



Green infrastructure and its tri-benefits: health, environment and economic

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Green infrastructure and its tri-benefits: health, environment and economic

What is green infrastructure?

Green infrastructure (GI) is the network of natural landscapes and features in all of our surrounds. This network of natural landscape assets enhances ecosystem health and resilience in urban environments, and provides environmental, social, economic and health benefits.

GI exists in a variety of physical forms:

- Public parks and gardens
- Urban forests
- Greenways
- Street verges and open spaces in residential streets
- Sports and recreational facilities
- Private and semi-private gardens
- Squares and plazas
- Green roofs and walls
- National parks and nature reserves
- Utility areas
- Agricultural land.

Why is GI important for human health?

More and more research is showing that increasing the amount of GI (predominantly in the form of green spaces), particularly in urban communities, has a positive effect on physical, mental and social health.

This is important as our health status affects our general functioning – our productivity, our relationships, and our roles as family and community members.

Investing in GI, and supporting the infrastructure that already exists makes sense – by being able to interact with nature, support our body's physical health through activity, and reduce the stress associated with our urbanised lives, we maintain our health and protect ourselves from the increasing pressures in our city environments.

The benefits of GI

Physical health

The provision of attractive, accessible, open green spaces, such as public parks, gardens, and recreational spaces is important for promoting physical activity. Research suggests that there is an association between the presence

of, or access to, various forms of green space and increased levels of physical activity.^{1,2,3,4}

These green spaces are particularly important for facilitating physical activity for children, adolescents, and the elderly.



Melbourne in Focus: Case Study 1

The Development of a Transport Walkability Index for Metropolitan Melbourne⁵

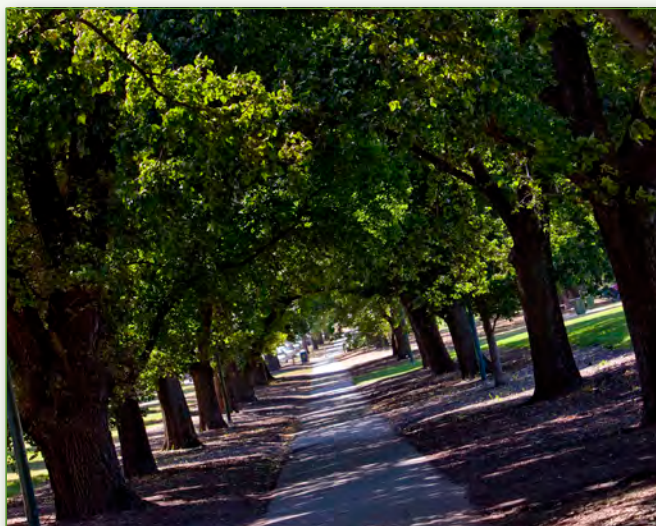
This study developed and mapped a walkability index comprised of three components that have been found to be associated with walking for transport – mixed planning, population density, and street connectivity. This index is able to assist local policy makers identify areas that could become more walkable, and to monitor progress of increasing local walkability in neighbourhoods.

Research suggests that there is also an association between access to green space, or increased levels of green space, and lower levels, or risk of, obesity^{6,7} cause-specific mortality and morbidity^{8,9,10,11} and improved birth outcomes^{12,13,14}.

Mental health

Viewing, or experiencing natural environments is associated with lower levels of self-reported stress, and improved measures of physiological stress.^{15,16,17} This empirical evidence is supported by the stress reduction theory.¹⁸

Forests, and urban forests, are important forms of green infrastructure for human health. This is because there is strong evidence showing that viewing a forest, or experiencing a forest, is associated with lower levels of stress, and enhanced mood, feelings and emotions.^{19,20,21,22}



Melbourne in Focus: Case Study 2

City of Melbourne's Urban Forest Strategy (2012–2032)

This strategy seeks to respond to the future challenges facing Melbourne's urban forest; declining tree population, climate change and urban growth. It will address these challenges by:

- (i) increasing canopy cover from 22 to 40 percent by 2040**
- (ii) increasing forest diversity**
- (iii) improving vegetation health**
- (iv) improving soil moisture, and**
- (v) improving biodiversity.²³**

There is some emerging evidence that shows green infrastructure may indirectly reduce stress levels by serving as a 'buffer' against the negative impacts of stressful life events.^{24,25} This evidence suggests that those individuals who regularly visit, or are exposed to, natural environments or natural elements may be less affected by a personal crisis than those who don't, or are not.

Viewing or experiencing natural environments, or green spaces, is associated with reduced symptoms of certain mental illnesses, such as depression and anxiety^{26,27,28} and alleviated symptoms of emotional and behavioural problems – particularly in children with attention deficit hyperactivity disorder (ADHD)^{29,30,31}.

Viewing natural environments or elements is associated with improved recovery from illness.^{32,33} GI and environments also have positive benefits for those with Alzheimer's and Dementia.³⁴

Social health

Positive social interactions and relationships are important in facilitating the healthy functioning of communities.³⁵ The design of the physical environment can influence social behaviour and social interactions.^{35,36} Green infrastructure can play an important role in maintaining and improving a community's social health.

For example, community gardens can enhance a community's social capital, facilitate social networks, and improve the overall social health of the community.³⁷



Melbourne in Focus: Case Study 3

Community Gardens³⁷

A recent study explored the extent to which the local community garden in Melbourne (the 'Dig In' Community Garden Program) provided the opportunity to enhance social capital.

The study found that the community garden provided several social benefits to its members. These benefits include increased social cohesion, increased social support and increased social connections.

There is also some evidence to suggest that GI, particularly green space, is important for facilitating social interaction and cohesion in low socioeconomic neighbourhoods³⁵, and reductions in criminal, violent and aggressive behaviour^{38,39}.

It is clear that GI provides important physical, mental, and social health benefits.

There is still more work to be done to refine and enhance our understanding of the linkage between GI and human health outcomes.



What are the links between economics, health and GI?

We know that improving our health doesn't just save lives, but also saves us money. Recently, there has been a move to place a monetary value on the health benefits that GI provides.

Green infrastructure projects have substantial, potential economic health value. This can be seen in the following three international case studies.

Case Study 1: The Economic Health Value of Parks and Recreational Spaces for 11 US Cities and Counties⁴⁰

The US Trust for Public Land's Centre for City Park Excellence estimated the collective healthcare savings of city residents associated with physical activity as a result of available park and recreational spaces for a given year.

It was estimated that the collective healthcare savings of residents ranged from approximately US\$4,300,000 to US\$90,200,000 for a given year.

Case Study 2: The Economic Health Value of Increased Green Space in the Netherlands⁴¹

This study estimated the healthcare savings that would be incurred from the reduced prevalence of individuals with depression if green spaces levels in the district of Bos en Lommer, Amsterdam were increased by 10%.

The study estimated that the proposed increase in green space would reduce the number of individuals (aged 16 years and over) living with depression by 132 in 2014. This reduced prevalence was calculated to result in €223,000 in healthcare savings 2014.

This study also estimated the national healthcare savings if green space levels were increased by 10% in the Netherlands. The report calculated that it would result in savings of more than €65 million in national health care costs per annum.

Case Study 3: The Economic Health Value of Green Space in the UK⁴²

This study estimated that changes in natural and green space that resulted in a 1% decrease in sedentary behaviour in the existing UK population would provide a total economic value of £2billion (using willingness to pay-based values) per annum for a range of physical and mental health conditions.

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