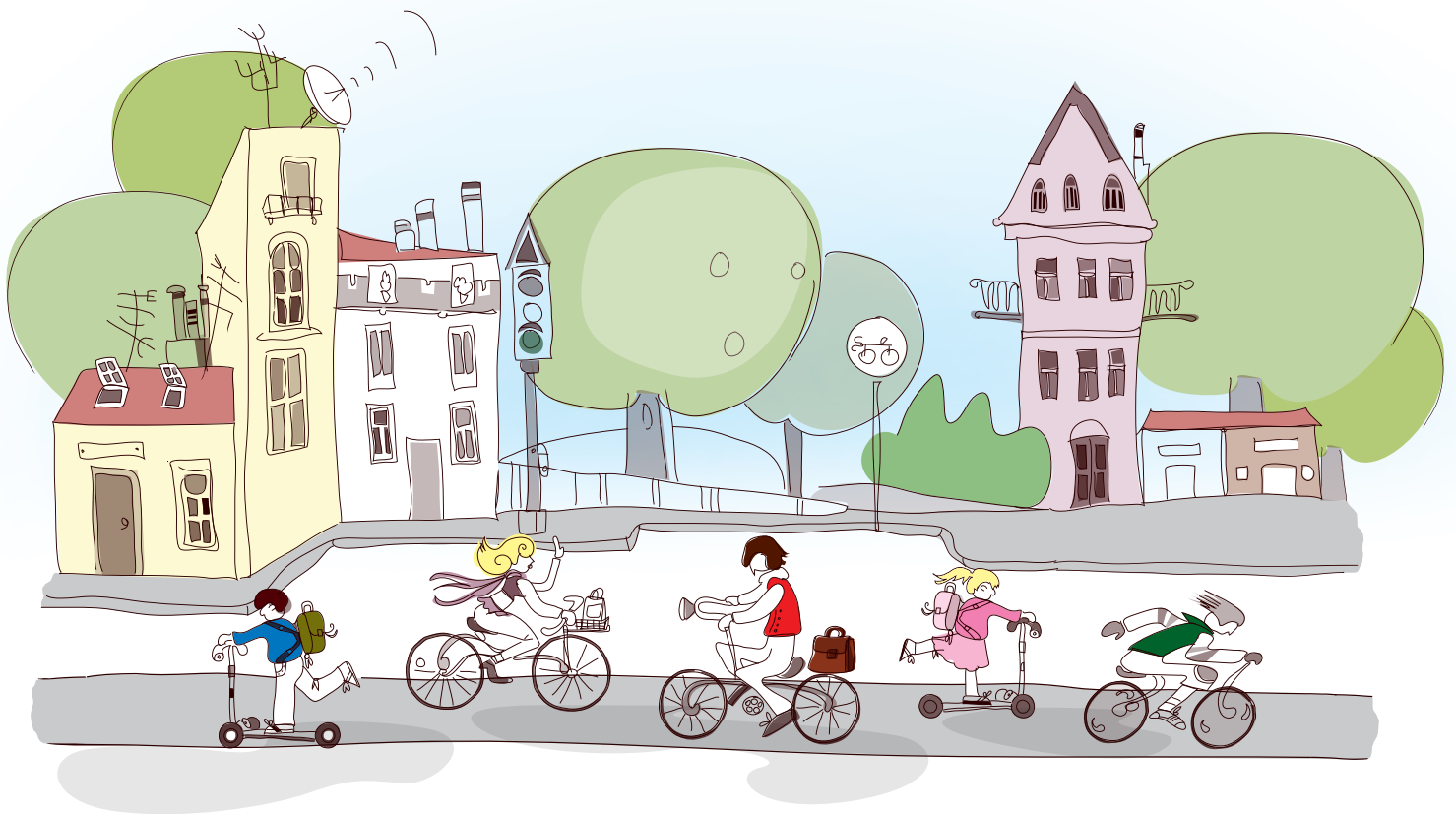


Essays in

Healthy City Design



Anthony Capon

Mark Johnson Peter Head

Siddharth Agarwal Roderick Lawrence

Sunyani Hospital, Ghana
designed by Nightingale Associates for IHG

Humanity for Children Paediatric Clinic
designed by Sheikh Ahsan ulah Mojumder



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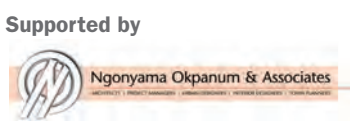
image courtesy of AMREF Uganda



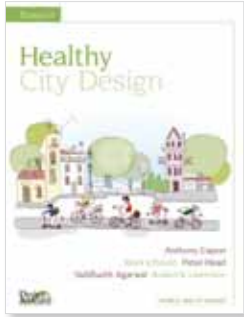
CBF Women's Health Centre designed by FAREstudio



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Foreword



Cities are now the dominant habitat for the human species. For the first time in the history of human life on Earth, more people now live in cities than in the countryside. Historically, there have been various phases of concern about health and cities. Indeed, the modern profession of urban planning arose from health concerns – epidemics of disease in crowded, unsanitary and polluted 19th century cities. The garden cities movement was an appropriate urban planning response to the health problems of that era.

Since then, the urban planning and public health professions have taken separate paths. From the mid-20th century, public health utilised new medical technologies – vaccines and drug treatments – to improve health. Urban planning reshaped cities to accommodate increasing use of private motor cars for transport.

At the beginning of the 21st century, we confront global epidemics of chronic disease. We must also respond to climate change, peak oil and increasing competition for other resources. There is an urgent need to rethink current patterns of urban development and to shift to healthier and less carbon-intensive approaches. It's time, once again, for the built environment and public health professions to respond together.

Last year, the World Health Organization ran an urban health campaign and, with UN-HABITAT (the UN urban settlements programme), released a major report on global urban health inequity. In the coming years, most urban population growth will be in low- and middle-income countries. Tackling urban health inequity is essential for achieving healthy and sustainable cities.

In this collection of essays, the notion of healthy city design is explored and illustrated with relevant case studies from around the world. **The View from the City** (page 6), my opening essay, scopes the challenge of developing healthy cities and argues that an integrative approach is essential to achieving a successful transition.

In **Healthy Cities in an Ecological Age** (page 10), engineer Peter Head writes that our cities consume land and non-renewable resources inefficiently and this consumption underpins health and environmental problems. He says systems thinking can help navigate through the complexity of urban decision-making.

Life-Changing Regeneration (page 15) by Mark Johnson, urban planner, takes a historical perspective on urban planning and health, and exposes the underlying causes of contemporary urban problems. The essay showcases examples of successful urban revitalisation in the North American context.

The Invisible Poor (page 20), by physician Siddharth Agarwal, highlights the burden faced by the urban poor in low-income countries. He stresses the value of participative approaches, rather than conventional top-down urban planning.

In **Health Begins at Home** (page 27), human ecologist Roderick Lawrence examines the myriad links between housing and health and presents a conceptual model across demographic and geographic scales. As housing has a unique capacity to nurture and sustain health, designers should embrace their potential contribution to health promotion.

The International Academy for Design and Health seeks to mobilise efforts for the building of healthy cities. As a bridge between research, government and industry, the Academy is providing leadership, developing workforce capacity, and translating knowledge for policy and practice. These essays are a 'call to arms' for all built environment professionals – architects, designers, urban planners, engineers and others – to adopt healthy city design.

“Tackling urban health inequity is essential for achieving healthy and sustainable cities”

Anthony Capon

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The view from the city

For the first time in our history, more people live in cities than in the countryside – and urban design has a critical role to play in influencing the health of tomorrow’s city-dwellers



Anthony Capon
The Australian National University

“Urban transition provides an unparalleled opportunity to improve health outcomes for people, and the planet, through healthy city design”

Human futures are urban futures. The majority of world’s population now live in cities and, for the foreseeable future, most population growth will be in urban areas¹ (Figures 1 and 2). By the middle of the 21st century, we need to house 2-3 billion more people in the cities of the world – more than one million people every week. This urban transition provides an unparalleled opportunity to improve health outcomes for people, and the planet, through healthy city design.

Cities can be great places to live. People are attracted to cities for many reasons – work, education, social and cultural reasons, and access to food, healthcare and other services. However, cities can also be unhealthy places to live. Contaminated water, lack of sanitation, inadequate housing and overcrowding are health issues in many

low-income cities. About one billion people live in slum conditions, 90% of them in the developing world (Figure 3).

The way people live in cities affects their health via levels of physical activity, food choices, safety, social connection and participation, and exposure to pollution². These are determinants of common, contemporary health problems such as obesity, diabetes, heart disease, chronic respiratory disease, some cancers, depression, injury and asthma. The way people live in cities also affects the health of the environment through loss of biodiversity, changes to ecosystems, carbon emissions, climate change, and environmental pollution. These environmental changes have feedback impacts on human health.

While city dwellers, on average, enjoy better health than those who live in

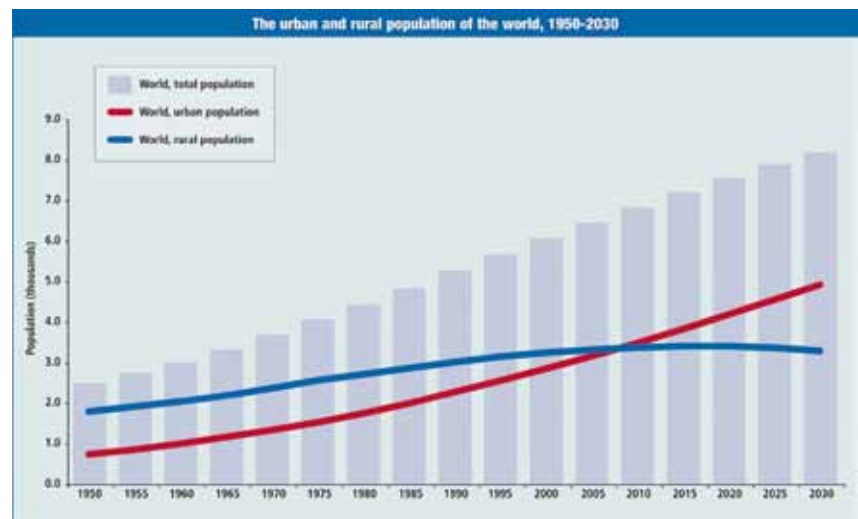


Figure 1: The urban and rural population of the world, 1950-2030 (United Nations, 2010)

the countryside, there is only limited understanding of the health differences that exist within cities. Urban health inequities are detrimental to all city dwellers. Disease outbreaks, social unrest, crime and violence are some ways that urban health inequities affect everyone³.

The challenges ahead

Population growth will increase competition for Earth's finite resources. With rising incomes, per capita consumption is increasing in many parts of the world. This combination of increasing population and per capita consumption is greatly increasing demands on the Earth's ecosystems. To reduce potential for conflict, it is essential that resources are shared fairly.

The availability of cheap liquid fuels during the 20th century enabled the development of energy-intensive cities. Many cities became reliant on the motor car for transport⁴. This era of cheap liquid fuels is now over. In order for cities to continue to thrive, they must adapt to rising liquid fuel prices and transition to be less energy-intensive places to live. In addition, housing a growing population in cities puts pressure on the surrounding countryside. Because cities usually develop in places that are good for food growing, population growth in cities can put this fertile agricultural land at risk.

In almost every country, the proportion of people aged over 60 years is growing because of increased life expectancy and reduced fertility rates. This demographic transition presents challenges and opportunities in cities. From a health perspective, cities are confronting global epidemics of chronic diseases (i.e. heart disease, diabetes, chronic lung disease, cancers and depression)⁵. As these epidemics mature, we should think of the built environment as a potential 'treatment' for chronic disease, as well as a place for 'prevention' of disease.

Evolutionary perspectives

There is value in understanding modern health problems from an evolutionary perspective. Most human beings are now living in very different ways than our hunter-gatherer ancestors did thousands of years ago (see Figure 4 overleaf). The evolutionary health principle postulates that if an animal's environment changes



Figure 2: "Human futures are urban futures." By 2030, six out of 10 people will live in cities



Figure 3: About one billion people live in slum conditions, 90% of them in the developing world

Photo credit: WHO/Chris de Bode

Photo credit: WHO/EURO



Figure 4: Heavy traffic can bring pollution, injury risks to pedestrians and cyclists, and inhibits physical activity – the antithesis of the hunter-gatherer lifestyle to which our bodies are more suited

From ‘city dweller’ to ‘urban hunter-gatherer’?

For thousands of generations, our ancestors were hunter-gatherers. It was only about 10,000 years ago that some humans began to take up farming as a way of life. From an evolutionary perspective, the human body is well suited to the hunter-gatherer way of life – procuring plants and animals from the wild, by gathering and hunting – because it provides a natural diet and plenty of exercise. Nowadays, most people are living in ways that are very different to the way hunter-gatherers live. The modern lifestyle can be very sedentary; and the modern diet can be far from natural. The way we live in cities contributes to many of our contemporary health problems. In order to design healthy cities, perhaps our ambition

should be to plan and develop cities in ways that would enable people to live more like the hunter-gatherers of 10,000 years ago.

What would these cities be like? An ‘urban hunter-gatherer’ would get plenty of exercise in daily life – walking to school, up and down stairs in buildings, to the shops, to work. Bursts of intense physical activity – ‘hunting’ – would happen when people ran fast (eg if they are running late for the bus) or if they cycled at speed. An urban hunter-gatherer could ‘gather’ healthy food at local shops and markets, or in a community or street garden. While this may seem an unusual vision for the future of our cities, it could provide valuable insights for the design of active and healthy cities.

“We should think of the built environment as a potential ‘treatment’ for chronic disease, as well as a place for ‘prevention’ of disease”

in a significant way, then it is likely that the animal will be less well adapted to the new conditions and will consequently show signs of physiological or behavioural maladjustment⁶. From an evolutionary perspective, chronic disease can be seen to arise, in part, from human maladaptation to the ready availability of fossil-fuel energy.

Change in cities and their environs can also be conceptualised as an evolutionary process, with four distinctive stages (1-4: poverty, industrial, consumption, eco-city)⁷. Cities do not fit neatly into a single stage, rather they usually exhibit characteristics of more than one stage at any one time. The principal health concerns are different for each stage (see Figure 5), although this is not clear-cut – chronic diseases are an increasing burden in low-income cities. The typology is useful because it identifies typical transitions in the evolution of cities and includes an aspirational stage, number 4, the healthy eco-city.

The key question is how might cities avoid the pitfalls of stages 2 and 3, and move directly from stage 1 to eco-city?

Adapting cities

Climate change affects health in many ways – most of them adverse – and will do so increasingly over coming decades⁸. The threats include more frequent, and more intense, heatwaves, hurricanes and other extreme weather events. Coastal cities are particularly vulnerable to beach erosion and inundation. There are also indirect health impacts from changes to physical and biological processes, such as the enhanced health risks created by urban air pollution. In addition, there are flow-on health impacts from social, demographic and economic disruptions, such as declining rural incomes from agricultural production, with consequent urban migration. The health impacts of climate change are greater in low-income communities – with those least responsible for climate change being affected the most.

Responses to climate change – mitigation and adaptation actions – also affect health. These health impacts are mostly beneficial and have been called ‘health co-benefits’⁹. A co-benefit is an additional benefit arising from an action that is undertaken for a different principal purpose. Putative co-benefits from action on climate change (ie additional benefits beyond reducing

Figure 5: Stages of urban evolution and characteristic environmental conditions and health issues*

Stage	Characteristic environmental conditions	Characteristic health issues
1. Poverty	Contaminated water; poor sanitation, poor housing	Infectious diseases, malnutrition, injury
2. Industrial	Air pollution and land contamination by chemicals and solid waste	Chronic respiratory disease, injury, heart disease
3. Consumption	High levels of consumption of water, energy and other resources	Chronic diseases (obesity, diabetes, heart disease, cancers), injury, depression
4. Healthy eco-city	Conditions of life in balance with nature	Maximum health potential

* Adapted from Capon, 2007².

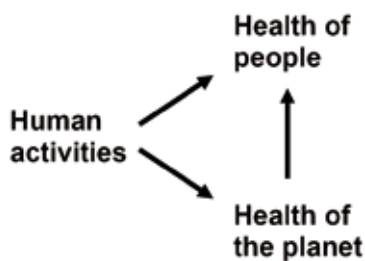


Figure 6: The 'Biosensitivity Triangle' to illustrate the concept of co-benefits (although the arrows are presented as uni-directional for clarity, there are relationships in both directions)

However, although the take home message is a positive one – low-carbon ways of living are healthy ways of living – urban policymakers should be alert for potential unintended negative impacts, such as exacerbation of social inequity.

Moving forward

Cities are for people¹¹. Architects and other built-environment professionals need improved decision-support tools to enable city design to improve the health of people¹². A focus on health at the design stage is important, because once a development is built, retrofit changes are difficult and costly.

Health impact assessment has utility for large-scale urban development projects. Importantly, architects, planners and engineers should also consider health impacts in everyday decision making, because the cumulative impacts of small decisions can be as important as the decision on a large project.

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Health is not just relevant to urban planning and development. Health should also be considered a key outcome of the ongoing management of cities. While the form and size of cities are highly variable – reflecting different histories, geographies, cultures, technologies, economies – human health needs are universal⁶.

Our habitat – now increasingly urban – is a determinant of our habits, including health behaviours. Built environment professionals and public health workers must join together to design healthy cities.

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the production of greenhouse gas) include reduced air pollution, increased levels of physical activity, a healthier diet, improved energy security through a more diverse energy supply and less dependency on oil, a reduction in traffic congestion, and new employment opportunities.

Co-benefits are sometimes referred to as a 'no-regrets approach' because, even in the absence of a need to act on climate change, there are already strong arguments for many of the proposed actions. Figure 6 is a diagrammatic representation of the concept of co-benefits for health¹⁰. Human activities have direct human health impacts (via pathways including nutrition and level of physical activity) and indirect human health impacts (via the health of the planet – climate change, for example). It follows that there can be co-benefits for health from actions to address climate change.

An understanding of health co-benefits could have profound implications for decisions about the future of cities. In the interest of our future health, the findings of research on health co-benefits should be accounted for in the design of cities.

Healthy cities in an ecological age

The health issues of affluent industrialised cities, and the challenge of creating resilient cities for the post-industrial age, are really two sides of the same coin – which should guide how they are tackled



Peter Head
Director of global
planning, Arup

“Instead of being regarded as a drain on the public purse, health departments could become the engine room of urban development”

Our cities are essentially unhealthy places to live, characterised by heavy traffic, high levels of pollution, noise, violence, social disintegration and isolation. Notwithstanding major changes in the physical environment of our cities that have eliminated, or at least controlled the disease blights of the past, people in towns and cities experience increased rates of disease, injuries, and alcohol and substance abuse, with poor people typically exposed to the worst environments¹.

This has created a huge and escalating drain on resources in industrialised countries. As cities are now home to more than half of the world's population (and significantly more in highly urbanised countries such as Australia, US, Canada and the UK), the challenge of overcoming the health burden of cities developed and managed along agricultural-age and industrial-age lines is increasingly pressing.

There are ways to tackle these challenges. As designers we have a significant role to play in developing and articulating solutions and helping to implement them. Design for healthy cities involves a shift in focus toward the notion that “health is a state of complete physical, psychological and social well being; not only the absence of illness”⁴. The Ottawa Charter for Health Promotion (1986)⁵ declared that “to reach a state of complete physical, mental and social well-being, an individual or group must be able to identify and to realize aspirations, to satisfy needs, and to change or cope with the environment. Health is, therefore, seen as a resource for everyday life, not the objective of living. Health is a positive

concept emphasizing social and personal resources, as well as physical capacities. Therefore, health promotion is not just the responsibility of the health sector; but goes beyond healthy life-styles to well-being.”

This involves broadening our focus from hospitals to the communities they serve and the cities that nurture them. It involves moving towards the notion that our cities and their systems serve those who occupy them and not the other way round.

As it happens, the challenge of providing for the health and wellbeing of those who live in cities has another side to it: the challenge of transforming cities so that

A snapshot of urban health issues in Europe²

- More than 92% of urban populations live in cities with levels of air pollution (with particulate matter) that exceed the WHO air quality guideline value
- Road traffic crashes kill about a hundred children and young people aged under 25 every day, and cause on average 35 non-fatal injuries for every death
- The prevalence of 11- and 13-year-olds who are overweight (including obesity) ranges from 5% to more than 25% in some countries
- Fifty percent of car journeys are under 5km, a distance that could be covered in 15-20 minutes by bicycle or 30-50 minutes by brisk walking
- Environmental noise is perceived as the most common stressor in urban areas
- At least one million healthy life years are lost every year from traffic-related noise in western Europe³.

they can prosper in the face of the urgent demand to reduce the rate at which they generate carbon and the rate at which they use our finite resources.

Just as WHO articulated a holistic view of health, so the World Commission on Environment and Development (otherwise known as the Brundtland Commission) articulated the idea of sustainable development as "...development that meets the needs of the present without compromising the ability of future generations to meet their own needs"⁶.

The way we live now runs contrary to the demands of sustainable development in two key areas: the rate at which we generate carbon emissions and the rate at which we are using the earth's resources. We know we are generating carbon emissions at an unprecedented rate, and that the concentration of carbon in the atmosphere is growing relentlessly. There is general consensus that this is leading to climate disruption. While the politics are difficult, we know that our long-term future relies on moderating the rate at which we generate carbon emissions and that our short-term future relies on us adapting our cities so they become resilient in the face of our changing climate. The burden of dealing with the consequences of climate disruption falls disproportionately on low-income countries, even though they have contributed little to the causes, because many of these countries are at particular risk from such consequences as flooding and spread of disease into new habitats. This introduces a moral dimension to the challenge.

As to our use of resources, the concept of an ecological footprint is useful as a measure of human demand on the earth's ecosystems. It represents the amount of biologically productive land and sea area needed to regenerate the resources a human population consumes, and to render harmless the corresponding waste. With our population projected to peak in the second half of this century at something like nine billion, we can estimate that our maximum allowable ecological footprint is 1.44 global Ha per person. Almost all industrialised countries are consuming resources substantially in excess of this limit.

One of the benefits of the remarkable development achieved around the world over the course of the 20th century has

"Local communities represent the lifeblood of healthy cities; their decline in the second half of the 20th century is one of the great tragedies of our era"

been the marked improvement in standards of living that has accompanied it. The Human Development Index (HDI) is one way to measure this. HDI is a comparative measure of wellbeing, especially child welfare, based on life expectancy, literacy, education and standard of living for countries worldwide.

Unfortunately, these improvements in standards of living have been accompanied by less welcome increases in carbon and ecological footprints. One of the challenges of the coming decades is to decouple the two so that we can achieve improvements in standards of living without compromising our planet's resources. This is a particular challenge in countries like China, which are urbanising rapidly. In countries with already high standards of living, reducing ecological footprint without compromising standards of living represents a related challenge.

Cities contribute disproportionately to these problems: while they are home to half the world's population, cities consume over two-thirds of the world's energy and account for more than 70% of global CO₂

emissions. Cities are where we need to focus our attention.

Cities of the ecological age

Two things are needed: a target for change and a roadmap to get there. One way of articulating a target is Head's Ecological Age formulation⁷:

$$\text{Ecological Age} = [\text{CO}_2 - 80\%] + [1.44 \text{ gHa per person}] + [\text{increase in Human Development Index HDI}]$$

This links necessary action on reducing our carbon footprint and living within our ecological means with an improvement in quality of life. Even in countries with a high HDI, quality of life challenges remain pressing. The idea that we can effect major lifestyle changes while at the same time improving our quality of life is at once challenging and liberating. Our challenge is to "...convert a sprawling, polluted, congested 20th-century metropolis into a clean, free-flowing, low-carbon city able to survive all that the 21st century will throw at it. Most of the world's



Figure 1: "Cities are essentially unhealthy places to live" – with air pollution one of the greatest health risks

leading cities have evolved over many decades (London, New York, Paris). A few have been created in a concentrated burst of growth (Sao Paulo), but almost none have been 'planned'. But that is exactly what is needed now. If the 21st century is to be the 'ecological age', it will also have to be the age of municipal planning"⁸.

Janine Benyus' brilliant book *Biomimicry*⁹ provides an excellent guide not only to why but also to how we might design and retrofit infrastructure for the ecological age. Her approach is to adopt principles that mimic the biological system of which we are part, principles that support a virtuous cycle of benefit: use waste as a resource, use materials sparingly and do not draw down on resources. Behind these lies an ambition to optimise rather than maximise systems. The question is: how do we do this?

Cities as systems

The way a city operates is the product and reflection of a complex interaction between its physical form and the social, economic and political drivers that influence it. The pressure to reform cities to meet the challenges provided by current and emerging economic, social and ecological drivers can be viewed in terms of optimising the city as a system that encompasses both its physical and social realms. We need cities to work well and efficiently.

It is clear we cannot be prescriptive about how cities should develop, but instead should concentrate on creating a development and governance environment in which resilient and effective solutions can evolve. The most effective way to achieve this is to adopt a holistic approach to how we think about cities and the way we plan them, develop them, manage them and live in them. In the past, when cities were smaller and simpler and the problems of the city condition were not so acute, they could be planned and developed effectively by addressing each system separately – so a health department or a transport department or a housing authority could, in the 20th century, deliver effectively on its remit. It is clear that in this century such an approach is simply not up to the task.

It is also clear that the linear, centralised infrastructure systems that worked so well for cities in the 20th century – transport, energy, water, waste, food, health – are becoming increasingly stretched and

expensive and are probably no longer the most effective solution for the future as cities continue to expand. Projections for Australia, for instance, show its population approximately doubling in coming decades and we might expect most of that growth to occur in cities. The picture of workers living on the remote urban fringe in houses built on the city's former market gardens, spending ever-increasing amounts of their discretionary time travelling on ever-more congested roads and railways to jobs in the centre of the city, is not an attractive one.

If we think of cities as systems, we might think about how best to intervene in those systems. Renowned systems analyst Donella Meadows provides a framework with her classic 12 leverage points to intervene in a system, "where a small shift in one thing can produce big changes in everything"¹⁰. This framework is a means to reflect on those elements on which we need to focus to effect change. Meadows notes that we tend to spend an inordinate amount of time focusing on relatively ineffective leverage points and, given the complexity of systems, in many cases push things the wrong way.

Meadows' 12 places to intervene in a system, in ascending order of effectiveness:

12. Constants, parameters, numbers
11. The size of buffers and other stabilising stocks, relative to their flows
10. The structure of material stocks and flows
9. The length of delays, relative to the rate of system change
8. The strength of negative feedback loops, relative to the impacts they are

trying to correct against

7. The gain around driving positive feedback loops
6. The structure of information flows
5. The rules of the system
4. The power to add, change, evolve or self-organise system structure
3. The goals of the system
2. The mindset or paradigm out of which the system arises
1. The power to transcend paradigms.

Establishment of air quality or water quality standards are examples of intervention in the urban system through manipulation of parameters – item 12 on Meadows' list. While such measures yield long-term health benefits, their impact is indirect and slow-acting, as they rely on progressive modification to the urban system in response to tightening standards. This demands industry compliance from polluters and establishment of a regime of monitoring and enforcement to support and reinforce the declared standards. This is not to say such standards are not important, but simply that they are a weak means of improving the health of cities.

Contrast this with a change of mindset (item 2 on Meadows' list) reflecting a 'wellness' rather than 'illness' approach to health, a change from an exclusive focus on care to a mixed one that includes prevention. Such a change in mindset might drive integration of health and urban development policy agendas and attention, for instance, to the drivers of obesity (eg the creation of more walkable communities, the encouragement and facilitation of routine walking and cycling, or

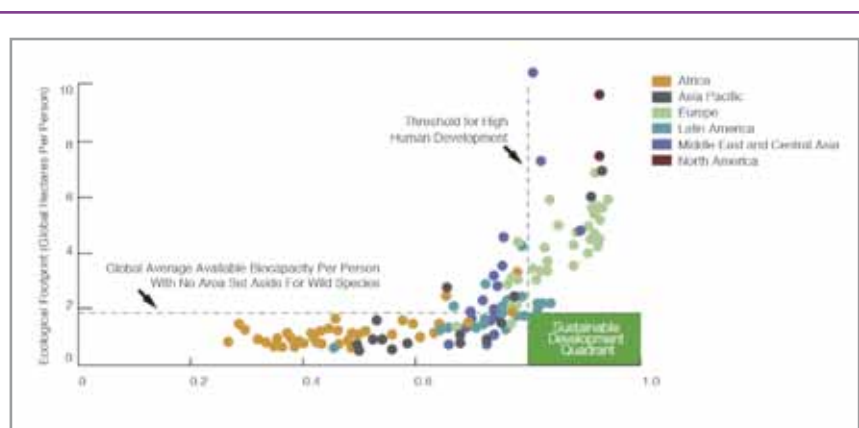


Figure 2: Human Development Index versus ecological footprint. Improving global living standards, without adding to our footprint, is one of the most difficult challenges we will face

“If the goal of the health system were amended to focus on optimising health outcomes, a different approach to the health task might well emerge”

the development of local sources of fresh produce), depression (eg attention to social isolation through more comprehensive public transport services) and marital breakdown (eg retrieval of discretionary time through attention to land-use mix to minimise long commutes). Imagine how effective that could be in reducing the overall demand on struggling health systems, with their ballooning budgets and challenging prospects in the face of projected demographic changes over coming decades. Instead of being regarded as a drain on the public purse, health departments could become the engine room of urban development.

Or contrast the recurring call for more hospital beds (item 10 on Meadows' list: the size of buffers) with a goal to minimise health department expenditure (item 3). The former may address a specific issue that has emerged in a region but is at best a Band-Aid solution that does no more than address a symptom of health system malaise. The latter, in contrast, determines overall actions and budgets. If the goal of the health system were amended to focus on optimising health outcomes, a different approach to the health task might well emerge. Driven by a wellness approach to healthcare, a goal of optimising health outcomes might help drive the inevitable move to community-based care, not simply as a means to limit burgeoning costs but to improve health outcomes.

How design impacts health

So, real change in the creation of healthy communities demands that we focus on those intervention points that have the power to change the way we think about our cities and the way we manage them. Thinking about the health task in isolation can result in little more than a desperate effort in many jurisdictions of doing more with less, of coping with escalating demands on diminishing budgets. There really is no alternative to adopting an approach that

embeds objectives around healthy outcomes in the process of urban design, planning, management and delivery. Given a number of the health and wellness challenges faced by western societies are the product of current urban form, health professionals have a substantial interest in available means of transforming that urban form.

Specific design interventions can have important impacts on physical and mental health outcomes. A move away from petrol- and diesel-engined vehicles to walking, cycling and electric vehicles will allow a move back to openable windows and natural ventilation in commercial buildings, with clear and immediate health benefits. Similarly, the benefits to both physical and mental wellbeing of exposure to the natural environment are well documented^{11,12}. This suggests that the integration of trees and parkland into the urban fabric not only benefits the physical environment by reducing air pollution and reducing the load on stormwater systems by slowing water runoff, it also has direct health benefits.

A major focus of urban planning and health needs to be on enhancing resilience.

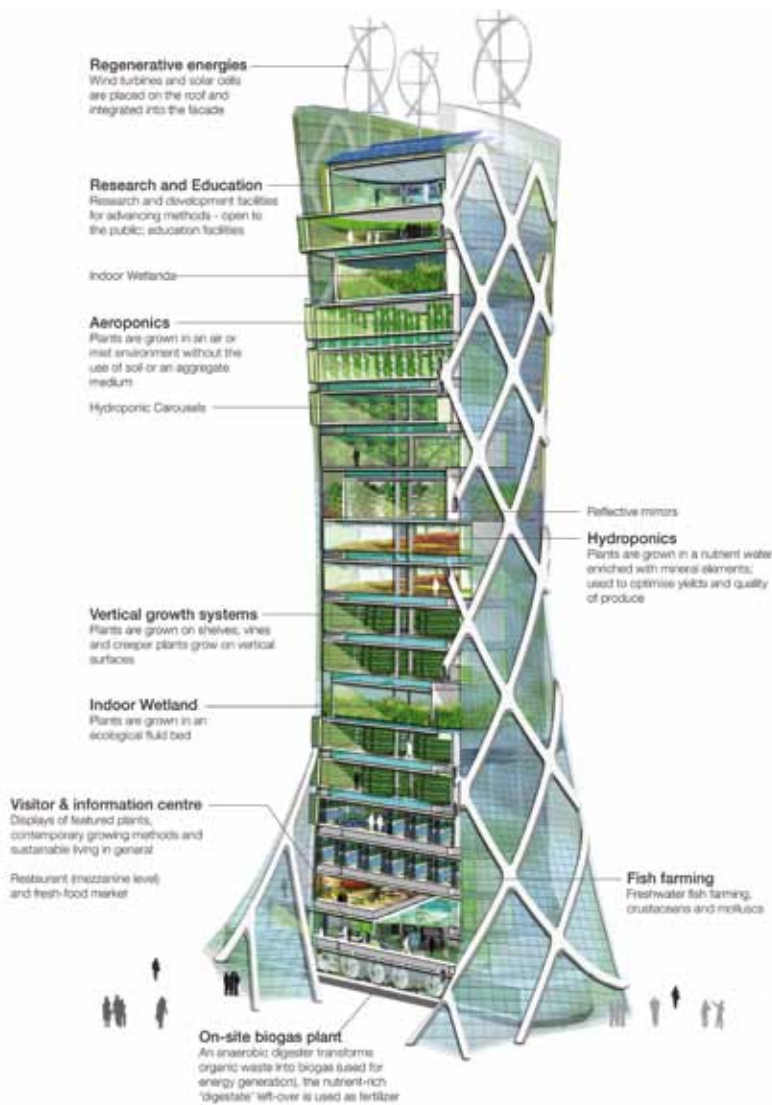
Recent natural disasters provide plenty of evidence of the fragility of our city systems and motivation for us to find ways for cities to continue to operate effectively in the face of abnormal conditions as well as normal ones. Development of distributed rather than centralised and linear infrastructure systems – transport, energy, water, waste, food, health – is an important part of the solution to this challenge.

A key way this focus is reflected in health planning is the need to strengthen and support – and, in some cases, create – local communities. Local communities represent the lifeblood of healthy cities and their decline in the second half of the 20th century in industrial-age cities represents one of the great tragedies of our era. Reinvigoration of local communities (as it happens, an example of Meadows' item 4: the power to add, change, evolve or self-organise system structure) can provide the foundation on which a wellness-focused health service is delivered in the ecological

Suburban health risks

Suburban sprawl has its consequences: parental absence and family breakdown are associated with excessive time spent commuting to places of employment and to mortgage stress. In fast-growing areas such as Wyndham and Melton on Melbourne's periphery, youth unemployment lies at 50% or higher, with high levels of attendant social and health risk. In some parts of Wyndham, as many as 60% of households have only a single parent.





Figures 3 & 4: Agriculture in the city. The future could see high-rise buildings used as 'vertical farms', as in this vision for Sydney's skyline

age of the 21st century. A city consisting of a network of vibrant local communities filled with empowered citizens will be inherently more resilient than a city with a single central focus surrounded by a sea of community-less commuter suburbs.

Transforming our cities to meet the challenges of the coming decades is vital. So is transforming the way we live in our cities to meet the challenges of delivering on our health agenda. These may be treated as separate and unrelated issues, but to do so invites development of suboptimal outcomes. Better to treat them as the related challenges they are and to work towards best possible outcomes.

About the authors

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Life-changing regeneration

The urban planning of the late 19th century has had damaging consequences for health in the US, but sophisticated community design, and an accompanying shift in policy, can repair the damage



Mark Johnson
 Founding principal,
 Civitas Inc, USA

“We found almost no correlation between the organisational silos of the city and the goals for a sustainable city”

We have arrived at a time when people, at least in developed countries, have the luxury to consider some of the more complex relationships between personal health, public health and the environment. Most professionals are aware of the dangers of over-consumption, of the damage to health created by polluted air, water and soils, or of the consequences of unhealthy lifestyle choices. We have become aware of a variety of environmental issues such as climate change and the impact of energy consumption on a variety of environmental consequences, as well as the need to address sustainability in almost all our choices. We even understand the increasing frequency of obesity, especially among urban children, and the rising incidence of diabetes, asthma and similar diseases in our cities. We may not be fully aware of all the linkages, for example, between food deserts and obesity, yet we know well that eating nothing but junk food and low levels of physical activity are not good for us.

Public health officials worldwide understand these issues and the causes and consequences of poor food and lifestyle choices. But all too often the people who most fundamentally influence these outcomes do not understand their role and power in influencing public health – through urban policies, urban planning and urban design. In most American cities there is a plethora of agencies, institutions and social-service providers that diligently pursue the impact of public health issues. They are of critical importance to improve the physical and mental health of the

community, but they are disconnected and unrelated to many of the root causes of the problem, which stem from antiquated policies, standards and practices regarding city form, infrastructure, transportation, environmental policy, housing policy, tax policy, and the very organisational structure of government.

A harmful legacy

In the late 19th century there was a global cry against the evils of an industrial society and the damage it caused to the environment and to people. Seminal works such as *How the Other Half Lives* (1890), authored by the Dane Jacob Riis, highlighted the growing gap between the wealthy and



Figure 1: Late-19th-century utopian ideals produced suburban development (as in Riverside, Illinois, illustrated here) that worked for the times, but have contributed to reliance on cars, sedentary lifestyles and social isolation

the poor on whose back that wealth was generated. Great minds came together in debate. New programmes and institutions emerged to address the problems of the day. Among the many ideas that developed by the 1890s were two that were seemingly rich, and were supported by the great thinkers of the day, but in retrospect have had pernicious consequences.

The Country Life movement was one of several idealistic and even utopian visions of new thinking about city function and form. It advocated the development of railroad and streetcar suburbs, to be populated by urban dwellers in search of a healthier life in a pastoral environment (and of course escape from the environmental and social ills of the city). In Ebenezer Howard's Garden City and architect Frederick Law Olmsted's plan for Riverside, Illinois, (Figure 1) two deeply held ideas quickly moved from concept to convention, and by 1915 these ideas were at the foundation of global urban thinking. Howard introduced the notion that uses that are not alike should not be located together. Olmsted introduced the idea that even like uses should be set in pastoral landscapes, organised around transportation systems. Riverside was the first railroad suburb, and in its plan we can see the same pattern later applied by Howard – the concept that cities should be built as separate cells or modules of use, swimming in green and linked by a supportive transportation, water and sanitary infrastructure.

Meanwhile, the City Beautiful movement made a major contribution in the organisation, structure and beauty of the city on the principle that urban parks and parkways could bring greenery and grandeur into the city, with a presumption that these interventions would lead to improved social, economic and health conditions for urban populations. The parks systems of Chicago, Minneapolis, Denver and Kansas City are well known examples (see Figure 4). Of course we need not look very deeply to learn that these interventions were no guarantee of the betterment of urban populations. In some cases these very parks and parkways became the centres of crime and social decay.

These ideas coincided with the invention of the car and the aeroplane, and of the use of the railways for commuting. With the adoption in 1915 of the first New



Photo credit: Civitas

Figures 2 & 3: Denver's Central Platte Valley has shifted from post-industrial wasteland to vibrant community

York City zoning ordinance, which required the isolation of uses, one by one, like by like, revolutionary ideas had become standard convention. In a lawsuit entitled *City of Euclid vs Ambler Realty Co.*, the US Supreme Court found that the zoning was valid on the basis that it was critical to preserve public health, safety and welfare: isolation of use and the dependence on transportation became the law of the land, and virtually all of America subsequently conformed to this new suburban model.

Undoing the damage

Urban theorists are only beginning to undo the damage caused by this progression of ideas that worked in their time, but which have become a curse during our time. Our

intense reliance on the automobile, on fossil fuels, on many forms of consumption, of social isolation, of sedentary lifestyles and industrial scale food production and distribution, stem from these decisions. The consumer society that is at the root of today's sustainability and health challenges began with these decisions.

The United States Centers for Disease Control and Prevention (CDC) has acknowledged this in recent years with a significant initiative to understand the role that community design plays in supporting public health. In its *Designing and Building Healthy Places* publication, it states that "Since 1900, life expectancy in the United States has increased by approximately 40 years. Only seven of those years

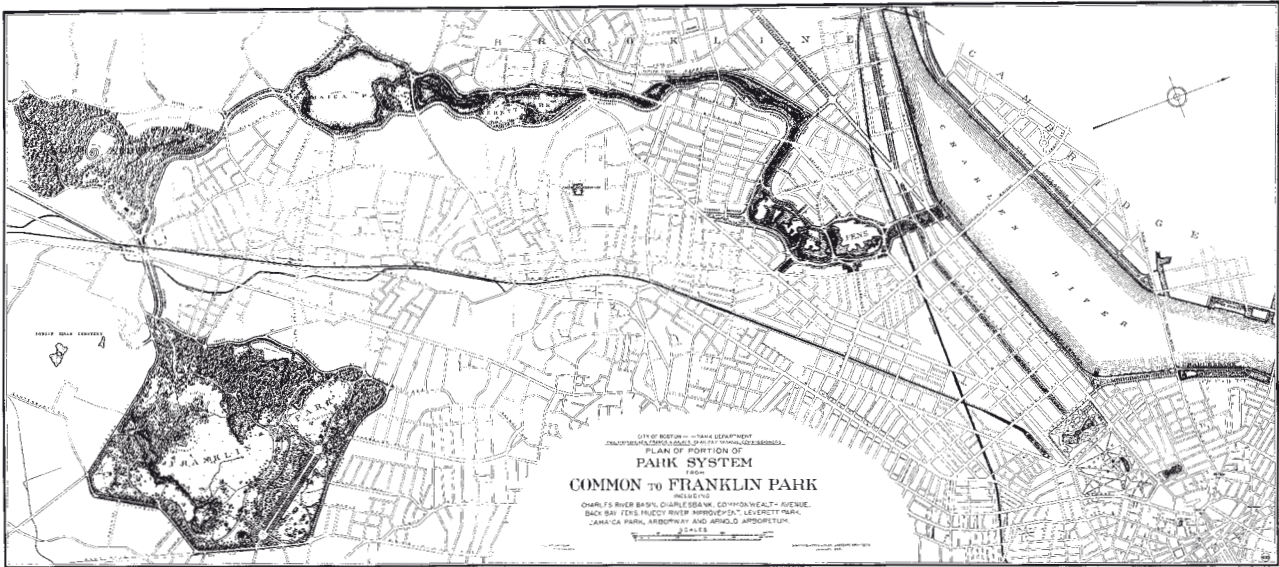


Figure 4: Boston Fenway – planning influenced by the City Beautiful movement

can be attributed to improvements in disease care; the rest are the result of improved prevention efforts and improved environmental conditions, including sanitation and water.” Furthermore, the CDC promulgates research and guidelines to assist the development of healthier communities, and has published these eight principles for healthy community design:

- Increase physical activity
- Reduce injury
- Improve access to healthy food
- Improve access to clean air and water
- Decrease mental health stress
- Strengthen social fabric
- Provide fair access to jobs
- Minimise the impact of climate change.

Slowly, these principles are working their way into the dialogue of urban planning and design. The ‘new urbanism’ movement in the US has made inroads toward changing zoning codes towards more compact, mixed and interconnected patterns – but so far has mostly affected green-field, consumptive forms of new suburban development. My interest and that of my firm, Civitas, has been elsewhere, in the regeneration of our core cities through forms of community design and intervention that address systemic operations of infrastructure, at the scale of large territories of influence. Our goal is simple – to influence urban thinking and to implement urban projects that make a demonstrable difference in the lives and health of urban communities.

A new model

In recent years Civitas has become engaged with the Working Group for Sustainable Cities at Harvard, which mixes academics and urban professionals in exploration and sharing of information. Our question was this: what would the elements of sustainability be for a city that has suffered under poor physical, social and economic health for decades? With this in mind, we began working with the city of Newark in New Jersey. Planning director Toni Griffin and sustainability officer Chelsea Albucher, along with mayor Cory Booker, were in the process of creating a new vision for the city based in real metrics that revealed actual conditions. Some of these findings about the city’s inhabitants were striking. In 2008 for example, Newark’s population was 13% unemployed (before the global crisis), 40% of adults of all ages did not work, pointing to a population of 9% elderly, 26% of whom lived in poverty. On top of that, 34% of

children lived in poverty and half of those in single-parent homes.

Mayor Booker and his staff created a vision, Shifting Forward 2025, about which the mayor said: “Newark will set a national standard for urban transformation by marshalling its tremendous resources to achieve security, economic abundance and an environment that is nurturing and empowering for families.” This vision came with the notion that the city had suffered under a cycle of disinvestment that disabled, disenfranchised and destabilised the population. His goal became the creation of a virtuous cycle of success, based on jobs for residents through growth; healthy and safe neighbourhoods by design; and making Newark a ‘city of choice’.

With this vision we set out together to establish a framework, Sustainable Urbanism for Newark, to demonstrate the ordering of elements that need to fit together into a cohesive set of policies, and

“Our goal is simple – to influence urban thinking and to implement urban projects that make a demonstrable difference in the lives and health of urban communities”



Photo credit: Civitas

Figure 5: The regeneration of the “economically devastated” Northside, St Louis, is one of the largest projects of its type in the US

then actions. This exercise was revealing in one important way: we found almost no correlation between the organisational silos of the city and the goals for a sustainable city. In fact, as we have so often found in our efforts to stimulate systemic regeneration, the silos themselves are often primary obstacles to satisfactory rebirth. The silos of the modern city organisation are in fact powerfully reinforced against the very interconnected, integrative urban systems and forms that we now know are fundamental to sustainable economies, social and public health.

The Newark example requires that we consider how the city establishment can be redirected to focus on this set of objectives, issues and outcomes. Instead of seeing the city as a collection of separate infrastructures, of separate land uses, and of disconnected socioeconomic activity, our proposed framework for a healthy and sustainable Newark is as follows:

Goal 1: growth

- Grow activity at air and sea ports
- Increase retail spending to create and capture jobs

- Retain open land as the basis for creating new jobs through green industry
- Improve mobility to jobs to make employment accessible
- Improve freight mobility to attract job-creating industries.

Goal 2: healthy and safe neighbourhoods

- Build safe, active, connected places throughout the city
- Create new access to a diversity of quality housing choices
- Create adequate access to parks and recreation at many scales
- Create quality public education, social and health facilities that are located and staffed to serve the community first.

Goal 3: choice

- Facilitate downtown living
- Promote a city of learning
- Make the river a regional environmental, education and recreational asset
- Promote historic and cultural assets
- Create a green and healthy environment.

This ordering of objectives clearly will require a review of governance, organisation and methods for creation and delivery of urban services to the people where they need them – in the community. This principle, that services, facilities, transportation and infrastructure should be designed to support community health is not only fundamental, it also requires a fundamental shift in thinking and policy that is necessary to make our cities healthy and sustainable under today’s economies, social orders and technologies.

Vital agents for change

We have spent years investigating, planning and designing interventions in cities with this principle at the forefront. Each time we encounter a new city we find a need to address this principle in a review and shift in governance. Again and again we find that making change that lasts depends on two things: revealing the opportunity that is latent in the place to restore, rehabilitate and regenerate existing resources as catalysts for change; and building leadership that understands the need for such integration of objectives as we found in Newark, and

who are ready to act to bring change about. There follows a few examples of recent work in which we have found success in meeting these goals. Each of these projects has a deep and complex story, but in many ways it is their strikingly powerful visions of reintegration of people, place and economy that form the basis for new hope for our communities and their health.

In the Central Platte Valley of Denver, Colorado, we have spent nearly 20 years helping change this post-industrial wasteland into a productive and healthy community. Key to this success was a strong Mayor, Wellington Webb, who saw the potential to revitalise a (nearly) dead river. By making the river healthy, we can envision making the land and the community healthy. By giving life back to the river, it gives life back to us. This mantra was one that I have used for all these years in getting citizens, policy makers and civic leaders to realise that this wasteland could be a source of revitalisation, and that the river itself could be the source of a community that would be connected, mixed, active and vital.

Habitats for people and wildlife

The transformation began with visions and planning, but also with the creation of several new governing entities, notably the South Platte River Commission, tasked with making the river a healthy, flowing river with habitats for wildlife and people, as a connector of the city to its region. The project's success stems from research into soil and hydrological conditions, which were reconstructed to establish a site that is nearly 40% native wetland and upland restoration, bringing nature into motion in the heart of the city. Since the construction of the park and system of bridges, streets and transit the area has gone from wasteland to a vibrant community.

The revitalisation of the Los Angeles River (Figures 6 & 7) was the product of several collaborators, notably Tetra Tech, Mia Lehrer and Associates, Wenk Associates and Civitas. The nature of the design team – a combination of a wide range of knowledge platforms and different intelligences – created this visionary and implementable plan under the leadership of the city's Bureau of Engineering. This project has had a major impact on how the community and the governing bodies view the river as an asset to the community



to improve health and create a catalyst for a healthy regrowth of this 32-mile-long inner-city corridor. Fundamental to this vision is that the design concepts are actually achievable; that the Bureau saw the need to break down silos within itself and across agencies and jurisdictions, leading to the formation of three new governing entities tasked with achieving the plan; and the development of a diverse base of community supporters who now see that the river can be one of the region's most significant assets, instead of the derelict and dangerous corridor it's been for 75 years.

The regeneration masterplan of Northside, St Louis (Figure 5) is among the most ambitious in the US, with the goal of regenerating a highly degraded, socially fragmented and economically devastated area of a city that in the past 60 years has shrunk by 500,000 people and many industries. The neighbourhood is home to the infamous Pruitt-Igoe public housing projects that were perhaps the worst examples of housing and socioeconomic engineering in American history.

I led a team of professionals under the aegis of the McEagle Company, a development group that has purchased nearly a thousand parcels of land. When paired with a similar number of parcels owned by the city (underway at the time of writing), this approved and funded plan will set off one of the greenest and most complex projects anywhere. A central consideration is a green approach to every aspect of the project, beginning with job training, attraction of green industries, reconstruction of the entire infrastructure to contemporary green standards and a



Figures 6 & 7: LA River, a 32 mile stretch of concrete (above), and Civitas' vision for its greener future (top)

fibrous mix of diverse uses, public spaces, green linkages, habitat corridors, schools, community health facilities and other urban services, delivered on a local scale for maximum accessibility and impact on reconstructing the economic, social and environmental fabric of the city.

Conclusion

Together these examples are just part of an emerging recognition in America that our cities must be the focus of reinvestment in public health and social capital through sophisticated community design, if we are to succeed as an ever-urbanising country that must become less dependent on fossil fuels, more dense, more urban and more healthy for a growing urban population.

About the author

Mark Johnson is the principal and founder of Civitas Inc, a Denver-based urban design firm, and a lecturer and critic.

Photo credit: Civitas/LA River Design Team

The invisible poor

The urban environment can have a significant impact on health and wellbeing, particularly among the poorest of city dwellers. Siddharth Agarwal discusses how urban planning and design can help improve their situation



Siddharth Agarwal
Director of the Urban Health Resource Centre, India

“Urbanisation has resulted in sharper inequalities, specifically in terms of access to elementary necessities”

The global population landscape has been changing very fast over the last century. Lesser-developed countries in Asia, Latin America and the Caribbean have witnessed large growth in their urban population, projected to increase from 2.4 billion in 2007 to 5.3 billion in 2050. At the same time, the urban population of more developed regions is projected to increase modestly – from 0.9 billion in 2007 to 1.1 billion in 2050¹.

Usually rural residents look towards cities as dream destinations with a better quality of life. However, a large proportion of a city's poor find themselves residing in old or new slums, squatter settlements or peri-urban spaces which accompany the sprawl of almost all cities. Urbanisation has resulted in sharper inequalities, specifically in terms of access to elementary necessities such as infrastructure, healthcare and other universally essential services.

The slum population worldwide is projected to grow from an estimated 1.14 billion in 2010 to 1.5 billion by 2020. Over 90% of world's slum population is in developing countries where urbanisation has become more or less synonymous with slum formation². Although not all slum dwellers are poor, slums represent significant concentrations of urban poverty – the physical and psychological wellbeing of slum populations is severely compromised on account of the poor living environment, thus inhibiting their ability to be active, productive and prosperous members of society.

In most cities in developing countries, there is inadequate planned response to growth in the city's population, resulting in the development of peri-urban slums on rural-urban fringes and informal occupation of other available open spaces – mostly government or municipal land. Another important contributor to the growth of poverty clusters is the periodic organised and formal expansion of city boundaries, as well as the designation of hitherto rural areas as urban, e.g. the development of Special Economic Zones or Industrial Areas.

Challenge of slum environments

Slum environments present a unique set of challenges for urban planners and designers. These include:

- *Poor roads, drainage and lack of playing spaces for children.* Slums are at varying levels of vulnerability with respect to housing, land rights, drainage conditions, availability of open spaces and other social sector programmes. Most of the colonies have open drains which are blocked from the disposal of solid waste and no regular cleaning. Vacant space is often used for the disposal of garbage, creating an extremely unhealthy environment. There is also a paucity of spaces where children can play, forcing them to play near large open drains or garbage dumps.
- *Lack of safe water supply and sanitation facilities.* City level data for 43 African

cities shows that 83% of the population lack toilets that are connected to sewers; for the large cities of Asia it is 55%³ and more than 420 million urban residents do not have access to even the simplest latrine. In many cities in developing countries, the scarcity of public water supplies forces many low-income urban residents to purchase water from private vendors, who can charge much more than the cost of municipal water supply. Consequently, people in slums often must pay much more for lower quality water than other urban residents⁴.

Each year 2.2 million deaths, or 4% of all deaths, can be directly attributed to inadequate supplies of clean water and sanitation⁵. Women and children suffer from additional vulnerability to this challenge, often having to haul the water required for domestic use from distant sources. Women and girls are also not able to attend to their sanitary needs during daylight hours or at other times when they need to, due to the absence of sanitation facilities at or near their homes.

- *A large proportion of urban poor reside in unrecognised slums.* Evidence from the 65th round of the National Sample Survey conducted in India in 2008-9 indicates that 48% of the slums are not part of the official list⁶. Similarly, in Nairobi, informal settlements constitute 60% of the city's total population⁷. The United Nations (UN) found that in Africa, unintentionally urban poor are being undercounted by large margins⁸. Improved urban planning that is sensitive to the needs of these less fortunate citizens can help improve this situation.
- *Housing and land tenancy.* Since a large proportion of slums are not recognised by the authorities, missing clusters of urban poverty have to deal with many hardships. First and foremost, as informal settlements have no place to live, they are often located on marginal land (along river banks, railway lines, steep slopes and on or near garbage dumps), unseen by most, and are generally prone to natural and man-made disasters. Secondly, they either live on private or government land which means they would need to be resettled at alternative locations.

Thirdly, as unrecognised slums are not part of official government lists, they are left out during the resettlement housing programmes. Forced eviction is the most disruptive issue faced by the urban poor because it moves them from a bad to a worse situation. Many times, evictions of slums are conducted without any due process, consultation, adequate notice or adequate compensation, resulting in people losing not only their homes (which they have usually built themselves) and personal possessions, but also their livelihood and social networks.

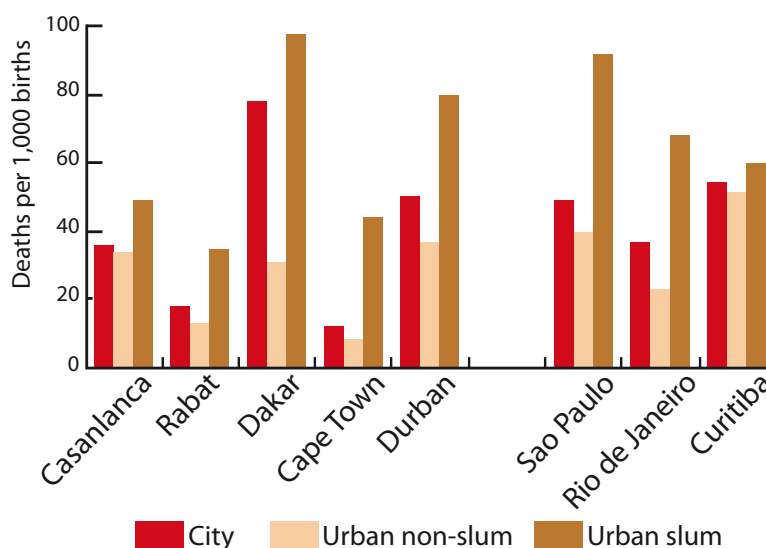
- *Health inequities in urban areas.* It is commonly believed that urban residents enjoy better health status compared to those in rural areas. However, the comparison of urban and rural averages tends to mask the wide disparities that exist within urban areas. An examination of intra-city disparities revealed that the urban poor faced health risks that are as bad as in rural areas and sometimes decidedly worse⁹. Table I shows infant mortality rates among the urban poor; urban non-poor and rural areas in different regions of the world. The urban

Table I: infant mortality estimates for urban poor, urban non-poor and rural, by region (rates expressed per 1,000 births)

DHS surveys by region	Rural	Urban poor	Urban non-poor
North Africa	81	60	43
Sub-Saharan Africa	103	89	74
Southeast Asia	59	53	27
South, Central, West Asia	74	69	49
Latin America	69	62	39
Total	86	75	56

Source: Panel on Urban Population Dynamics, 2003

Figure I: under-five mortality (deaths per 1,000 births) by types of residence in selected cities



Source: UN-HABITAT 2005, Urban Indicators Programme Phase III

Note: Computed from Demographic and Health Surveys (DHS) data, 1995-2003



Undernutrition among children is significantly higher in slum areas

poor face a significantly higher mortality risk compared to the non-poor across all regions of the world.

- *Undernutrition among children* is also significantly greater in slums than in non-slum residential areas across most of the developing countries where such comparative data is available. Frequent episodes of morbidity because of poor environmental conditions, along with poor diets, keep the urban poor, especially children, in a vicious cycle of malnutrition and poor health. In the cities of Brazil, malnutrition among slum dwellers is 19% compared with 5% among better-off urban residents. In Cote d'Ivoire, child malnutrition in slums and non-slum areas is 37% and 10% respectively¹⁰. A study carried out in the slums of Delhi showed that 51% of slum families were food insecure¹¹. In 2005-06 among India's urban population, 54% of children were stunted and 47% underweight in the poorest urban quartile compared to 33% and 26%, respectively, for the rest

of the urban population – an indication of the high levels of food security in this segment of the population. It is worth noting that a large majority of these children will, in the next 15 years, form the bulk of the urban informal sector workforce of the world's second-fastest growing economy.

- *Low access to health services.* In spite of physical proximity to world-class health facilities, economic and social barriers often inhibit the urban poor from accessing these services. Based on re-analysis of urban component of India's Demographic and Health Surveys (DHS) programme data for 2005-06, in the poorest quartile, only 40% of children were completely immunised compared to 65% for the rest of the urban population¹². An analysis of the 2003 Mozambique DHS data by wealth quintiles revealed that only 42.6% of the urban children in the poorest quintile received all basic vaccinations compared with 56% in rural areas and 90.5% in the

richest urban quintile. Similarly, in Kenya, 72.6% of urban poor mothers delivered at home compared with 65.5% in rural areas and 23.3% among the urban rich¹³. Similar patterns have been observed in the analysis of other health access indices in other countries.

- *Cramped housing and risk of communicable disease.* As more poor people are added to the cities to provide cheap labour, they often live in overcrowded, congested environments. For instance, in Bangladesh slums are characterised by very high population densities and room crowding with the average size of rooms being 76 and 100sqft⁷. Similarly, in Delhi's slums 29,397 people live in one square kilometre¹⁴ And according to estimates of Kenya's Ministry of Housing, Roads and Public Works, in Nairobi alone the urban poor make up 55% of the total population and occupy less than 5% of the total residential land area¹⁵.

Living in overcrowded slum environments results in increased risk of measles¹⁴ and tuberculosis, while

unclean water and poor sanitation conditions predispose slum dwellers to water- and food-borne diseases such as typhoid, jaundice and diarrhoea. Analysis of Indian DHS data for 2005-06 reveals that tuberculosis prevalence among the lowest quartile of the urban population was 461 per 100,000 persons compared with 258 among the rest of the urban population.

- *Uncertain livelihoods.* The level of livelihood stability is closely linked to health. People with regular employment or assured regular income have better health than those with less remunerated or irregular employment¹⁷. Stability mitigates the fear associated with uncertain livelihoods and contributes to a sense of responsibility, self-efficacy and improved interest in children's education and the healthcare of the family.

Making cities safer and healthier

There is a reciprocal relationship between urban social conditions and the actual built environment. For example, poorly planned cities and their suburbs, and inefficient public transit and road systems, can result in long and expensive commutes for low-income workers that fray family and community ties, reduce the opportunity for social gatherings and leisure and recreation, create conditions that make crime and violence, and the accompanying fear, more likely, or reduce access to basic amenities and services such as healthcare and education.

Creating a safe urban environment is vital for health and health equity. This has three broad aspects: creating an environment where unintentional injuries in public spaces and homes are prevented; creating an environment where harmonious social conditions result in low levels of crime and violence, and where the planning and design of the built environment makes it easier to avoid crime and violence; and creating urban environments that are better able to cope with natural hazards.

This calls for a combination of public policies, enforcement of health-protective legislation, good urban planning/design, community action and the development of personal and community knowledge, skills and behaviour. It is critical to involve key stakeholders, including communities and vulnerable groups. Fostering

“Many evictions of slums are conducted without any due process, consultation, adequate notice or adequate compensation”

links between practitioners to avoid fragmented interventions by different urban management sectors such as urban design, safety, transport, planning, criminal justice and health. Planning approaches that recognise equitable access to public space and use participatory mechanisms to engage communities and stakeholders are among the most promising options for safer cities.

Urban planning and design impact on the urban physical environment in various ways – for example, through the determination of the nature of residential units and infrastructure, the regulation of land use and density and the location of facilities and open space. Depending on how it is done, it can also reduce health inequities via various pathways.

1. *The mapping of urban poor habitations and resources.* An underutilised yet simple method of making the invisible visible is through the spatial mapping of all poverty clusters, including invisible or unrecognised slums. Spatial mapping is essential and serves as an effective tool for the visual depiction of poverty habitations or slums and resources, such as health centres, hospitals, schools and social programme offices. It is also of great importance for bringing unlisted slums to the attention of decision-makers and, subsequently, within the purview of programme planning and service coverage. Such spatial maps, done through sophisticated software such as GIS or drawn by hand, will also allow governments to better prepare and respond to the complexities, as well as to take advantage of the opportunities that growing urbanisation brings.

2. *Social mobilisation.* Organising and strengthening slum community

organisations and processes is increasingly recognised as an effective intervention for addressing health concerns. Slum communities have both the desire and the resourcefulness to find ways to improve their shelters, services and other aspects which impinge on their life.

One of the key activities of Shack Dwellers International, a federation of slum and homeless population associations worldwide, is the mobilisation of small savings from residents of low-income urban localities and lending to them in a time of need. As communities interact with each other for this purpose, their sense of being part of the community intensifies and they bond together for issues of common concern such as the threat of eviction or negotiation for better infrastructure and services. Through training and support, it has gradually strengthened the participation of women on both local and city issues, as well as their involvement in discussions about their wellbeing, livelihoods and other needs. Socially sensitive planning and design can provide for meeting spaces in housing colonies for the poor where community groups can meet and carry out their activities. The credit itself is of immense utility to the community as it is completely excluded from the formal financial market and is often forced to borrow from moneylenders who charge extremely high rates of interest. Despite the small amount of money, it meets crucial crisis needs, and women get community acknowledgement for having created these resources. Similar interventions have also resulted in improved health outcomes in low-income urban settlements in other regions of the world¹⁸.

Organised community groups are also vital allies to the authorities in reaching out to vulnerable groups: women's groups

can be motivated, organised and trained to track health coverage, represent the voice of the community before authorities and negotiate for services; 'TB clubs' can be marshalled to reduce the stigma associated with the disease and encourage patients to adhere to the demanding short-course regimen of treatment¹⁹; and community health volunteers can help local residents access hospitals services and trained local health workers attached to the hospitals then provide follow-up care and lend support during treatment^{18,20}.

3. Lead programmes in selected countries linking urban design and health.

Given the limited experience in tackling disparities in housing, sanitation, water, space, health inequities in cities and the diversity of the urban situation, it is important to develop lead programmes as early learning sites in selected countries, preferably in Asia and Africa.

These programmes, integrating urban planning and design into a comprehensive programme strategy, will provide working examples to stimulate other cities in the same country and also encourage other countries to address urban health challenges systematically.

Such programmes should address critical urban health programming issues, such as the inclusion of all urban poor habitations (including unofficial or illegal slums), developing working approaches for coordination among different sectors and stakeholders, and involving and empowering slum communities to tackling the challenges of urban health.

It is also important to document, evaluate and widely disseminate the lessons learnt in implementing these programmes so that they feed into the planning, replication and upscaling of such programmes.

They should also produce tools that can be used in further programmes, such as those for the spatial mapping of urban poor habitations, conducting needs assessments, and the monitoring and evaluation of urban health programmes.

Lead programmes should ensure that they share knowledge in the form of data and programme lessons, through electronic and other forms of media, to reach out to the global public health audience.

4. Equitable access to the benefits of urban

life-livelihood opportunities and facilities.

Efficient and affordable public transportation accords greater livelihood opportunities for low-income urban dwellers. In addition, it is important that issues of location are carefully considered. Residents of slums often live there for particular reasons, mainly to be close to livelihood opportunities, and relocation may negatively impact on their livelihoods and thus, ultimately, on their health^{21,22}. Sensitive urban planning, including transportation, at the time of the resettlement of slums is crucial to help resettled slum dwellers revive, or maintain, their livelihoods and reduce the negative impact of having to move out of their earlier habitat.

5. Facilitate access to adequate shelter with humane and basic living conditions.

Government bodies should also seek support from NGOs and other civil society organisations in planning houses for the poor in terms of design and facilities. They can ensure the involvement of the urban poor in housing and resettlement efforts, so that the plan is developed by those who have to be settled and relocated. For example, the National Slum Dwellers Federation in India works actively with the Mumbai authorities to develop and implement the resettlement plan and ensure that the most vulnerable are not missed out.

They map each household and issue identity cards to each member of the household. This ensures transparency in rehabilitation efforts.

It is essential that the community contribute to the cost of housing upgrades in some way. Experience shows this strengthens a community's sense of ownership of the upgrading process. The contribution can be financial (cash or community loans) or it can take the form of contributed labour and/or building materials, or a mix of these.

Upgrading works best when the community's contribution is supplemented by some kind of subsidy, such as donor grants or public project funds. NGOs and slum-based community groups play an important role in loan recovery by encouraging and facilitating slum communities to save part of their earnings in recurring deposits and by making microfinance available to them. Facilitating such regular savings helps the more vulnerable families to benefit from such housing schemes.

It is also important to evolve new methods of land-use planning and management, factoring in population growth projections. One approach is to nurture more middle-level cities, providing them with development focus, infrastructure investment and political attention in order to 'prepare' them to offload mega-cities to some extent.



Urban planning can help increase food security for the poorest communities

Housing the poor is an urgent and important need for building socially inclusive cities offering equity of life for all. What we need is accurate planning and mainstreaming of the urban poor in the economic growth story of our urban areas.

6. *Provision of a safer living environment with low risk of injuries.* The vulnerable and poorer segments of the city's populace are more at risk of traffic-related deaths. For most types of injuries, people die at a far higher rate in low- and middle- income countries than in high-income countries. The poor are at a high risk of injury because they are faced with hazardous situations on a daily basis.

As pedestrians on unsafe roads, they are vulnerable to being crushed by vehicles – urban planning/design has a very direct link to the prevalence of traffic accidents. Their workplaces adhere to few safety standards. Their homes, often poorly constructed, are vulnerable to fire. The poor also have less chance of survival when injured because they have less access to health services. Burn injuries of children are common in low- and middle-income countries²³ – childhood burn injuries are generally linked to lack of access to safe forms of energy.

Disasters can also impact in a wide variety of ways on health. For example, flooding can result in injuries, increased faecal-oral disease, increased vector-borne disease (e.g. malaria), increased rodent-borne disease and negative impacts on mental health²⁴. Thoughtful urban planning can mitigate and manage these risks – the planning and design of the built environment can contribute towards resilience to natural disasters, such as flooding and earthquakes (for example, in terms of the design of drainage systems, design of buildings, etc).

7. *Addressing food and nutrition security and the ability to contribute to productivity.* It is noteworthy that a large majority of underweight and/or stunted children will, in the next 15 years, form the bulk of the urban informal sector workforce of the world's developing countries. If we were able to take better care of the nutrition and food security of this segment of the population, they would be more able to make a more robust contribution to the country's economy – with rapid urbanisation, the urban contribution to



Communities can, and want to, contribute to the development of urban planning and design solutions

the GDP of most developing countries is increasing steadily. The significant association of unemployment with food insecurity highlights the need to link the urban poor with employment generation avenues, schemes, skill upgrading, training and linkages with potential employers. The promotion of low-cost nutritious food items and appropriate cooking methods can help families better cope during food insecurity periods. Urban planners need to analyse the impact of current planning on the urban food system, food prices, and need to explicitly put food security for all at the centre of community goals. This is likely to include better regulation of the food market chain to address food inflation. Food subsidies, where required, is an important strategy for the more vulnerable urban families.

A more harmonious connection between rural food systems and urban food systems has the potential of mitigating food inflation in cities. In the urban context, where the social support system is weak, motivating and training community members to form groups who could contact and advise peers from the same community would help families make effective nutritional choices and improve their access to information, linkages to food security and nutrition services and provide a support system to rely on¹⁸. Such initiatives have the potential of motivating other neighbourhoods – and their lessons can be adopted in other cities.

Promoting community contributions for development of a community grain bank for coping with periods of food scarcity has been successfully implemented in rural areas²⁵ and could be tried in urban slums.

8. *Equitable availability of space, physical activity and play avenues for children.* Methods of providing spaces for children and adults for playing, cycling, walking and social interaction need to be adapted to suit the urban contexts of low- and middle-income countries. The benefits of designing pleasant urban environments that are conducive to outdoor recreation activities go far beyond the direct health benefits of increased physical activity.

Urban planning has three key conflicting goals: economic growth; environmental protection; and equity and social justice²⁶. People-sensitive, equity-focused urban planning views the city as a location where the equitable distribution of resources, services and opportunities is a challenge she/he takes head-on. The competition for these is within the city itself, among different social groups. Space is the social space of communities no matter which socioeconomic strata they belong to. Unfortunately, the powerful capture more space and other resources. Spatial justice is essentially about conceptualising space as a social product and is related to LeFebvre's notion of the 'right to the city'²⁷. Grassroots movements should be encouraged to

gently assert for such justice and negotiate for the use of public spaces are key towards helping the socially disadvantaged segments of the city have access to these spaces.

Urban planning/design can potentially assist in reducing poverty and inequity through creating more compact and integrated cities in which all residents have more equitable access to the benefits of urban life, such as livelihood opportunities, physical infrastructure and education (through walking/cycling or through affordable and effective public transport).

9. *Access to a healthy natural environment.* Since local solutions to local problems can prove very beneficial, the affected communities should be involved in these working groups for identifying needs and planning basic facilities such as health, transport and education.

This will also require empowering the people first so that they can make a meaningful contribution to the planning process and later take the ownership with the plan. What we need is an enabling policy environment, open-mindedness among urban planners and managers, facilitation by those skilled in social planning such as civil society groups, and participation of the



A large number of urban poor live in unrecognised slums

affected community to make the transition from one habitat to another smooth and people-centric.

Sensitive 'urban planning' will need to be a more flexible and participatory type of planning, including in the design of public spaces – one that is socially-oriented and focuses on equity and sustainability, and not the traditional rigid approach to urban planning.

About the author

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Health begins at home

Good-quality housing is a vital component of health promotion, but the relationship between health and housing needs a broader understanding as well as more widely disseminated research



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"Architects, interior designers and housing authorities should accept that housing has a unique capacity to nurture and sustain"

Housing environments are complex, with many material and non-physical components. Likewise, health is multidimensional. Hence both subjects are not delimited by traditional disciplines and professional sectors. Therefore, the relationships between housing and health ought to be considered in terms of the multiple factors that influence housing conditions and health status, as well as the interrelations between them.

An ecological perspective recognises that behavioural, biological, cultural, economic, social, physical and political factors need to be considered if a broad, comprehensive understanding is to complement disciplinary and sector-based interpretations. In order to integrate all these dimensions, it is necessary to go beyond interpretations that rely solely on the bio-medical model of health. Multi-disciplinary and collaborative research contributions are necessary. They should adopt a holistic interpretation which rejects any kind of single causal statistical interpretation. They need to consider the interrelations between several factors in the societal context in which they occur.

This essay begins with a presentation of some key definitions and interpretations of health and housing. Then it presents a synthesis of numerous contributions. Given the diversity of these contributions, a conceptual model (Figure 1) is presented to illustrate the interrelationships between housing and health at the demographic

scales of the individual, the household and the community in relation to the geographical scales of the housing unit, its immediate surroundings and the larger residential neighbourhood. Finally, there is an argument for a shift from traditional disciplinary and professional approaches to inter-disciplinary and trans-disciplinary research and professional practice. Hopefully, these contributions will serve as a catalyst for many more innovative projects in the near future that promote health and quality of life.

The relationship between the residential environment and a population's health is multidimensional and complex. It is possible not only to determine whether housing impacts health but also how the health of an individual can influence her/his housing conditions. For example, housing conditions, and homelessness in particular, are key components in the chain of explanatory factors linking poverty and inequality to health status.

Typology of research

A typology of four categories of published studies (proposed by Fuller-Thompson, Hulchanski and Wang¹) includes:

1. Studies that consider the impact of biological exposures (such as dampness and mould and the incidence of respiratory diseases). There is evidence that mould growth in damp housing units is a significant

cont. p29

Figure 1: The residential context of health

Scale \ Factors	Physical/ Material	Social, Political & Economic	Psychological/ Cultural
Individual	(1) Personal traits	(6) Income	(11) Meaning of housing
Family	Personal space/ lifestyle	Social class Profession	Autonomy Meaning of health
Household	(2) Quality of dwelling Lifestyle	(7) Tenure security Household traits	(12) Meaning of family Neighbours/privacy
Neighbourhood	(3) Environmental conditions	(8) Accessibility & affordability of health & social services	(13) Community life Social capital Sense of security
City/Region	Infrastructure		
National	(4) Housing regulations	(9) Housing, health & social policies	(14) Diversity of lifestyles Housing diversity
Continent	Health services		
Global	(5) Climate change Ozone layer	(10) Globalisation Peace, conflicts	(15) Population mobility Refugees

The interrelationships between housing conditions and health status are multiple, and the above representation is developed as a conceptual reference framework. The numbers below explain the numbered factors in the table.*

(1) The physical/material characteristics of the individual include his/her personal space, lifestyle and personal traits (age, gender etc.) that may prescribe the functional use of the residential environment. The individual can be one person in a household of several, but in developed countries the share of one-person households is high and increasing.

(2) Housing quality includes quantifiable and qualitative dimensions of the housing unit and its immediate surroundings such as the area and volume of space for each household, the characteristics of the physical fabric (indoor and outdoor air quality, damp, mould, hot/cold seasonal temperatures, noise, and the quality of equipment in kitchen and bathrooms etc).

(3) The environmental conditions of residential neighbourhoods include ambient air quality, noise, soil and water quality, whereas infrastructure refers to the supply of potable water; sewage disposal, collection and treatment of solid and liquid wastes, site drainage, supplies of energy, and access to public green spaces and other facilities.

(4) Physical and material characteristics of residential buildings and environmental

conditions can be prescribed by national housing regulations, building construction standards and environmental laws. Likewise the quality and quantity of health and social services in local communities is related to national policies and funding.

(5) Climate change and the depletion of the ozone layer are global concerns which have impacts on residential environments and human health owing to erratic weather patterns (storms, flooding, frosts, heat waves) as well as the propagation of vectors diseases.

(6) The income of an individual and household is crucial for access to suitable housing and healthcare. Income, profession and security of employment are crucial indicators of individual and household poverty, housing conditions, and access to health and social services.

(7) Security of housing tenure especially in the formal rental sector and informal housing is crucial for low-income households including one-parent families, migrants, unemployed persons and elderly residents who are in need of healthcare and social services.

(8) Social and health services may or may not be located in residential neighbourhoods. Public transportation or mobile service units may reduce the distance to these services. However, accessibility should not be isolated from the affordability of healthcare and social

services for low-income residents.

(9) The accessibility and affordability of housing, health and social services is influenced by national policies that may promote the public or private sector. Governments may or may not subsidise medical and welfare services especially of individuals and households in need.

(10) Globalisation policies have influenced housing markets, access to jobs and also a wide range of production and consumption patterns, especially food available in local supermarkets. Ethnic, religious and other conflicts occur in all regions of the world and influence living and working conditions as well as health.

(11) The meaning of housing, like the meaning of health, varies between individuals and social groups in the same society as well as between cultures. In contrast to dependency, the autonomy of the resident is a crucial psychological dimension of housing and health.

(12) Household and family bonding, neighbour relations and the immediate social environment are crucial components of residential environments that help define a sense of privacy identity, belonging and self-esteem which are associated with residential satisfaction.

(13) Residents may be strongly integrated or isolated from local associations and community life and this can influence the degree of mutual aid, a sense of security and help them meet the challenge of difficult housing and health situations in specific neighbourhoods.

(14) Diverse housing styles and lifestyles have always existed but this has been accentuated by the mass media and tourism. Often, imported types of housing construction and consumer goods (including clothing and food) are inappropriate for local climatic conditions and may clash with traditional societal values.

(15) Population and residential mobility is increasing in many countries. The homelessness of refugees due to conflicts or war is a major humanitarian concern that impacts on local housing and job markets. Climate or environmental refugees are expected to increase rapidly during the 21st century.

*Thanks to Mr Matthias Braubach, WHO European Office, Bonn, Germany for comments on a preliminary version.



“Any shortcomings in the indoor residential environment, including high household population density, may have implications on human health and wellbeing”

> risk factor for asthma, chronic bronchitis, nasal allergies and eczema; it is also correlated to the incidence of, for example, headaches, fatigue, anxiety and diagnosed cases of depression.

2. Research on the impact of chemical and physical exposure (such as urea formaldehyde foam insulation and its incidence on respiratory diseases). Asbestos, radon, tobacco smoke, emissions from gas and wood-fired appliances for cooking and heating, and volatile organic compounds (VOCs) in solvents, are all known to have harmful effects to health.

3. Contributions that consider the physical conditions of the housing unit in relation to the risk of accidents or other characteristics of health and wellbeing. Unintended injuries from accidents inside or around housing units are a major public health problem, but one that is still not widely recognised. In the European region, for example, more deaths result from household accidents than from road traffic accidents!

4. Studies that examine the cultural, economic and other social characteristics of housing (such as housing cost or tenure) in relation to health and wellbeing. Quality of life is strongly linked to the overall satisfaction that people have with their residential environment, tenure status, housing affordability, air quality and thermal comfort inside the housing unit.

There are also some empirical findings that have identified and measured the mechanisms linking characteristics of residential environments to mental health. Studies have confirmed that people living in housing that is in a poor state of repair, or that lacks natural daylight and ventilation, or that is prone to vandalism, have a low mental health status.

Photo credit: Yankunsten architects

Figures 2 & 3: Teglværkshavnen harbour housing, Copenhagen (Vandkunsten architects). Fifty percent social housing, this development was built as close to the water as possible, to encourage swimming and kayaking directly from the properties, as well as reflecting as much daylight as possible inside

Synopsis of research findings

Housing is an important determinant of quality of life and wellbeing following the results of numerous published findings since the mid-19th century. The multiple components of housing units and their surroundings need to be considered in terms of their potential and effective contribution to physical, social and mental wellbeing. In principle, there are nine main components concerning housing that ought to be considered, as follows:

1. The characteristics of the site, in ensuring safety from 'natural' disasters including earthquakes, landslides, flooding and fires; and protection from any potential source of natural radon. In addition, the impacts of industrial accidents should not be ignored.

2. The residential building as a shelter for the inhabitants from the extremes of outdoor temperature; as a protector against dust, insects and rodents; and as a provider of security from unwanted persons; and as an insulator against noise. Data show that more than 10% of adults living in Europe suffer from chronic sleep disturbances in need of treatment, especially stemming from exposure to noise during the night. Sleep disturbance is a risk factor for stress and related illnesses.

3. The effective provision of a safe and

continuous supply of water that meets standards for human consumption, and the maintenance of sewage and solid waste disposal. Water can be a vector for several infectious diseases and it is still a serious public health challenge in many so-called developing countries.

4. Ambient atmospheric conditions in the neighbourhood and indoor air quality, both of which are related to emissions from industrial production, transportation, fuels used for domestic cooking and heating, as well as the local climate and ventilation inside and around buildings. Some cooking and heating appliances emit fumes from fuels that can have adverse effects on human respiratory systems.

5. Household occupancy conditions, which can influence the transmission of airborne infections including pneumonia and tuberculosis, and the incidence of

injury from domestic accidents. Research has demonstrated that accidents within the home are a major health problem across all European countries.

6. Accessibility to community facilities and services (for commerce, education, employment, leisure and primary health care, for example) that are both affordable and available to all individuals and groups. An increasing number of people in Australasia, Europe and North America rely on social welfare in order to access primary healthcare and affordable housing.

7. Food safety, including the provision of uncontaminated fresh foods that can be stored with protection against spoilage. The type, amount and quality of food eaten have a direct impact on health and should not be ignored when considering the increasing incidence of obesity and Type II diabetes in many countries.

8. The control of vectors and hosts of disease outdoors and inside residential buildings which can propagate in the building structure; the use of non-toxic materials and finishes for housing and building construction; the use and storage of hazardous substances or equipment in the residential environment.

9. The capacity of housing to sustain positive social and psychological processes. For example, the capacity of the resident to use her/his domestic space to control personal contacts with others, to create a personal space using physical and psychological appropriation practises.

Other contributions highlight the importance of domestic activities and the lifestyles of individuals and households. Studies in several industrialised countries show that more than half of all non-sleep activities of employed people between 18 and 64 years of age occur inside housing units. Children, the aged and housewives spend even more time indoors. Therefore,

“It is possible not only to determine whether housing impacts health but also how the health of an individual can influence her/his housing conditions”

Photo credit: Flickr.com/la-citta-vita



Figure 4: Hammarby Sjöstad, a new community for Stockholm built on industrial brownfield land, and a celebrated example of environmentally friendly urban planning



Figure 5: Poorly built 1960s blocks over looking Wanstead Flats, London. Fungus, cracked walls and overflowing sewage prompted irate tenants from neighbouring blocks to invade their local town hall to complain; at the time, their homes were just four years old

any shortcomings in the indoor residential environment, including high household population density, may have implications on human health and wellbeing.

Design implications

Architects, interior designers and housing authorities should accept that housing has a unique capacity to nurture and sustain social and psychological processes including health and quality of life. For example, the capacity of the resident in her/his home environment to alleviate stress accumulated at school or in the workplace, and whether this capacity is mediated by views of nature or being in natural surroundings such as urban parks. The multiple dimensions of housing that circumscribe the resident's capacity to use her/his domestic setting to promote wellbeing and quality of life is a subject that has been studied. Now designers face the challenge to consider housing that can promote health by reducing the risk of accidents, stress and enable wellbeing. These dimensions of

housing environments and the health of residents should not be isolated from their diet, lifestyle, type of employment and the availability of healthcare. Hartig and Lawrence² have used the term 'the residential context of health' to refer to all these dimensions. A matrix of these dimensions (shown in Figure 1) defines the interrelated nature of housing and health.

The ultimate goal of designing for health promotion is to combine research-based knowledge with the practical know-how of professional practice. Knowledge for architects and urban designers has been accumulated by housing studies and epidemiological research about health and housing. Much of this evidence-based knowledge is still not used in professional practice today! Overcoming this applicability gap is an important challenge for all those who wish to design for the promotion of health and quality of life.

Conclusion

If housing and the built environment

are considered too narrowly then the interrelations between housing, health and wellbeing may not seem important. The broad framework proposed in Figure 1 can account for the multiple dimensions of housing and health that influence health and wellbeing. It is time that all those involved in the provision of housing understand that direct investments in housing design and construction that enable wellbeing are also investments in health promotion.

About the author

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We shape a better world



Hunters Point, San Francisco, CA, USA



Songdo City, Incheon, South Korea



Low2No, Helsinki, Finland



Springvale road and rail, Melbourne, Australia



Motorway interchange, Queensland, Australia



Decentralised energy masterplan, London, England

In designing healthier cities, Arup considers the whole urban environment, integrating eco-friendly building design with low carbon transport connectivity, and water, waste and energy solutions that promote sustainable communities.