of environmental support might limit engagement in social and community activities as people age in place. For instance, older adults (≥50 years) and those with chronic illnesses, which are more common with increasing age, tend to be particularly affected by walkability difficulties. To facilitate their community participation additional environmental support (e.g. places to sit/rest, transportation, social support) is required. The more well-maintained and walkable public space is the higher the civic participation level will be, shaping a 'healthier' society.

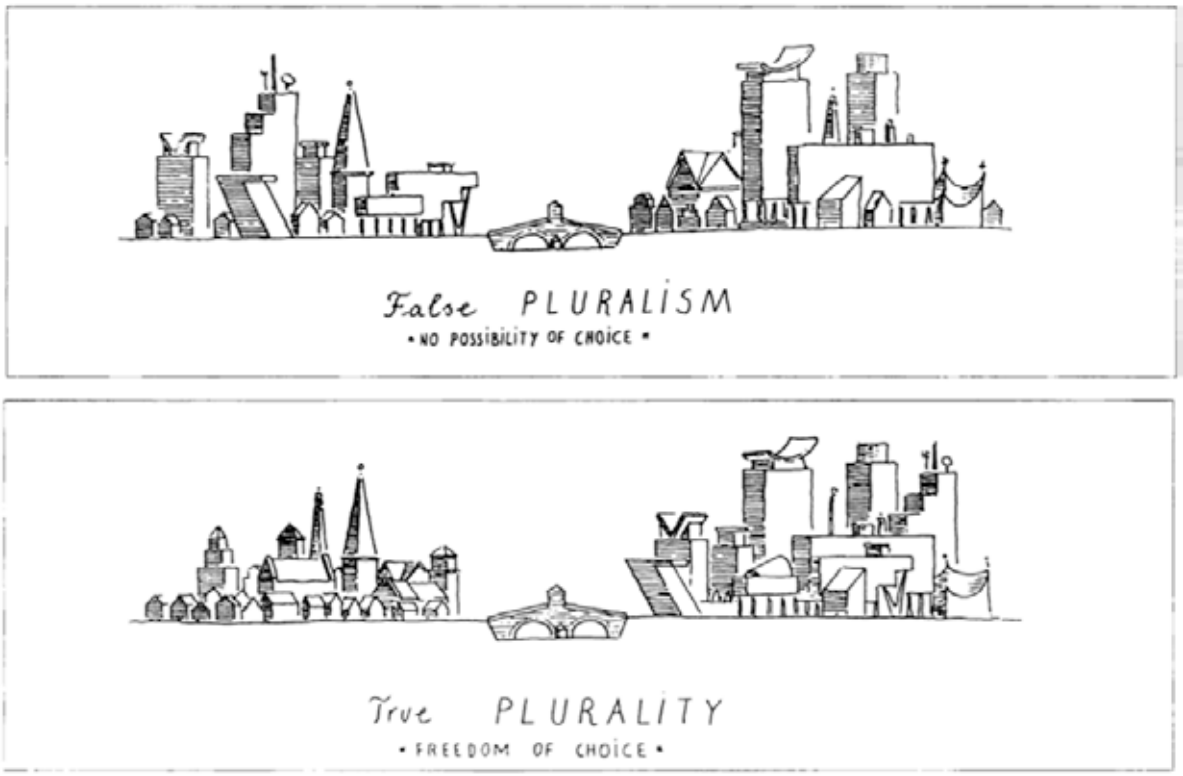
Although making squares, streets, and avenues more walkable is essential for increasing the residents' organizational involvement and electoral participation, it is also crucial for a public space to represent an architectural plurality.

ACCESSIBILITY BARRIERS

- **BUILDING DESIGN** (STAIRS, BATHROOMS, NARROW OR HEAVY DOORS)
- **LIGHTING** (TOO DIM TO READ, SIGNS NOT LIT, TOO BRIGHT, TO DISTRACTING)
- **SOUND** (BACKGROUND NOISE, INADEQUATE SOUND SYSTEM)
- **HOUSEHOLD / WORKPLACE EQUIPMENT** HARD TO USE

MOBILITY BARRIERS

- **CROWDS**
- **SIDEWALKS AND KERBS**
- **TRANSPORTATION**
- **ATTITUDES OF OTHER PEOPLE**
- **POLICIES** (RENTAL POLICIES, ELIGIBILITY FOR SERVICES, WORKPLACE RULES)
- **OTHER**



Léon Krier *Architecture: Choice Or Fate* (1998)

IN A PUBLIC SPACE THAT REPRESENTS THE ARCHITECTURAL PLURALITY, RESIDENTS MIGHT FEEL MORE COMFORTABLE TO PARTICIPATE IN GROUP ACTIVITIES ADDRESSING DIVERSE ISSUES OF PUBLIC CONCERN.

Pluralism could be considered not only as the aggregation of citizens' interests through diverse political parties and interest groups, but also as a diversity of views, a plurality of lifestyles, of beliefs, which are often expressed through architectural styles and urban design. In Architecture: Choice Or Fate (1998), architect Léon Krier demonstrates an association between political pluralism and architectural plurality, claiming that a variety of urban and architectural visions can be guided to produce an inclusive diversity of towns and villages with very different structures, organisation, architecture and density, each with its own unity, harmony and specificity.

Architectural plurality assumes that there cannot be a single architectural answer, but it does not necessarily mean a confusion of urban forms. When architectural styles are mixed up, there is arguably limited possibility of choice, or as Krier implies false or 'fake' pluralism. In this case, a public space becomes not only less attractive to residents but also less suitable for maintaining the higher levels of civic engagement as residents cannot see the possibility of choice. Conversely, 'true' plurality implies a respect for differences, freedom, and fundamental choice. The diversity of urban and architectural visions may therefore be seen as a reflection of political views. In a public space that represents the architectural plurality residents might feel more comfortable to participate in group activities addressing diverse issues of public concern.

Over the last few decades, architects, urban planners and designers, researchers, and policymakers have evolved their perspectives on how public urban space is appropriated by the population. The square or plaza, as one of the most common forms of a public space, holds a central role in shaping a 'healthy' city. Each square has a unique combination of symbols and history;[143] they are used in different ways by different

VE Day celebrations in Piccadilly Circus, London, 8 May, 1945

MOST OF THE DECISION-MAKING HAS SHIFTED AWAY FROM THE TOWN HALL AND INTO WIDER GOVERNMENT STRUCTURES, WITH SQUARES BEING USED FOR OTHER ACTIVITIES, SUCH AS DEMONSTRATIONS, ENTERTAINMENT, OR CELEBRATION.

Protests on Avenida Paulista in the city of São Paulo on 20 June, 2013

people, and often have distinct physical characteristics. When people first began to settle in cities, the town square was also the natural gathering spot – a place where people debated, made policies, and decided on a course of action[144] (such as, the ancient Greek agora, medieval Scandinavian ting, and Slavic vecha). Most of the decision-making has shifted away from the town hall and into wider government structures, with squares being used for other activities, such as demonstrations, entertainment, or celebration.

Public space tends to be a space for political realisation,[145] which takes the form of demonstration, protest or even revolution. Such political expression often occurs when urbanism, society at large, ceases to reflect civic practices and shared interests. Social demonstrations use the streets, squares and avenues of cities as their stage. Public space might be considered as a social space of struggles (social movements), and for party political forms of expression such as establishing new political parties, or alternative economic and social policies. For example, most of the demonstrations organised by the Free Transport Pass Movement during 2013 and 2014 in São Paulo, Brazil, occurred in the central south-west region of the old-city centre. Protesters gathered on Avenida Paulist, the city's most famous thoroughfare.[146] Demonstrations were held against planned increases in public transport fares, which were necessary to ensure "workers' access to the wealth of urban space." Having taken over the streets during the demonstrations, people shifted control of fare policy from the city to themselves, with the result that the government cancelled planned increases in public transport: buses, subways, and trains.

Democracy has also been considered[147] from this perspective, with public spaces representing the public sphere where everyday life is manifested. Access to walkable and wheelable urban public spaces directly influences the standards of urban living and social relations.[148] In his paper "Livable streets: protected neighbourhoods?", Appleyard[149] proves this idea, revealing a positive association between the individual assessments of neighbourhood walk- and wheel-ability, and various aspects of social capital, including promoting neighbourly engagement, political participation, trust, and positive social interaction. People living in car-dependent suburbs have less time[150] to participate in community activities, or to engage socially with their neighbours. Also, it is common to find either no pavements or poorly connected pathways in contemporary suburbs.[151] In contrast, residents from less car-dependent neighbourhoods are more likely to walk to their local centre, interacting with other residents and gaining a greater sense of community.[152]

Conversely, a number of studies reported no significant difference[153] in mortality between social interaction, and sense of community. These studies[154] find that people do not necessarily interact more,[155] or feel more sense of community[156] in the traditional neighbourhoods than in the conventional suburbs, and that suburban population homogeneity can foster a stronger sense of community.[157] Nevertheless, the significance of having access to communal, and safe, outdoor public spaces has been emphasised by the current global pandemic, raising the social and political significance of a shared urban realm.

CONCLUSION

Walking Ourselves Towards Healthier Towns and Cities

The above evidence shows how sustainable urban design combined with active travel - providing the access and capacity to move efficiently by foot, cycle, scooter, or wheelchair - is already changing the health of our cities, townsfolk, and the urban environment. Practical, efficient, and walkable urban design promotes healthier residents, generates less polluted and greener urban zones, and may start up, or refresh local economies. Capable business ventures can be tuned to respond to the echoes of local footfall, the cadence of cycles, and the vitality of streets more populated by residents, workers, and visitors.

Well-designed, walkable neighbourhoods, as the evidence proves, can be more attractive places in which to live and work; more beautiful and better[158] to visit, as well as healthier for the body, mind, and soul. The opening essays reflected on the correlated stresses of urban living and the growth of unwalkable, unfriendly – to flora and fauna alike – city and suburban spaces that have dominated much of the last century of urban design, and the majority of residential and working spaces that humans have designed for themselves in recent decades. Evidence related to the physiological and psychological benefits of walking, and to the advantages of designing walkable living and working spaces is substantiated in over 600 studies reviewed in this report. Just as walkable place-making provides healthier spaces, patient capital investment and careful urban stewardship can provide the basis for durable, restorative pathways for development. Eighteenth- and nineteenth-century philosophers and environmentalists, such as Immanuel Kant and Henry David Thoreau, writing midst the era of burgeoning Western urbanisation and industrialisation turned to walking not only for exercise, their daily constitutional, but also as a way to connect more directly with the changing world around them. The re-grounding of walkable lifestyles is ever more salient in today's context, as Frédéric Gros pronounces in A Philosophy of Walking:[159] 'With every pace, the entire weight of my body finds support and rebounds, takes a spring. There is everywhere a solid base somewhere underfoot.'

The most recent[160] scientific evidence from across the globe, confirms that human societies have changed the planet's atmospheric, geological, and ecological systems. Climate concerns, and new forms of coping with our biosphere are now a necessity for us all to confront, rather than a luxury to consider. Urbanisation has played its part across various scales and epochs in dramatically shaping both human and natural living worlds, and now lies at the core of how we can address the shared environmental and health issues that face us today at global, and local levels. Building a legacy of walkable neighbourhoods is a first step, one of many ahead, to lead us in a more secure, and healthier direction.

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1 Ogilvie et al. (2007)
2 Kapucu et al. (2020)
3 History.com (2018)
4 Touboul et al. (2011)
5 Hammen et al. (2009)
6 Abizaid (2019)
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15 Clarkson & Thompson (2000)
16 Rudlin & Falk (2016)
17 Szibbo (2017)
18 Farnham et al. (2018)
19 C40 : Green and Healthy Streets (2021)
20 Government of the United Kingdom (2020)
21 IPCC Sixth Assessment Report (2021)
22 Mental health statistics: relationships and community (2018)
23 Seresinhe et al. (2019)
24 Reber et al. (2004)
25 Town and Country Planning Association (2021)
26 London's Lost Rivers Mapped, With The Place Names They Inspired (2018)
27 What are Walk Score and Walk Appeal? (2018)
28 Dunning (2021)

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29 Gordon et al. (2013)
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45 Bornioli (2018)
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CHAPTER 6

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CHAPTER 7

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CONCLUSION

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