

Cities, green infrastructure and health

A paper for the Foresight Future of Cities project

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1. Introduction

a. Background

“Much greater priority needs to be given to public health and prevention in health and social care. While progress has been made in secondary prevention and improving life expectancy, health inequalities persist, and effective approaches to primary prevention and tackling the determinants of health are lacking. Services are still too focused on treating ill health and dealing with acute need and those in crisis” – Transforming the Delivery of Health and Social Care, The Kings Fund, 2012.

Most people in the UK live in towns and cities and will continue to do so. They need places close to home, in those same towns and cities, where their physical and mental health problems can be addressed. But there is a huge and growing concern about the costs of treating ill health¹, partially a result of mounting pressures on the public purse, an ageing population² and widening health inequalities. If treating ill health is overstressing the public purse, then perhaps there is a way of reducing demand on health services. Indeed, there is a growing body of evidence that supports investing in preventing illness and enhancing wellbeing, as a way of reducing the cost of health care. Some of this investment needs to be in supporting changes in people’s behaviour – eating healthier food, smoking fewer cigarettes, exercising more. But greater consideration needs to be given to ensuring that our towns and cities support and encourage healthy lifestyles.

National policy has only reflected this imperative for a relatively short time. This may be the reason why there has not yet been a major shift in delivery priorities and partnership working, although examples of best practice do exist. Other barriers are outlined later in this paper. But there are many exciting opportunities too. The primary one, in the context of this paper, is to focus on improving the health and wellbeing of people in our towns and cities through the delivery of comprehensive, multifunctional green infrastructure (GI).

¹ Appleby, J., Spending on health and social care over the next 50 years: Why think long term? Introduction, p 1. The Kings Fund, London, 2013.

² <http://www.parliament.uk/business/publications/research/key-issues-for-the-new-parliament/value-for-money-in-public-services/the-ageing-population/>

b. Defining green infrastructure

Infrastructure is a familiar term, traditionally denoting networks and systems that provide us with essential services such as water, electricity and transport. GI is more than just delivering each of these services in greener ways. It stresses multifunctionality, using urban networks of natural and semi-natural features, such as green spaces, rivers, street trees and parks, to deliver a wide range of ecosystem services³. More emotive language describes GI as our ‘natural life support system’⁴ that enables us to work ‘with the grain of nature’. But whether we use technocratic or more populist language, there is considerable support for the potential of GI to deliver a wide range of benefits for society, the environment and the economy. Enhancing people’s health and wellbeing is just one of these benefits.

Natural England, the UK’s Landscape Institute (LI) and the European Commission (EC)⁵ all have definitions of GI that include networks and multifunctionality, and imply landscape and infrastructure. The EC’s definition is the most comprehensive of these: it describes GI as *a strategically planned network of high quality natural and semi-natural areas with other environmental features, which is designed and managed to deliver a wide range of ecosystem services and protect biodiversity in both rural and urban settings.*

Definitions of GI that refer to health are rare. However England’s National Planning Policy Framework (NPPF) does so: it defines GI as *a network of multifunctional green space, both new and existing, both rural and urban, which supports natural and ecological processes and is integral to the health and quality of life of sustainable communities*⁶.

Our cities are faced with many challenges, yet these are often approached as separate issues. The idea of GI evolved during the 1990s in response to a growing recognition that those planning and designing complex urban areas often ignored the interactions between issues such as public health, flood management, housing delivery, biodiversity, climate change adaptation and so on. This ‘silo’ approach prevented the adoption of more dynamic, integrated and forward-thinking solutions. GI offers an alternative to this narrow-minded approach – a way of tackling big challenges head on, and delivering multiple secondary benefits at the same time. This integrated approach uses the ability of nature to provide us with the ecological services that we need and helps unlock the potential of our towns and cities to support healthier lives.

Imagine, for example, a city which has cleaned up its rivers and streams, provides footpaths and cycleways along them, links these with larger open spaces such as parks and squares, invests in tree planting in large and small public spaces and streets, develops community gardens, has an educational programme that encourages hard to reach groups to be more active, and is committed to implementing sustainable drainage systems⁷ (SuDS). That city’s urban heat island effect and flood risk will reduce; there will be increases in air and water quality, active travel, the number of people

³ UK National Ecosystem Assessment (2014) The UK National Ecosystem Assessment: Synthesis of the Key Findings. UNEP-WCMC, LWEC, UK.

⁴ North West Green Infrastructure Think Tank (2008). North West Green Infrastructure Guide.

⁵ Natural England 2009; Landscape Institute 2013; European Union 2013.

⁶ Department for Communities and Local Government, National Planning Policy Framework (NPPF) March 2012.

⁷ Sustainable Urban Drainage Systems, whether constructed as a part of new build or as a retrofit: see <http://www.landscapeinstitute.org/knowledge/SustainableDrainageSystemsSuDS.php>

walking, running and cycling for fun, and growing their own food; there will also be more opportunities for formal and informal education focused on enhanced wildlife. All these changes will have positive impacts on people's health and wellbeing.

2. The Evidence

Whenever evidence relevant to health is called for, there is a tendency to demand the kind of clinical evidence, validated through experimentation and testing, that is necessary with new drugs or surgical methods. This kind of certainty is hard to achieve when exploring the links between people's health and wellbeing, their behaviours and lifestyles, and the places where they live, work and play. Nevertheless over the past thirty years much attention has been given to building up the evidence base. It is now widely accepted that there is enough evidence to support claims about the positive connections between health benefits and environmental quality. Public policy makers have only started to embrace GI relatively recently. There is therefore limited evidence explicitly linking GI with improvements in health and wellbeing. There is, however, a substantial evidence base linking health and wellbeing with access to green spaces. In a summary paper such as this one it would be unhelpful to include a long list of specific research reports. Therefore most of the references included in this section are by authors who have reviewed relevant research activity.

A 2008 report from Foresight on Mental Capital⁸ highlighted that *"The quality of the physical environment also plays an important role in mental wellbeing. Among the significant factors are noise and light levels, building layouts and way-finding, access to nature, and the design of everyday products, buildings, transport systems and information/communication devices, all of which contribute to levels of stress or contentedness, and a sense of inadequacy or self-efficacy and of isolation or connection to others."* GI has a critical role to play in regard to many of these factors.

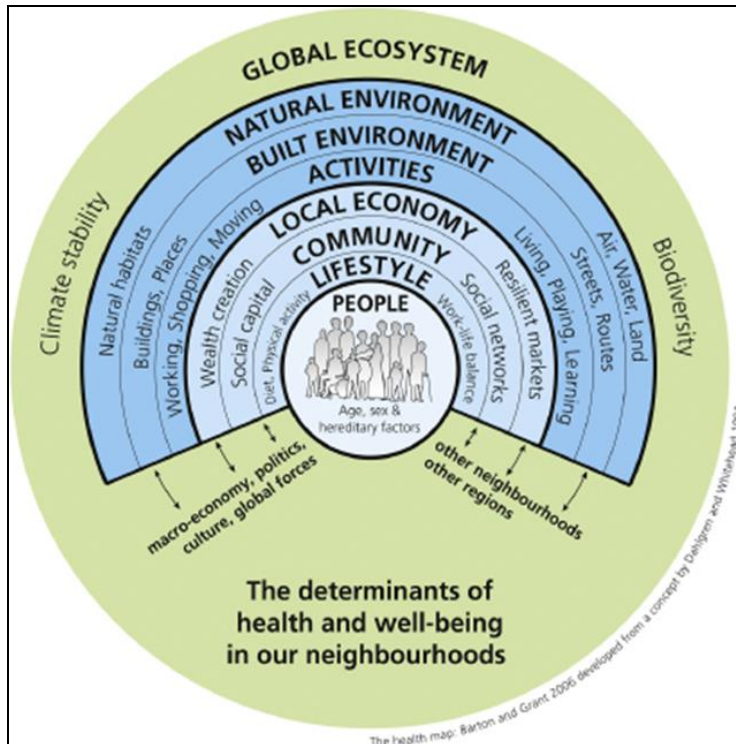
Another Foresight report⁹ highlighted the importance of green infrastructure to quality of life, stating that *"[...]there has been an upsurge in concern for green space in and around urban areas, including the development of green infrastructure[...]Two-thirds think it is important to have green space nearby and the majority think parks and public spaces improve quality of life."*

Access to nature and attractive green spaces has been a recurring theme in descriptions of therapeutic environments and healthy lifestyles for many years. Ward-Thompson (2011) traces the history of the emergence of evidence about the links between health and the physical environment. She finds that traditional, conventional wisdom is often confirmed by more recent empirical research, and concludes *"The importance of access to the landscape appears to be as relevant as ever in the context of modern urban lifestyles"*.

Barton and Grant's Settlement Health Map is a useful, graphic summary of the ways in which health and wellbeing are strongly influenced by the character and quality of the places where people live and work. The paper that accompanies the map details the evidence on which the map is based (Barton and Grant 2006):

⁸ Foresight Mental Capital and Wellbeing Project (2008) Final Project report – Executive summary. The Government Office for Science, London

⁹ Foresight Land Use Futures Project (2010) Final Project report. The Government Office for Science, London



Although both Ward-Thompson and Barton and Grant focused on the links between health, wellbeing and the physical environment in general, their work is undoubtedly relevant to discussions on GI. The connectivity that typifies a comprehensive GI network means that their conclusions are particularly relevant: continuous GI networks that are integrated within and between urban areas will be accessible to, and will therefore benefit, large populations.

In 2013 the Landscape Institute (LI) produced a position statement exploring the relationship between public health and landscape¹⁰. At its heart was an evidence review, which was used to underpin the LI's *Five Principles of Healthy Places*. Although the evidence relates to the broader concept of landscape, it is relevant to GI, which is a way of describing multifunctional landscapes.

The Landscape Institute's Five Principles of Healthy Places

Principle 1: Healthy places improve air, water and soil quality, incorporating measures that help us adapt to, and where possible mitigate, climate change.

Principle 2: Healthy places help us overcome health inequalities and can promote healthy lifestyles.

Principle 3: Healthy places make people feel comfortable and at ease, increasing social interaction and reducing antisocial behaviour, isolation and stress.

Principle 4: Healthy places optimise opportunities for working, learning and development.

Principle 5: Healthy places are restorative, uplifting and healing for both physical and mental health conditions.

¹⁰ Landscape Institute (2013) Public Health and Landscape: Creating healthy places. London, Landscape Institute.

The evidence in support of Principle 1 includes a study of the health effects of climate change¹¹, a review of research into the microeconomic evidence of the benefits of investing in the natural environment¹², and a study that shows how the urban heat island effect can be reduced by modifications to urban form¹³.

The Marmot review of health inequalities in England post 2010¹⁴ is one of the key overviews of evidence that supports Principle 2. There are many sources of evidence about the positive connections between healthy lifestyles and the environments in which people live. These include Natural England's information pack on health and natural environments¹⁵ and the BMA's report linking healthy transport with healthy lives¹⁶.

Principle 3 is supported by the Natural England review already cited, by recent PhD research into the connections between local facilities, social interaction and people's wellbeing¹⁷, and by a study that links creating greener building envelopes with quietness¹⁸.

Many studies support the contention in Principle 4, that access to green places enhances children's play and learning¹⁹. There are fewer studies that explicitly connect the design of workplaces and enhanced health and wellbeing, although some do²⁰.

Principle 5 is all about places designed and used as therapeutic environments. Although the evidence here is about specific sites, these can of course be located within broader GI networks. One of the key researchers in this field is Ulrich, who has been publishing evidence about the impact of access to green spaces on people recovering from illness since the 1980s²¹.

In parallel with the promotion of GI, biophilic design has been championed as a complementary strategy for addressing workplace stress, student performance, patient recovery, community cohesion and other familiar challenges to health and overall wellbeing. The biophilia hypothesis, first defined by Fromm and popularised by Wilson²², states that people have an innate affinity with other living beings and with the natural world. Wilson's prime argument was in favour of strengthening the conservation ethic throughout human societies. But interest in biophilia has also led to

¹¹ Vardoulakis, S., and Heaviside, C (Eds.), *Health Effects of Climate Change in the UK 2012: Current evidence, recommendations and research gaps*, Health Protection Agency, 2012.

¹² Bolund, P. and Hunhammar, S., (1999) cited in Sunderland T, *Microeconomic evidence for the benefits of investing in the natural environment*, Natural England Research Report NERR033, 2012.

¹³ Hathway, E. A. and Sharples, S., *The interaction of rivers and urban form in mitigating the urban heat island effect: a UK case study*, Building and Environment, 58: 14-22, 2012.

¹⁴ Marmot, M., *Fair Society, Healthy Lives*, Marmot Review – Strategic review of health inequalities in England post 2010, Department of Health, 2010.

¹⁵ *Health and Natural Environments: An evidence based information pack*, Natural England, Sheffield, 2012.

¹⁶ BMA 2012

¹⁷ Calve Blanco, T., *The social value of local facilities and its impact on residents' wellbeing*. Submitted PhD Thesis, WHO Collaborating Centre for Healthy Urban Environments, UWE, Bristol, 2013.

¹⁸ Van Renterghem, T., et al *The potential of building envelope greening to achieve quietness*, vol. 61, 34-44 Building and Environment, 2013.

¹⁹ Beunderman, J., Hannon, C., and Bradwell, P., *Seen and Heard: Reclaiming the public realm with children and young people*, Demos, London, 2007; Ginsburg, K., *The Importance of Play in Promoting Healthy Child Development and Maintaining Strong Parent-Child Bonds*. Clinical Report: American Academy of Paediatrics, vol. 119 no 1 pp 182–191, 2007.

²⁰ Kaplan, R., *Employees' reactions to nearby nature at their workplaces: The wild and the tame*, vol 82 1–2, pp 17–24, Landscape and Urban Planning, 2007.

²¹ Ulrich, R S., *Health benefits of gardens in hospitals*, Plants for People, International Exhibition Floriade, Netherlands, 2002; Sternberg E., *Healing Spaces: The science of place and wellbeing*, Belknap Press of Harvard University Press, Cambridge, Massachusetts, 2009.

²² Wilson, E. O., *Biophilia*, Cambridge, MA: Harvard University Press, 1986.

arguments in favour of a greener approach to environmental planning, design and architecture.

There are significant overlaps in the research cited in support of the biophilia hypothesis, and that used by the LI and others. But there is a growing body of research that seeks to test the biophilia hypothesis. For example, Grinde and Patil's²³ evaluation of some fifty relevant empirical studies concluded that an environment devoid of nature may have negative effects on people's wellbeing.

3. Opportunities

In terms of opportunities, we focus on two key areas of public policy – planning and public health – which have the potential to deliver the kinds of changes necessary to enable enhanced delivery of GI.

a. The planning system

The planning system establishes the framework within which decisions are made about land use. It therefore has a profound impact on both the aesthetic and functional qualities of our towns and cities. The vast majority of these decisions have consequences on people's health and wellbeing.

The National Planning Policy Framework (NPPF) recognises this, acknowledging that the planning system needs to create “...a high quality built environment, with accessible local service that reflect the community's need and support its health, social and cultural wellbeing”. It goes on to state that planning policy and decision making should create places that are safe and accessible, where “crime and disorder, and the fear of crime, do not undermine quality of life or community cohesion” and that “Access to high quality open spaces and opportunities for sport and recreation can make an important contribution to the health and wellbeing of communities.”

In addition to direct references to health and wellbeing the NPPF also highlights the importance of giving due consideration to future environmental changes, in particular climate change. In the context of health and wellbeing this is significant, given the relationship between public health and issues such as air quality, flood risk and the urban heat island effect. GI is identified as one of the key methods for addressing these challenges.

b. Public health policy

Public health policy exists to improve the health of the general population by addressing health issues before they have the chance to occur. It seeks to address longstanding health issues, reduce inequalities in health and wellbeing, and to ensure that, as far as possible, we can all live longer, healthier lives.

The Marmot Review (*'Fair Society, Healthy Lives'*) recommended that in order to reduce health inequalities, a key objective must be the creation and development of healthy and sustainable places and communities. Policies cited as central to achieving this include:

- improving active travel;
- improving the availability of good quality open and green spaces and;

²³ Grinde B, Patil GG. Biophilia: Does Visual Contact with Nature Impact on Health and Well-Being? *International Journal of Environmental Research and Public Health*. 2009; 6(9):2332-2343.

- improving the food environment in local areas.

Drawing on the findings of the Marmot Review, a range of measures has been introduced in the Health and Social Care Act (2012) to promote public health:

- the transfer of responsibility for public health to local authorities. This is a move that has potentially significant positive implications in terms of relationships between Directors of Public Health and other services provided by local authorities, for example planning and environment departments, and;
- the introduction of Health and Wellbeing Boards, to include Directors of Public Health, and at least one elected Councillor. Their role in the development of Joint Strategic Needs Assessments (JSNAs) and Joint Health and Wellbeing Strategies (JHWSs) will be important in promoting health and wellbeing and reducing inequalities. JSNAs must assess current and future health and social care needs and ensure that mental health receives equal priority to physical health, including health protection, and upstream prevention of ill health. There are therefore a range of issues that need to be considered by Health and Wellbeing Boards, including broader social, economic and environmental factors, many of which can be influenced positively by GI interventions. These will need to be considered in JHWSs as these are the mechanisms by which issues identified in JSNAs are to be addressed.

The Public Health Outcomes Framework 2013-2016 has been published by the Department of Health and presents a useful mechanism for focusing the attention of public health on the value of GI. A set of public health indicators has been developed as part of the Framework to help understand the level of progress on those things that matter most to public health. Indicators have been selected to cover the full spectrum of what is meant by public health, and what can be realistically measured. At present, there is a range of indicators that can be positively influenced by integrating GI into our towns and cities, including:

Domain 1 – Improving the wider determinants of health

- The percentage of the population affected by noise.
- Utilisation of green space for exercise/health reasons.
- Social connectedness.
- Older people's perception of community safety.

Domain 2 – Health improvement

- Diet.
- Proportion of physically active and inactive adults.
- Self-reported wellbeing.

Domain 3 – Health protection

- Air pollution.

Domain 4 – Healthcare public health and preventing premature mortality

- Mortality from causes considered preventable.
- Mortality from all cardiovascular diseases (including heart disease and stroke).

- Mortality from respiratory diseases.
- Health-related quality of life for older people.
- Dementia and its impacts.

Taken together, these two key policy areas provide a significant degree of support for greater delivery of GI. However change on the ground is still lacking, which inevitably results in the need to consider what barriers might exist and which need to be overcome despite demands set out in national policy.

4. Barriers

Despite the imperative for action, the policy opportunities and evidence to support the need to integrate GI into the fabric of our towns and cities, we are not seeing this translated into delivery on the ground. We suggest there are a number of reasons for this:

- a number of local authorities do not have GI strategies in place²⁴. Many local authorities still have no identifiable policies or documents which refer to GI and many appear not to be working strategically with neighbouring authorities. Others use the term GI to mean green space, which ignores other types or functions of GI and may result in missed opportunities;
- no statutory duty upon local authorities to protect or maintain their green infrastructure assets;
- reduced public spending has had a number of negative impacts, including a lack of funding for maintaining existing assets, let alone the delivery of new GI close to where people live²⁵. It has also reduced the number of individuals within local authorities with the skills necessary to demand GI interventions and undermines the ability of authorities to act as an 'intelligent client';
- the natural environment is still seen as a 'nice to have', and as a result of budgetary pressures which have seen some local authorities predicting they will not be able to fund statutory responsibilities, GI is afforded a lower priority;
- recent planning reform, despite references to GI, has not given the concept equal priority to other forms of infrastructure. This lack of concern at a national level is demonstrated through recent Government action which has archived Natural England guidance on GI;
- a failure to plan in the long-term and the lack of interest in strategic planning. This is particularly pertinent to GI as the benefits it delivers accrue over time;
- GI, in the real sense of the term, is multifunctional and therefore the organisations/teams who could be taking an interest in its planning/design and delivery need to act together. A failure to coordinate/collaborate properly undermines GI's potential to deliver public health outcomes, and;
- a lack, despite potential, of public health involvement in place making.

²⁴ <http://www.landscapeinstitute.org/PDF/Contribute/GreenInfrastructureResearchSummary.pdf>

²⁵ Heritage Lottery Fund (July 2014): "The State of the UK's Public Parks".

5. Conclusion

The King's Fund recently issued a stark warning. It said that, based upon patterns over the past 50 years, the UK might face a scenario where it is spending up to 20 per cent of its GDP on funding the NHS. There is therefore clearly an urgent need to explore new ways of preventing ill health before it has the chance to occur, beyond more traditional programmes designed to encourage healthier lifestyles such as smoking cessation, healthier eating and more frequent exercise.

We believe, and the evidence is growing to support this, that an exciting opportunity exists to significantly improve health and wellbeing by integrating nature into the fabric of our towns and cities. In doing so, not only will urban populations be healthier but, a huge number of other benefits will be gained for society, the economy and the environment. This is a result of the dynamic and multifunctional nature of GI, where land is planned and designed to deliver many services, often simultaneously.

The policy support exists to encourage enhanced GI in our towns and cities, and recent initiatives, such as the Natural Capital Committee (NCC), have only strengthened the case. In its Third Report the NCC highlighted that *"if every household in England were provided with more equitable access to good quality green space, then around £2.1bn in health cost savings could be achieved by the NHS per annum"*. And there are a number of projects, strategies and initiatives that offer encouraging signs.

However a number of barriers to delivery still exist, not least those highlighted in this article. And with the ongoing need for public sector efficiency, greater delivery of GI will not be straightforward. With some local authorities suggesting that even the delivery of statutory duties is increasingly at risk, delivery of GI – all too often seen as a 'nice to have', despite evidence to the contrary – faces a challenging future. The Third Report of the NCC goes on to state that *"Investment in GI is often the first to be sacrificed during periods of financial pressure, but this is a false economy"*. We could not agree more. We need to see increasing investment in GI now, to save in the future. We cannot afford not to, given the multiple challenges that can be addressed through such investment, including concerns about health and wellbeing.

Arguments surrounding the need to increase investment in GI will undoubtedly continue. At the same time however opportunities do still exist, and will be enhanced through a more creative, collaborative approach to the planning, design and management of our towns and cities. We are convinced that the potential offered by GI to address such a variety of economic, social and environmental challenges means that in future a wider range of interested parties need to come together to ensure that urban landscapes are rich, varied and truly multifunctional. This must include both landscape and public health professionals, given the enormous opportunity presented by GI to help ensure that people in our towns and cities live longer, healthier lives.

About the Landscape Institute

The Landscape Institute is the Royal Chartered institute for landscape architects. As a professional body and educational charity, we work to promote the protection, conservation and enhancement of natural and built environment for the public benefit. We champion landscape and the landscape profession in order to inspire great places where people want to live, work and visit.

Read more about the Landscape Institute's thinking on public health and green infrastructure:



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