



Natural medicine for planners

Caroline Brown and **Marcus Grant** review the evidence of links between urban nature and human health and well-being – and recommend ways in which planners can play doctor and use nature itself as an urban medicine

FOR ALL the efforts of governments and policy-makers, some things in cities are not getting better. While the overall quality of urban environments varies enormously, generally speaking urban nature is struggling. A report on urban environments in England and Wales revealed intense pressure on urban wildlife as a result of pollution, development and insensitive design.¹

The state of urban nature may not seem significant in the grand scheme of things. After all, city centres aren't nature reserves, and there seems to be plenty of other land given over to nature and wildlife around our towns and cities. But more than 80 per cent of people in the European Union live in urban areas, and it is axiomatic that the quality of human habitat affects human well-being. We already know that urban open space has many benefits, including positive impacts on property values, land prices, crime and fear of crime. The question is: what contribution does urban nature make to human health and well-being? And, crucially, what can planning do?

This article reviews evidence about the links between urban nature and health and aims to draw out what this might mean for planning practice.

The health-nature link

The concept of health that we use in this article is akin to that of well-being. It is the positive state of an individual that helps them resist illness. This is the 'salutogenic model' of health.² This model puts people on a health continuum

between 'disease' and 'ease'. As a person moves nearer the disease end they become less able to cope with what have been identified as 'stressors' or 'pathogenic' stimuli; while at the ease end a person is better able to cope with stimuli that might cause disease.

There is a large body of research literature covering the links between nature and salutogenic health. This literature spans a number of subject areas, including: landscape design; medicine; education and development; urban design; town planning; psychology; and environmental health.

Among this literature, the evidence for the health benefits of urban nature falls into three distinct categories. The first relates to the ecological services provided by nature to urban dwellers. These services derive from the presence and functioning of plants and other organisms, and include the cooling effect of trees on the urban climate, for example. The second and third parts of the evidence base concentrate on the benefits that derive from human interaction with nature. This is a broad field which can be usefully subdivided to distinguish *active* contact with nature, for example gardening, from *passive* interactions such as the view from an office window.

These three categories of evidence are discussed in turn below.

Ecological services

Most people know that as plants photosynthesise, carbon dioxide is taken up and oxygen is released into the

atmosphere. This process is as important at the local level as it is at the global level, and within urban areas trees are known to have a role in improving air quality. As oxygenators, plants and trees can help to maintain or increase levels of oxygen in the atmosphere. This is particularly important where pollution and a lack of vegetation mean that the concentration of oxygen is well below normal – as it is in many cities.³ In addition, plants and trees function as bio-accumulators, extracting both particulates and chemicals from the surrounding air. Studies have shown that both parkland and street trees are able to remove a significant proportion of dust from the atmosphere.

It is not hard to see why and how these ecological services are important for human health. We need oxygen to function – to breathe, to think and just to be. Pollution and particulates, on the other hand, are known to exacerbate asthma and respiratory illnesses. Although urban air quality is improving, during the mid-1990s poor air quality brought forward between 12,000 and 24,000 deaths each year.¹

Urban trees and open spaces also have a role to play in the movement and circulation of air in cities. A park breeze is generated by the differences in temperature between open spaces and the neighbouring built environment. Even individual trees can have an impact, providing localised cooling as a result of transpiration and shade. However, overall cover is also important. Studies have shown that where 50 per cent of an area is

► covered by parks and gardens, temperatures are reduced by 7°C compared with areas with only 15 per cent green cover.

The issue of temperature and cooling may not seem particularly important for human health, but it can be a matter of life and death. The extreme heat of the European summer in 2003 is thought to have caused around 35,000 deaths.⁴ Many of those affected were living in cities, underlining the literal need for 'cool' places to live.

The health benefits of active interaction with nature

Our collective obsession with TV programmes about gardening, wildlife and nature suggests that our desire for contact with nature is strong. Where we have *active* contact with nature – gardening, hill walking, bird watching – the evidence shows a range of health benefits. For example, studies of therapeutic horticulture show that participants benefit from enhanced self-esteem and self-confidence, reduced aggression and recovery from depression. Some groups – psychiatric patients, prison inmates, students with learning difficulties – derive particular benefit from contact with nature, such that gardening and horticultural projects are often used therapeutically in prisons and hospitals.

Recent work has also demonstrated the value of natural spaces as a setting for physical activity and exercise. Green gyms and health walks are now being prescribed by GPs in preference to conventional exercise programmes. The evidence shows that participants are less likely to drop out, and value contact with nature *in addition* to the benefits of the exercise. But it is not simply that parks and woodlands are nice places in which to exercise; the health benefits of urban nature are more profound than that – a Japanese study showed that retired people who walked every day in tree-lined and leafy surroundings lived longer than people who walked in less green surroundings. Urban nature not only provides a setting for physical activity, but in and of itself it has a positive impact on our psychological and physiological well-being.

The health benefits of passive interaction with nature

Passive contact with nature has also been shown to influence human health. The literature of health effects through passive interaction can broadly be split into four areas of evidence:

- nature as setting, such as walking in a park rather than along a treeless street;
- visual contacts with nature, such as a view of trees or plants from a window;
- implied visual contacts with nature, such as landscape painting; and

■ other sensory contacts with nature, such as smell and sound, bird song and leaves rustling in the wind.

Perhaps the most well-known study in this field is Ulrich's 'view from a window',⁵ which compared patient outcomes following surgery. The only difference between the two groups studied was the view from their hospital window – one group could see trees, the other a blank wall. The results showed that patients with a view of trees recovered more quickly and required less pain relief than the group with a view of a wall.

Prominent in the field of exploring passive interactions with nature are Kaplan and Kaplan, and particularly useful is their concept of 'nearby nature',⁶ based on the passive experience of nature in day-to-day living, both indoors and out-of-doors. It encompasses vegetation ranging from a vase of cut flowers on a table to a plant in a window box or a street tree or neighbourhood park. The relationship to the human subject may be direct or indirect, such as a view through a window.

Following extensive research based on an analysis of reactions to slides and photographs, the Kaplans have concluded that 'nature' is a critical component of how people experience the environment.⁷ In particular, what is essential to perception is the presence of vegetation and the context created by it.

Typical of a new wave of empirical field studies in this area is that carried out by Hartig *et al.*⁸ As part of a study on 112 young adults, it was shown that sitting in a room with a tree view promoted a drop in blood pressure and reduced feelings of stress. Other studies have shown similarly profound effects on blood pressure, heart rate, concentration, educational attainment and the ability to cope with stress. In addition, neighbourhood greenery has also been associated with lower levels of crime and fear of crime.⁹

Planning for health and nature

From the evidence reviewed above, it seems fairly clear that there are many reasons why urban nature is a good thing for human well-being. This health dividend comes *in addition* to other reasons for promoting urban nature, such as supporting biodiversity, designing attractive places in which to live and work, and improving air and water quality. The question remains about what planners and planning should do with this evidence. We have five suggestions:

■ **Pay attention to the design of roads and transport routes:** Routes which have trees and greenery reduce stress in the people travelling along them. This is as true for bus passengers and car drivers as

it is for pedestrians and cyclists. However, pedestrians and cyclists are particularly sensitive to their surroundings as they travel more slowly, so the aesthetic quality of transport routes is especially important for these groups.

Achieving better-quality routes will require lots of imagination and close collaboration with highways and transport engineers. But it can easily be done, as most Dutch *woonerfs* (home zones) demonstrate. In the Netherlands *woonerfs* tend to include lots of street trees, verge planting and soft surfaces – making them attractive as places in which to play, sit, socialise and just watch.

■ **Local open spaces matter:** Aside from the nature conservation value which open spaces may have, nearby nature – or even just nearby greenness – is important for the well-being of residents, workers and visitors. This means providing a range of spaces for people to use and to observe: parks, gardens, terraces, squares, verges and river banks. Good landscape design is important not only in residential spaces, but in work spaces too. Thus the surroundings in business and retail parks have their part to play in promoting well-being. It is probably fair to say that retail parks are particularly poor in this respect, with very little in the way of greenness or landscaping.

All this will require much greater attention to landscape design issues in new developments. Planners will need to take into account the quality of spaces that surround new buildings, as well as the views afforded to occupants, visitors and passers-by. At the local level, policies on gardens, allotments and other open spaces will need to protect existing urban nature/greenness *and* create new open spaces wherever possible.

■ **Overall 'greenness' matters:** Planners need to think strategically about urban nature. The overall balance of soft surfaces and vegetative cover is important in terms of local air hygiene and temperature control. In the context of climate change – and particularly climatic extremes – cool places in which to live and work will become more important. Urban areas should thus include as much vegetative cover as possible in order to minimise the effect of the urban heat island, to trap pollutants and particulates, and to maintain normal oxygen levels.

The strategic view of urban nature is something that development plans and local development frameworks will need to take into account. Where vegetative cover is low, then planning authorities should consider setting targets for increasing the proportion of green space and soft surfaces within their area.

■ **Streets need trees:** Some of the most attractive town- and city-scapes in the

country are characterised by street trees, many of which were planted by our Victorian forebears. From a health point of view, there is much to commend such an approach – street trees provide shade and shelter, visual interest and nearby nature. For planners to achieve this, all that is needed are simple design policies that establish street trees as an important element in all new developments. In addition, local authorities need to make arrangements to care for their urban trees, ensuring that developer contributions reflect the costs of maintenance and replacement.

■ **Good design is 'green' design:** Our last hint to planners thinking about human health is to make sure that standards of good design are also 'green', incorporating plants, trees, open spaces and soft surfaces wherever possible. Planners need to challenge urban designers and landscape architects to 'build in' health using nature as part of the palette. As the evidence outlined above demonstrates, urban nature contributes to well-being in many ways. The lack of provision of access to nature is a basic misunderstanding of the human condition. *'Nature is not merely an amenity, luxury, frill or decoration. The availability of nearby nature meets an essential human need.'*¹⁰ ■

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Notes

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- 2 A. Antonovsky: *Health, Stress and Coping*. Jossey-Bass, San Francisco, USA, 1979
- 3 D. Nicholson-Lord: *Green Cities and Why We Need Them*. New Economics Foundation, 2003
- 4 M. Hillman: *How We Can Save the Planet*. Penguin, 2005
- 5 R.S. Ulrich: 'View through a window may influence recovery from surgery'. *Science*, 1984, Vol. 224, pp.420-421
- 6 R. Kaplan and S. Kaplan: *The Experience of Nature: A Psychological Perspective*. Cambridge University Press, New York, 1989
- 7 R. Kaplan: 'The psychological benefits of nearby nature'. In D. Relf (Ed.): *The Role of Horticulture in Human Well-Being and Social Development*. Based on a National Symposium, Apr. 1990, Arlington, VA, USA. Published by Timber Press, Portland, OR, USA, 1992, pp.125-133
- 8 T. Hartig, G.W. Evans, L.D. Jamner, D.S. Davis and T. Gärling: 'Tracking restoration in natural and urban field settings', *Journal of Environmental Psychology*, 2003, Vol. 23, pp.109-123
- 9 C. Brown and M. Grant: 'Biodiversity and human health: What role for nature in healthy urban planning?'. *Built Environment*, 2005, Vol. 31, No. 4, pp.326-338
- 10 See R. Kaplan: 'The psychological benefits of nearby nature'⁷