Green Cities, Healthy People

Planning Healthy Urban Settings

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B-Debate report: “Green Cities, Healthy People”

B-Debate International Center for Scientific Debate Barcelona is a Biocat initiative with support from “la Caixa” Foundation. It drives first-rate international scientific debates to foster dialogue, collaboration and open exchange of knowledge with prestigious national and international experts, approaching complex challenges of high social interest in life sciences. B-Debate sees debate as a powerful, effective way to generate knowledge and strives to help position Barcelona as a benchmark in generating knowledge and Catalonia as a country of scientific excellence.

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PHENOTYPE is a European collaborative research project funded through the 7th Framework Programme. The project takes a multidisciplinary and integrated approach using the best and most efficient methods to understand the relation between exposure to the natural environment and health. It specifically addresses in-depth the potential mechanisms associated, and will translate these findings into potential policies and management practices.

More information: www.phenotype.eu
Twitter: @greenhealth4eu

Organising Committee:

Laia Arnal, Head of Investigation and Scientific Debate, Biocat, Barcelona, Spain

Diana van Gent, FP7 Project Manager, Centre for Research in Environmental Epidemiology (CREAL), Barcelona, Spain

Mark Nieuwenhuijsen, PHENOTYPE Scientific Coordinator, Centre for Research in Environmental Epidemiology (CREAL), Barcelona, Spain

Roderick Lawrence, Head of Human Ecology Group, Institute of Environmental Sciences, University of Genève, Switzerland.

Joris Zufferey, Research Fellow, Human Ecology Group, University of Genève, Switzerland

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Introduction

“Green Cities, Healthy People – Planning Healthy Urban Settings” was a two-day B-Debate held in October 2013, intended to explicitly link research and practice in Public Health and Urban Planning. Among the contributors were international experts from different disciplines as well as practitioners who contributed examples of good practice to the debate. The focus was on the European region and more specifically regarding cities in southern and eastern Europe. The topics of public health and urban planning have a strong societal impact, relating to the improvement of the quality of life of citizens, by promoting more physical activity and participation in community activities.

Today, there is a growing concern about the impact of non-communicable diseases on health and quality of life. Empirical research clearly shows a strong relationship between these diseases, lifestyle and environmental variables. In order to reduce the risk of non-communicable diseases (e.g. cardiovascular disease, cancers, asthma, diabetes type 2) lifestyles that reduce these health risks need to be promoted by education programmes and living environments that enable physical activity and social interaction. According to the World Health Organization, these diseases (including mental disorders) account for approximately 86% of the deaths in the European region.

The design and planning of our cities, public spaces and surrounding environments, whether suburban or rural, can affect our health and well-being. For example, in many cities around the world, according to the strength of the urban health inequalities, life expectancy can vary significantly from one neighborhood to another. Furthermore, access to natural places like public green spaces can be seen as an important catalyzer for health promotion. Similarly, the creation of supportive environments for health and well-being is one priority action of “Health 2020”, the new pan-European Public Health Strategy endorsed by European Ministries of Health and coordinated by the World Health Organization.

With this B-Debate, the organizers intended to:

1. Promote a strong integration of scientific knowledge from the social, natural and medical sciences, and the know-how of professions, and the tacit knowledge of stakeholders and citizens. This with the aim to apply a transdisciplinary approach that is applied across more than one discipline or sector.

2. Validation by the participants of a set of core variables and indicators to assess the capacity of public green space to promote social interaction and physical activity at the municipal and/or city level.

In the fields of public health and urban planning, the applicability gap between scientific knowledge from research and implementation in urban and land-use planning has been identified by scholars. This gap highlights the current lack of understanding and cooperation between scientific researchers and urban planners. In other words, there is a need for a better integration of human health needs into land use planning and the management of public green spaces.
During the last two decades, some scientific researchers and professional practitioners have tried to understand to what extent the characteristics of built and natural surroundings impact on mental and physical health and well-being. A growing number of empirical studies measure the impact of characteristics of the immediate environment on health and well-being. These studies have been completed by epidemiologists, psychologists, sociologists and public health officers.

The multiple factors that influence human health and well-being are being documented by numerous empirical studies. Increasingly, scientists, politicians and practitioners are referring to this field of research, which has a holistic vision of health and well-being. The goal is to create healthy settings for social contact and physical activity. Since 1986, with the launch of the WHO Healthy Cities project, an initiative has been working on these questions, involving more than ninety European cities. In 2005, the Commission on Social Determinants of Health (CSDH) was established by the World Health Organization.

Some of the challenges include how to address human and nature based values and to overcome the prescription of minimum standards and inflexible norms in the guidelines for practitioners in urban and land-use planning. It is necessary to account for the complexity of all those factors that influence health and quality of life, and to promote a strong collaboration between disciplines and forms of knowledge in a transdisciplinary and community-based approach.

From this perspective, and following the evidence based movement and translational research in medicine and public health, the most accurate scientific evidence should be translated into policy briefs and guidelines for decision makers, with recommendations for practitioners that are meant to promote more healthy and participatory urban planning.

**Results and impacts expected**

The objectives of “Green Cities, Healthy People” in terms of reach and success were to:

- Develop a common language between the stakeholders and participants and a better understanding of the perceptions of each field. These debates must open new outlook for the participants and lead to a stronger collaboration between the different disciplines and professions involved.

- Illustrate to all participants the pertinence of intersectoral and transdisciplinary collaboration.

- Publication of policy briefs based on the dialogue with policymakers and local authorities.

We have succeeded in bringing together different disciplines and provided a unique opportunity for knowledge exchange, which is illustrated in table 1. The debate was perceived very positively by the delegates, who emphasised the need for continuation of this type of activity. Participants were also positive about the opportunity provided by this meeting to form
wider networks and considered the event a good investment for future collaborations and cross-disciplinary activities.

Continuing the dialogue, we are identifying the best resources and routes to reach the appropriate audience with the information that flows forth from the discussions. To facilitate this, the PHENOTYPE project is surveying the needs and uses and different stakeholders to which the information is beneficial.
Table 1: B-debate presentations classified according their (main) disciplines, field of contribution, methodologies and scale.

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<th>Discipline (main)</th>
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<th>Action Research - Participatory</th>
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<td>Quantitative Qualitative Mixed</td>
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<td>E. Richardson (1)</td>
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<td>S. Bell (4)</td>
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<td>H. Beck (5)</td>
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<td>M. Neila (9)</td>
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<td>A. Verma (10)</td>
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<td>R. Lawrence (17)</td>
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B-Debate 1: What do we know about the impacts of immediate environment on human health and well-being?

This session aimed to increase understanding of the role of the environment in health and wellbeing, presenting the state of the art in this area of study. Furthermore, this session contributed to the ongoing debate on to the extent to which scientific evidence informs policy-making.

In most studies, populations of greener areas have been found to have lower risks of obesity, cardiovascular disease, respiratory disease, adverse birth outcomes, poor general and mental health, as well as lower risks of mortality. The main causal pathways which the existing literature proposes to explain how green space – (a) increases opportunities for physical activity, (b) facilitates social contacts, and (c) provides psychological restoration – are the bottom-line of the first three presentations. Currently, new research focuses on how these mechanisms are intertwined and whether they might be valid in other types of open spaces beyond the green ones. In the debate, considerations about other threats to health were raised. For instance, the risk of allergies and the use of pesticides in agricultural systems might outweigh any potential beneficial effect to health due to casual pathways. More and more meta-analysis is used seeking stronger statistical evidence on associations. For instance, the three first presentations draw on mainly quantitative research to show how access to green space and their environmental quality are related to the above-mentioned causal paths to human health and well-being. Nevertheless, these studies might entail some risk and limitations as, for instance, the imposition of criteria on data; limiting the scope for gathering additional affect evidence or on-site learning.

In this line of thought, the participants asked how to control concrete key variables; and argued on their context dependency and its implications on research design. Furthermore, from a planning perspective, which qualities green spaces should have and how they should be measured were discussed. There was general agreement regarding the need to combine quantitative and qualitative methodologies depending on the quality of the green space. For instance, qualitative methods seem to be more adequate to assess safety in parks.

In contrast to other speakers, Professor Simon Bell’s presentation is complementary both in methodology and the scale of the empirical cases presented. This presentation contributed to the debate seeking qualitative evidence on spatial characteristics from the implementation of interventions in green spaces. These results are far more contextualized and grounded on people’s experiences rather than on casual paths.

Not many studies have integrated green space users’ preferences in pathway research. Furthermore, integrating users’ experience in planning gives a pragmatic shed light on the important characteristics of green spaces.

Finally, since two of the presentations drew heavily on applying new technologies to raise data in research, concerns on confidentiality and potential negative effects of smartphones on health were raised. Furthermore, considerations on how individuals are selected (e.g., who
could afford the purchase of a smartphone) could bias and affect measurements on associations between green space access and quality with inequality. This is important since many studies in this field are grounded in social justice.

How to move from research cases to health promotion policies was identified as one of the biggest challenges of the project. Thus, policies might be informed not only by research but also by applied examples of good practices.
Presentations

Green Space and Health, What do We Know?
Elizabeth Richardson, School of GeoScience, University of Edinburgh

Natural spaces are being linked with improved health and wellbeing in a growing number of studies. As cities grow, opportunities for contact with nature may be restricted, with potentially important implications for the health of city-dwellers. There is consequently great interest in the prospect that urban planning may help to maintain or increase these healthful experiences of nature, with concomitant benefits for population health. The talk outlined the current state of our knowledge about natural space and health, with a focus on population-level evidence. In line with the conference title natural spaces were referred to as ‘green spaces’, despite the fact that some non-green natural spaces, such as aquatic environments, were included in the research reviewed. The need for more research on particular aspects was highlighted, and it was noted that filling these evidence gaps will be a crucial input into the planning of healthy green urban settings.

Firstly, the evidence for relationships between green space and various health outcomes was reviewed. In most studies, populations of greener areas have been found to have lower risks of obesity, cardiovascular disease, respiratory disease, adverse birth outcomes, poor general and mental health, as well as lower risks of mortality. The studies originate from Europe, Australasia, Asia (Japan), and North America. Nonetheless, these positive findings have not been replicated in all studies, indicating that the green space and health relationship is not a case of ‘one size fits all’.

Secondly, the potential causal pathways that have been proposed to explain how green space may influence health were reviewed. These pathways were (a) increased opportunities for physical activity, (b) facilitation of social contacts, and (c) psychological restoration. Physical activity, social contacts and psychological restoration are already known to have health benefits, so researchers have asked whether greener environments promote these health-benefitting circumstances, and whether these circumstances can partly or fully explain the green space and health relationship. The evidence for the role of physical activity was described as mixed. Stronger evidence has been found for the role of social contacts and for psychological restoration, with the latter being explored in greater depth in the subsequent talk by Prof Terry Hartig. Evidence suggests that it is likely that the proposed mechanisms may intertwine to create health benefits.

Thirdly, the talk addressed whether the green space and health relationship is the same for everyone everywhere. Characteristics such as sex, life stage, and socioeconomic status have been found to alter green space and health relationships. The same densely-forested park that is a valued jogging or walking area for some people may be a terrifying no-go area for others. If the barriers to green space use are not identified and addressed local people cannot be expected to use and benefit from them, regardless of the good intentions of urban planners. Without recognising the exceptions to the ‘rule’ that green space equals health benefits, urban
greening interventions might be designed inappropriately and health benefits may be distributed unequally.

The methodological strengths and weaknesses of the existing evidence base were outlined. Key issues highlighted were the cross-sectional analyses used in most studies, precluding causal inference, and difficulties in measuring health-relevant ‘exposure’ to green space. Opportunities for future research were proposed, in order to focus efforts on bridging the knowledge gaps. Studies with longitudinal or natural experimental designs are needed, as are improved measures of usage and exposure. Researchers should also consider how the relationships vary between population groups and types of green space, and should address the quality vs. quantity debate more thoroughly.

In summary, urban green spaces have the potential to be important public health resources: the existing evidence base holds important guidance for enabling this potential to be realised, but further evidence is also needed.

**Reference:**

Green Space and Restoration  
Terry Hartig, Institute for Housing and Urban Research, Uppsala University, Sweden

Urban green space may serve health in a variety of ways. Of the now quite large and rapidly growing body of research on green space and health, much concerns one or more of four pathways to health: air quality, physical activity, social contacts, and stress. A key aspect of the stress pathway involves the possibilities afforded by green spaces for psychological restoration. The significance of restorative experiences for the prevention of chronic stress and stress-related illness is widely acknowledged in current accounts of public health values of access to urban and peri-urban green spaces. Such accounts also recognize that restorative experience is bound up with other pathways. For example, with regard to physical activity, people do not only walk in parks during leisure time because they believe that doing so will be good for their health in the long run, but also because it helps them to reduce stress and otherwise feel good in the short term. To take another example, people often join others in parks to help them sustain their relationships as well as wind down after a difficult workday; the example thus brings restoration together with both physical activity and social contacts.

The state-of-the-art in research concerned with health values of restorative experience in urban green space varies with the type of study. Many observational studies have been completed over several decades consistently attesting to the importance of stress reduction and other forms of restoration as important motives for visits to local and more distant natural areas (Knopf, 1987). These have been complemented in recent years by additional observational studies reporting associations among access to green space, stress and self-reported health (e.g., Stigsdotter et al., 2010). In contrast, almost no experimental research has been performed with community residents to assess cumulative effects of repeated restorative experiences in local parks and green spaces (Ward Thompson et al., 2012; Hartig et al., in press). Rather, the strongest causal evidence has so far come from small-scale randomized experiments with convenience samples that focused on short-term changes in emotion, cognition, and physiology characteristic of restoration as they occurred during a single visit to a natural setting versus some other kind of environment. Many such experiments have been conducted to date, and the evidence they have yielded has affirmed the plausibility of claims about psychological restoration as a basis for nature-health relations, while also adding nuance to those claims (e.g., with regard to configurations of natural features that promote vs. hinder renewal of depleted cognitive resources; Gatersleben & Andrews, 2013). This has stimulated further experimentation on restorative experiences in urban and peri-urban green spaces, with expansion in several directions as more attention has gone to the possible variations in the environments visited, the people visiting, the amount of time spent and the activities engaged in. The designs of experiments have also varied, with researchers taking different approaches to representing key aspects of restorative experience: restoration needs that people may satisfy during their visits, the objective environmental variations relevant to the satisfaction of those needs, the restorative quality of the person’s experience of the environment, and the kinds of measures used to capture restoration.
As the number of published experimental studies has increased, so too have possibilities for performing meta-analytic research. The meta-analyses so far reported have faced challenges in terms of identifying studies with common denominators in design and measurement, but conclusions based on the limited number of suitable studies found have affirmed relatively beneficial effects of natural comparison environments, primarily with regard to self-reports of affective states or well-being (Bowler et al., 2010; Thompson Coon et al., 2011). This kind of research is needed, but it does entail some risks. For one, meta-analyses may exclude studies or parts of studies with uncommon design or measurement features that have helped advance the state of knowledge. For example, in one experiment (Hartig et al., 2003), blood pressure data collected during time spent in natural and urban comparison environments could not be represented in a meta-analysis that included only pre- and post-treatment measures of blood pressure in order to encompass a sufficient number of studies. The analysts’ choice was understandable, and they acknowledged the problem with cutting the on-site data (Bowler et al., 2010). Their work is a valuable contribution, but it also illustrates the Procrustean character of meta-analytic work: by limiting the data to the common-denominator research designs and measures, such analyses cut away not only at the feet (i.e., additional effect evidence for quantitative summary statements) but also the head (i.e., in the case cited, the learning represented by the inclusion of on-site measurements).

It is worth noting that even when little experimental evidence has been available, planners and other environmental professionals have used it to argue for measures that would ensure access to green spaces for people in growing urban populations. Yet, just as many cities are growing today, many others are shrinking, and the “urban wilderness” around abandoned, unoccupied buildings may be perceived by some residents of those cities in decline as a threat rather than a restorative resource. Care must be taken with generalization regarding restorative effects of urban parks and green spaces.

References


**Understanding and Measuring Access to Green Spaces with Emphasis on Novel Technologies and Methods**

Michael Jerrett, PhD, Chair and Professor, Division of Environmental Health Sciences, School of Public Health, University of California, Berkeley

The notion that natural areas and particularly green spaces promote health gained prominence in the late 19th and early 20th centuries with the Garden Cities movement initiated by Sir Ebenezer Howard. Moving populations from densely populated urban areas with poor sanitation to less dense areas removed from the city center was seen as a way of protecting large segments of the population from ills of the industrial city. During this time, institutions for the mentally ill were also often located in bucolic areas under the belief that “therapeutic landscapes” would have a calming influence on their illness. Although laudable for the positive intent, little scientific evidence supported the belief that green and natural areas had a beneficial effect on health.

Over the past 15 years, however, a substantial and growing evidence base suggests that access and exposure to greens spaces, parks, and other natural areas such as waterfronts may contribute to lower environmental exposures, higher levels of physical activity, improved mental health, and subsequently reduced morbidity and mortality.

Parks, green spaces, and other natural areas often play a role in defining ecological functions of urban and suburban environments (Gilbert, 1989). They support biodiversity and provide important ecosystem services (Bolund and Hunhammar, 1999; Crane and Kinzig, 2005; Gaston et al., 2005; Smith et al., 2005). Parks and green spaces also provide many environmental, social, and psychological services that are of significance for the livability of modern cities, including noise reductions (Fang and Ling, 2003; Yang et al., 2005). Trees in urban areas may also modestly reduce air pollution by absorbing gaseous pollutants and storing them, thereby removing them from the atmosphere (Nowak et al. 2006). Urban tree canopies can also moderate temperatures by providing shade and cooling, which helps to reduce the risk of heat-related illnesses for city dwellers (Blum et al., 1998; Cummins and Jackson, 2001; Nowak and Dwyer, 1997; Nowak et al., 1998). A park experience may also reduce stress (Hull and Michael, 1995; Ulrich, 1981; Woo et al., 2009), enhance contemplation, rejuvenate the city dweller, and
provide a sense of peace and tranquility, some of which has been documented with internal biomarkers (Kaplan, 1985; Song et al., 2007). Despite these potential benefits, growing evidence suggests many urbanites lack sufficient access to green spaces and parks, and funding for parks programming differs considerably between neighborhoods and cities (Wolch et al. 2005; Sister et al. 2010).

In this talk, I will review the definitions of green space and focus on ways of characterizing access to green spaces for epidemiological investigations. I build on a framework for categorizing the likely health benefits. A key premise is that the definition of green space is inherently linked to the specific hypothesis or research question posed. As illustrative examples, I will also cover several major studies conducted in North America that explore the link between policies, natural areas, health behaviors, and health outcomes.

Over the past 10 years, I have collaborated with colleagues on several major research projects in California. These projects have investigated access to green space (Sister et al. 2009), program provisioning near green space (Wolch et al. 2005, Dahmann et al. 2010), the environmental quality around green space, whether green spaces are — on a momentary basis — related to physical activity and, finally, whether access to parks and recreation reduces the growth of body mass index (Wolch et al. 2010). These findings have been based on advanced methods for assessing access to green space, parks, and built environment features, that along with the findings themselves, are important to researchers and policy makers in this field.

Although important advances have been made in assessing access to and use of green spaces, several critical short-comings are apparent in the literature. First, many studies continue to use simple Euclidian buffers or at best network buffers of say 500 m to characterize green spaces. Such methods fail to account of the myriad of factors influencing social-spatial behavior, which may lead to true activity spaces that are much larger than the buffers. In addition, there have only been two attempts to characterize green spaces using potential accessibility models that account for all plausible green areas and their potential attractiveness or gravity to draw users in. The very few studies that use objective measures of physical activity have done little to characterize the types of activity that may be taking place. Finally, little emphasis has been placed on the relative dangers of accessing different green spaces in terms of their quality, safety (both on the green space) while accessing these areas. These limitations hamper current efforts to understand more fully the beneficial potential of green space on health.

The North American results from this extensive research program collectively paint a picture of inequality in access to green areas, which is particularly acute for the urban poor and in some racial-ethnic minorities, with more polluted parks in areas of social deprivation, with parks in these areas having much more dangerous access in terms of traffic crash risk, and generally lower quality programming in poorer communities.

Methodologically we have also shown that contact with green areas increases the momentary levels of physical activity using objective measures of both green areas derived from satellites and of personalized physical activity derived from accelerometers. Additionally, we demonstrated that lack of access to parks and programming is associated with the longitudinal growth of BMI in children. We have also shown that traffic density around the home increases
the growth in BMI, and part of this affect may be due to inhibited access to parks and green areas due to traffic danger (Jerrett et al. 2010). New work is being conducted with cell-phone applications that can measure both geographic location and physical activity. Preliminary results to validate the use of phones indicates that research-quality data can be derived on physical activity and momentary emotional states, but some level of error in the GPS appears greater than with stand-alone instruments.

Whether these findings extend in whole or in part to European settings remains unknown. Considerable evidence suggests similar beneficial health effects of green space in Europe, with nascent suggestion of similar equity dimensions (see, e.g., Dadvand et al. 2011). In this context they point to several critical policy solutions as parks and park programming can have measureable benefits for children in terms of increased physical activity and reduced obesity. Policy efforts need to ensure that the benefits of green areas are not simply enriching wealthier groups by (1) endorsing policies that increase access to parks, recreation facilities and programs in inner-city areas with underserved populations; (2) encouraging non-profits to collaborate with low-income cities to help equalize access to park and recreational programming across metropolitan regions; (3) promoting interventions designed to improve access to age-appropriate recreational programs close to children’s homes and schools; (4) investing in parkways, street trees and other forms of green cover that promote walking, running and biking outdoors; (5) supporting traffic calming measures to encourage walkable neighborhoods and safe access to recreation; and (6) establishing collaboration between public sector organizations and the academic community to translate new research into practice. Finally, additional research is needed to understand how different measures of access to green spaces affect the results of epidemiological investigations.

References


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URBAN GREEN SPACE AS A CATALYST FOR HEALTH PROMOTION?

Simon Bell OPENspace Research Centre, Edinburgh College of Art, University of Edinburgh and Estonian University of Life Sciences

Urban green space has become the new focus for many kinds of values and benefits. Owing to the increasingly sedentary lifestyle we lead, people need to become more physically active and to avail themselves of the benefits that urban green spaces (parks, urban forests etc) offer, such as pleasant landscapes within which to walk, run, cycle or to indulge in social activities closer to nature. Research has tended to approach the field of landscape and health from the direction of either the people or the landscape, reflecting the problem of a subject cutting across several disciplinary areas (landscape architecture, environmental psychology, public health etc) where communication and terminologies are difficult to resolve as well as where there are differences in accepted levels of evidence.

In order to understand what aspects of the landscape are important to which people in increasingly diverse urban societies and urban landscapes we need to know more about human-environment relationships and to look at the subject in a holistic way. This short paper attempts to illustrate this using the theory of affordances.

AFFORDANCE THEORY

In order to demonstrate that green space can be a catalyst for health promotion, we need to know about the properties which different types possess and how they affect the way they can be used under different social, cultural, economic and environmental conditions. One of the most useful theories for this is that of affordances, which are, according to Gibson (1979), as “Action possibilities” latent in the environment, objectively measurable and independent of the individual’s ability to recognize them, but always in relation to agents and therefore dependent on their capabilities”, “Affordances are relational properties of the environment taken with reference to a specific individual” and “because affordances are action-related properties of environments, they are particularly well suited for considering the implications of environmental design for health promotion and ‘active living”. Affordances are most essentially about function: they identify possibilities for action, as well as constraints on action. Affordances can be divided between all the potential affordances that are provided by an environment while actualised affordances are those actually used by a person or group of people. These can also be said to occur in different “behaviour settings”.

So when we evaluate a green space in terms of its potential as a catalyst for health promotion, such as its suitability for physical exercise, we need to consider how specific individuals and groups see the space affordances. Thus a specific park may contain very different sets of affordances to a young child, a teenager, a disabled man or an elderly woman, for example. These relate to physical properties and spatial characteristics. In order to uncover the actualised affordances of users of green spaces we have several possibilities. Two approaches will be briefly illustrated:
1. Finding out from people themselves by persuading them to identify the affordances for their home territory using techniques such as “Soft GIS”

2. Observing people in green spaces and analysing their activities spatially and temporally.

1. Soft GIS

Marketta Kyttä and her colleagues at Aalto University in Finland have developed a special interface to capture so-called “soft values” about a neighbourhood using a GIS (Geographic Information System) for use in planning. The approach specifically builds on the affordance theory using different web-based versions of software which is suitable for different age groups, such as children, and this enables many different qualitative aspects - both positive and negative - about a place to be captured spatially.

2. Participant Observations

Observing what people do in green spaces can help to identify the range of affordances and, if done before and after interventions, can reveal what makes a place likely to have catalysing properties. Structured observations of the behaviour of people at a specific site are conducted over several days or seasons, randomly assigning time periods for comprehensive coverage. Codes are used to capture activities and demographic characteristics which are mapped to show the spatial patterns which can then be related to features of the site and thus affordances. If conducted before and after design interventions it is possible to detect the impact these have on behaviour.

As an example, some small interventions were made (“urban acupuncture”) at a derelict, abandoned site at the waterfront in Tallinn, Estonia. In 2011 Tallinn was European Capital of Culture and on the site some benches and a changing cubicle were installed and some vegetation was cleared and a railway line converted into a trail. The post-intervention observations showed clear changes to the patterns of uses and one of the more significant was the increase in the number of women using the space, in part because of the signals about its increased accessibility and safety provided by the interventions and the result of the small-scale vegetation management.

Conclusions

The concept of affordances is a powerful one as it embodies human-environment relationships. We can discover the specific range of affordances at various scalar levels for different social, life stage, lifestyle of cultural groups and from this we can deduce the aspects which make a place attractive for visiting for all kinds of activities and we can improve the design to improve the catalysing possibilities of green spaces for health.

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B-Debate report: “Green Cities, Healthy People”

**B-Debate 2: How to translate the knowledge into action?**

Overall, these four presentations enrich the debate on the role of the environment in health and wellbeing from a practitioner’s perspective. Marcus Grant, discussant, opened the debate presenting an image of the system we all worked in (Figure 1). A very interconnected system, with and interplay of factors, not only determining the health of people and the environment, but also interacting with each other in sophisticated ways.

![Figure 1: The Health Map (with Creative Commons License) (Barton and Grant 2006)](image)

Stimulating debate, he brought to the fore issues of evidence from the four presentations. In terms of evidence there seems to be much research leading to the generation of evidence in this field. However there is a comparative lack of research into evidence application. Receptors of evidence should be policy makers, communities and professional staff, but how much do we know about how they utilise our research evidence? All four presenters posed critical questions to the audience. Helen asked for reactions to park valuation, is the right approach, what are the benefits of alternative approaches? Montse asked how could an evidence base feed into her detailed analysis and action plan for Barcelona? Ingrid asks is evidence necessary in order to act? Don’t we need to know more about process than evidence? And finally George’s conjecture was that the messages are simple – but how do we shape them to fit the circumstances in each context?
Firstly, Helen Beck raised the issue of local information of publicly owned urban green spaces in England (e.g. ownership, condition, monetary valuation), which is used to advise the English government on green urban planning. Monetary valuation was critically discussed in the plenary. Giving a market price to green spaces is seen as a powerful strategy to counterbalance developers’ interests on urban space; and to convince policy-makers of the good value for money of green spaces. There was a discussion on making ante-post assessments of the project as a tool to convince policy-makers. A suggestion was made to form an international network for before and after studies, thereby also helping to create a policy-to-research agenda feedback loop. Evidence is obviously important but clear and concise messages to policy-makers are necessary. The moderator suggested that reducing the ‘economic burden of disease’ has some traction in EU circles. There is also the developing policy argument about co-benefits and cross-benefits, which is highly relevant for green space. The economic evaluation was strongly considered as a good strategy for many. However, this economic evaluation would hardly assess the monetary costs / savings from disease prevention. Having values could facilitate the trading between green spaces and other social activities; e.g.: social housing. Reducing the ‘economic burden of disease’ has some traction in EU circles. There is also the developing policy argument about co-benefits and cross-benefits, which is highly relevant for green space.

Initial discussion touched on issues of inequality and where does this sit in the research. This led into an interesting but brief discussion connecting the value of assets based approach, Antonovsky (salutogenesis) and the previous discussion of the affordances. Furthermore, concerns were raised on how the economic theory of distribution can be used opportunistically for people who can use the economies to their own benefit. In the debate, beside the economic rational, the “human right” and “environmental” rationalities seemed equally valid to justify investment on green urban planning for health and well-being. For instance, Maria Neira reflected on sanitation policies in Europe after the Second World War, which were implemented regardless any cost-benefit analysis.

Secondly, Montse Rivero gave an institutional perspective on the Strategic Plan of Barcelona implemented by its city council. This experience was reported as a good example of science-policy interaction in policy making at local level. In the plenary, bottom-up versus top-down approaches to policy-making were discussed contributing to current debates on governance of public green spaces. From an academic perspective, bottom-up approaches are seen useful to find solutions to green urban planning but weak to draw explanatory paths. From a policy perspective, favouring the implication of civil society giving them the institutional and political support seemed the preferred option by many of the B-debate participants. George Morris claimed that translating promising ideas into sound, effective policies will only be possible with the a supportive infrastructure (institutional and physical) but also governance arrangements which support rather than impede cross cutting/interdisciplinary work.

Ingrid Walda provided an example on how to integrate civil society in green interventions from a more bottom-up approach. She looked at how to create healthy communities in “improved” local green spaces. Furthermore, the case serves empirical research purposes; and therefore, it has a double contribution: on practice and on academia. Contrary to the previous presentation, this case study was finally assessed as a non-good practice. In the debate, one participant asked
for things to change to turn this case into a “good practice”. Ingrid would have done preliminary community engagement to identify other hidden issues beside the quality of the green space and power relationships. Furthermore, preliminary work on community-building; commitment seeking; and opening up to people’s framing on their well-being problems are other elements which could have improved.

George Morris described a new environmental health policy initiative “Good Places, Better health” which had been implemented in Scotland; in contrast to the previous two local examples. He recognised the importance of issue framing using simple conceptual models. Furthermore, other lessons emerging from an initial prototype phase include the need to gather a mixed range of qualitative/quantitative and experimental/non experimental evidence and expert/wider stakeholder testimony. The synthesis of this wider evidence set is a significant challenge. The policy tries to reflect a much richer understanding of how our health and wellbeing is affected by the physical surroundings in which we live and to find ways to navigate in “social complexity” to deliver simple policy messages.

A question was posed whether if we were talking about an economic problem or a socio-ecologic problem. Social factors; as for instance loneliness of the elderly, could have had a bigger impact than temperature per se (climate change) as a cause of death in the French heat waves of Summer 2005.

Furthermore, during the debate, participants reflected on to what extent research beliefs conditioned the evidence collected. Could common sense and emotions inform policy-making as strongly as empirical evidence?

Marcus finished by saying that if we want to stimulate better progress with the urban green health agenda, what is blocking progress more - a lack of evidence or a lack of expertise?

Reference

Presentations

Evidence to inform action and shape policy: Demonstrating the value of urban green space.

Helen Beck, UK Commission for Employment and Skills (previously of CABE Space based within the Commission for Architecture and Built Environment)

Parks and green spaces are the backbone of sustainable and high-quality environments. A growing body of robust research demonstrates that high-quality green spaces bring considerable social, economic and environmental benefits to local economies, communities and individuals (CABE Space (2009) Making the Invisible Visible: The real value of park assets, London: CABE).

Between 1999 and 2011, CABE Space was the English Government’s advisor and champion for good quality, well-designed and well-maintained public urban spaces. Research commissioned by CABE Space aimed to inform action by green space professionals working in urban areas, shape national policy relating to publicly owned spaces and inform debate around these spaces as tangible assets that provide demonstrable economic value.

In particular the research aimed to fill a national ‘green information gap.’ There is very little accurate information about how many publicly owned and managed parks and green spaces there are in urban England, where they are, who owns them, what condition they are in, or how many people are employed in looking after them (CABE Space (2009) The Green Information Gap: Mapping the nation’s green spaces, London: CABE).

Without this basic data, it is challenging to ensure that scarce public resources are allocated and targeted to best possible effect. A better understanding is needed to maximise the benefits of provision for individuals and the areas that they live in, especially because the poorest areas suffer from the poorest quality of environments. Better data gives green space managers the tools to make the most of their assets and protect them from cuts to funding. (CABE Space (2010) Urban Green Nation: Building the evidence base, London: CABE).

In response, research carried out for CABE Space by Heriot-Watt University, investigated over 70 major data sources and assembled an inventory of over 16,000 individual spaces in England. This database, established a baseline from which future changes can be tracked. It collated information demonstrating the value of investing in, and maintaining, public spaces.

The study found that almost 9 out of 10 people use parks and green spaces in urban areas, they value them, and this appreciation is increasing. If people are satisfied with their local parks, they also tend to be satisfied with their council.

However, residents’ general satisfaction with their neighbourhood falls from around 80% in affluent areas to around 50% in the most deprived English areas. Indeed – the provision of parks in deprived areas is worse than in affluent areas. Both in terms of quality and quantity: with the most affluent wards having 5 times more parks and green spaces than those living in the most deprived 10% of areas.
Focusing on ethnicity, the study found that black and minority ethnic (BME) communities fare worst in terms of amount of local green space and the quality of this. For instance, areas with very few BME residents can have up to 11 times more green space than areas where more than 40% of the population are from black and minority ethnic groups.

Subsequent research, carried out for CABE Space by OPENspace Research Centre, further investigated the inter-relationship between urban green space inequality, ethnicity and wellbeing in urban England. Over 500 people were interviewed about their use of green space and asked about their perceptions of safety, personal health and aspirations for local neighbourhood spaces (CABE Space (2010) *Community Green: Using local spaces to tackle inequality and improve health*, London: CABE).

The study found a distinction between the types of spaces considered as a location to visit. 90% of people reported using their local park and the majority (78%) travelled there on foot. In contrast, smaller, less formal spaces close to home are not used by people. Shockingly less than 1% of people living in social housing in the study (21% of the overall sample) said they used the green space on their estate.

Yet registered Social Landlords often own more green space in an urban borough than a local authority – but have no duty to map, plan and manage its upkeep. This matters, 17% of households in England are social tenants, up to half of whom are likely to be aged under 16.

In response, CABE Space and the National Housing Federation set out a practical action plan aimed at social landlords identifying 10 priorities to improve the quality of the green spaces on social housing estates.

To conclude, public green spaces are a local resource for exercise and socialising, community events, education, and offer a respite from the pressures of urban living. If spaces provide what people want, they will be better used. It therefore makes sense to focus on the spaces in communities that are worse off - improving these spaces benefits those that have most to gain.
Urban blue and green spaces management: The Barcelona Green Infrastructure and Biodiversity Plan.

Montse Rivero. Green Spaces and Biodiversity Direction. Environment and Urban Services, Urban Habitat, Barcelona City Council

Urban green areas and the biodiversity they house afford us with an excellent opportunity to witness nature thriving in a major city. These spaces serve specific environmental and social purposes – acting as a backdrop for socialising, playing games and taking strolls – which are essential to improve quality of life and personal wellbeing. Barcelona Green Infrastructure and Biodiversity Plan is a tool that sets out the challenges, goals and commitments of the City Council when it comes to the preservation of green infrastructure and biological diversity. Biodiversity refers to the variety of life forms existing on Earth. It constitutes global natural heritage to be enjoyed by humankind as a whole. In the city, biodiversity is incorporated into the urban network in the same way as the constructed city (buildings, streets, etc.) and green areas play host to a vital component of biodiversity that is often overlooked: fauna, consisting of a huge variety of birds, small mammals, amphibians, insects and other organisms.

Green infrastructure refers to a life support system that carries out a vital role: enhancing the operation of a city and that of other infrastructure. The network of public and private areas with natural, agricultural and landscaped vegetation provides a host of ecological, environmental, social and even economic services. This contribution is enhanced when connectivity is achieved within green infrastructure, in other words, when continuity is attained with respect to green areas. This encourages the mobility of the organisms they house enabling the ecological processes and flows for which they are characterised – with regard to water, materials and creatures, etc. – to unfold undisturbed. It operates as a complete ecological system housing plant life and animal life at the same time.

Barcelona Green Infrastructure and Biodiversity Plan is a strategic instrument that sets out the long-term actions that are needed to attain green infrastructure that can serve a number of environmental and social functions, that can bring nature into the city with all the life forms it houses, that can achieve connectivity between the city and the broader territory and, lastly, that can make the city more fertile and resilient in order to face up to the very pressures and challenges it exerts. The aim is to secure a city model where nature and urbaniety interact and enhance one another for the benefit of citizens to enable them to benefit from the natural heritage and be actively engaged in the protection and improvement of all areas.

Barcelona is home to a complex system of green infrastructure comprising an extensive variety of components, ranging from natural open areas to vertical gardens grown on dividing walls and various parks and squares. Each specific type of area or component has its own features and qualities, which can be enhanced when managed appropriately.
They all provide ecological values that are vital to the city, such as wealth of species, as well as social and cultural values, such as the direct impact they have on wellbeing, health, beauty, culture and potential for socialisation. When we refer to features, we are gauging environmental and sensory-based quality, carrying capacity and cultural interest, among other aspects.

The plan is organised into ten **strategic lines** which are defined in terms of 68 priority actions:

1. **Preserving** the city’s natural heritage.

2. **Planning** green infrastructure to ensure connectivity and strike a balance in distribution.

3. **Designing** the city and its green spaces taking into account environmental services and integrating criteria to enhance biodiversity.

4. **Creating** new spaces for nature and increasing the presence of green infrastructure and biodiversity.

5. **Managing** parks and gardens and other green spaces with sustainability and efficiency criteria, fostering biodiversity.

6. **Preserving** and enhancing the value of cultural heritage, especially in historical gardens.

7. **Improving knowledge for** the management and conservation of green infrastructure and biodiversity.

8. **Spreading** knowledge of green infrastructure and biodiversity and their values, fostering training.

9. **Fostering** green spaces as places for health and enjoyment as well as promoting citizen involvement in their creation and in the conservation of biodiversity.

<table>
<thead>
<tr>
<th>Values</th>
<th>Features</th>
<th>Functions</th>
<th>Types of Spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sociocultural</strong></td>
<td><strong>Biological Quality</strong></td>
<td><strong>Preserves nature</strong></td>
<td>OPEN NATURAL SPACE</td>
</tr>
<tr>
<td><strong>Environmental</strong></td>
<td><strong>Habitat Quality</strong></td>
<td><strong>Preserves wetlands</strong></td>
<td>RIVER AREA</td>
</tr>
<tr>
<td>NATURE DIVERSITY</td>
<td><strong>Soil quality</strong></td>
<td><strong>Protects soil and landscape</strong></td>
<td>CAVE</td>
</tr>
<tr>
<td>COMPLEXITY CONNECTIVITY</td>
<td><strong>Topographic diversity</strong></td>
<td><strong>Reduces air pollution</strong></td>
<td>FOREST</td>
</tr>
<tr>
<td><strong>Cultural Interest</strong></td>
<td><strong>Permeability</strong></td>
<td><strong>Reduces noise pollution</strong></td>
<td>GARDEN</td>
</tr>
<tr>
<td><strong>Health</strong></td>
<td><strong>Presence of water</strong></td>
<td><strong>Regulates the water cycle</strong></td>
<td>VEGE \FAB GARDEN</td>
</tr>
<tr>
<td><strong>Beauty</strong></td>
<td><strong>Flora and fauna index</strong></td>
<td><strong>Provides moisture</strong></td>
<td>POIN</td>
</tr>
<tr>
<td><strong>Culture</strong></td>
<td><strong>Density</strong></td>
<td><strong>Moderates temperatures</strong></td>
<td>SQUARE</td>
</tr>
<tr>
<td><strong>Welfare</strong></td>
<td><strong>Stratification</strong></td>
<td><strong>Enforces biodiversity</strong></td>
<td>FREE *RIED STREET</td>
</tr>
<tr>
<td><strong>Relationships</strong></td>
<td><strong>Health of flora and fauna</strong></td>
<td><strong>Contributed to physical and mental wellbeing</strong></td>
<td>LANDSCAPED * *HILL</td>
</tr>
<tr>
<td><strong>Landscape</strong></td>
<td><strong>Representation</strong></td>
<td><strong>Creatives environments for life and sensory enjoyment</strong></td>
<td>GREEN *FOX</td>
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10. **Strengthening** local leadership, networking and the commitment to the conservation of green infrastructure and biodiversity.

Due to the nature of actions proposed, the Plan has a **2020 horizon**, taking as benchmarks the EU Biodiversity Strategy to 2020, and the United Nations’ Convention on Biological Diversity (CBD), as expressed in the Strategic Plan for Biodiversity 2011–2020 and the Aichi Biodiversity Targets.

‘How to creating healthy green space in practice: evaluation of a pilot project in Rotterdam, the Netherlands’

Ingrid Wakla, Municipal Health Services Rotterdam, the Netherlands

**Evaluating a green intervention**

The National Institute of Public Health and Environment and the Municipal Health Service in Rotterdam evaluated a green intervention in Rotterdam. Potential health profits in the studied green intervention were large, since it was planned in a neighbourhood with low social economic status. An existing small public green space in Rotterdam has been adapted after consultation of people living in the neighbourhood. Goals were to improve quality of the green space and to stimulate its use in order to improve health and well being of residents. In this project it was evaluated if this goal was met. Furthermore, it was evaluated what the successes of this intervention were and what could be learned from it. The cooperation process between project partners and residents was evaluated. In addition, the study method itself was studied to improve the insight in the way in which health promotion spatial interventions could be evaluated.

**Study method**

Data were collected through both questionnaires (at baseline sent to all 320 addresses) and in depth interviews of 20 residents, together with observations of use of the green area. In the low income neighbourhood in which the study took place residents were more prepared to verbal answering questionnaires then to written answering. Halfway the study period we changed from written to verbal questionnaires because of low response on the written version (15%). Although interviewing residents was labour-intensive, through interviews usable information was collected. We recommend to build in ‘go-no go’ moments during this kind of evaluation studies to eventually adapt the methodology because of changes in the intervention that were not foreseen in advance.

**Evaluation of the effect on wellbeing**

The study shows that the impact of the green space adaptation on health and well being is limited. A first likely reason is that the adaptation was smaller then expected in advance and the frequency of use has hardly increased. Residents use the gardens for the same activities (eating and drinking together, let their children play outdoors) and there are hardly any new users. A second likely reason is that other problems in the neighbourhood (unemployment, littering, maintenance, worries about new residents with personal problems) had a larger effect on the residents’ well being.
Evaluation of cooperation process

The cooperation between project partners was evaluated as good, expect for the cooperation with the housing organisation. During the project it became clear that the ambition level of this organisation was lower than that of other partners. Gradually it turned out that this organisation did not support a vegetable garden maintained by residents themselves. The result of this attitude was a limited adaptation of the green space. Possible reasons for the inefficient cooperation are: lack of a Project Start Up, change of personnel, different roles in green intervention and study project and lack of transparent communication.

Since no Project Start Up had taken place, project partners did not talk about expectancies and did not agree on tasks, responsibilities and ambitions at the beginning of the project. No decisions were made on minimal goals or on ambition level that would satisfy all partners involved. With more structure and clear appointments the cooperation might have been more successful. At least it might have provided more committed project partners. Another factor that did not help to increase commitment was the high level of change amongst personnel within the participating organisations and the lack of insight in the connection between the intervention itself and the evaluation of its effect on the residents. Most partners experienced two different projects and focused on their own role in one of them without making this connection and taking responsibility for both to succeed. In addition, despite of several attempts project partners did not succeed in discussing difficulties in a transparent way.

Evaluation of resident participation

Project partners were not satisfied with resident participation since only a small group of residents participated and activities in the garden were not organised together with residents. Possible reasons for this failure are: shortage of joint goals (ideas on the contents of participation differed amongst partners), insufficient budget for resident participation, shortage of clear communication with residents and insufficient support and guidance of residents. Another factor might be mutual lack of trust: residents doubted whether their ideas and suggestions would be taken seriously and the housing organisation doubted the ability of residents in joined responsibility regarding maintenance tasks. Besides, several dominant residents detained others to participate.

Lessons learned

1. Both the evaluation of the cooperation process and resident participation has delivered insights that may be of value for comparable green space interventions.

2. We recommend not to focus on the physical intervention only, but also:

3. provide an efficient participation process with citizens, with sufficient attention and budget for communication, support and guidance with regard to garden activities, and accompany the spatial intervention with social activities with residents in the adapted area;

4. provide agreement on jointly goals, ambitions and process arrangements between all project partners (e.g. engage an independent process companion);

5. consider changing the traditional order of spatial planning by starting with social activities and citizen participation and plan the actual spatial interventions later on and step-by-step, and take time for this process. In this way the necessary commitment of residents has a chance to develop which increases the chance of success of the green intervention considerably.
Rethinking the “public health project” on ecological principles – implications for policy and practice based on the Scottish experience.

Dr George Morris, Independent Environmental Health Adviser, Scotland

The notion of change lies at the core of public health and accordingly those who pursue better more equal population health must always be nimble in their thinking and their actions. Importantly, they must be willing and able to amend their approach in response to changing circumstances (Rayner and Lang, 2012). One very important transition during the modern public health era has been in the way we have come to understand the role of the environment in health and wellbeing. Recently voted by BMJ readers to be the most important medical milestone since the journals inception in 1840 (Ferriman, 2007), the sanitary revolution, which saw the introduction of piped water and water rinsed sewage, was driven by an “environmental conceptualisation of public health”. The unacceptable burden of disease and premature death especially in urban areas was perceived to be a direct consequence of foul emanations (miasma) and, later, pathogenic organisms from a squalid and filthy physical environment. Whilst action to reduce infectious and toxic exposures from environmental carriers such as water, food and air is an undoubted success story, it contributed to a rather narrow, compartmentalised and hazard-focused view of the environment health. This view, combined with ‘individualisation of health status in the 20th century,’ marginalised and constrained environment health, assigning to it, rather limited relevance in key contemporary challenges such as obesity, mental health and wellbeing but also socio-demographic inequality in health and wellbeing. The mismatch between traditional perspectives and a much richer understanding of the environmental in health emerging from medical science was a key driver when, in 2004, Scottish Government began to consider whether a new approach was required on environment and human health. Underpinning the initiative was an implied question - If science had given credence to the capacity of environment to influence health in a positive way; to a psychosocial dimension to the relationship between people and their physical and, perhaps most importantly of all, recognised the complex interaction of many factors including environment in creating and destroying health, could an amended approach to environmental health policy deliver benefits for health and health equity in Scotland? Having considered views from a number of quarters, in December 2008 Scottish Government launched the 3 Year prototype phase of a new national policy initiative on environmental health, Good Places, Better Health (GPBH) (http://www.scotland.gov.uk/Resource/Doc/254447/0075343.pdf). The initiative applied a genuinely new approach to environment and health, choosing 4 health outcomes in children <9 years as its targets These were obesity, mental health and wellbeing, unintentional injuries and asthma. A Scottish Government project team, were partnered in the delivery process by a range of national agencies including those responsible for health protection, health improvement, and environmental protection. Critical support was provided throughout by Government-funded research conducted by the Environmental determinants of Public Health in Scotland (EDPHiS) consortium (http://www.edphis.org.uk/). The GPBH project was tackled through several workpackages concerned with a)” issue framing” using a version of the WHO endorsed Drivers Pressures, State Exposures Effect Actions (or DPSEEA model)(WHO,2004), modified to reflect the recognised socio-ecological complexity within the
determinants of health and wellbeing (Morris et al, 2006); b) the assembly of different types of evidence from diverse sources; c) information, primarily in the form of data about health, environment and social variables; and d) local stakeholder and public engagement. Other innovative elements of the work close attention to the science policy interface and to creating governance arrangements which were both crosscutting and capable of distilling clear messages for policy makers through synthesis of the diverse intelligence sources.

Together with a methodology report (http://www.scotland.gov.uk/Topics/Health/Healthy-Living/Good-Places-Better-Health/Approach/Methodology) evidence reports and recommendations from the Prototype Phase are now available(http://www.scotland.gov.uk/Topics/Health/Healthy-Living/Good-Places-Better-Health)

However of at least equivalent value is the observation coming from the work that certain key components or “pillars” are necessary to support any mature modern policy approach to environment and human health in a complex world. In general terms, these relate to evidence and its synthesis, to infrastructure, to governance and, especially, to the way in which complex issues in public health are framed. However, even over the lifetime of the policy initiative described, it has become clear that the damaging impact of human activity on planetary systems now precludes any possibility that health and wellbeing will be sustained globally and in the medium to long term without attention to the environment. Expressed in another way, the need is not simply for a fuller and more sophisticated representation of environment within public health, but rather for an entirely new environmental conceptualisation of the public health project. Public health and wellbeing must henceforth be built on ecological principles. Some speak of the need to operationalize “ecological public health”. We must start somewhere and organising to deliver through holistic approaches to issue framing, new ways with evidence and its synthesis and through attention to infrastructure and governance (in essence, the pillars identified above) seems a good place to start. There are lessons from the Scottish experience which, when combined with rich insights from elsewhere, point to a way forward.

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B-Debate 3: What will be a good indicator? How to translate indicators in effective policy-making?

Indicators are object to interest to both researchers and policy-makers. Thus, this session bridges between the two previous debates. On one hand, academics hold interest on developing the right indicators to measure the effects of casual pathways in health and wellbeing. On the other hand, indicators provide a good benchmark to assess the effectiveness of environmental health policy implementation. Indicators can tell us that a change we are interested in is happening.

Social justice is a strong political justification in some of these epidemiologic studies. Initial discussion touched on issues of inequality and where does this sit in the research. This led into an interesting but brief discussion connecting the value of assets based approach, Antonovsky (salutogenesis) and the previous discussion of the affordances.

Dr. Arpana Verma presented the European Urban Health Indicator System, which is mainly qualitative and statistically significant. This system allows cross-country comparison. Positive aspects discussed were using the indicator set as a tool for benchmarking and to highlight good practices which could be implemented in other countries. At this purpose, the survey quality would depend on the validation and translation of the questions. In the debate, participants discussed about the limitations of the survey interpretation due to different cultural traditions to countryside. Integrating the affordances concept could enhance some of these difficulties.

In contrast, Dr. Hanneke Kruise integrates perception data or interviews in quantitative indicators on environmental health inequalities. This additional information brings in the local perspective. Combining different indicators typology seems important not only to understand what the indicator measures at local level, but also to bring new ideas on the development of further quantitative indicators. However, how to keep the indicator set as simple as possible was the challenge discussed in the debate. In this line of thought, Professor Catherine Ward Thompson gave an example on how to build indicators which combines objective measures of the physical aspects of the green space with both objective and subjective measurements of health and well-being.

Dr. Erik Gómez-Baggetum brought the ecological economics perspective on green cities. Ecosystem services were at the core of his conceptual framework. Different typologies of urban ecosystem services were presented in relation with their contribution to human well-being. The growing salience of the ecosystem service debate in policy making relates to discourses on how to value nature. This brought back to the debate the convenience of monetary valuation. The speaker highlighted that valuation in many cases is about recognition. For instance, in the case presented on urban allotments what respondents valued the most were non-material things such as the social contact or the direct exposure to nature. Furthermore, ecosystem services valuation ideally should work across scales. In practice, choosing a scale determines strongly what type of services research look at.
The PHENOTYPE project (www.phenotype.eu) faces the challenge of developing a set of variables aiming at integrating the existing knowledge and developing shared understanding between disciplines. Two models were presented: one explanatory and science oriented whereas the other was policy oriented. The systemic character of the model aims at highlighting the relational aspects between variables.

During the debate, one participant reflected on the difficulties of interdisciplinary work and on the power inequalities between disciplines. In an encouraging note, one speaker reported on successful interdisciplinary work experiences.

These models were object of discussion: i) one participant discussed on the convenience to add other variables, which are important to urban planning, as for instance the topology; ii) another participant reflected on the complexity of relational aspect of the model. Different relations could be drawn as plausible explanations. For instance, the variable “ownership” might refer to the tenure form, which from a psychological point of view can relate to the expectations over the control and security in the green spaces; but it might be also related to the type of user depending on the housing ownership. Furthermore, an index as “function” should allow different types of functions to coexist (e.g.: physical activity; employment...); iii) Another participant pointed out that the explanation model and the implementation one might be contradictory since the thinking/logic processes in research and policy-making are different. Furthermore, differences might exist not only because of different rationalities but also on different interests depending on the discipline and the level of implementation.

Finally, the availability of the data might be a limitation. In this sense, collaborative work might be a solution. The nature of health as a multidimensional concept was highlighted; thus different professions hold responsibility towards their potential different contributions.
Presentations

Urban Health Inequality and Indicators

Arpana Verma, Manchester Urban Collaboration on Health, University of Manchester, United Kingdom

There are a number of issues that affect urban areas (UA) primarily e.g. rapid migration into and out of the UAs, inequalities in health outcomes and exposure to poor environmental factors. UAs have specific problems associated with health that are different to non-urban areas that national or regional investigations would not identify. Many urban areas have health policy determined at local level. Policy makers require data at urban area level to inform these local policies. Resource allocation is usually at local level in many countries. The European Urban Health Indicator System (EURO-URHIS www.urhis.eu) project funded by DG SANCO, identified urban health indicators and their availability. One of the key findings from the first project was the lack of routinely collected, comparable environmental indicators. Therefore, EURO-URHIS 2 developed methodology and validated tools useful to policy makers at all levels to make health gains via evidence based policy decisions for urban populations. The objectives were to collect data at urban area level; provide tools for evidence based policy; develop methods for cross-sectional and longitudinal assessment for urban population health including all relevant determinants of health; validate these tools and methods by using existing population-based registries and databases; apply the tools in the field and ensuring they are easy and intuitive to use by policy makers.

The EURO-URHIS 2 project consists of 18 partners in 14 different countries across Europe and Vietnam and the project identifies health problems in urban areas. This project adds to information that is already locally available, in that it is the first study to enable reliable comparisons of health status between different cities in Europe. Policy makers can use the information to prioritise topics for urban health policy and for interventions in an evidence-based way. The data was collected using surveys of existing sources; priorities of policy makers in terms of policies and interventions for their urban area, and a lifestyle/environment surveys. The data was validated and analysed to develop specific tools for policy makers to use. The meta-data collected has formed the context to investigate trends in policy, major health problems, and it has allowed for investigation of the link between the two. Differences in health indicators can be compared for benchmarking and to make changes. The EURO-URHIS 2 project collaborated with policy-makers, researchers, non-governmental agencies and civil society through a number of activities including consultation during the development stage, through training workshops and through the European Urban Health Conference in Amsterdam, September 2012.
Environmental health inequalities: more information needed?

Dr Hanneke Kruize, National Institute for Public Health and the Environment, the Netherlands

Despite the attention for it for quite a while, differences in healthy life years up to 20 years exist between the lowest and the highest socio-economic groups in Europe. Differences in life expectancy at birth between these groups reaches 10 years for men and 6 years for women. Inequalities in related losses have been estimated to cost around €141 billion in 2004 or 1.4% of GDP (http://www.health-inequalities.eu). These inequalities are caused by processes at different spatial scale levels. The socioeconomic and political context in which people live create social hierarchies. Based on their socioeconomic position, individuals experience differences in exposure and vulnerability to conditions that may have a negative effect on their health. These include material circumstances, including housing and neighbourhood quality; psychosocial circumstances; behavioral and biological factors; and the health system (Solar and Irwin, 2010).

Indications exist that green space in the direct living environment of people may help to reduce these health inequalities. In their paper Mitchell & Popham described that health inequalities were smaller in greener environments compared to environments with less greenspace (Mitchell & Popham, 2008). Among others, Maas proved that the relationship between green space and health is stronger for people with a lower SES as opposed to people with a high SES (Maas, 2008). At the same time there is evidence that people with lower SES often have less access to public greenspace in the proximity of their homes and less often have their own garden, and lower incomes are more often dissatisfied with the greenspace in their neighbourhood compared to higher incomes (e.g. Kruize, 2007). Furthermore, the quality of available greenspace is often lower.

Public green spaces are no-cost opportunities for sports, walking, cycling, gardening and conservation work, and are therefore particularly valuable in low-income communities. Offering more good quality space in lower income neighbourhoods and improving the quality of existing greenspaces may result in a more equal access and more frequent use of green space for lower incomes, that are generally difficult to reach for lifestyle campaigns and otherwise. Consequently, it may stimulate physical exercise, social contacts, and reduce stress in these groups and in that way improve their health and well-being. Furthermore, involving lower socio-economic groups in the development and maintenance of green space (e.g. urban agriculture) may potentially improve feelings of responsibility and attachment to their neighbourhood.

Returning to the broader context of environmental health inequalities, public policy may play an important role to create healthy living environments for all. In addition, to assess where and when policy action is needed, it is important to monitor environmental health inequalities. This requires insights on the extent of environmental health inequalities in place and time. For that spatially detailed (GIS) data on environmental indicators, socio-economic indicators, health indicators (or dose-response functions), and population/housing data are needed. In addition,
perception data from surveys or interviews often provide helpful additional information. Challenges are that the required data or models are often not available. Furthermore, data are often available for the general population, not for socio-economic subgroups.

Tackling environmental health inequalities requires intersectoral policy action at different spatial scale levels (figure 1; WHO, 2012).

To know what action or intervention is most effective, we need a better understanding of the drivers of environmental health inequalities and which of these drivers can be influenced by policymakers. Furthermore, it requires evaluation of interventions aiming to reduce inequalities, which currently is often lacking. Challenges are the complexity of the underlying mechanism. A multidisciplinary, system oriented approach is needed for this evaluation.

References


**Ecosystem Services and Co-Benefits for Urban Planning**

**Erik Gómez-Baggethun, Institute of Environmental Science and Technology, Universitat Autònoma de Barcelona**

Concentration of population in cityscapes dominated by technology and built infrastructure has fostered the conception of an urban society that is increasingly decoupled and independent from ecosystems. However, demands on ecosystems services keep increasing steadily in our urbanized planet (Guo et al., 2010). Because decoupling of cities from ecosystems can only occur partially, thanks to the appropriation of vast areas of ecosystem services provision beyond the city boundaries (Folke et al., 1997), citizens depend on ecosystems to sustain long-term conditions for health, security, social relations and other well-being components.

Urban ecosystems are those where the built infrastructure covers a large proportion of the land surface and include all ‘green and blue spaces’ in urban areas, including parks, cemeteries, yards and gardens, urban allotments, urban forests, wetlands, rivers, lakes, and ponds. In public policy discourse, urban ecosystems are often portrayed as ‘green infrastructure’ (EEA, 2011), a metaphor that captures the role that water and vegetation in cities play in delivering ecosystem services. Urban ecosystem services are direct and indirect contributions from urban ecosystems to human well-being, and may include material goods (*provisioning services*), indirect benefits from ecological processes (*regulating services*), and immaterial benefits from nature (*cultural services*) (TEEB, 2011). An example of provisioning services in cities is the supply of food through farming in peri-urban fields, rooftops, backyards, allotments and community gardens.

Important regulating ecosystem services in urban environments include: runoff mitigation, urban cooling, noise reduction, buffering of impacts from climate hazards, and waste treatment (Gómez-Baggethun and Barton 2013). Runoff mitigation increases with the area of green impermeable surface that enhance the capacity to percolate water in soils thereby reducing the pressure on urban drainage systems (Bolund and Hunhammar, 1999). Urban cooling results from the blue and green infrastructure that regulates local temperatures, including water areas that absorb heat in summer time and release it in winter, and vegetation that absorbs heat from the air through evapotranspiration and moderate local temperatures by providing humidity and shade (Chaparro and Terradas 2009). Noise reduction results from absorption, deviation, reflection, and refraction of sound waves by urban soil and plants, such as the belt trees that disperse sound energy through their branches. Air purification takes place through removal of pollutants such as ozone (O3), sulfur dioxide (SO2), nitrogen dioxide (NO2), carbon monoxide (CO), and particulate matter less than 10µm (PM10) by deposition and filtration of particulates through the leaves of trees and shrubs (Nowak et al., 2007). Impacts from climate hazards can be buffered by ecosystems such as mangroves or coral reefs that act as natural barriers during events of storms, waves, floods, hurricanes, and tsunamis (Costanza et al., 2006). Waste treatment operates through ecosystems that filter out, retain and decompose nutrients and organic wastes for urban effluents. Ponds, for example, filter wastes from human activities reducing the level of pollution in urban waste water, urban streams fix nutrients from
organic waste and plant communities can play an important role in the decomposition of many labile and recalcitrant litter types (Vauramo and Setälä, 2011).

Last but not least, urban ecosystems provide a variety of cultural services and benefits by offering opportunities for recreation, physical exercise, mental health, and cognitive development (Chiesura 2004). Moreover, urban dwellers hold moral, spiritual, educational, place, identity, and community values that often are inextricably attached to urban nature.

The importance of urban ecosystem services can be approached from multiple value perspectives, each of which may capture a relevant dimension of urban environmental policy and planning (Gómez-Baggethun et al. 2013). In some cases, economic costs from the loss of green infrastructure can be captured through direct or indirect monetary valuation methods, such as calculations of the expenses involved in producing and maintaining public services and supplies through built infrastructure as similar services provided by urban ecosystems are lost or degraded. In other cases loss of green infrastructure involves a degradation of social and cultural values reflecting impacts in emotional, affective, and symbolic views towards urban nature that in most cases cannot be adequately captured by commodity metaphors or monetary metrics. Ethics and aesthetics, health, urban environmental justice, economic costs and benefits, and resilience are all relevant languages for the valuation of urban ecosystem services.

Conserving and restoring ecosystem services in urban areas can reduce the ecological footprints and the ecological debts of cities while enhancing resilience, health, and quality of life for their inhabitants. Conversely, loss of urban green infrastructure often involves a degradation of the many social, cultural, and symbolic values attached to nature, long-term economic costs and an increase the vulnerability of cities to heat waves, flooding, storms, hurricanes, tsunamis and other environmental extremes in the context of accelerating climate and other global environmental change. Urban ecosystem services can play a key role in reconnecting cities to the biosphere, enhancing the urban commons, and guiding policies to improve quality of life in urban environments. Strategies aimed at restoring and enhancing urban ecosystem services should play a major role in the transition towards more healthy, resilient, and sustainable cities.

References


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Motivation, Benefits, Biodiversity and Urban Nature: An English city case study

Katherine N Irvine, PhD¹, Senior Researcher in Environment, Sustainable Behaviour and Well-being, Social, Economic and Geographical Sciences Research Group, James Hutton Institute, Scotland UK

This case study presentation drew together insight from two interdisciplinary studies undertaken in Sheffield, UK, a former industrial city with a population of approximately a half million. Sixty-six percent of the urbanized area is considered green space with 41% publicly available (Gaston et al. 2005). The research incorporated methodologies and frameworks from environmental psychology, ecology and medicine to explore linkages between motivation for use of urban green space, ecological quality, and health/well-being benefits. Funding came from the UK’s Engineering and Physical Sciences Research Council to the CityForm consortium (GR/S20529/1) and the URSULA consortium (EP/F007388/1). Three issues were explored in this presentation:

- To what extent ‘health’ is self-identified by users of urban nature areas
- To what degree existing theories and models account for the perceptions and experiences of the users of these spaces
- To what extent biodiversity contributes to the urban nature experience

Overview of Studies: The Park study was conducted in 15 publicly accessible urban parks (1-23 hectares) with a sample of 312 park users (Fuller et al. 2007; Irvine et al. 2010; Irvine et al. 2013). The River study included 34 publicly available riparian green space sites with a 1100 participants, all of whom were using the study sites (Dallimer et al. 2012). The cross sectional in situ study design incorporated questionnaires with open- and closed-questions (conducted face-to-face in the study sites), park use observation, and ecological surveys (assessing species richness of birds, butterflies and plants). Several people-environment-health frameworks underpinned the research including Attention Restoration Theory (Kaplan and Kaplan 1989), psycho-physiological model (e.g. Ulrich et al. 1991; Manfredo et al. 1996), sense of place (e.g. Manzo 2003; Patterson and Williams 2005), therapeutic landscapes (e.g. Gesler 1992; Williams 1998) and the biopsychosocial-spiritual health model (e.g. McKe and Chappel 1992).

Park Use for Heath/Well-being?: Park usage profiles (based on observation from the Park study) revealed that over half (51%-58%) of the activities undertaken by park users were sedentary (i.e. lying/sitting down, sitting in café) while just under two-fifths (37%-39%) could be considered active (i.e. walk, sport, exercise, walk dog). This pattern was consistent for weekend and weekday as well as weekday lunchtime usage. [See Irvine et al. 2010 for further detail.]

The research presented here is at its core collaborative; key collaborators include Richard Fuller, Martin Dallimer, Kevin Gaston, Sara Warber, Zoe Davies, Patrick Devine-Wright, Phil Warren, Paul Armstrong, the research assistants and individuals who agreed to participate in the studies.

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Two open-ended questions asked participants to describe the main reasons for coming to the site and describe how they felt after being there. Analysis sought to understand the extent to which health was self-identified as a motivation for and a benefit of use. It also drew insight into the degree to which users’ perceptions and experiences were reflected in the frameworks. Findings from the Park study are discussed here (see Irvine et al. 2013 for detailed method/analysis; the River study is a manuscript in preparation).

Motivations for park usage were many and often multiple for any one individual. Six domains were identified, each made up of sub-themes and codes (Irvine et al. 2013). In frequency order, these included physical (subthemes: pursuits, restoration), space qualities (nature, park features, sense of place), children, cognitive (pursuits, restoration), social, and unstructured time. Physical pursuits were most predominantly mentioned, specifically walking (both in and through the space); space qualities emphasized the tangible (e.g. proximity, fauna) and the intangible (e.g. attachment to the place, fresh air); children clearly brought adults into the park; social-related reasons were minimally mentioned and, although a small proportion, the idea of unstructured time was present as a visit motivation. Across the set of responses, aside from physical health, there was minimal specific mention of concepts found within the underpinning frameworks.

Seven domains were identified (also consisting of sub-themes and codes) that represented a breadth of ways people felt after leaving the park (Irvine et al. 2013; Warber et al. 2013). The physical domain was most frequently present with ‘relaxed’ the predominant state (other sub-themes: revitalized, depleted, comforted, uncomfortable). Two emotion-focused domains emerged: affective and place attachment. The former consisted of mostly positive feelings within oneself while the latter emphasised positive feelings toward the place (value of the park, appreciation); a small proportion of neutral or negative feelings were present. The remaining domains were spiritual (tranquil, interconnected), cognitive (satisfied, mentally recharged, rushed), a global sense of wellbeing (better, healthy), and social. This set of responses represented multiple dimensions of well-being with some frameworks more represented than others.

These findings suggest that park usage is not always active. They also provide a breadth, depth and salience of visit motivation and park use benefits with insight into how the park user speaks about the experience which may not always focus on health nor directly match the current people-environment-health frameworks. Insight can also be drawn for potential measure development (Irvine et al. 2013).

Ecological Quality and Wellbeing: The Park and River studies both considered the relationship between actual species richness, several ecological factors (number of habitats, tree cover) and well-being. Psychological well-being measures were derived through factor analysis (see Fuller et al. 2007; Dallimer et al. 2012 for detail), focusing on reflection, place identity and place attachment. In both studies there was no apparent relationship between butterfly richness and psychological benefit. Within urban parks, reflection and place identity were positively related to plant species richness and number of habitats; emotional attachment to the space was
positively related to bird variety. There was also a correlation between perceived and sampled species richness for plants and birds.

In the urban riparian green spaces, these relationships showed less consistency. All three aspects of well-being increased with higher bird variety - a finding that replicates and extends Fuller et al’s (2007) urban park study. In contrast, as plant diversity increased, all aspects of well-being declined, there was no relationship with habitat diversity yet as tree cover increased so too did psychological wellbeing. Interestingly, psychological benefit was positively related to participants’ perceived species richness of all three taxonomic groups.

The findings raise important and challenging questions about the relationship between biodiversity and wellbeing. Increasingly governments and other decision making bodies within the UK, Europe and globally are interested in understanding – and managing – the relationship between ‘natural capital’ and human health/wellbeing, particularly in light of projected demographic and environmental changes. The identified mismatch between the actual and the perceived species richness and the influential role of perceptions on experience suggest a need to more fully embrace a nuanced relationship between conservation and human well-being agendas.

Concluding considerations noted at the end of the talk included: the design of interventions that enhance a broad spectrum of health/wellbeing, not just physical and mental; how to encourage ‘going to the park’ and still keeping it fun’ in spite of the increasing interest in, for example, ‘nature prescriptions’; the role of actual and perceived ecological quality to the experience; the design of urban areas to facilitate contact with urban nature in one’s everyday routine; and the opportunities – and challenges – for synergistic linkages between biodiversity conservation, sustainability and the well-being agenda.

References


Irvine KN, Warber SL, Devine-Wright P, Gaston KJ. Understanding urban greenspace as a health
B-Debate report: “Green Cities, Healthy People”


Access to green space in disadvantaged urban communities: evidence of salutogenic effects based on objective and subjective measures of wellbeing.

Catharine Ward Thompson, Professor of Landscape Architecture and Director of OPENspace research centre, University of Edinburgh.

This presentation described two case studies from OPENspace research centre’s work in Scotland, exploring links between access to green space, perceptions of and activities in green space, and health and quality of life.

The first study was part of the GreenHealth project, supported by the Scottish Government and undertaken in collaboration with the James Hutton Institute and the Universities of Heriot-Watt, Glasgow and Westminster. It investigated whether there is a link between objective measures of the amount of green space in the residential environment and both objective and subjective measures of health and wellbeing. It was undertaken with residents of deprived urban communities in Scotland. The study found evidence of a link between green space quantity and both perceived stress (using the Perceived Stress Scale (PSS)) and mental wellbeing (using the shortened version of the Warwick-Edinburgh Mental Wellbeing Scale (SWEMWBS)), with different patterns for men than for women. Four different measures of green space quantity around each participant’s home, of differing resolution and composition, were used in the study. Using one of the simplest measures of green space in the study - a measure of green space based on the Census Area Statistics (CAS) for Wards, which includes parks, woodlands, scrub and other natural environments, but not private gardens - we found a significant association between higher levels of green space and lower levels of physiological stress, as indicated by diurnal salivary cortisol patterns in a sample of unemployed men and women. This is important in demonstrating an objective method for measuring the salutogenic effects of environmental settings such as green space within the context of people’s everyday lives.

The second study focused on urban forestry and was supported by the Forestry Commission Scotland (FCS). It involved a natural experiment to study the effects of improvements under the FCS Woods In and Around Town (WIAT) programme in a disadvantaged urban community, compared with a similar community without such environmental interventions, both in Glasgow. A repeat cross-sectional survey of the community resident within 500 m of the local woodlands/green space was used to examine perceptions of neighbourhood quality of life, neighbourhood environment, and local woodland qualities, frequency of woodland visits and levels of outdoor physical activity. Results show significant differences over time in the intervention site in perceptions of the quality of the physical neighbourhood environment, an indicator of quality of life. The research also found significant differences in woodland use, in attitudes to woodlands as places for physical activity and in perceptions of safety in the intervention site over time, compared with no significant change in the comparison site.

The second study has acted as a pilot for a further study currently under way to explore the impact of woodland improvement interventions on community-level, self-report stress,
wellbeing, physical activity and quality of life. The presentation will conclude with an overview of this and other opportunities for further research on green and healthy cities.

References


SYNTHESIS AND CONSENSUS BUILDING

URBAN NEXUS project: aspects and discussions related to health and quality of life in urban areas

Núria Blanes, SGR Interfase, Departament de Geografia, Universitat Autònoma de Barcelona

Urban Nexus is a coordination and support action funded by the European union under the 7th Framework Programme. This coordination and support action builds on the work of the FP6 project URBAN-NET, which formulated the key dimensions of sustainable urban development that URBAN-NEXUS is now working on:

- Urban Climate Resilience
- Health and Quality of Life
- Integrated Urban Management
- Integrated Data and Monitoring
- Competing for Urban Land

In order to achieve a sustainable city, a vast range of interconnected issues need to be linked up: these include environment and urban planning, energy, water scarcity, transport, tourism, technology and innovation, governance and education, social equity and cohesion, and sustainable consumption. URBAN-NEXUS is focused on combining existing knowledge into useful and shared 'integration perspectives'. Through these integration perspectives URBAN-NEXUS identifies which practices and innovations from various policy fields (urban climate resilience, health and quality of life, competing for urban land) can practically be combined with the practices and innovations from other policy fields to create integrated and viable solutions for more sustainable cities.

With the focus on citizens, considered as the individuals impacted by the improvements or deterioration of the quality of the urban environment as a result of policies, structures and patterns that determine their quality of life, the dimension of Health and Quality of Life in urban areas has been studied.

A conceptual framework analysing the different aspects influencing health and quality of life have been developed based on interlinkages and connections through governance and policies developed at city level for the following factors:

- socio-economic and cultural environment (social equity, vulnerable groups, gender issues, and cultural specificities),
- the environmental stressors and alleviators (air, noise and electromagnetic pollution versus green infrastructures and accessibility)
and the urban management types and urban structure (focused on land use, integrated urban management, services, quality of the surroundings, status and flows of the urban area, housing quality, etc.

As a result of this analysis based mainly on a literature review and the compilation of several project’s results, an outcome report was developed to be approached during a structured discussion session with experts and scientists dealing with health and quality of life in general or dealing with a specific topic in particular. A word map highlighting which are the main concepts arising throughout the document is shown below:

Nevertheless, and after the discussion took place, it has been evident that the participants put much more emphasis on the society and on the public, on the participation at local level, on the share of knowledge, on the education,... than on the problems being highlighted in the report. Isolated solutions for specific problems was not perceived as a pathway to improve the quality of life in urban areas. Instead, joint efforts involving people itself and the society in general (not only politicians and scientific experts) with local solutions agreed after a participatory process, for example, have been encouraged and demonstrated as the upcoming roadmap for having healthier cities with a greater quality of life of their inhabitants.

Building this shared knowledge among the society, politicians, scientists and private companies in order to improve quality of life and health in urban areas is not going to be an easy task.
More participative processes for planning, designing and managing a urban area should help, tackling main concerns of the people, such as the mobility policies or the improvement of their neighbourhoods (through the establishment of more green areas, through the encouragement of social mixed neighbourhoods, etc.).

FRAMEWORK, KEY VARIABLES AND INDICATORS

Roderick J. Lawrence, Institute for Environmental Sciences, University of Geneva, Switzerland

The design and planning of our cities, public spaces and surrounding environments, whether suburban or rural, can affect our health and well-being. For example, in many cities around the world, according to the strength of the urban health inequalities, life expectancy can vary significantly from one neighborhood to another. Furthermore, access to natural places like public green spaces can be seen as an important catalyst for health promotion.

This presentation presents an overview of research and what is known about this vast subject. Some concepts including affordance, attractiveness, behaviour setting, co-benefits, multifunctionality as well as latent and manifest functions are presented as being pertinent for the advancement of our current knowledge. Then a systemic conceptual framework is presented to overcome the lack of coordination and improve the integration of diverse contributions. This systemic framework has been used to develop a conceptual model of plausible pathways and processes that link natural environments, human behaviour and health outcomes. A second model derived from a critique of the DPSEEA model is proposed for implantation by professionals. Finally, eight categories of key variables that characterize the attractiveness of green and blue spaces for health promoting behaviours have been identified. These are ownership, size/shape, biological characteristics, functional uses, localisation, management, community identity and weather. Different stakeholders have been involved during all the process of elaboration, from the conceptual framework and the key variables. Once these have been validated then the core indicators for each variable can be developed. These stakeholders include the members of the Swiss National Advisory Board (NAB) as well as stakeholders from Spain and the Netherlands, including scientists, policy-makers, natural space managers, health professionals and land-use planners.