



transforming urban spaces

greenspace scotland

research report

the links between greenspace and health:

a critical literature review

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Executive Summary

Aims of the review

This review was commissioned by Greenspace Scotland to support the development of a Health Impact Assessment Guide that will contribute to the greater recognition of the role of urban greenspace in improving health. More specifically the review was intended to identify and explore the links between physical health, health behaviours (i.e. physical activity), mental health and general well-being, and social health and different aspects of greenspace, including:

- the physical aspects of greenspace;
- the perception of greenspace;
- social aspects of the use of greenspace;
- the process of being involved in greenspace activity;
- the context of greenspace in the local area.

Approach and Methods

In undertaking this review a number of the methods associated with systematic reviewing were applied. Complex search strategies were developed. Thirteen databases were searched. A set of inclusion and exclusion criteria were applied to the studies identified by the searches, and all potentially relevant studies were quality appraised. A total of 87 studies have been included in this review. Studies have been predominantly undertaken in the USA and the UK, but there are a significant number of studies that have been undertaken in Australia, Canada, the Netherlands, Japan, Sweden and Denmark. The majority of studies are cross-sectional in design.

Findings: Summary Points

Impacts of greenspace on population health

The evidence indicates a positive relationship between greenspace and general health. By controlling for socio-economic status the studies demonstrate overall that better health is related to greenspace regardless of socio-economic status. The studies do not, however, explain the mechanisms by which greenspace has a positive effect on population health, nor do they demonstrate whether different types of greenspace have a greater or lesser impact on health in urban environments.

Links between greenspace and levels of physical activity

The evidence indicates that people who use greenspaces regularly are more likely to take exercises, and those who use greenspaces most regularly usually live nearby. The attractiveness or quality of greenspace is an important determination of greenspace use. Evidence indicates that greenspace is most valuable as a resource for physical activity when used by high volumes of people: therefore spaces need to be accessible, of sufficient size, and connected to residential areas. Access to safe greenspaces is particularly important for children and young people.

Although there is evidence that health promotion programmes can promote an increase in physical activity, it is more difficult to prove that greenspace plays a particular or significant or additional role in such programmes. However evidence does suggest that the attractiveness of green settings does provide an additional incentive to continue exercising.

Links between greenspace and mental health and well-being

Studies consistently show a relationship between levels of stress and access to urban greenspaces. The more time people spend in outdoor greenspaces, the less stressed they feel, regardless of age, gender, and socio-economic status. While the particular features of greenspaces that reduce stress are less well-understood, authors suggest that various factors may in isolation or combination impact on stress. Such factors include outdoor activity and exercise, natural daylight, stimulation of the senses, and the aesthetic experience.

Lay perceptions of greenspace

Many studies undertaken in the UK have explored the public attitudes towards greenspaces and the environment. Lay perceptions of greenspace are generally positive. There are widely shared beliefs that greenspaces improve quality of life. The opportunities offered by greenspaces to be in contact with nature, to have fresh air, to be outdoors, to be close to plants and animals, are generally seen to have a profound impact on wellness and well-being. Greenspaces are seen to promote positive emotional experiences. Although the studies show that greenspaces are valued as places for exercise, for many people this is not the primary value placed on them. More often the “de-stressing” capacity of greenspaces, their role as an escape from the dirt, stress, noise and visual hardness of urban settings and their restorative capacity are the most valued aspects. Despite the generally positive perceptions of greenspace, personal safety and fear of crime feature as a key concern of greenspace users.

Social value of greenspace

Parks and greenspaces are most usually free in the UK, and are not highly regulated. They are one of the few remaining spaces that are available to all, and neutral spaces where people from different communities and backgrounds come together. Surveys show that individuals and families undertake a wide of activities in greenspaces. Greenspaces are frequently noted as places of attachment and affection for individuals and communities, and as a distinct feature of localities. They are seen to improve local neighbourhoods, boost community pride, and offer opportunities for exercise and recreation.

Hazards and risk associated with greenspace

The searches identified a small number of papers that explored the hazards and risks associated with greenspaces, including the risk of contacting blood born viruses from discarded syringes in parks, and the risk of exposure to Lyme disease as a result of being bitten by ticks. It would seem that a more specific enquiry would be needed to explore such risks and associated risk-reduction strategies.

Conclusions

With regard to physical health, evidence demonstrates a positive relationship between greenspace and health, however the mechanisms which generate these positive effects are not entirely clear. The value of greenspaces as places to exercise is unquestionable. Access to greenspace does not, however, appear to be the key variable for explaining levels of physical activity, although people who use parks regularly appear to take more exercise. Exercise is not, however, the primary motivation for the majority of park users, and many greenspace activities are sedentary or involve gentle exercise. Evidence from a number of studies indicates that greenspaces are most valued as an escape from the stress, dirt, and noise of urban environments.

Experiencing greenspace has a positive effect on levels of stress, however the evidence base is as yet insufficient to address more detailed questions exactly how greenspace impacts on stress, and whether different types of greenspace have different effects.

Time and resources did not allow for citation searching, and it became clear as the review progressed that there is a wider literature covering many different aspects of greenspace. We are confident that our search strategies were rigorous and extensive, and that no significant or major study has been omitted from this review. We also note that there are particular challenges for those conducting reviews in complex health and social policy areas, where many different disciplines and agencies are investigating a variety of related themes and topics. For example, the impact of greenspace on environmental variables that may have positive effects on health was not within the remit of this review, neither was the “healing” capacity of greenspaces and greenspace activity. These and other themes might usefully be investigated further. The topicality of greenspace (as is evident from the number of studies and publications undertaken very recently) means that the evidence base is fast developing. It is also highly variable, ranging from large scale, in-depth studies to many smaller, less robust evaluations.

We note the valuable review by the Health Council of the Netherlands (HCN, 2004) which covers related topics in considerable depth, and also the mapping work by Bell and colleagues at the OPENspace Research Centre, and its associated database which gives indications of current work on-going in this field.

CHAPTER 1: Aims of the review and methodology

Aims of the review

This review was commissioned by Greenspace Scotland to support the development of a Health Impact Assessment Guide that will contribute to the greater recognition of the role of urban greenspace in improving health. More specifically the review was intended to identify and explore the links between physical health, health behaviours (i.e. physical activity), mental health and general well-being, and social health and different aspects of greenspace, including:

- the physical aspects of greenspace;
- the perception of greenspace;
- social aspects of the use of greenspace;
- the process of being involved in greenspace activity;
- the context of greenspace in the local area.

Definition of key terms

We recognise that there is no single definition of greenspace, and various authors propose various definitions (see for example, Swanwick et al (2003) for a definition and typology of open space). For the purposes of this review, we sought papers that addressed various types of greenspaces, but with a particular emphasis on greenspace in urban areas (see the inclusion and exclusion criteria below). As noted above, the requirement was to consider the impact of greenspace not just on physical health, but on all aspects of physical, mental and social well-being.

Review methods

In undertaking this critical review, we have applied a number of the methods associated with systematic reviewing – notably rigorous and transparent searching techniques, the application of inclusion and exclusion criteria, as well as the application of a simple quality assessment tool. The application of these techniques makes this more than a traditional literature review. The intention was to locate key studies published since 1990 (in English), and to synthesise the main messages that could be drawn from robust evidence to address the review questions.

Search Strategy

The following databases were searched for relevant published literature:

- MEDLINE
- EMBASE
- PsycINFO
- HMIC: Health Management Information Consortium
- Cochrane Database of Systematic Reviews
- Social Science Citation Index

- Science Citation Index
- Sociological Abstracts
- Social Policy and Practice
- Planex
- Environline
- Architecture Database
- ICONDA

Complex search strategies were developed by an information scientist (Lindsey Myers), and agreed with the Project Advisory Group (see Appendix A for list of members). The full strategies and descriptions of the searches undertaken are presented in Appendix B. In addition to electronic databases, searches of relevant organisational websites were also carried out. These organisations are listed in Appendix C. All searches were carried out in April and May 2007. Some additional references were also provided by the Project Advisory Group. This review was also informed by the findings of an earlier critical literature review on the physical characteristics of neighbourhoods and health commissioned by the Glasgow Centre for Population Health (Croucher et al, 2007).

In all, over 550 references were identified and initially scanned for relevance using abstracts or summaries. The references were managed in the Endnote library *greenspaceMASTER.enl*.

Note that time and resources available for the review did not allow for citation searching (i.e. where citations from retrieved studies are checked and in turn retrieved to be included in the review). It became clear however that our searches, although rigorous, had not identified all key studies that were referenced by other authors.

Inclusion and exclusion criteria

Papers identified by the search strategies were considered for inclusion in the review if they met the inclusion criteria presented in Table 2.1 below.

Table 2.1: Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Studies reporting the impact of greenspaces on: <ul style="list-style-type: none"> ▪ Physical health ▪ Health behaviours ▪ Mental health and well-being ▪ Social health 	Studies reporting the impact of greenspace on other topics, for example: levels of pollution.
Greenspace to include: <ul style="list-style-type: none"> ▪ Public parks and gardens; ▪ Community gardens and allotments; ▪ Urban planting and landscaping; ▪ Cemeteries ▪ Sports fields ▪ Green path/routes and trails ▪ Brownfield sites ▪ National parks and other wilderness 	Greenspaces to exclude: <ul style="list-style-type: none"> ▪ Private and domestic gardens ▪ National parks and other wilderness settings outside the UK.

Inclusion criteria	Exclusion criteria
environments in UK only	
Studies undertaken in developed countries.	Studies undertaken in developing countries.
Studies focusing on impact of urban greenspaces, and/or greenspaces that are near and/or accessible to urban areas (for example, greenbelt, country parks). Note: Urban settlements defined within Scottish context as settlement with more than 3,000 people	Studies focusing on greenspace in a rural context.
Papers reporting evaluations and empirical studies.	Papers not reporting empirical studies, for example, editorials, think-pieces, theoretical and methodological discussion papers. Papers reporting primary studies that have been previously included in earlier, methodologically robust reviews. Theses and dissertations*
Literature reviews on relevant topics with adequate reporting of review methods.	Literature reviews not reporting review methods.
Papers published in English	Papers published in languages other than English.
Papers published since 1990	Papers published before 1990

*Note that theses and dissertations were primarily excluded for practical reasons as these documents are often difficult to locate and costly to retrieve.

Quality appraisal

There is an on-going methodological debate regarding the relative value and mechanisms for appraising evidence from a range of research paradigms. Papers were only included in this review if they met the quality criteria developed by Croucher *et al* (2003). This tool was designed to be relatively transparent and simple to use across a range of study designs. It allows the inclusion of robust studies, and the exclusion of studies that are not considered to be sufficiently robust to generate confidence in the reported findings. These quality criteria are presented in Appendix D.

Papers that were excluded from the review because they either did not meet the inclusion and exclusion criteria, or because they did not meet the quality criteria are presented in Appendix F. These include examples of practice guides, case studies, and 'think' pieces that could not be included in a critical review, but may be of considerable use and interest to some readers of the review.

Overview of studies included in the review

A total of 87 primary studies have been included in this review. Approximately one third of these have been undertaken in the USA, a further third in the UK, and the remaining studies in Australia, Canada, the Netherlands, Japan, Sweden and Denmark. Many of the larger studies of greenspace have been undertaken in the UK, and were funded by various government departments and agencies. These have tended to adopt a multi-method approach incorporating large scale surveys, and qualitative interviews and focus groups. The USA based studies are smaller in scope. Almost all the studies are of a cross-sectional design, although there are a very small

number of quasi-experimental studies, and one longitudinal study. There is also a significant body of qualitative work.

The search strategies identified 20 literature reviews, addressing a range of topics of relevance to this review. These varied in their focus, for example Bird (2004) considers how greenspace and biodiversity can impact on physical activity. CJC Consulting (2005) address the economic benefits of green space. The Health Council of the Netherlands (HCN, 2004) was concerned with the impact of “nature” on health, and so forth. None of the reviews we identified gave a clear account of their methodological approach by presenting search strategies, inclusion criteria or critical appraisal methods. The absence of search strategies is frustrating. Although there is a common pool of studies that are regularly cited (and many are cited in this review), various reviews report unique references (often conference papers, or studies that come from the grey literature) that we have not been able to trace in our searches. Despite the general lack of methodological reporting, these reviews are not without value. Many address related topics that are outwith the remit of this review, and may be useful reference points for some readers (for example, the review by Land Use Consultants (2004) gives a clear account of recent UK policy regarding greenspace).

Of these reviews the most important and rigorously conducted review is the systematic review *Nature and Health* commissioned by the Health Council of the Netherlands (HCN, 2004) that, as the title suggests, considers the relationship between nature and health, and was conducted by an extended expert committee. It is available in English from <http://www.healthcouncil.nl/pdf.php?ID=1019&p=1>. This is a particularly valuable review with a very broad scope, covering the topics considered here, but also the role of nature in the home, workplace, therapies that use nature (such as horticultural therapy), the impact of nature on child development, and the impact of nature on personal development and sense of purpose. The review also draws on studies published in Dutch, thus drawing in a wider literature than was possible within the resources available for this review. The review does not present a search strategy, however studies were appraised by a multi-disciplinary expert committee using methodological assessment, consensus of results, diversity of research methods and outcomes measures, and connection to accepted theory to come to an agreement about strengths and weaknesses of particular studies.

Of further interest is the recently completed scoping review *Green and Public Space Research: Mapping and Priorities* (Bell et al, 2006), commissioned by the Department for Communities and Local Government. The database of more than 1,500 studies is freely available on the OPENspace website (<http://www.openspace.eac.ac.uk>).

The papers identified by the searches indicate that there is considerable interest in the links between greenspace and health across a range of different disciplines, including: public health, leisure and recreation management, environmental psychology, ecology, and others. Many papers highlight concerns about lifestyle-related ill health, and provide useful accounts of the prevalence and incidence of

diseases and conditions (for example, obesity, cardiovascular disease, Type II diabetes, cancers, mental illness, and osteoporosis) that are consequent to the increasingly sedentary lifestyles of the populations of most developed and developing countries (see for example, Bird, 2004; Pretty et al, 2005). Greenspaces are seen to have a significant role in promoting public and individual health by providing space for both formal and unstructured exercise, play and recreation, as well as having a crucial restorative and stress reducing function.

It is worth noting that the famous study by Ulrich (1983) is cited by almost all the papers included in (and excluded from) this review as evidence of the restorative properties of nature. Of interest are the reservations expressed in Health Council of the Netherlands review. While the Ulrich study is seen as important being the first to provide evidence that a view of nature can influence speed of physical recovery, the methods (data were collected over a period of nine years with little account of intervening changes in medication or treatment) are considered to be weak, and the outcomes measures (date of discharge from hospital and comments by nursing staff) are described as “*neither sound nor reliable as measures of health effects*” (HCN, 2004, p41).

Structure of the review

In the following chapter the findings of the review are presented under the following headings:

- Links between greenspace and population health;
- Links between greenspace and levels of physical activity;
- Links between greenspace and mental health and well-being;
- Lay perceptions of greenspace;
- Social value of greenspace;
- Hazards and risk associated with greenspace.

In Chapter Three we reflect on the main messages that can be drawn from the review.

CHAPTER 2: The links between greenspace and health: literature review

Introduction

In this chapter we present the substantive findings of the review. The studies reported here are drawn from a variety of disciplines, and many - although not all - utilise a cross-sectional design. There is also a substantial body of qualitative work that has primarily been conducted to explore people's perceptions and experiences of nature and greenspaces, and the lay values assigned to such places.

This literature is fast developing as is demonstrated by the increasing numbers of studies and reviews that have been undertaken in the last five years that address different aspects of benefits that greenspace bring to physical and mental health and social well-being.

Impacts of greenspace on population health

The search identified five epidemiological studies that specifically investigated the role of greenspace with regard to general health (De Vries *et al*, 2003; Takano *et al*, 2002; Maas *et al*, 2006; Nielsen and Hansen, 2007, Mitchell and Popham, 2007). Further studies reported secondary analysis of European cross-sectional data relating to graffiti, greenery, and obesity in adults (Ellaway *et al*, 2005), the impact of a range of a range of socioeconomic and environmental variables on morbidity (Fukuda *et al*, 2004), and the links between the quality of neighbourhood parks and neighbourhood health indicators (Coen and Ross, 2005).

Taken over all the evidence suggests a positive relationship between greenspace and general health. By controlling for socio-economic status the studies demonstrate overall that better health is related to greenspace regardless of socio-economic status. The studies do not, however, explain the mechanisms by which greenspace has a positive effect on population health, nor do they demonstrate whether different types of greenspace have a greater or lesser impact in urban environments. A further concern is that results of population studies may not necessarily transfer into different cultures and countries. The studies are explored in further detail below.

Using a cross-sectional study design, De Vries *et al* (2003) tested the hypothesis that people in green areas are healthier than people living in less green areas by combining Dutch data on the self reported health of 17,000 people with land use data on the amount of greenspace in their living environments. The statistical analysis controlled for confounding factors such as age, sex, and socio-economic status. The authors conclude that living in a greener environment was positively related to all three of the available health indicators and the association was somewhat stronger for housewives and older people. The three health indicators considered by De Vries *et al* were: number of health problems experienced in the previous 14 days; perceived general health measured on a five point scale; and the score on the Dutch version on the General Health Questionnaire.

In Japan a longitudinal study by Takano *et al* (2002) demonstrated that living in areas with walkable greenspace positively influenced the longevity of older people in an urban area (Tokyo), independent of age, sex, marital status, baseline function and socio-economic status. Interviews with a sample of Tokyo residents (n = 3,144) aged 70 years and over were conducted, and data collected on their neighbourhood of residence. Interviewees were asked to assess the accessibility of walkable greenspace in their neighbourhood. These data were analysed at the individual level, and the mortality rate in the cohort was followed over a five year period.

In a study investigating a wide range of socioeconomic factors associated with mortality in Japan, Fukuda *et al* (2004) found that a wide range of both environmental and living conditions and socioeconomic factors were related to morbidity, and that there were significant differences between the sexes. Living in an area with less vegetation was significantly associated with female mortality rates but not with male mortality rates.

In a second Dutch study Maas *et al* (2006) investigated the strength of the relationship between the amount of greenspace in people's living environment and their perceived general health. More than 250,000 people registered with general practices completed a questionnaire on socio-demographic status, background and perceived health. Study participants lived in urban and rural area. The percentage of greenspace within a one kilometre and three kilometre radius of the postcode of participants was calculated. Greenspaces were categorised as: agricultural land, natural green (forests, grasslands etc), and urban green. Analysis controlled for age, gender, and socio economic status. Results clearly showed perceived general health to be better in people living in greener environments. In areas where 90% of the environment around the home was green, 10.2% of residents reported feeling unhealthy. In areas where 10% of the environment was green, 15.5% of residents reported feeling unhealthy. This link between perceived health and greenspace was seen across all groups, but there were greater beneficial effects on older people (65 and over) and younger people (0-24 years) in urban areas. In urban areas, the proximity of green space became more important.

Researchers in England (Mitchell and Popham, 2007) conducted a similar study to that of Maas *et al*, utilising data from the Generalised Land Use Database at the lower level super output areas (LSOA) and responses to questions on health contained in the 2001 UK census which were used to calculate a Standardised Morbidity Rate for the same small areas.¹ They also used five domains of the 2004 English index of multiple deprivation to capture differences in area population characteristics that might impact on health, notably: employment; deprivation; education skills and training deprivation; barriers to housing; crime; and income deprivation. Note that this study did not use individual based data (as did Maas *et al*), and was not able to measure access to greenspace which may have varied between

¹ The 32,482 LSOAs in England have a minimum population of 1000, a mean population of 1,500 and an average physical area of 4 km².

and within areas. Associations between greenspace and health were explored in a linear regression model. In general a greater proportion of greenspace was associated with better health, however the association varied according to the combination of area income deprivation and urbanity. There was no significant association between health and greenspace in higher income suburban and rural areas, and a greater level of greenspace was associated with worse health in low-income suburban areas. The authors point to evidence from other studies that suggest greenspace in lower income areas maybe of poorer quality, suggesting that either poor quality green space negatively effects health or alternatively, poor quality greenspace is not sufficient to impact on poor health status.

A very recent study undertaken in Denmark (Nielsen and Hansen, 2007) investigated the links between access and use of greenspace and two health indicators – body mass index and experienced stress. This is a less robust study using a postal survey of a randomly selected sample of 2,000 adults aged 18-80 (response rate 63%). Respondents were asked about use of greenspace, distance from home to different types of greenspaces, and questions related to feelings of stress, details of height and weight, as well as socioeconomic status. Statistical analysis of the responses found that greater distance from home to greenspaces was a better predictor of higher stress levels for all groups and obesity in younger respondents (aged 25 or below) than reported use of greenspaces. Clearly there is a relationship between the distance to a greenspace and the amount of use (what the authors refer to as “distance decay”). Thus the health benefits of greenspaces cannot be simply explained by the level of use of greenspace. The authors suggest that the distance to greenspaces might be correlated to the characteristics of neighbourhoods and whether or not they are conducive to outdoor activities and healthy modes of transport. Although this review is concerned primarily with public spaces (see Inclusion and Exclusion criteria in Section 1), it is of interest that having access to a private garden or green area near the home was also associated with reduced levels of stress and obesity.

A further study conducted in Montreal (Coen and Ross, 2005) explored the state and quality of a sample of larger (>11,500m²) urban parks (n= 28) in a sample of neighbourhoods that varied in health status (measured using life expectancy for men at birth, lung cancer incidence rate, and ischemic heart disease mortality rate). Parks in areas with poor health status were observed to have more limited physical activity facilities, pronounced concentrations of physical incivilities (graffiti, presence of boarded up or vacant buildings) and locational drawback (for example, bordered by industrial sites, multi-lane roads). The authors suggest that the study provides evidence for “deprivation amplification”, where local facilities that might facilitate healthy activities are poorer for people who are poorer, of lower health status, and with fewer personal resources.

Links between greenspace and levels of physical activity

The searches for this review identified 16 studies that investigated the role of green space in promoting physical activity. Of these, nine studies addressed whether

access or proximity of greenspace promoted greater levels of physical activity, sometimes as a wider investigation into a range of determinants of physical activity (Addy *et al*, 2004; Ball and Timperio, 2007; Duncan and Mummery, 2005; Giles-Corti and Donovan, 2002a; Giles-Corti and Donovan, 2002b) and sometimes with a focus on greenspaces (Cohen *et al*, 2007; Giles-Corti *et al*, 2005; Hillsdon *et al*, 2006; Zlot and Schmid, 2005). Eight were concerned with specific projects of initiatives such as green walks (Ashley and Barlett, 2001; Lamb *et al*, 2002; Dawson *et al*, 2006), or the introduction of urban trails and green pathways (Librett and Yore, 2006; Lindsey *et al*, 2006; Shafer *et al*, 2000), and green gyms where different types of greenspaces are used for different types of physical activity (Pretty *et al*, 2005).

Although our searches did not identify any studies that explored access to greenspaces from the workplaces, the review by the Health Council of the Netherlands (HCN, 2004) identified three Dutch studies that explored why workers took exercise in their break periods. 'Being outside', and 'getting fresh air' were primary motivations, and one study reported that presence of footpaths, a park, and pleasant walks were the most cited motivating factors for workers taking exercise in the lunch break.

Access to greenspace

Some - but not all - studies support the argument that people who use greenspaces regularly are more likely to take exercise, and those who use greenspaces most regularly usually live nearby. The use of public open spaces is sensitive to distance (Giles-Corti *et al*, 2005). For example, Cohen *et al* interviewed park users and a community sample of people living near a park in the USA. People living nearer the park used the park more often: 43% of park users lived within 0.25 miles; 21% lived between 0.25 and 0.5 miles. Only 13% of park users lived more than one mile away. Age (being young), gender (being male) and distance (living within 1 mile of the park) were positively associated with park use. People who lived within 1 mile were 4 times more likely to visit the park once a week or more, and had 38% more exercise on average in a week than those living further away.

Studies also show that levels of physical activity are mediated by a number of different factors, including those related to self-efficacy and motivation (see Giles-Corti and Donovan, 2002a and 2002b; Ball and Timperio, 2007). Moreover it is not just access as measured by distance; other issues such as the ease of access and connectivity with greenspaces also play a role in greenspace use. Note too that many greenspace activities are quite passive. Although park users often report that they walked to the park, people do not just visit the park to walk, run or jog, or take part in sports, many go to sit and relax, or undertake passive activities (Cohen and McKenzie, 2007). This is supported by the surveys of park users that are further explored below (Bell *et al*, 2004; Comedia and Demos, 1995; Dunnett *et al*, 2002).

Hillsdon *et al* (2006) utilised three measures of access to open green space (distance to the nearest green space, number of greenspaces within a 2 km radius, and the area of green space within 2 km radius) and mapped these against the residences of

a cohort of 4,732 middle aged (aged 47-74 years) people in Norwich (UK) who had completed a physical activity questionnaire. Greenspaces greater than two hectares in size in the city were surveyed using a purpose designed quality measurement tool. Multiple regression models were used to determine the relationship between access to greenspace and levels of recreational physical activity. There was no evidence of clear relationship between recreational physical activity and access to greenspaces. The authors report that those with best access to high quality large greenspaces actually reported lower levels of activity than those with the poorest access. The sample was stratified by deprivation (using the Townsend Index of area deprivation), and again no relationships were observed between access to greenspace and those living in either the least or most deprived areas.

A further dimension of access is that of access to attractive spaces. Studies by Cohen *et al* (2007) and Giles-Corti *et al* (2005) show that the attractiveness or quality of greenspace is also an important determinant of greenspace use. Again the surveys of park users conducted in the UK also indicate that different types of greenspaces, and features of greenspaces, are perceived to be more attractive or interesting, for example, trees, planted areas, water features, and wildlife. For example, Comedia and Demos (1995) reported that mothers would take their children to a more distant park because there was a pond with ducks that was more interesting for the children.

Giles-Corti *et al* (2005) tested three models of accessibility: simple distance from respondent's home to all public open space in the study area, distance and attractiveness where the attractiveness of public open space (POS) was scored, and distance and attractiveness and size of the POS. A survey of residents (n = 1803) in a metropolitan area of Perth (Australia), was undertaken that excluded those aged over 59, the unemployed, ill or injured, and those in active occupations. Overall 28% of the sample had used a POS for physical activity in the previous week. Regardless of the model used, overall use was positively associated with accessibility. However when size was taken into account, those with very good access to large attractive POS were more likely to use POS, suggesting that after distance is taken into account, size was more important than attractiveness in encouraging use. Those using POS were three times more likely to achieve recommended levels of physical activity than those who did not use POS. Although regardless of the accessibility model used, the accessibility of POS was not significantly associated with achieving recommended levels of physical activity.

Zlot and Schmid (2005) found that levels of utilitarian (as opposed to recreational) walking and bicycling were positively associated with parkland as a percentage of city acreage in the USA, and communities with more parks had significantly higher levels of walking and bicycling for transportation. No significant relationships were observed for leisure time walking or cycling.

Evidence indicates that greenspace is most valuable as a resource for physical activity when used by high volumes of people; therefore, spaces need to be accessible, of sufficient size, and connected to residential areas. Greenspaces need

to be diverse, as evidence suggests that single use greenspace (such as sports fields) deter undedicated use. Open spaces with a range of attractive attributes (such as trees, lakes, landscaped features) encourage higher levels of walking (Giles-Corti, 2005); walking in such spaces is associated with the restorative qualities of nature, and more than just the benefits of exercise.

Access to safe greenspaces, such as parks and playgrounds, and recreational facilities are particularly important for children and young people. Evidence collated for an earlier review (Croucher *et al*, 2007) clearly shows that children who have better access to such safe places are more likely to be physically active, and less likely to be overweight, compared to those living in neighbourhoods (usually poorer neighbourhoods) with reduced access to such facilities.

Greenways and trails

Our searches did not identify any UK based studies of urban greenways or trails, however four relevant studies undertaken in the USA were identified. Librett *et al*, (2006) were concerned with use of trails and the characteristics of trail users; Lindsey *et al* (2006) were interested in the characteristics of neighbourhoods that impact on trail use. Shafer *et al* (2000) examined the impact of trails on quality of life as perceived users of three different trails. Anderson *et al*, (2005) adopted a prospective study design to ascertain the changes in levels of physical activity consequent to the construction of a multi-use trail. Both Librett *et al* and Shafer *et al* utilised surveys of trail users. Lindsey *et al* used GIS mapping techniques, data on neighbourhood characteristics, and monitoring of trail use.

The prospective study conducted by Anderson *et al* (2005) surveyed a random sample of adults living within 2 miles of an old railway track that was scheduled for conversion to a trail before the trail was constructed, and two years following its opening. Sixty three per cent of the first survey respondents completed the follow up (n = 366) The study did not demonstrate that the new trail had any effect on levels of physical activity.

Librett *et al* concluded that trail users were more likely to be regularly physically active than non-trail users, to be fitter generally, and to be men. Trails were used for both recreational and non-recreational journeys. In their study of neighbourhood characteristics that impacted on trail use, trails in poorer neighbourhoods, and neighbourhoods with higher proportions of older residents or young children were less well used.

With regard to the improvements in quality of life brought about by trails, Shafer *et al* found that opportunities to exercise, the provision of green area and accessible recreation spaces, decreasing levels of pollution, along with increased pride in the community and more opportunities for social connections were all perceived benefits of trails. Each of the three trails examined in this study served different communities and were used in different ways – for example, one trail connecting a university complex to residential neighbourhoods was a main commuting route, another linked

a city centre with residential areas and was popular for lunchtime running by city workers. The trail with the most mixed use ran through a large park, and on into mixed residential and commercial areas. The authors conclude that the type of connections offered by each trail impacted on the patterns of use, and are perceived to contribute most to the 'liveability' of an area by providing natural spaces that are accessible for both recreation and transport, that offer opportunities to meet and engage with others, as well as opportunities to escape from urban noise and other developments.

Note that the citations from these papers indicated a wider literature on trail use, drawn mainly from the USA, and primarily concerned with trails as a means of promoting physical activity.

The health benefits of using greenspaces as part of formal exercise programmes

There is increasing interest in using greenspaces as locations for exercise programmes. Although there is evidence that health promotion programmes can promote an increase in physical activity (and the associated benefits of improvement in physical and mental health), it is more difficult to prove that greenspace plays a particular or significant or additional role in such programmes. However evidence does suggest that the attractiveness of green settings does provide additional incentive to continue exercising.²

Our searches identified three evaluations of the Walking the Way to Health Initiative³, including a national evaluation (Dawson *et al*, 2006), a randomised controlled trial (Lamb *et al*, 2002), and a survey of walk participants (Ashley and Barlett, 2002) undertaken at a relatively early stage of the programme.⁴

Lamb *et al* (2002) report a randomised controlled trial of a lay-led walking programme to increase physical activity in middle-aged adults. A total of 260 adults were randomly assigned to either only receive advice on how to improve levels of exercise, or were invited to take part in a programme of health walks led by volunteers. The two groups were followed up over a 12 month period. In the 'advice only' group 22.6% had increased their level of moderate intensity activity, compared to 35.7% of the health walks groups. Intention to treat analysis (where the last recorded data for those who drop out of a trial are included in the final analysis) did, however, reduce

² Note that Natural England and the National Institute for Clinical Excellence are currently working on the development of a single measurement tool for the evaluation of green exercise activity.

³ The Walking the Way to Health Walks started in 1995 in Oxfordshire. There are now more than 350 similar volunteer-led schemes, collectively known as the Walking the Way to Health Initiative co-ordinated by the British Heart Foundation and the former Countryside Agency (now Natural England), see www.whi.org.uk.

⁴ Note that there have been more than 50 local evaluations of different WHI initiatives. These are summarised on the WHI website, along with a number of case studies. While of interest, these studies and evaluations are not of sufficient quality to be included in this review.

the differences between the two study groups, and these differences were not statistically significant. A companion qualitative study (Ashley and Barlett 2001) explored the motivations of people taking part in the first year of a Health Walks Programme. Of those that expressed their intention to continue with the programme, 79% said the opportunity to spend more time in the countryside was a motivating factor to continue. Note however that other factors were also important motivations: 82% were determined to maintain their fitness levels; 78% said the walks were nearby and convenient; and 77% said the walks were enjoyable and fun. The national evaluation (Dawson *et al*, 2006) also focused on the participants' experiences of the walks. For many people, the social opportunities that the walks offered were as important as the exercise.

Our searches also identified a study by Pretty *et al* (2005) that evaluated ten different examples of green exercise initiatives in the UK. A variety of activities were evaluated including walking groups, riding, boating, fishing, and conservation work. Participants in the initiatives were invited to complete a two part questionnaire, the first before taking part in a session of the activity, and the second immediately afterwards. The questionnaire utilised a standardised instrument for measuring health status and health outcome (the Euroqol EQ-5D questionnaire), and questions to measure changes in psychological status, and self esteem derived from the green exercise activity. Two hundred and sixty three participants were involved in the evaluation (51% male, 49% female). Results of the evaluation showed overall increases in self esteem, and improvements in mood consequent to taking part in the activity, regardless of the level of intensity, duration or type of green activity undertaken. Comments from the participants indicated their awareness of the physical and psychological health benefits of taking part in green exercise.

Links between greenspace and mental health and well-being

With regard to the restorative qualities of nature, there are three related theories that frequently underpin studies of the impact of nature on mental health and well-being. The first theory - Biophilia - proposed initially by Wilson (1984), asserts that human beings subconsciously seek contact with other species through a pre-determined biological need developed through the evolutionary process reflecting man's close relationship with the natural world. The second theory, Stress Reduction Theory, proposed by Ulrich (1983) postulates that natural environments promote recovery from any form of stress (both mild, short term stress), and longer term problems (not just attention fatigue), as a consequence of psycho-evolutionary process whereby particular types of environments produce certain effects, thus the perception of certain types of "safe" environments triggers positive emotional and physiological responses. Finally Attention Restoration Theory (ART) was proposed by Kaplan and Kaplan (1989) who considered that nature primarily assists with recovery from attention fatigue which occurs as a consequence of performing tasks that require prolonged maintenance of attention and focus. Natural environments assist with recovery by allowing individuals to distance themselves from routine activities and thoughts ("being away"), and because they attract the attention without requiring

concentration or effort. These theories are frequently referred to in various papers and reviews (see for example, HCN, 2004; Pretty, 2005; Hull and Michael, 1994).

Our searches identified six studies that were concerned with the impact of greenspace on mental health and well-being, including a study in the UK of the impact of the urban environment on mental health (Guite *et al*, 2006), a study conducted in Sweden (Grahn and Stigsdotter, 2003) that addressed the use of urban greenspaces and levels of stress, a study of a natural setting for recreation compared to an indoor setting (Hull and Michael, 1994), a study of the impact of park use on older people's stress levels (Orsega-Smith *et al*, 2004), a study of the impact of greenspace around public housing developments (Kuo, 2000), and a report by MIND of two evaluations of green projects for users of mental health services (MIND, 2007). This body of work clearly demonstrates that experiencing greenspace has a positive impact on levels of stress. Note that all those studies that measured changes in psychological state used different measurement tools.

Of these studies, the work of Grahn and Stigsdotter is by far the most robust study.⁵ It clearly demonstrates the relationship between levels of stress and access to urban greenspaces. The more time people spend in outdoor greenspaces, the less stressed they feel. Almost 1,000 randomly selected individuals in nine Swedish cities answered questions about their health and the use of urban green spaces close to their homes. Significant statistical relationships were found between the use of urban greenspaces and reported experience of stress regardless of age, gender and socio-economic status. Those people who visited urban greenspaces more frequently reported fewer stress related illnesses. The same relationship was also noted for length of time spent in greenspaces. The study also showed that distance to urban greenspaces is associated with amount of use, and surprisingly those who had access to a private garden at their place of residents visited greenspace more often than those who did not. The authors suggest that the following factors may in isolation or in combination impact on levels of stress: outdoor activity and exercise; natural daylight; stimulation of the senses (sight, sound, scent, temperature, touch, balance and hearing); and aesthetic experience.

The survey by Guite *et al* (2006) of 1,000 adults conducted in a deprived inner city area in London (UK) supports these findings. A range of urban environmental variables were investigated along five domains (internal environment, design and maintenance, noise, density and escape, fear of crime and harassment, social participation), and linked to measures of mental health and well-being. Density, notably feeling overcrowded in the home and dissatisfied with local greenspaces (which are important as escape mechanisms) were associated with poorer mental health, as were variables in all five domains.

⁵ Note we also identified two reviews: Chu *et al*. 2004. The impact on mental well-being of the urban and physical environment: an assessment of the evidence. *Journal of Mental Health Promotion* 3(2): 17-32; and English Nature. 2003. *Nature and Psychological Well-being*. English Nature Research Report 533.

A study in the USA (Kuo, 2001) tested the hypothesis that greenspace enhances the capacity of residents in urban public housing to cope with the effects of poverty. This in-depth study used a random assignment of public housing residents to buildings with and without nearby nature. Residents who lived in public housing with nearby nature (for example, with views of trees or open space) showed greater capacity to cope with stress than those who lived in dwellings without nearby nature. The authors suggest that public housing projects could be configured to enhance residents' resources for coping with the poverty.

Orsega-Smith *et al* (2004) also demonstrated that the stress levels of older people could be positively affected by the use of urban parks.

A report by MIND (MIND, 2007) of two evaluations of green exercise activities for people with mental health problems also supports the findings of other studies. While both studies are relatively small in scope, they indicate that participating in green exercise improved levels of confidence, self-esteem, and lifted mood. One of the evaluations compared the effects of walking in a group in a Country Park to those of walking in a group in a large indoor shopping centre. The different environments promoted different responses in self esteem and mood, with the green walk having the more positive effect.

The study by Hull and Michael (1994) measured changes in mood in a sample of park users in USA, and then in the second stage of the study asked the same group to undertake a recreational activity at home, again mood change was measured. Recreation in both settings had a positive impact on mood, however there was no significant difference between the two settings.

It is important to note that the review by the Health Council of the Netherlands (HCN,2004) identified a much greater number of studies relating to the role of nature in reducing stress and attention fatigue. Thirty four studies were identified as being relevant, and 19 studies were included in the review. Thirteen studies considered the restorative effects of looking at images of nature or views of nature. Four measured the restorative effects of walking or playing in a natural environment, and two examined the restorative effects of the presence of plants in offices. None of these studies were identified in our searches, but many would not have been within the scope of this review. The studies were concerned with impacts of nature on mood, cognitive functioning (attention and concentration) and self-discipline and aggressive behaviour. Overall the review authors concluded that there is strong evidence from both experimental and quasi-experimental research performed in both laboratory and field settings that nature has a positive effect on recovery from stress and attention fatigue. Effects occur even after brief exposure to a view of nature, although less is known about the impact of long-term exposure to nature (and whether this may be stronger or weaker), or the influences of different types of nature.

Perceptions of greenspace

There are a number of studies, usually surveys supported by focus groups and interviews, that have explored public attitudes towards greenspaces and the environment of which the majority have been undertaken in the UK and commissioned by various government departments (see for example: DEFRA, 2002; Comedia and Demos, 1995; Dunnett *et al*, 2002 (for the DTLR); Commission for the Built Environment, 2004; Bell *et al*, 2004 (for English Nature); Sport England, 2003; MORI, 2002). Many of these studies also include details about the frequency of greenspace use, and the numbers and types of people visiting over a given period, their reasons for visiting and the types of activities undertaken (see below). Most are concerned with urban greenspaces, with some exceptions, for example the study commissioned by DEFRA (DEFRA, 2002) was more concerned with attitudes towards broader environmental concerns. .

In addition our searches identified a small number of other studies, three undertaken in the UK (Henwood and Pidgeon, 2001; Ozguner and Kendle, 2006, O'Brien, 2006), four in the USA (Glaser, 1994; Ho *et al*, 2005; Backlund *et al*, 2004, De Sousa, 2006), one in the Netherlands (Chiesura, 2002), one in Australia (Gill and Simeoni, 1995), and one in Italy and the UK (Bonnes *et al*, 2007). Note too that many of the studies reviewed in earlier sections above also give some account of individual perceptions and attitudes towards greenspace (for example, Shafer *et al*, 2000).

All the studies demonstrate that lay perceptions of greenspaces are, on the whole, very positive (with some caveats around personal safety and security). One unpublished study (reported by CAGE, 2005) indicated that 91% of the public believe that public parks and open spaces improve their quality of life. The opportunities offered by greenspace to be in contact with nature – to have fresh air, to be outdoors, to be close to plants and animals – are generally seen to have a profound impact on wellness and wellbeing. Greenspaces are seen to promote positive emotional experiences. Perhaps of interest is that although the studies show that greenspaces are valued as places for exercise, for many people this is not the primary value placed on them. More often the “de-stressing” capacity of greenspaces, their role as an ‘escape’ from the dirt, stress, noise, and visual hardness of urban settings and their restorative capacity are the most valued factors (see for example, Bell *et al*, 2004; Dunnett *et al*, 2002; Chiesura, 2003; Dines *et al*, 2006).

Greenspaces – both urban greenspaces, and forests and woodlands - are frequently noted as places of attachment and affection for individuals and communities, and as a distinct feature of localities. They are places which have marked different periods in people’s lives, serving for childhood play, for teenagers to let off steam, for romance and courting, a place to bring children and grandchildren, and even places where memorials can be place for loved ones (see for example, Henwood and Pidgeon, 2001; Commedia and Demos, 1995).

Urban greenspaces are also seen to enhance local areas and neighbourhood appeal. A study of public attitudes towards the development of new community parks from brownfield sites in Chicago (USA) showed that parks were quickly assimilated into the communities where they were located, and became regularly used for a variety of

different purposes (De Sousa, 2006). They were seen to improve the local neighbourhood, boost community pride, and offer opportunities for exercise and recreation. Gill and Simeoni (1995) reported similar findings in a study of the development of a new community park in Australia.

A consistent theme in many of the studies is that of childhood, and the perceived importance of greenspaces for child development. Urban parks are seen as particularly important for children, as places where they can enjoy greater freedom, and be away from urban traffic and pollution. Similarly, accessible urban woodlands or more wild spaces are perceived to be important for children (see for example, Ward-Thompson *et al*, 2004; O'Brien, 2006). Many of the older participants in the studies felt that children's opportunities to play out and have the freedom are much reduced compared to when they were children. Note the evidence around nature and child development is examined in some depth in the Health Council of the Netherlands review.⁶

Preferences for different types of greenspace

Evidence from the various studies suggests that spaces with different features, attributes and areas of interest are generally preferred over spaces that are featureless (see for example Giles-Corti *et al*, 2005). Evidence suggests that natural areas are highly valued, but some people find them dangerous, dirty, uncomfortable places.

Ozguner and Kendle (2003) explored attitudes towards a botanic garden, and urban woodland in Sheffield (UK) by interviewing users of both sites (n=200). The majority felt that the botanic garden was safer and more peaceful and quiet, and a better place to relieve stress, and experience a sense of renewal. The woodland offered more of a sense of naturalness, freedom and opportunities for social contact. Animals, birds and wildlife were the most popular feature in both sites, in line with findings of other surveys which show that points of interest such as wildlife are important to park users.

Of interest is that both sites were perceived as 'natural', which the authors suggest demonstrates that lay attitudes are different to those of landscape professionals. Of interest too is that the botanic garden was perceived to be safer than the woodland. The authors conclude that more formal gardens maybe more useful in reducing stress, because their formality encourages passive use, and quietness. A study of different greenspaces in Rome also highlighted the differences between lay and professional perceptions of 'quality' greenspace (Bonnes *et al*, 2007). In a survey of residents satisfaction (total respondents n=547), biodiversity richness of different spaces did not appear to contribute to residents levels of satisfaction with

⁶ The HCN review committee found that it was plausible that children's cognitive and emotional development benefits from contact with the natural environment, however the evidence base was not yet convincing, although it is known that an exciting playing and learning environment is important for cognitive and motor development.

greenspaces. Availability of greenspace was important in determining satisfaction, and also in determining use. Biodiversity richness is often taken by experts in the ecology domain as being an indicator of greenspace quality.

Ho et al (2005) explored the preferences of different ethnic groups for types of facilities available in parks in two city areas in the USA. All ethnic groups agreed that parks and open spaces provided opportunities to improve health, social/spiritual well-being, and environmental quality. There were also shared concerns about crime and safety. Some important differences were found between different ethnic groups, for example, Japanese and White respondents were more likely to agree that parks improved social well-being, while African American were least likely to agree. Results suggest that different ethnic groups have different perceptions of parks, and this generated different patterns of use. Fewer differences were found between men and women. Women were more likely to prefer the presence of park managers, and to prefer open spaces with a high degree of visual access, most likely reflecting concerns about personal safety.

Backlund *et al* (2004) reports a survey of more than 1,000 people's preferences for public space in Illinois (USA). The survey showed greater preferences for undeveloped open spaces: lake, ponds, state parks, natural areas, forested areas, wildlife habitat, parks, walking trails, playgrounds, and much less support for sports fields, golf course, which were seen to be limited in use.

Negative perceptions of greenspace

Despite these positive perceptions, personal safety and fear of crime feature as a key concern among users of greenspaces in almost all the studies which report public attitudes, although only one relatively small study (Glaser, 1994) undertaken in the USA makes security and safety its primary focus. Such fears and concerns act as barriers to the use of greenspace, and are negatively associated with usage patterns (Glaser, 1994; Ward-Thompson *et al*, 2004). Apart from fear of assault or violence, incivilities (debris from drug use, dog fouling, litter, graffiti, vandalism, poor maintenance, and in country parks and woodlands, fly tipping, use of off-road motorbikes and 4X4 vehicles) are also frequently reported as negative aspects of greenspace (see for example Bell *et al*, 2004). Although a recent survey (Sport England, 2003) showed that 57% of respondents felt that safety was good, surveys of park use consistently indicate that people rarely use parks alone (unless they are walking a dog), and that women in particular are highly unlikely to visit greenspaces unless they are accompanied by other people. Despite the perception that greenspaces are particularly important for children, parents frequently express concerns about allowing children to go to greenspaces alone or unsupervised by an adult. Note too that many of those participating in organised group health walks (see above) are often fearful of walking alone, in part due to fear of crime. The Commission for the Built Environment (2004) has reviewed different management policies and practices in a number of case study areas that make urban greenspaces safer and more attractive.

Social value of greenspace

Various surveys of greenspace use (Sport England, 2003; Dunnett *et al*, 2002; Bell *et al*, 2004; Comedia and Demos, 1995) show that they have a wide range of uses and high numbers of users, and this is particularly the case for urban parks. The survey reported by Sport England showed that two thirds of adults in England had visited a public park in the previous 12 months (estimated to be 24.2 million people). Of those who had visited a park, almost two thirds visited a park at least once a week, and the most popular type of park visited was an urban or city park. Similar levels of usage were reported by Comedia and Demos (1995) and Dunnett *et al* (2002).

There are clearly different patterns of use among people from different socioeconomic backgrounds and cultures. Almost three quarters of adults from social classes A and B reported that they had visited a park in the previous 12 months, compared to only half of those from the lower social groups (D and E) (Sport England, 2003). People in higher social classes were also more likely to visit country parks, formal gardens and heath land (Sport England, 2003). Studies in the UK show that people from black and minority ethnic communities and disabled people are less frequent visitors to urban greenspaces, and much less likely to visit woodlands, country parks and other out-of-city greenspaces. However a recent study of the use of public spaces in East London (Dines *et al*, 2006) showed that parks (and other types of public spaces, such as street markets) were a means of bringing different communities together, as they offered opportunities for regular informal contacts between different groups and individuals.

Studies also show that greenspace activities and reasons for visits are highly varied, thus there may inevitably be some tension between different groups of greenspace users (for example, people walking their dogs, and people playing sport, street drinkers and other user groups). Urban parks in particular are accessible to all and free to use. There are very few other spaces that are so accessible.

The search strategy identified four papers that addressed the nature of social contact in public spaces, including green spaces (Holland *et al*, 2007; Krenichyn, 2004; Risbeth and Finney, 2006, Dines *et al*, 2006).⁷

Holland *et al* (2007) observed a number of different types of public spaces in a regional town in the south east of the UK, including greenspaces, shopping centres and town centre street locations. The use of greenspaces was most effected by the seasons, time of day, and weather conditions. People using the municipal park and canal towpath were seen to behave in less formal and sometimes more intimate ways. These spaces were free, and not highly regulated, which made some feel uncomfortable, but attracted others, particularly those who might have been

⁷ Note that we were unable to obtain one paper (Risbeth and Finney, 2006) examining the meaning of urban greenspaces for asylum seekers and refugees in Sheffield (UK)

“excluded” from town centre or commercial meeting places. Certain groups of young people, and groups of street drinkers, homeless and unemployed people used the municipal park all year round.

Krenichyn (2004) explored the themes of relationships and caring among women undertaking physical activity in an urban park in New York. This study offers particular insights in the use of greenspaces by women, and how the presence of others in greenspaces promoted feelings of safety and enjoyment, as well as providing opportunities for social interaction and support for undertaking physical activity.

The review by the Health Council of the Netherlands (HCN, 2002) identified three papers that were not retrieved by our searches that address the social impact of (relatively small) shared greenspaces in the context of a particular social housing development in Chicago. One study (Coley *et al*, 1997) found that the presence of greenery increased the use of public spaces. A second study (Kuo *et al*, 1998) found that the presence and views of green common space correlates positively with social ties in a neighbourhood. Finally Kweon *et al* (1998) found a positive link between the social integration of the elderly in a neighbourhood and their exposure to green common spaces. Despite acknowledging the methodological rigour and interest of these studies, the HCN Committee are cautious about their interpretation as other factors (such as design of the buildings, maintenance, individual factors) may also play a role in facilitating social contact.

Community gardens

Community gardens are an international phenomenon (see Tranel and Handlin (2006) for a useful typology). Urban gardening is often seen as means of improving local food sources, as well as providing leisure and recreational resources. They are also seen to be instrumental in building community capacity (Twiss *et al*, 2003). The overarching principle is that all these spaces are in some sense public in terms of ownership, access, and degree of democratic control.

Although there is much anecdotal evidence on the health and community benefits of community gardens our searches found only two studies, one a survey of community garden coordinators in the USA (Armstrong 2000) which also provides a useful literature review of citations not identified in our searches, and a qualitative study of the benefits of community gardening for older people undertaken in the UK (Milligan *et al*, 2004).

Armstrong’s survey of coordinators of 20 community gardening programmes in upstate New York (USA), gives some indication of the variety of benefits that individual and communities might derive from such programmes. Reported motivations for participating included wanted access to fresh/better tasting food, to enjoy nature, and improve health, including mental health. These were particularly important for urban residents. Community gardens were also reported to improve

attitudes of residents toward their neighbourhood in some areas, to promote additional community organising, and improve social networks.

The qualitative study by Milligan *et al* (2004) reported on the potential benefits of allotment gardening activity for older people (aged 65 and over) with particular regard to health and mental well-being. From an initial group of 30 participants recruited for the project from general practitioner lists, nineteen were followed up over a nine month period using focus groups, interviews and diary keeping to identify how the participants felt the experience of communal gardening, and how the experience of nature and landscape impacted on their health and well-being. With regard to the experience of nature and landscape, while the participants recognised its value, fear of crime meant that contact with nature in public spaces was limited, and the domestic garden assumed great importance. Sharing work on the allotment was seen to contribute to the social inclusion of older people offering opportunities to reduce social isolation, and increase social networks. There were also opportunities to gain a sense of achievement and satisfaction, as well as pleasure from engagement with nature while working on the allotment. Importantly, the group members offered each other mutual support, thus the less able members of the group were able to participate without feeling overwhelmed.

Hazards and risk associated with greenspace

We identified six papers that explored hazards and risks associated with greenspace, of which two were undertaken in the UK. Nyiri *et al* (2004) explored the risk to park workers and users of contracting blood born viruses (hepatitis B and hepatitis C) from discarded syringes in south London parks. Rees and Axford (1994) investigated whether park workers in two London parks had been exposed to Lyme disease as a result of being bitten by ticks. Other studies included: two investigations of the risks of Lyme disease from tick bites, one undertaken in Prague (Basta *et al*, 1999), and one in New Jersey, USA (Hallman *et al*, 1995); a study of the level of human-related microsporidia in pigeon droppings in seven parks in Spain (Haro *et al*, 2005); and a study of sun-protection behaviour among zoo visitors in Australia (Mayer *et al*, 2001).

These studies serve to illustrate that there are some risks from being in greenspaces. However, it would seem that a more specific enquiry would be needed to properly explore these risks and associated risk-reduction strategies.

As noted above, crime and anti-social behaviour are a concern to park users and a barrier to use and enjoyment of greenspaces. We found no studies however that attempted to measure how perceptions measured against reported crimes or incidents that could give a clearer indication of the extent of crime and anti-social behaviour in different type of greenspaces in the UK.

CHAPTER 3: Discussion and conclusions

Here we consider the main messages that can be drawn from the literature regarding the links between different aspects of health and well-being and different aspects of greenspaces.

In mapping the existing and future research into public and greenspace Bell *et al* (2006) concluded that currently by far the weakest area represented in the evidence base is that of the relationship between greenspace and health and well-being, both in terms of the types of greenspace that impact on health, and the types and level of impact on different social groups. Although we would agree with this conclusion, once scrutinised the evidence base does currently give some clear indications regarding the links between health and well-being and greenspace.

Physical health

With regard to population health, the evidence demonstrates quite clearly a positive relationship between greenspaces and health, however the mechanisms which generate these positive effects are not entirely clear. Studies use different indicators of population health, including standardised morbidity rate (Mitchell and Popham, 2007), self-rated health (De Vries *et al*, 2003; Maas *et al*, 2006), mortality (Takano *et al*, 2002), body mass index and experienced stress (Neilsen and Hansen, 2007). Is it enough to simply live near a greenspace, or have a view of greenspace, or do people need to experience greenspace more directly by exercising, working, playing or simply being in a park or other greenspace? Does the type of greenspace matter? Does living near a well-maintained urban park have a different impact from living near a more modest greenspace, such as a private garden? Thus far the evidence does not address these more subtle questions.

A further question here is whether the findings of studies undertaken in different countries where there may be different underlying environmental, cultural and socio-economic factors that influence health (for example, levels of pollution, attitudes to exercise, diet, transport, family and social structures) are transferable to the UK context.

With regard to physical exercise, the value of greenspaces as places to exercise is unquestionable. Access to greenspace however does not appear to be the key variable for explaining levels of physical exercise, although people who use parks regularly appear to take more exercise. Surveys of park users in the UK show however that taking exercise is not the primary motivation for the majority of park users, and many park activities are quite sedentary, or involve gentle exercise such as walking. The studies of green exercise programmes conducted in the UK thus far are limited in scope. Although evidence shows consistent, small, and short term effects of exercising in greenspace, studies do not as yet demonstrate any longer term effect, nor do they show that such interventions work across different sections of the population. Nor do these studies show that greenspace has an “added bonus” effect to exercising in any other type of environment. There is some evidence that the

pleasurable sensory experience of greenspace gives people more incentive to continue with walking programmes (Ashley and Bartlett, 2001), but other aspects of the programmes, particularly social aspects were equally motivational. It is of course worth noting that greenspace comes (usually) free to users. A walk in the park costs nothing, compared to the costs, for example, of joining a gym or going swimming.

Mental health and well-being

While the diseases consequent to lack of exercise and sedentary lifestyles remain such a public health concern, it might be easy to give less attention to impacts of greenspace on general mental health and well-being, however it is the restorative effects of greenspaces and contacts with nature where the evidence is most compelling. Experiencing greenspace has a positive effect on levels of stress. Again it is difficult to unravel whether different types of nature impact on different people in different ways, and the evidence base as yet is insufficient to answer more detailed questions about the impacts of different types of greenspaces on different types of people, and indeed questions around the impact of experiencing greenspace over prolonged periods of time. There is some evidence that suggests that people's perceptions of formal parks and gardens and wilder, more 'natural' spaces such as woodlands, and country parks are different (Ozguner and Kendle, 2003; Bell et al, 2004).

Social health

Evidence from surveys conducted in the UK demonstrates that greenspaces have a wide variety of uses and users. Parks and greenspaces are (most usually) free, and not highly regulated. They are perhaps one of the few remaining spaces that are available to all, and neutral spaces when people from different communities and backgrounds can be together (Dines *et al*, 2006). Much of the promotional literature lists an enormous range of educational and community events and activities that take place in parks (although some 'special' events are not always welcomed by regular park users, or nearby residents). Surveys also show that individuals and families undertake a range of activities when they go to the park or other greenspace. Studies of lay perceptions of greenspaces also show how greenspaces are important as places of memory, and locations that are closely associated with neighbourhood (and even national) identity. Greenspaces are often the focus for conservation or volunteer activities which offer opportunities to meet others, develop interests and share goals. Importantly studies that report lay perceptions of greenspace indicate almost entirely positive attitudes and perceptions.

On a more negative note, studies also consistently show that people from BME communities and disabled people are less frequently users of greenspaces (see for example, Countryside Recreation Network, 2001). Thus there is the potential for greenspaces to become more socially inclusive. In addition, crime and personal security are concerns to many people, and fear of crime is a barrier to using greenspaces.

Limitations of the review

As noted in Chapter 2, time and resources did not allow for citation searching, and it became clear as the review progressed that there is a wider literature covering many different aspects of greenspace. We are confident that our search strategies were rigorous and extensive. We are also confident that no significant or major study has been omitted from this review. We also note that there are particular challenges for those conducting reviews in complex health and social policy areas, where many different disciplines and agencies are investigating a variety of related themes and topics. The topicality of greenspace (as is evident from the number of studies and publications undertaken very recently) means that the evidence base is fast developing. It is also highly variable, ranging from large scale, in-depth studies to many smaller, less robust evaluations. In the context of this review, the grey literature was particularly hard to identify and locate.

We note the valuable review by the Health Council of the Netherlands (HCN, 2004) which covers related topics in considerable depth, and also the mapping work by Bell and colleagues at the OPENspace Research Centre, and its associated database which gives indications of current work on-going in this field.

An area of interest that was not within the remit of this review is that of the impact of greenspace on environmental variables, for example, the capacity of trees to reduce atmospheric pollution and improve air quality (see for example, Broadmeadows and Freer-Smith, 1996), and the potential of greenspaces to produce a cooling effect in urban areas. Our searches identified a small number of studies that reported on these positive and potentially health enhancing impacts of greenspace. Solecki *et al* (2005) investigated how greenspaces mitigate the heat island effect in urban areas, a topic also addressed by Harlan *et al* (2006) and Pinho and Orgaz (2000). The reviews by Brown and Grant (2005) and Giovoni (1991) provide useful introductions to these topics, however to investigate these topics further different search strategies would be required, as well as the utilisation of databases that have a greater focus on the natural science literature.

A further area of interest is that of horticultural therapy, and the “healing” capacity of greenspaces and greenspace activity. This is addressed in some detail in the review by the Health Council of the Netherlands (NCN 2004). Our searches identified two papers that addressed the therapeutic role of greenspace with older people living in care settings (Kearney and Winterbottom, 2005, and Austin *et al*, 2006). Neither study is particularly robust, nevertheless they indicate some benefit to older people of having access to nature and participating in horticultural activities. A search strategy that focused on the therapeutic benefits of greenspaces would no doubt produce a larger number of studies, and allow a fuller exploration of this topic.

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APPENDIX A Steering Group Members

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APPENDIX B: Search strategies

This appendix presents the detailed searches carried out to inform the critical literature review.

The core search strategy used was as follows:

1. (greenspace\$ or green space\$).ti,ab.
2. (urban nature or urban biodiversity).ti,ab.
3. open space\$.ti,ab.
4. (parkland\$ or park land\$).ti,ab.
5. ((public or municipal or botanic\$ or community or urban or suburban or city) adj (park or parks)).ti,ab.
6. ((public or municipal or botanic\$ or community or city) adj (garden or gardens)).ti,ab.
7. (green adj (path\$ or trail\$)).ti,ab.
8. (greenway\$ or greenbelt\$ or green belt\$).ti,ab.
9. (allotment\$ adj6 (garden\$ or vegetable\$)).ti,ab.
10. (urban adj2 (planting or landscaping)).ti,ab.
11. (common land\$ or heathland\$ or strays).ti,ab.
12. (sport\$ adj (field\$ or ground\$)).ti,ab.
13. (cemeteries or cemeteries or cemety or cemetery).ti,ab.
14. (brownfield\$ or brown field\$).ti,ab.
15. ((railway\$ or railroad\$ or canal\$ or highway\$ or road\$) adj2 embankment\$).ti,ab.
16. (urban adj (wood\$ or woodland\$)).ti,ab.
17. urban wilderness.ti,ab.
18. or/1-17
19. Health Status/
20. suburban health/
21. urban health/
22. Health Behavior/
23. ((benefit\$ or chang\$ or effect\$ or enhanc\$ or gain\$ or improv\$ or increas\$ or maintain\$ or maximis\$ or maximiz\$ or promot\$ or rais\$ or sustain\$ or influence\$ or impact\$ or affect\$) adj6 health).ti,ab.
24. (health status or health state\$).ti,ab.
25. level\$ of health.ti,ab.
26. (health adj (behaviour\$ or behavior\$)).ti,ab.
27. ((self-rated or selfrated or self-assess\$ or selfassess\$ or self-report\$ or selfreport\$ or self-perceived or selfperceived) adj2 health).ti,ab.
28. (self-perception\$ of health or selfperception\$ of health).ti,ab.
29. or/19-28
30. Mental Health/
31. ((benefit\$ or chang\$ or effect\$ or enhanc\$ or gain\$ or improv\$ or increas\$ or maintain\$ or maximis\$ or maximiz\$ or promot\$ or rais\$ or sustain\$ or influence\$ or impact\$ or affect\$) adj6 mental health).ti,ab.
32. level\$ of mental health.ti,ab.
33. ((self-rated or selfrated or self-assess\$ or selfassess\$ or self-report\$ or selfreport\$ or self-perceived or selfperceived) adj2 mental health).ti,ab.
34. (self-perception\$ of mental health or selfperception\$ of mental health).ti,ab.
35. or/30-34
36. "Quality of Life"/
37. Self Concept/ or morale/
38. Loneliness/ or Anxiety/ or stress, psychological/ or mental fatigue/
39. ((benefit\$ or chang\$ or effect\$ or enhanc\$ or gain\$ or improv\$ or increas\$ or maintain\$ or maximis\$ or maximiz\$ or promot\$ or rais\$ or sustain\$ or influenc\$ or impact\$ or affect\$) adj6 (wellbeing or well-being or wellness)).ti,ab.
40. quality of life.ti,ab.
41. (level\$ of wellbeing or level\$ of well-being or level\$ of wellness).ti,ab.
42. ((self-rated or selfrated or self-assess\$ or selfassess\$ or self-report\$ or selfreport\$ or self-perceived or selfperceived) adj2 (wellbeing or well-being or wellness)).ti,ab.

43. (self-perception\$ of wellbeing or selfperception\$ of wellbeing or self-perception\$ of well-being or selfperception\$ of well-being or self-perception\$ of wellness or selfperception\$ of wellness).ti,ab.
44. ((benefit\$ or chang\$ or effect\$ or enhanc\$ or gain\$ or improv\$ or increas\$ or maintain\$ or maximis\$ or maximiz\$ or promot\$ or rais\$ or sustain\$ or influenc\$ or impact\$ or affect\$) adj6 (self esteem or life satisfaction or purpose in life)).ti,ab.
45. ((benefit\$ or chang\$ or effect\$ or enhanc\$ or gain\$ or improv\$ or increas\$ or maintain\$ or maximis\$ or maximiz\$ or promot\$ or rais\$ or sustain\$ or influenc\$ or impact\$ or affect\$) adj6 (personal growth or morale or positive outlook or positive mental)).ti,ab.
46. ((prevent\$ or reduc\$ or minimis\$ or minimiz\$ or restrict\$ or limit\$ or combat\$) adj6 (dependence or discrimination or loneliness or exclusion or anxiety or distress or stress or mental fatigue)).ti,ab.
47. social support/ or social support.ti,ab.
48. or/36-47
49. 29 or 35 or 48
50. 18 and 49
51. limit 50 to (english language and yr="1990 - 2007")
52. (letter or editorial or historical article).pt.
53. 51 not 52
54. Animals/
55. Humans/
56. 54 not (54 and 55)
57. 53 not 56

This strategy was designed for searching MEDLINE through the Ovid interface and was adapted as appropriate for all other databases searched, taking into account differences in indexing terms and search syntax for each database.

Mindful of the time and resources available for this review, the searches were limited to identify papers in English and papers published from 1990 onwards.

Full details of all databases searched and search strategies are provided below.

MEDLINE: Ovid (<http://gateway.ovid.com/athens>)

The MEDLINE search covered the date range 1990 to April 2007 (Week 1). The search was carried out on 12 April 2007 and identified 74 records.

[Strategy: Greenspace MEDLINE] [Saved as file: greenspace-medline.txt]

1. (greenspace\$ or green space\$).ti,ab. (51)
2. (urban nature or urban biodiversity).ti,ab. (13)
3. open space\$.ti,ab. (269)
4. (parkland\$ or park land\$).ti,ab. (294)
5. ((public or municipal or botanic\$ or community or urban or suburban or city) adj (park or parks)).ti,ab. (160)
6. ((public or municipal or botanic\$ or community or city) adj (garden or gardens)).ti,ab. (159)
7. (green adj (path\$ or trail\$)).ti,ab. (8)
8. (greenway\$ or greenbelt\$ or green belt\$).ti,ab. (47)
9. (allotment\$ adj6 (garden\$ or vegetable\$)).ti,ab. (19)
10. (urban adj2 (planting or landscaping)).ti,ab. (5)
11. (common land\$ or heathland\$ or strays).ti,ab. (86)
12. (sport\$ adj (field\$ or ground\$)).ti,ab. (48)
13. (cemeteries or cemeteries or cemetery or cemetery).ti,ab. (3)
14. (brownfield\$ or brown field\$).ti,ab. (39)
15. ((railway\$ or railroad\$ or canal\$ or highway\$ or road\$) adj2 embankment\$).ti,ab. (21)
16. (urban adj (wood\$ or woodland\$)).ti,ab. (6)
17. urban wilderness.ti,ab. (1)
18. or/1-17 (1201)

19. Health Status/ (32676)
20. suburban health/ (256)
21. urban health/ (10390)
22. Health Behavior/ (15474)
23. ((benefit\$ or chang\$ or effect\$ or enhanc\$ or gain\$ or improv\$ or increas\$ or maintain\$ or maximis\$ or maximiz\$ or promot\$ or rais\$ or sustain\$ or influence\$ or impact\$ or affect\$) adj6 health).ti,ab. (117841)
24. (health status or health state\$.ti,ab. (21551)
25. level\$ of health.ti,ab. (960)
26. (health adj (behaviour\$ or behavior\$)).ti,ab. (4936)
27. ((self-rated or selfrated or self-assess\$ or selfassess\$ or self-report\$ or selfreport\$ or self-perceived or selfperceived) adj2 health).ti,ab. (3834)
28. (self-perception\$ of health or selfperception\$ of health).ti,ab. (81)
29. or/19-28 (172962)
30. Mental Health/ (12141)
31. ((benefit\$ or chang\$ or effect\$ or enhanc\$ or gain\$ or improv\$ or increas\$ or maintain\$ or maximis\$ or maximiz\$ or promot\$ or rais\$ or sustain\$ or influence\$ or impact\$ or affect\$) adj6 mental health).ti,ab. (6427)
32. level\$ of mental health.ti,ab. (109)
33. ((self-rated or selfrated or self-assess\$ or selfassess\$ or self-report\$ or selfreport\$ or self-perceived or selfperceived) adj2 mental health).ti,ab. (117)
34. (self-perception\$ of mental health or selfperception\$ of mental health).ti,ab. (5)
35. or/30-34 (17590)
36. "Quality of Life"/ (58536)
37. Self Concept/ or morale/ (32613)
38. Loneliness/ or Anxiety/ or stress, psychological/ or mental fatigue/ (85906)
39. ((benefit\$ or chang\$ or effect\$ or enhanc\$ or gain\$ or improv\$ or increas\$ or maintain\$ or maximis\$ or maximiz\$ or promot\$ or rais\$ or sustain\$ or influenc\$ or impact\$ or affect\$) adj6 (wellbeing or well-being or wellness)).ti,ab. (7779)
40. quality of life.ti,ab. (60088)
41. (level\$ of wellbeing or level\$ of well-being or level\$ of wellness).ti,ab. (171)
42. ((self-rated or selfrated or self-assess\$ or selfassess\$ or self-report\$ or selfreport\$ or self-perceived or selfperceived) adj2 (wellbeing or well-being or wellness)).ti,ab. (117)
43. (self-perception\$ of wellbeing or selfperception\$ of wellbeing or self-perception\$ of well-being or selfperception\$ of well-being or self-perception\$ of wellness or selfperception\$ of wellness).ti,ab. (5)
44. ((benefit\$ or chang\$ or effect\$ or enhanc\$ or gain\$ or improv\$ or increas\$ or maintain\$ or maximis\$ or maximiz\$ or promot\$ or rais\$ or sustain\$ or influenc\$ or impact\$ or affect\$) adj6 (self esteem or life satisfaction or purpose in life)).ti,ab. (2811)
45. ((benefit\$ or chang\$ or effect\$ or enhanc\$ or gain\$ or improv\$ or increas\$ or maintain\$ or maximis\$ or maximiz\$ or promot\$ or rais\$ or sustain\$ or influenc\$ or impact\$ or affect\$) adj6 (personal growth or morale or positive outlook or positive mental)).ti,ab. (788)
46. ((prevent\$ or reduc\$ or minimis\$ or minimiz\$ or restrict\$ or limit\$ or combat\$) adj6 (dependence or discrimination or loneliness or exclusion or anxiety or distress or stress or mental fatigue)).ti,ab. (26736)
47. social support/ or social support.ti,ab. (32508)
48. or/36-47 (246093)
49. 29 or 35 or 48 (400512)
50. 18 and 49 (125)
51. limit 50 to (english language and yr="1990 - 2007") (100)
52. (letter or editorial or historical article).pt. (1016787)
53. 51 not 52 (97)
54. Animals/ (4050286)
55. Humans/ (9679026)
56. 54 not (54 and 55) (3073984)
57. 53 not 56 (74)

The EMBASE search covered the date range 1990 to 2007 (Week 14). The search was carried out on 12 April 2007 and identified 59 records.

[Strategy: Greenspace EMBASE] [Saved as file: greenspace-embase.txt]

1. (greenspace\$ or green space\$).ti,ab. (42)
2. (urban nature or urban biodiversity).ti,ab. (8)
3. open space\$.ti,ab. (211)
4. (parkland\$ or park land\$).ti,ab. (252)
5. ((public or municipal or botanic\$ or community or urban or suburban or city) adj (park or parks)).ti,ab. (140)
6. ((public or municipal or botanic\$ or community or city) adj (garden or gardens)).ti,ab. (101)
7. (green adj (path\$ or trail\$)).ti,ab. (7)
8. (greenway\$ or greenbelt\$ or green belt\$).ti,ab. (41)
9. (allotment\$ adj6 (garden\$ or vegetable\$)).ti,ab. (21)
10. (urban adj2 (planting or landscaping)).ti,ab. (9)
11. (common land\$ or heathland\$ or strays).ti,ab. (97)
12. (sport\$ adj (field\$ or ground\$)).ti,ab. (62)
13. (cemeteries or cemeteries or cemetery or cemetery).ti,ab. (6)
14. (brownfield\$ or brown field\$).ti,ab. (40)
15. ((railway\$ or railroad\$ or canal\$ or highway\$ or road\$) adj2 embankment\$).ti,ab. (19)
16. (urban adj (wood\$ or woodland\$)).ti,ab. (8)
17. urban wilderness.ti,ab. (4)
18. or/1-17 (1033)
19. Health Status/ (30971)
20. Health Behavior/ (12723)
21. ((benefit\$ or chang\$ or effect\$ or enhanc\$ or gain\$ or improv\$ or increas\$ or maintain\$ or maximis\$ or maximiz\$ or promot\$ or rais\$ or sustain\$ or influence\$ or impact\$ or affect\$) adj6 health).ti,ab. (86231)
22. (health status or health state\$).ti,ab. (15495)
23. level\$ of health.ti,ab. (681)
24. (health adj (behaviour\$ or behavior\$)).ti,ab. (3467)
25. ((self-rated or selfrated or self-assess\$ or selfassess\$ or self-report\$ or selfreport\$ or self-perceived or selfperceived) adj2 health).ti,ab. (3245)
26. (self-perception\$ of health or selfperception\$ of health).ti,ab. (57)
27. or/19-26 (123451)
28. mental health/ or psychological well being/ (23722)
29. ((benefit\$ or chang\$ or effect\$ or enhanc\$ or gain\$ or improv\$ or increas\$ or maintain\$ or maximis\$ or maximiz\$ or promot\$ or rais\$ or sustain\$ or influence\$ or impact\$ or affect\$) adj6 mental health).ti,ab. (5229)
30. level\$ of mental health.ti,ab. (113)
31. ((self-rated or selfrated or self-assess\$ or selfassess\$ or self-report\$ or selfreport\$ or self-perceived or selfperceived) adj2 mental health).ti,ab. (99)
32. (self-perception\$ of mental health or selfperception\$ of mental health).ti,ab. (3)
33. or/28-32 (26607)
34. wellbeing/ (13667)
35. "Quality of Life"/ (73573)
36. self esteem/ or Life Satisfaction/ (10385)
37. loneliness/ or anxiety/ or Distress Syndrome/ or emotional stress/ or Dysthymia/ (56350)
38. ((benefit\$ or chang\$ or effect\$ or enhanc\$ or gain\$ or improv\$ or increas\$ or maintain\$ or maximis\$ or maximiz\$ or promot\$ or rais\$ or sustain\$ or influenc\$ or impact\$ or affect\$) adj6 (wellbeing or well-being or wellness)).ti,ab. (6438)
39. quality of life.ti,ab. (56982)
40. (level\$ of wellbeing or level\$ of well-being or level\$ of wellness).ti,ab. (129)
41. ((self-rated or selfrated or self-assess\$ or selfassess\$ or self-report\$ or selfreport\$ or self-perceived or selfperceived) adj2 (wellbeing or well-being or wellness)).ti,ab. (107)
42. (self-perception\$ of wellbeing or selfperception\$ of wellbeing or self-perception\$ of well-being or selfperception\$ of well-being or self-perception\$ of wellness or selfperception\$ of wellness).ti,ab. (4)

43. ((benefit\$ or chang\$ or effect\$ or enhanc\$ or gain\$ or improv\$ or increas\$ or maintain\$ or maximis\$ or maximiz\$ or promot\$ or rais\$ or sustain\$ or influenc\$ or impact\$ or affect\$) adj6 (self esteem or life satisfaction or purpose in life)).ti,ab. (2045)
44. ((benefit\$ or chang\$ or effect\$ or enhanc\$ or gain\$ or improv\$ or increas\$ or maintain\$ or maximis\$ or maximiz\$ or promot\$ or rais\$ or sustain\$ or influenc\$ or impact\$ or affect\$) adj6 (personal growth or morale or positive outlook or positive mental)).ti,ab. (460)
45. ((prevent\$ or reduc\$ or minimis\$ or minimiz\$ or restrict\$ or limit\$ or combat\$) adj6 (dependence or discrimination or loneliness or exclusion or anxiety or distress or stress or mental fatigue)).ti,ab. (23341)
46. social support/ or social support.ti,ab. (16493)
47. or/34-46 (187938)
48. 27 or 33 or 47 (304738)
49. 18 and 48 (84)
50. limit 49 to (english language and yr="1990 - 2007") (74)
51. (letter or note or editorial).pt. (730100)
52. 50 not 51 (72)
53. exp animal/ or Nonhuman/ (2876414)
54. exp human/ (5694613)
55. 53 not (53 and 54) (2446060)
56. 52 not 55 (59)

PsycINFO: Ovid (<http://gateway.ovid.com/athens>)

The PsycINFO search covered the date range 1990 to April 2007 (Week 1). The search was carried out on 12 April 2007 and identified 40 records.

[Strategy: Greenspace PsycINFO] [Saved as file: greenspace-psycinfo.txt]

1. recreation areas/ (330)
2. (greenspace\$ or green space\$).ti,ab. (18)
3. (urban nature or urban biodiversity).ti,ab. (16)
4. open space\$.ti,ab. (156)
5. (parkland\$ or park land\$).ti,ab. (12)
6. ((public or municipal or botanic\$ or community or urban or suburban or city) adj (park or parks)).ti,ab. (71)
7. ((public or municipal or botanic\$ or community or city) adj (garden or gardens)).ti,ab. (33)
8. (green adj (path\$ or trail\$)).ti,ab. (1)
9. (greenway\$ or greenbelt\$ or green belt\$).ti,ab. (12)
10. (allotment\$ adj6 (garden\$ or vegetable\$)).ti,ab. (4)
11. (urban adj2 (planting or landscaping)).ti,ab. (1)
12. (common land\$ or heathland\$ or strays).ti,ab. (29)
13. (sport\$ adj (field\$ or ground\$)).ti,ab. (14)
14. (cemeteries or cemeteries or cemetery or cemetery).ti,ab. (0)
15. (brownfield\$ or brown field\$).ti,ab. (9)
16. ((railway\$ or railroad\$ or canal\$ or highway\$ or road\$) adj2 embankment\$).ti,ab. (0)
17. (urban adj (wood\$ or woodland\$)).ti,ab. (0)
18. urban wilderness.ti,ab. (1)
19. or/1-18 (652)
20. health behavior/ (8392)
21. ((benefit\$ or chang\$ or effect\$ or enhanc\$ or gain\$ or improv\$ or increas\$ or maintain\$ or maximis\$ or maximiz\$ or promot\$ or rais\$ or sustain\$ or influence\$ or impact\$ or affect\$) adj6 health).ti,ab. (35403)
22. (health status or health state\$).ti,ab. (6677)
23. level\$ of health.ti,ab. (247)
24. (health adj (behaviour\$ or behavior\$)).ti,ab. (3862)
25. ((self-rated or selfrated or self-assess\$ or selfassess\$ or self-report\$ or selfreport\$ or self-perceived or selfperceived) adj2 health).ti,ab. (2041)
26. (self-perception\$ of health or selfperception\$ of health).ti,ab. (57)
27. or/20-26 (46426)

28. Mental Health/ (15565)
29. ((benefit\$ or chang\$ or effect\$ or enhanc\$ or gain\$ or improv\$ or increas\$ or maintain\$ or maximis\$ or maximiz\$ or promot\$ or rais\$ or sustain\$ or influence\$ or impact\$ or affect\$) adj6 mental health).ti,ab. (9295)
30. level\$ of mental health.ti,ab. (154)
31. ((self-rated or selfrated or self-assess\$ or selfassess\$ or self-report\$ or selfreport\$ or self-perceived or selfperceived) adj2 mental health).ti,ab. (113)
32. (self-perception\$ of mental health or selfperception\$ of mental health).ti,ab. (4)
33. or/28-32 (22121)
34. well being/ (9729)
35. "Quality of Life"/ (11469)
36. self esteem/ or life satisfaction/ or morale/ (16002)
37. discrimination/ or loneliness/ or anxiety/ or distress/ or psychological stress/ (34012)
38. ((benefit\$ or chang\$ or effect\$ or enhanc\$ or gain\$ or improv\$ or increas\$ or maintain\$ or maximis\$ or maximiz\$ or promot\$ or rais\$ or sustain\$ or influence\$ or impact\$ or affect\$) adj6 (wellbeing or well-being or wellness)).ti,ab. (7039)
39. quality of life.ti,ab. (15365)
40. (level\$ of wellbeing or level\$ of well-being or level\$ of wellness).ti,ab. (268)
41. ((self-rated or selfrated or self-assess\$ or selfassess\$ or self-report\$ or selfreport\$ or self-perceived or selfperceived) adj2 (wellbeing or well-being or wellness)).ti,ab. (131)
42. (self-perception\$ of wellbeing or selfperception\$ of wellbeing or self-perception\$ of well-being or selfperception\$ of well-being or self-perception\$ of wellness or selfperception\$ of wellness).ti,ab. (2)
43. ((benefit\$ or chang\$ or effect\$ or enhanc\$ or gain\$ or improv\$ or increas\$ or maintain\$ or maximis\$ or maximiz\$ or promot\$ or rais\$ or sustain\$ or influenc\$ or impact\$ or affect\$) adj6 (self esteem or life satisfaction or purpose in life)).ti,ab. (6509)
44. ((benefit\$ or chang\$ or effect\$ or enhanc\$ or gain\$ or improv\$ or increas\$ or maintain\$ or maximis\$ or maximiz\$ or promot\$ or rais\$ or sustain\$ or influenc\$ or impact\$ or affect\$) adj6 (personal growth or morale or positive outlook or positive mental)).ti,ab. (885)
45. ((prevent\$ or reduc\$ or minimis\$ or minimiz\$ or restrict\$ or limit\$ or combat\$) adj6 (dependence or discrimination or loneliness or exclusion or anxiety or distress or stress or mental fatigue)).ti,ab. (12013)
46. social support/ or social support.ti,ab. (24759)
47. or/34-46 (105795)
48. 27 or 33 or 47 (151459)
49. 19 and 48 (55)
50. limit 49 to (english language and yr="1990 - 2007") (48)
51. animal.po. (123727)
52. human.po. (1397099)
53. 51 not (51 and 52) (116475)
54. 50 not 53 (40)

HMIC: Ovid (<http://gateway.ovid.com/athens>)

The HMIC search covered the date range 1990 to March 2007. The search was carried out on 12 April 2007 and identified 17 records.

[Strategy: Greenspace HMIC] [Saved as file: greenspace-hmic.txt]

1. urban open spaces/ (4)
2. parks/ or "water parks and lakes"/ (9)
3. public gardens/ (1)
4. greenbelts/ (25)
5. allotments/ (0)
6. sports grounds/ (6)
7. (greenspace\$ or green space\$).ti,ab. (14)
8. (urban nature or urban biodiversity).ti,ab. (1)
9. open space\$.ti,ab. (23)
10. (parkland\$ or park land\$).ti,ab. (7)
11. ((public or municipal or botanic\$ or community or urban or suburban or city) adj (park or parks)).ti,ab. (5)
12. ((public or municipal or botanic\$ or community or city) adj (garden or gardens)).ti,ab. (2)
13. (green adj (path\$ or trail\$)).ti,ab. (0)
14. (greenway\$ or greenbelt\$ or green belt\$).ti,ab. (30)
15. (allotment\$ adj6 (garden\$ or vegetable\$)).ti,ab. (2)
16. (urban adj2 (planting or landscaping)).ti,ab. (0)
17. (common land\$ or heathland\$ or strays).ti,ab. (3)
18. (sport\$ adj (field\$ or ground\$)).ti,ab. (5)
19. (cemeteries or cemeteries or cemetery or cemetery).ti,ab. (0)
20. (brownfield\$ or brown field\$).ti,ab. (3)
21. ((railway\$ or railroad\$ or canal\$ or highway\$ or road\$) adj2 embankment\$).ti,ab. (1)
22. (urban adj (wood\$ or woodland\$)).ti,ab. (0)
23. urban wilderness.ti,ab. (0)
24. or/1-23 (101)
25. Health Status/ (1748)
26. urban health/ (21)
27. health behaviour/ (358)
28. ((benefit\$ or chang\$ or effect\$ or enhanc\$ or gain\$ or improv\$ or increas\$ or maintain\$ or maximis\$ or maximiz\$ or promot\$ or rais\$ or sustain\$ or influence\$ or impact\$ or affect\$) adj6 health).ti,ab. (25090)
29. (health status or health state\$).ti,ab. (1618)
30. "level\$ of health".ti,ab. (269)
31. (health adj (behaviour\$ or behavior\$)).ti,ab. (333)
32. ((self-rated or selfrated or self-assess\$ or selfassess\$ or self-report\$ or selfreport\$ or self-perceived or selfperceived) adj2 health).ti,ab. (403)
33. ("self-perception\$ of health" or "selfperception\$ of health").ti,ab. (0)
34. or/25-33 (27298)
35. Mental Health/ (2623)
36. ((benefit\$ or chang\$ or effect\$ or enhanc\$ or gain\$ or improv\$ or increas\$ or maintain\$ or maximis\$ or maximiz\$ or promot\$ or rais\$ or sustain\$ or influence\$ or impact\$ or affect\$) adj6 mental health).ti,ab. (2349)
37. "level\$ of mental health".ti,ab. (29)
38. ((self-rated or selfrated or self-assess\$ or selfassess\$ or self-report\$ or selfreport\$ or self-perceived or selfperceived) adj2 mental health).ti,ab. (14)
39. ("self-perception\$ of mental health" or "selfperception\$ of mental health").ti,ab. (0)
40. or/35-39 (4421)
41. "Quality of Life"/ (1572)
42. personal identity/ or morale/ (389)
43. discrimination/ or loneliness/ or anxiety/ or distress/ or stress/ (2037)
44. ((benefit\$ or chang\$ or effect\$ or enhanc\$ or gain\$ or improv\$ or increas\$ or maintain\$ or maximis\$ or maximiz\$ or promot\$ or rais\$ or sustain\$ or influenc\$ or impact\$ or affect\$) adj6 (wellbeing or "well-being" or wellness)).ti,ab. (3046)
45. "quality of life".ti,ab. (2059)

46. ("level\$ of wellbeing" or "level\$ of well-being" or "level\$ of wellness").ti,ab. (44)
47. ((self-rated or selfrated or self-assess\$ or selfassess\$ or self-report\$ or selfreport\$ or self-perceived or selfperceived) adj2 (wellbeing or "well-being" or wellness)).ti,ab. (11)
48. ("self-perception\$ of wellbeing" or "selfperception\$ of wellbeing" or "self-perception\$ of well-being" or "selfperception\$ of well-being" or "self-perception\$ of wellness" or "selfperception\$ of wellness").ti,ab. (0)
49. ((benefit\$ or chang\$ or effect\$ or enhanc\$ or gain\$ or improv\$ or increas\$ or maintain\$ or maximis\$ or maximiz\$ or promot\$ or rais\$ or sustain\$ or influenc\$ or impact\$ or affect\$) adj6 (self esteem or life satisfaction or "purpose in life")).ti,ab. (168)
50. ((benefit\$ or chang\$ or effect\$ or enhanc\$ or gain\$ or improv\$ or increas\$ or maintain\$ or maximis\$ or maximiz\$ or promot\$ or rais\$ or sustain\$ or influenc\$ or impact\$ or affect\$) adj6 (personal growth or morale or positive outlook or positive mental)).ti,ab. (351)
51. ((prevent\$ or reduc\$ or minimis\$ or minimiz\$ or restrict\$ or limit\$ or combat\$) adj6 (dependence or discrimination or loneliness or exclusion or anxiety or distress or stress or mental fatigue)).ti,ab. (863)
52. social support/ or social support.ti,ab. (714)
53. or/41-52 (9520)
54. 34 or 40 or 53 (36040)
55. 24 and 54 (19)
56. limit 55 to yr="1990 - 2007" (17)
57. exp animals/ (1485)
58. exp people/ (53657)
59. 57 not (57 and 58) (1089)
60. 56 not 59 (17)

Cochrane Database of Systematic Reviews: Internet

<http://www3.interscience.wiley.com/cgi-bin/mrwhome/106568753/HOME>

Issue 2007/1 of The Cochrane Library was searched on 12 April 2007 to identify reviews on the Cochrane Database of Systematic Reviews. No reviews were identified.

No reviews were retrieved on CDSR after entering the first part of the strategy (the first concept 'greenspace'), therefore entering the other terms became redundant.

1. (greenspace* or green NEXT space*):ti,ab,kw (0)
2. (urban NEXT nature or urban NEXTbiodiversity):ti,ab,kw (0)
3. (open NEXT space*):ti,ab,kw (7)
4. (parkland* or park NEXT land*):ti,ab,kw (11)
5. ((public or municipal or botanic* or community or urban or suburban or city) NEXT (park or parks)):ti,ab,kw (5)
6. ((public or municipal or botanic* or community or city) NEXT (garden or gardens)):ti,ab,kw (0)
7. (green NEXT (path* or trail*)):ti,ab,kw (0)
8. (greenway* or greenbelt* or green NEXT belt*):ti,ab,kw (1)
9. (allotment* NEAR/6 (garden* or vegetable*)):ti,ab,kw (0)
10. (urban NEAR/j2 (planting or landscaping)):ti,ab,kw (0)
11. (common NEXT land* or heathland* or strays):ti,ab,kw (9)
12. (sport* NEXT (field* or ground*)):ti,ab,kw (0)
13. (cemeteries or cemeteries or cemetery or cemetery):ti,ab,kw (0)
14. (brownfield* or brown NEXT field*):ti,ab,kw (0)
15. ((railway* or railroad* or canal* or highway* or road*) NEAR/2 embankment*):ti,ab,kw (0)
16. (urban NEXT (wood* or woodland*)):ti,ab,kw (0)
17. urban NEXT wilderness:ti,ab,kw (0)
18. (#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17) (33)

MIMAS Web of Knowledge: Internet (<http://wok.mimas.ac.uk>)

The MIMAS search covered the date range 1990 to date. The search was carried out on 12 April 2007 and identified 119 unique records:

- 72 records on the Social Science Citation Index
- 80 records on the Science Citation Index

Limits were set at the beginning of the search for 'Language=English' and 'Timespan=1990-2007'.

1. TS=(greenspace* or "green space*") (195)
2. TS=("urban nature" or "urban biodiversity") (52)
3. TS="open space*" (1190)
4. TS=(parkland* or "park land*") (621)
5. TS=("public park*" or "municipal park*" or "botanic* park*" or "community park*" or "urban park*" or "suburban park*" or "city park*") (482)
6. TS=("public garden*" or "municipal garden*" or "botanic* garden*" or "community garden*" or "city garden*") (616)
7. TS=("green path*" or "green trail*") (12)
8. TS=(greenway* or greenbelt* or "green belt*") (334)
9. TS=(allotment* SAME (garden* or vegetable*)) (40)
10. TS=("urban planting" or "urban landscaping") (4)
11. TS=("urban of planting" or "planting of urban" or "urban of landscaping" or "landscaping of urban") (4)
12. TS=("common land*" or heathland* or strays) (1333)
13. TS=("sport* field*" or "sport* ground*") (72)
14. TS=(brownfield* or "brown field*") (319)
15. TS=("railway* embankment*" or "railroad* embankment*" or "canal* embankment*" or "highway* embankment*" or "road* of embankment*") (112)
16. TS=("railway* of embankment*" or "embankment* of railway*" or "railroad* of embankment*" or "embankment* of railroad*" or "canal* of embankment*" or "embankment* of canal*" or "highway* of embankment*" or "embankment* of highway*" or "road* of embankment*" or "embankment* of road*") (20)
17. TS=("urban wood*" or "urban woodland*") (47)
18. TS="urban wilderness" (5)
19. TS=(cemeteries or cemeteries or cemetry or cemetery) (6)
20. #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 (5255)
21. TS=((benefit* or chang* or effect* or enhanc* or gain* or improv* or increas* or maintain* or maximis* or maximiz* or promot* or rais* or sustain* or influence* or impact* or affect*) SAME health) (>100000)
22. TS=("health status" or "health state*") (19117)
23. TS="level* of health" (816)
24. TS=("health behaviour*" or "health behavior*") (4893)
25. TS=("self-rated health" or "selfrated health" or "self-assess* health" or "selfassess* health" or "self-report* health" or "selfreport* health" or "self-perceived health" or "selfperceived health") (3433)
26. TS=("self-rated of health" or "selfrated of health" or "self-assess* of health" or "selfassess* of health" or "self-report* of health" or "selfreport* of health" or "self-perceived of health" or "selfperceived of health") (703)
27. TS=("self-perception* of health" or "selfperception* of health") (57)
28. #27 OR #26 OR #25 OR #24 OR #23 OR #22 OR #21 (>100000)
29. TS=((benefit* or chang* or effect* or enhanc* or gain* or improv* or increas* or maintain* or maximis* or maximiz* or promot* or rais* or sustain* or influence* or impact* or affect*) SAME "mental health") (8204)
30. TS="level* of mental health" (103)
31. TS=("self-rated mental health" or "selfrated mental health" or "self-assess* mental health" or "selfassess* mental health" or "self-report* mental health" or "selfreport* mental health" or "self-perceived mental health" or "selfperceived mental health") (68)
32. TS=("self-rated of mental health" or "selfrated of mental health" or "self-assess* of mental health" or "selfassess* of mental health" or "self-report* of mental health" or "selfreport* of mental health" or "self-perceived of mental health" or "selfperceived of mental health") (16)

33. TS=("self-perception* of mental health" or "selfperception* of mental health") (4)
34. #33 OR #32 OR #31 OR #30 OR #29 (8311)
35. TS=((benefit* or chang* or effect* or enhanc* or gain* or improv* or increas* or maintain* or maximis* or maximiz* or promot* or rais* or sustain* or influence* or impact* or affect*) SAME (wellbeing or wellness)) (1572)
36. TS="quality of life" (66323)
37. TS=("level* of wellbeing" or "level* of wellness") (36)
38. TS=("self-rated wellbeing" or "selfrated wellbeing" or "self-assess* wellbeing" or "selfassess* wellbeing" or "self-report* wellbeing" or "selfreport* wellbeing" or "self-perceived wellbeing" or "selfperceived wellbeing" or "self-rated wellness" or "selfrated wellness" or "self-assess* wellness" or "selfassess* wellness" or "self-report* wellness" or "selfreport* wellness" or "self-perceived wellness" or "selfperceived wellness") (6)
39. TS=("self-rated of wellbeing" or "selfrated of wellbeing" or "self-assess* of wellbeing" or "selfassess* of wellbeing" or "self-report* of wellbeing" or "selfreport* of wellbeing" or "self-perceived of wellbeing" or "selfperceived of wellbeing" or "self-rated of wellness" or "selfrated of wellness" or "self-assess* of wellness" or "selfassess* of wellness" or "self-report* of wellness" or "selfreport* of wellness" or "self-perceived of wellness" or "selfperceived of wellness") (4)
40. TS=("self-perception* of wellbeing" or "selfperception* of wellbeing" or "self-perception* of wellness" or "selfperception* of wellness") (0)
41. TS=((benefit* or chang* or effect* or enhanc* or gain* or improv* or increas* or maintain* or maximis* or maximiz* or promot* or rais* or sustain* or influence* or impact* or affect*) SAME ("self esteem" or "life satisfaction" or "purpose in life")) (4178)
42. TS=((benefit* or chang* or effect* or enhanc* or gain* or improv* or increas* or maintain* or maximis* or maximiz* or promot* or rais* or sustain* or influence* or impact* or affect*) SAME ("personal growth" or morale or "positive outlook" or "positive mental")) (738)
43. TS=((prevent* or reduc* or minimis* or minimiz* or restrict* or limit* or combat*) SAME (dependence or discrimination or loneliness or exclusion or anxiety or distress or stress or "mental fatigue")) (60508)
44. TS="social support" (16823)
45. #44 OR #42 OR #41 OR #40 OR #39 OR #37 OR #36 OR #35 (86648)
46. #45 OR #34 OR #28 (>100000)
47. #46 AND #20 (119)

Sociological Abstracts: CSA Illumina (<http://www.csa1.co.uk/csailumina/login.php>)

The Sociological Abstracts search covered the date range 1990 to date. The search was carried out on 13 April 2007 and identified 15 records.

[Strategy: strategy 8] [Saved as file: greenspace-socabs.txt]

1. TI=(greenspace* or green space*) or AB=(greenspace* or green space*) (11)
2. TI=(urban nature or urban biodiversity) or AB= TI=(urban nature or urban biodiversity) (2)
3. TI=open space* or AB=open space* (70)
4. DE=parks (147)
5. TI=(parkland* or park land*) or AB=(parkland* or park land*) (5)
6. TI=(public park or municipal park or botanic* park or community park or urban park or suburban park or city park or public parks or municipal parks or botanic* parks or community parks or urban parks or suburban parks or city parks) or AB=(public park or municipal park or botanic* park or community park or urban park or suburban park or city park or public parks or municipal parks or botanic* parks or community parks or urban parks or suburban parks or city parks) (34)
7. TI=(public garden or municipal garden or botanic* garden or community garden or city garden or public gardens or municipal gardens or botanic* gardens or community gardens or city gardens) or AB=(public garden or municipal garden or botanic* garden or community garden or city garden or public gardens or municipal gardens or botanic* gardens or community gardens or city gardens) (22)
8. TI=(green path* or green trail*) or AB=(green path* or green trail*) (6)

9. TI=(greenway* or greenbelt* or green belt*) or AB=(greenway* or greenbelt* or green belt*) (14)
10. TI=(allotment* within 6 (garden* or vegetable*)) or AB=(allotment* within6 (garden* or vegetable*)) (2)
11. TI=(urban within 2 (planting or landscaping)) or AB=(urban within 2 (planting or landscaping)) (2)
12. DE=common lands (83)
13. TI=(common land* or heathland* or strays) or AB=(common land* or heathland* or strays) (30)
14. TI=(sport* field* or sport* ground*) or AB=(sport* field* or sport* ground*) (15)
15. DE=Cemeteries (46)
16. TI=(cemeteries or cemeteries or cemetry or cemetery) or AB=(cemeteries or cemeteries or cemetry or cemetery) (0)
17. TI=(brownfield* or brown field*) or AB=(brownfield* or brown field*) (11)
18. TI=((railway* or railroad* or canal* or highway* or road*) within 2 embankment*) or AB=((railway* or railroad* or canal* or highway* or road*) within 2 embankment*) (2)
19. TI=(urban wood* or urban woodland*) or AB=(urban wood* or urban woodland*) (6)
20. TI=urban wilderness or AB=urban wilderness (1)
21. #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 (454)
22. ((benefit* or chang* or effect* or enhanc* or gain* or improv* or increas* or maintain* or maximis* or maximiz* or promot* or rais* or sustain* or influence* or impact* or affect*) within 6 health) (8518)
23. TI=(health status or health state*) or AB=(health status or health state*) (1139)
24. TI=level* of health or AB=level* of health (77)
25. DE=health behaviour (1366)
26. TI=health behavio?r* or AB=health behavio?r* (59)
27. TI=((self-rated or selfrated or self-assess* or selfassess* or self-report* or selfreport* or self-perceived or selfperceived) within 2 health) or AB=((self-rated or selfrated or self-assess* or selfassess* or self-report* or selfreport* or self-perceived or selfperceived) within 2 health) (453)
28. TI=(self-perception* of health or selfperception* of health) or AB=(self-perception* of health or selfperception* of health) (6)
29. #22 or #23 or #24 or #25 or #26 or #27 or #28 (9936)
30. DE=mental health (2080)
31. TI=((benefit* or chang* or effect* or enhanc* or gain* or improv* or increas* or maintain* or maximis* or maximiz* or promot* or rais* or sustain* or influence* or impact* or affect*) within 6 mental health) or AB=((benefit* or chang* or effect* or enhanc* or gain* or improv* or increas* or maintain* or maximis* or maximiz* or promot* or rais* or sustain* or influence* or impact* or affect*) within 6 mental health) (656)
32. TI=level* of mental health or AB=level* of mental health (14)
33. TI=((self-rated or selfrated or self-assess* or selfassess* or self-report* or selfreport* or self-perceived or selfperceived) within 2 mental health) or AB=((self-rated or selfrated or self-assess* or selfassess* or self-report* or selfreport* or self-perceived or selfperceived) within 2 mental health) (15)
34. TI=(self-perception* of mental health or selfperception* of mental health) or AB=(self-perception* of mental health or selfperception* of mental health) (0)
35. #30 or #31 or #32 or #33 or #34 (2318)
36. DE=Well Being (1950)
37. TI=((benefit* or chang* or effect* or enhanc* or gain* or improv* or increas* or maintain* or maximis* or maximiz* or promot* or rais* or sustain* or influenc* or impact* or affect*) within 6 (wellbeing or well-being or wellness)) or AB=((benefit* or chang* or effect* or enhanc* or gain* or improv* or increas* or maintain* or maximis* or maximiz* or promot* or rais* or sustain* or influenc* or impact* or affect*) within 6 (wellbeing or well-being or wellness)) (1427)
38. DE=Quality of Life (1142)
39. TI=quality of life or AB=quality of life (1626)
40. TI=(level* of wellbeing or level* of well-being or level* of wellness) or AB=(level* of wellbeing or level* of well-being or level* of wellness) (78)
41. TI=((self-rated or selfrated or self-assess* or selfassess* or self-report* or selfreport* or self-perceived or selfperceived) within 2 (wellbeing or well-being or wellness)) or

- AB=((self-rated or selfrated or self-assess* or selfassess* or self-report* or selfreport* or self-perceived or selfperceived) within 2 (wellbeing or well-being or wellness)) (13)
42. TI=(self-perception* of wellbeing or selfperception* of wellbeing or self-perception* of well-being or selfperception* of well-being or self-perception* of wellness or selfperception* of wellness) or AB=(self-perception* of wellbeing or selfperception* of wellbeing or self-perception* of well-being or selfperception* of well-being or self-perception* of wellness or selfperception* of wellness) (0)
43. DE=(self esteem or life satisfaction or morale) (1959)
44. TI=((benefit* or chang* or effect* or enhanc* or gain* or improv* or increas* or maintain* or maximis* or maximiz* or promot* or rais* or sustain* or influenc* or impact* or affect*) within 6 (self esteem or life satisfaction or purpose in life)) or AB=((benefit* or chang* or effect* or enhanc* or gain* or improv* or increas* or maintain* or maximis* or maximiz* or promot* or rais* or sustain* or influenc* or impact* or affect*) within 6 (self esteem or life satisfaction or purpose in life)) (743)
45. TI=((benefit* or chang* or effect* or enhanc* or gain* or improv* or increas* or maintain* or maximis* or maximiz* or promot* or rais* or sustain* or influenc* or impact* or affect*) within 6 (personal growth or morale or positive outlook or positive mental)) or AB=((benefit* or chang* or effect* or enhanc* or gain* or improv* or increas* or maintain* or maximis* or maximiz* or promot* or rais* or sustain* or influenc* or impact* or affect*) within 6 (personal growth or morale or positive outlook or positive mental)) (114)
46. DE=(dependency psychology or discrimination or loneliness or anxiety or psychological distress or stress) (6278)
47. TI=((prevent* or reduc* or minimis* or minimiz* or restrict* or limit* or combat*) within 6 (dependence or discrimination or loneliness or exclusion or anxiety or distress or stress or mental fatigue)) or AB=((prevent* or reduc* or minimis* or minimiz* or restrict* or limit* or combat*) within 6 (dependence or discrimination or loneliness or exclusion or anxiety or distress or stress or mental fatigue)) (854)
48. DE=social support (2520)
49. TI=social support or AB=social support (2628)
50. #36 or #37 or #38 or #39 or #40 or #41 or #42 or #43 or #44 or #45 or #46 or #47 or #48 or #49 (15138)
51. #29 or #35 or #50 (24152)
52. #21 and #51 (15)

Social Policy and Practice: ARC2 WebSPIRS (<http://arc.uk.ovid.com>)

The Social Policy and Practice search covered the date range 1990 to 200703. The search was carried out on 26 April 2007 and identified 210 records.

[Strategy: greenspace SocPol] [Saved as file: greenspace-socpol.txt]

1. (greenspace* or green space*) in TI,AB,DE (249)
2. (urban nature or urban biodiversity) in TI,AB,DE (7)
3. open space* in TI,AB,DE (766)
4. (parkland* or park land*) in TI,AB,DE (26)
5. (public park or municipal park or botanic* park or community park or urban park or suburban park or city park or public parks or municipal parks or botanic* parks or community parks or urban parks or suburban parks or city parks) in TI,AB,DE (105)
6. (public garden or municipal garden or botanic* garden or community garden or city garden or public gardens or municipal gardens or botanic* gardens or community gardens or city gardens) in TI,AB,DE (83)
7. (green path* or green trail*) in TI,AB,DE (3)
8. (greenway* or greenbelt* or green belt*) in TI,AB,DE (382)
9. (allotment* near6 (garden* or vegetable*)) in TI,AB,DE (19)
10. (urban near2 (planting or landscaping)) in TI,AB,DE (6)
11. (common land* or heathland* or strays) in TI,AB,DE (22)
12. (sport* field* or sport* ground*) in TI,AB,DE (36)
13. (cemeteries or cemeteries or cemetery or cemetery) in TI,AB,DE (0)
14. (brownfield* or brown field*) in TI,AB,DE (711)

15. ((railway* or railroad* or canal* or highway* or road*) near2 embankment*) in TI,AB,DE (3)
16. (urban wood* or urban woodland*) in TI,AB,DE (8)
17. urban wilderness in TI,AB,DE (0)
18. #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 (2020)
19. ((benefit* or chang* or effect* or enhanc* or gain* or improv* or increas* or maintain* or maximis* or maximiz* or promot* or rais* or sustain* or influence* or impact* or affect*) near6 health) in TI,AB,DE (8655)
20. (health status or health state*) in TI,AB,DE (923)
21. (level* near2 health) in TI,AB,DE (127)
22. (health behaviour* or health behavior*) in TI,AB,DE (288)
23. ((self rated or selfrated or self assess* or selfassess* or self report* or selfreport* or self perceived or selfperceived) near2 health) in TI,AB,DE (409)
24. ((self perception* or selfperception*) near2 health) in TI,AB,DE (6)
25. #19 or #20 or #21 or #22 or #23 or #24 (9683)
26. MENTAL-HEALTH in DE (3405)
27. ((benefit* or chang* or effect* or enhanc* or gain* or improv* or increas* or maintain* or maximis* or maximiz* or promot* or rais* or sustain* or influence* or impact* or affect*) near6 mental health) in TI,AB,DE (1830)
28. (level* near2 mental health) in TI,AB,DE (40)
29. ((self rated or selfrated or self assess* or selfassess* or self report* or selfreport* or self perceived or selfperceived) near2 mental health) in TI,AB,DE (14)
30. ((self-perception* or selfperception*) near2 mental health) in TI,AB,DE (0)
31. #26 or #27 or #28 or #29 or #30 (4788)
32. (WELL-BEING or WELLNESS* or WELLBEING*) in DE (797)
33. (SELF-ESTEEM or LIFE-SATISFACTION or MORALE*) in DE (1423)
34. (DEPENDENCE* or DISCRIMINATION* or LONELINESS* or EXCLUSION* or ANXIETY* or DISTRESS* or STRESS*) in DE (15301)
35. ((benefit* or chang* or effect* or enhanc* or gain* or improv* or increas* or maintain* or maximis* or maximiz* or promot* or rais* or sustain* or influenc* or impact* or affect*) near6 (wellbeing or well being or wellness)) in TI,AB,DE (1442)
36. (quality near2 life) in TI,AB,DE (5043)
37. (level* near2 (wellbeing or well being or wellness)) in TI,AB,DE (41)
38. ((self rated or selfrated or self assess* or selfassess* or self report* or selfreport* or self perceived or selfperceived) near2 (wellbeing or well being or wellness)) in TI,AB,DE (11)
39. ((self perception* or selfperception*) near2 (wellbeing or well being or wellness)) in TI,AB,DE (0)
40. ((benefit* or chang* or effect* or enhanc* or gain* or improv* or increas* or maintain* or maximis* or maximiz* or promot* or rais* or sustain* or influenc* or impact* or affect*) near6 (self esteem or life satisfaction)) in TI,AB,DE (398)
41. ((benefit* or chang* or effect* or enhanc* or gain* or improv* or increas* or maintain* or maximis* or maximiz* or promot* or rais* or sustain* or influenc* or impact* or affect*) near6 (purpose near2 life)) in TI,AB,DE (7)
42. ((benefit* or chang* or effect* or enhanc* or gain* or improv* or increas* or maintain* or maximis* or maximiz* or promot* or rais* or sustain* or influenc* or impact* or affect*) near6 (personal growth or morale or positive outlook or positive mental)) in TI,AB,DE (169)
43. ((prevent* or reduc* or minimis* or minimiz* or restrict* or limit* or combat*) near6 (dependence or discrimination or loneliness or exclusion or anxiety or distress or stress or mental fatigue)) in TI,AB,DE (1107)
44. social support in TI,AB,DE (1533)
45. #32 or #33 or #34 or #35 or 36 or #37 or #38 or #39 or #40 or #41 or #42 or #43 or #44 (22092)
46. #25 or #31 or #45 (32106)
47. #18 and #46 (213)
48. #18 and #46 and (PY:1M = 1990-2007) (210)

The Planex search covered the date range 1990 to date and was carried out on 30 April 2007. The results were scanned for relevance and 42 potentially relevant items were identified.

[Saved as files: planex1-greenspace.txt; planex2-greenspace.txt; planex3-greenspace.txt; planex4-greenspace.txt; planex5-greenspace.txt; planex6-greenspace.txt; planex7-greenspace.txt; planex8-greenspace.txt; planex9-greenspace.txt]

The search interface for Planex does not facilitate the combining of search sets. The following terms were entered line-by-line:

- (greenspace* or "green space" or "green spaces") and (health or wellbeing or well-being or "well being" or wellness or "quality of life" or "self esteem" or "life satisfaction" or "purpose in life" or "personal growth" or morale or "positive outlook" or "positive mental" or dependence or discrimination or loneliness or exclusion or anxiety or distress or stress or "mental fatigue" or "social support") (26 records)
- ("urban nature" or "urban biodiversity") and (health or wellbeing or well-being or "well being" or wellness or "quality of life" or "self esteem" or "life satisfaction" or "purpose in life" or "personal growth" or morale or "positive outlook" or "positive mental" or dependence or discrimination or loneliness or exclusion or anxiety or distress or stress or "mental fatigue" or "social support") (11 records)
- ("open space" or "open spaces") and (health or wellbeing or well-being or "well being" or wellness or "quality of life" or "self esteem" or "life satisfaction" or "purpose in life" or "personal growth" or morale or "positive outlook" or "positive mental" or dependence or discrimination or loneliness or exclusion or anxiety or distress or stress or "mental fatigue" or "social support") (93 records)
- (parkland* or "park land" or "park lands") and (health or wellbeing or well-being or "well being" or wellness or "quality of life" or "self esteem" or "life satisfaction" or "purpose in life" or "personal growth" or morale or "positive outlook" or "positive mental" or dependence or discrimination or loneliness or exclusion or anxiety or distress or stress or "mental fatigue" or "social support") (6 records)
- ("public park" or "municipal park" or "botanic park" or "botanical park" or "community park" or "urban park" or "suburban park" or "city park" or "public parks" or "municipal parks" or "botanic parks" or "botanical parks" or "community parks" or "urban parks" or "suburban parks" or "city parks") and (health or wellbeing or well-being or "well being" or wellness or "quality of life" or "self esteem" or "life satisfaction" or "purpose in life" or "personal growth" or morale or "positive outlook" or "positive mental" or dependence or discrimination or loneliness or exclusion or anxiety or distress or stress or "mental fatigue" or "social support") (24 records)
- ("public garden" or "municipal garden" or "botanic garden" or "botanical garden" or "community garden" or "city garden" or "public gardens" or "municipal gardens" or "botanic gardens" or "botanical gardens" or "community gardens" or "city gardens") and (health or wellbeing or well-being or "well being" or wellness or "quality of life" or "self esteem" or "life satisfaction" or "purpose in life" or "personal growth" or morale or "positive outlook" or "positive mental" or dependence or discrimination or loneliness or exclusion or anxiety or distress or stress or "mental fatigue" or "social support") (10 records)
- ("green path" or "green paths" or "green pathway" or "green pathways" or "green trail" or "green trails" or greenway or greenways or greenbelt* or "green belt" or "green belts" or allotment*) and (health or wellbeing or well-being or "well being" or wellness or "quality of life" or "self esteem" or "life satisfaction" or "purpose in life" or "personal growth" or morale or "positive outlook" or "positive mental" or dependence or discrimination or loneliness or exclusion or anxiety or distress or stress or "mental fatigue" or "social support") (54 records)
- (urban planting within 2 or urban landscaping within 2 or "common land" or "common lands" or heathland* or strays or "sports field" or "sports ground" or cemeteries or cemeteries or cemetery or brownfield* or "brown field" or "brown fields") and (health or wellbeing or well-being or "well being" or wellness or "quality of life" or "self esteem" or "life satisfaction" or "purpose in life" or "personal growth" or morale or "positive outlook" or "positive mental" or dependence or discrimination or loneliness or exclusion or anxiety or distress or stress or "mental fatigue" or "social support") (64 records)
- (railway* embankment* within 2 or railroad* embankment* within 2 or canal* embankment* within 2 or highway* embankment* within 2 or road* embankment* within 2

or "urban wood" or "urban woods" or "urban woodland" or "urban woodlands" or "urban wilderness") and (health or wellbeing or well-being or "well being" or wellness or "quality of life" or "self esteem" or "life satisfaction" or "purpose in life" or "personal growth" or morale or "positive outlook" or "positive mental" or dependence or discrimination or loneliness or exclusion or anxiety or distress or stress or "mental fatigue" or "social support") (2 records)

Enviroline: Dialog (<http://www.dialogclassic.com/>)

The Enviroline search covered the date range 1990 to date. The search was carried out on 01 May 2007 and identified 88 records.

[Saved as file: greenspace-enviroline.txt]

S (greenspace? or green(w)space?)/ti,ab,de (184)
S (urban(w)nature or urban(w)biodiversity)/ti,ab,de (16)
S open(w)space?/ti,ab,de (666)
S (parkland? or park(w)land?)/ti,ab,de (206)
S ((public or municipal or botanic? or community or urban or suburban or city)(w)(park or parks))/ti,ab,de (507)
S ((public or municipal or botanic? or community or city)(w)(garden or gardens))/ti,ab,de (168)
S (green(w)(path? or trail?))/ti,ab,de (1)
S (greenway? or greenbelt? or green(w)belt?)/ti,ab,de (304)
S allotment?/de (0)
S (allotment?(6n)(garden? or vegetable?))/ti,ab (19)
S (urban(w)planting or urban(w)landscaping)/de (0)
S (urban(2n)(planting or landscaping))/ti,ab (19)
S (common(w)land? or heathland? or strays)/ti,ab,de (175)
S (sport?(w)(field? or ground?))/ti,ab,de (14)
S (cemeteries or cemeteries or cemetery or cemetery)/ti,ab,de (38)
S (brownfield? or brown(w)field?)/ti,ab,de (1024)
S (railway?(w)embankment? or railroad?(w)embankment? or canal?(w)embankment? or highway? (w)embankment? or road?(w)embankment?)/de (0)
S ((railway? or railroad? or canal? or highway? or road?)(2n)embankment?)/ti,ab,de (47)
S (urban(w)wood? or urban(w)woodland?)/ti,ab,de (42)
S urban(w>wilderness/ti,ab,de (3)
S s1:s20 (3015)
S ((benefit? or chang? or effect? or enhanc? or gain? or improv? or increas? or maintain? or maximis? or maximiz? or promot? or rais? or sustain? or influence? or impact? or affect?)(6n)health)/ti,ab (6642)
S (health(w)status or health(w)state?)/ti,ab,de (234)
S level?(1w)health/ti,ab,de (62)
S health(w)(behaviour? or behavior?)/ti,ab,de (1)
S (self(w)rated(w)health or selfrated(w)health or self(w)assess?(w)health or selfassess?(w)health or self(w)report?(w)health or selfreport?(w)health or self(w)perceived(w)health or selfperceived(w)health)/de (0)
S ((self(w)rated or selfrated or self(w)assess? or selfassess? or self(w)report? or selfreport? or self(w)perceived or selfperceived)(2n)health)/ti,ab (6)
S (self(w)perception?(1w)health or selfperception?(1w)health)/ti,ab,de (0)
S s22:s28 (6797)
S mental(w)health/de (0)
S ((benefit? or chang? or effect? or enhanc? or gain? or improv? or increas? or maintain? or maximis? or maximiz? or promot? or rais? or sustain? or influence? or impact? or affect?)(6n)mental(w)health)/ti,ab (11)
S level?(1w)mental(w)health/ti,ab,de (0)
S ((self(w)rated or selfrated or self(w)assess? or selfassess? or self(w)report? or selfreport? or self(w)perceived or selfperceived)(2n)mental(w)health)/ti,ab (0)
S (self(w)perception?(1w)mental(w)health or selfperception?(1w)mental(w)health)/ti,ab (0)
S s30:s34 (11)
S (wellbeing or well(w)being or wellness)/de (0)

S ((benefit? or chang? or effect? or enhanc? or gain? or improv? or increas? or maintain? or maximis? or maximiz? or promot? or rais? or sustain? or influenc? or impact? or affect?)(6n)(wellbeing or well(w)being or wellness))/ti,ab (157)
 S quality(1w)life/ti,ab,de (591)
 S (level?(1w)wellbeing or level?(1w)well(w)being or level?(1w)wellness)/ti,ab,de (4)
 S ((self(w)rated or selfrated or self(w)assess? or selfassess? or self(w)report? or selfreport? or self(w)perceived or selfperceived)(2n)(wellbeing or well(w)being or wellness))/ti,ab (1)
 S (self(w)perception?(1w)wellbeing or selfperception?(1w)wellbeing or self(w)perception?(1w)well(w)being or selfperception?(1w)well(w)being or self(w)perception?(1w)wellness or selfperception?(1w)wellness)/ti,ab (0)
 S (self(w)esteem or life(w)satisfaction or purpose(1w)life)/de (0)
 S ((benefit? or chang? or effect? or enhanc? or gain? or improv? or increas? or maintain? or maximis? or maximiz? or promot? or rais? or sustain? or influenc? or impact? or affect?)(6n)(self(w)esteem or life(w)satisfaction or purpose(1w)life))/ti,ab (4)
 S (personal(w)growth or morale or positive(w)outlook or positive(w)mental)/de (0)
 S ((benefit? or chang? or effect? or enhanc? or gain? or improv? or increas? or maintain? or maximis? or maximiz? or promot? or rais? or sustain? or influenc? or impact? or affect?)(6n)(personal(w)growth or morale or positive(w)outlook or positive(w)mental))/ti,ab (9)
 S (dependence or discrimination or loneliness or exclusion or anxiety or distress or stress or mental(w)fatigue)/de (535)
 S ((prevent? or reduc? or minimis? or minimiz? or restrict? or limit? or combat?)(6n)(dependence or discrimination or loneliness or exclusion or anxiety or distress or stress or mental(w)fatigue))/ti,ab (653)
 S social(w)support/ti,ab,de (19)
 S s36:s48 (1942)
 S s29 or s35 or s49 (8634)
 S s21 and s50 (104)
 S s51/ENG (104)
 S s52/1990:2007 (88)

INCONDA: Dialog (<http://www.dialogclassic.com/>)

The INCONDA search covered the date range 1990 to date. The search was carried out on 01 May 2007 and identified 21 records.

[Saved as file: greenspace-iconda.txt]

S (greenspace? or green(w)space?)/ti,ab,de (229)
 S (urban(w)nature or urban(w)biodiversity)/ti,ab,de (21)
 S open(w)space?/ti,ab,de (4281)
 S (parkland? or park(w)land?)/ti,ab,de (337)
 S ((public or municipal or botanic? or community or urban or suburban or city)(w)(park or parks))/ti,ab,de (335)
 S ((public or municipal or botanic? or community or city)(w)(garden or gardens))/ti,ab,de (1288)
 S (green(w)(path? or trail?))/ti,ab,de (8)
 S (greenway? or greenbelt? or green(w)belt?)/ti,ab,de (723)
 S allotment?/de (204)
 S (allotment?(6n)(garden? or vegetable?))/ti,ab (31)
 S (urban(w)planting or urban(w)landscaping)/de (68)
 S (urban(2n)(planting or landscaping))/ti,ab (38)
 S (common(w)land? or heathland? or strays)/ti,ab,de (27)
 S (sport?(w)(field? or ground?))/ti,ab,de (542)
 S (cemeteries or cemeteries or cemetery or cemetery)/ti,ab,de (1049)
 S (brownfield? or brown(w)field?)/ti,ab,de (198)
 S (railway?(w)embankment? or railroad?(w)embankment? or canal?(w)embankment? or highway? (w)embankment? or road?(w)embankment?)/de (78)
 S ((railway? or railroad? or canal? or highway? or road?)(2n)embankment?)/ti,ab,de (382)
 S (urban(w)wood? or urban(w)woodland?)/ti,ab,de (2)
 S urban(w>wilderness/ti,ab,de (8)

S s1:s20 (8947)
 S ((benefit? or chang? or effect? or enhanc? or gain? or improv? or increas? or maintain? or maximis? or maximiz? or promot? or rais? or sustain? or influence? or impact? or affect?)(6n)health)/ti,ab (976)
 S (health(w)status or health(w)state?)/ti,ab,de (25)
 S level?(1w)health/ti,ab,de (32)
 S health(w)(behaviour? or behavior?)/ti,ab,de (5)
 S (self(w)rated(w)health or selfrated(w)health or self(w)assess?(w)health or selfassess?(w)health or self(w)report?(w)health or selfreport?(w)health or self(w)perceived(w)health or selfperceived(w)health)/de (0)
 S ((self(w)rated or selfrated or self(w)assess? or selfassess? or self(w)report? or selfreport? or self(w)perceived or selfperceived)(2n)health)/ti,ab (2)
 S (self(w)perception?(1w)health or selfperception?(1w)health)/ti,ab,de (0)
 S s22:s28 (1024)
 S mental(w)health/de (14)
 S ((benefit? or chang? or effect? or enhanc? or gain? or improv? or increas? or maintain? or maximis? or maximiz? or promot? or rais? or sustain? or influence? or impact? or affect?)(6n)mental(w)health)/ti,ab (7)
 S level?(1w)mental(w)health/ti,ab,de (0)
 S ((self(w)rated or selfrated or self(w)assess? or selfassess? or self(w)report? or selfreport? or self(w)perceived or selfperceived)(2n)mental(w)health)/ti,ab (0)
 S (self(w)perception?(1w)mental(w)health or selfperception?(1w)mental(w)health)/ti,ab (0)
 S s30:s34 (21)
 S (wellbeing or well(w)being or wellness)/de (158)
 S ((benefit? or chang? or effect? or enhanc? or gain? or improv? or increas? or maintain? or maximis? or maximiz? or promot? or rais? or sustain? or influenc? or impact? or affect?)(6n)(wellbeing or well(w)being or wellness))/ti,ab (120)
 S quality(1w)life/ti,ab,de (1061)
 S (level?(1w)wellbeing or level?(1w)well(w)being or level?(1w)wellness)/ti,ab,de (1)
 S ((self(w)rated or selfrated or self(w)assess? or selfassess? or self(w)report? or selfreport? or self(w)perceived or selfperceived)(2n)(wellbeing or well(w)being or wellness))/ti,ab (0)
 S (self(w)perception?(1w)wellbeing or selfperception?(1w)wellbeing or self(w)perception?(1w)well(w)being or selfperception?(1w)well(w)being or self(w)perception?(1w)wellness or selfperception?(1w)wellness)/ti,ab (0)
 S (self(w)esteem or life(w)satisfaction or purpose(1w)life)/de (0)
 S ((benefit? or chang? or effect? or enhanc? or gain? or improv? or increas? or maintain? or maximis? or maximiz? or promot? or rais? or sustain? or influenc? or impact? or affect?)(6n)(self(w)esteem or life(w)satisfaction or purpose(1w)life))/ti,ab (4)
 S (personal(w)growth or morale or positive(w)outlook or positive(w)mental)/de (2)
 S ((benefit? or chang? or effect? or enhanc? or gain? or improv? or increas? or maintain? or maximis? or maximiz? or promot? or rais? or sustain? or influenc? or impact? or affect?)(6n)(personal(w)growth or morale or positive(w)outlook or positive(w)mental))/ti,ab (28)
 S (dependence or discrimination or loneliness or exclusion or anxiety or distress or stress or mental(w)fatigue)/de (19808)
 S ((prevent? or reduc? or minimis? or minimiz? or restrict? or limit? or combat?)(6n)(dependence or discrimination or loneliness or exclusion or anxiety or distress or stress or mental(w)fatigue))/ti,ab (828)
 S social(w)support/ti,ab,de (10)
 S s36:s48 (21698)
 S s29 or s35 or s49 (22677)
 S s21 and s50 (102)
 S s51/ENG (27)
 S s52/1990:2007 (21)

Architecture Database: Dialog (<http://www.dialogclassic.com/>)

The Architecture Database search covered the date range 1990 to date. The search was carried out on 01 May 2007 and identified 2 records.

[Saved as file: greenspace-architecturedb.txt]

The search was broadened for the Architecture Database as records do not have abstracts.

S (greenspace? or green(w)space?)/ti,de (27)
S (urban(w)nature or urban(w)biodiversity)/ti,de (4)
S open(w)space?/ti,de (601)
S (parkland? or park(w)land?)/ti,de (58)
S ((public or municipal or botanic? or community or urban or suburban or city)(w)(park or parks))/ti,de (116)
S ((public or municipal or botanic? or community or city)(w)(garden or gardens))/ti,de (231)
S (green(w)(path? or trail?))/ti,de (1)
S (greenway? or greenbelt? or green(w)belt?)/ti,de (244)
S allotment?/de (24)
S (allotment?(6n)(garden? or vegetable?))/ti,ab (3)
S (urban(w)planting or urban(w)landscaping)/de (0)
S (urban(2n)(planting or landscaping))/ti,ab (5)
S (common(w)land? or heathland? or strays)/ti,de (12)
S (sport?(w)(field? or ground?))/ti,de (298)
S (cemetries or cemeteries or cemetery or cemetery)/ti,de (473)
S (brownfield? or brown(w)field?)/ti,de (89)
S (railway?(w)embankment? or railroad?(w)embankment? or canal?(w)embankment? or highway? (w)embankment? or road?(w)embankment?)/de (0)
S ((railway? or railroad? or canal? or highway? or road?)(2n)embankment?)/ti,de (1)
S (urban(w)wood? or urban(w)woodland?)/ti,de (1)
S urban(w>wilderness/ti,de (1)
S s1:s20 (2136)
S (health or wellbeing or well(w)being or wellness or quality(1w)life or self(w)esteem or life(w)satisfaction or purpose(1w)life or personal(w)growth or morale or positive(w)outlook or positive(w)mental or dependence or discrimination or loneliness or exclusion or anxiety or distress or stress or mental(w)fatigue or social(w)support)/ti,de (1899)
S s21 and s22 (3)
S s23/ENG (2)
S s24/1990:2007 (2)

APPENDIX C: Organisational websites searched

In addition to the electronic databases, searches of the following organisational websites were carried out.

BHF National Centre for Physical Activity and Health (BHFNC): Internet
(<http://www.bhfactive.org.uk>)

The BHFNC website search was carried out on 4 May 2007. Details of 41 potentially relevant documents were downloaded for consideration by the reviewer.

OPENspace: Internet (<http://www.openspace.eca.ac.uk>)

The OPENspace website search was carried out on 4 May 2007. Details of seven potentially relevant documents were downloaded for consideration by the reviewer.

Forest Research [the research agency of the Forestry Commission]: Internet
(<http://www.forestry.gov.uk/fr/hcou-5qjmbb>)

The Forest Research website search was carried out on 4 May 2007. Details of four potentially relevant documents were downloaded for consideration by the reviewer.

CABE: Internet (<http://www.cabe.org.uk>)

The CABE website search was carried out on 4 May 2007. Details of two potentially relevant documents were downloaded for consideration by the reviewer.

National Institute of Health and Clinical Excellence (NICE): Internet
(<http://www.nice.org.uk/>)

The NICE website search was carried out on 10 May 2007. Details of the public health programme guidance on 'Physical activity and environment' were downloaded for consideration by the reviewer.

Scottish Executive: Internet (<http://www.scotland.gov.uk/>)

The Scottish Executive website search was carried out on 11 May 2007. Details of two potentially relevant documents were downloaded for consideration by the reviewer.

Natural England: Internet (<http://www.naturalengland.org.uk/>)

The Natural England website search was carried out on 11 May 2007. Details of nine potentially relevant documents were downloaded for consideration by the reviewer.

Scottish National Heritage: Internet (<http://www.snh.org.uk/>)

The Scottish National Heritage website search was carried out on 11 May 2007. Details of four potentially relevant documents were downloaded for consideration by the reviewer.

SNIFFER: Internet (<http://www.sniffer.org.uk/>)

The SNIFFER website search was carried out on 11 May 2007. Details of two potentially relevant documents were downloaded for consideration by the reviewer.

Physical Activity and Health Alliance: Internet (<http://www.paha.org.uk/>)

The Physical Activity and Health Alliance website search was carried out on 11 May 2007. No relevant documents were identified.

Sustrans: Internet (<http://www.sustrans.org.uk/>)

The Sustrans website search was carried out on 11 May 2007. Details of two potentially relevant documents were downloaded for consideration by the reviewer.

UNESCO's Man and the Biosphere Programme (MAB): Internet

<http://www.unesco.org/mab/mabProg.shtml>

The UNESCO MAB website search was carried out on 11 May 2007. No relevant documents were identified.

APPENDIX D: Quality criteria assessment tool

1	Question	Is the research question clear?	E
2	Theoretical perspective	Is the theoretical or ideological perspective of the author (or funder) explicit, and has this influenced the study design, methods or research findings?	D
3	Study design	Is the study design appropriate to answer the question?	E
4	Context	Is the context or setting adequately described?	
5	Sampling	(Qualitative) Is the sample adequate to explore the range of subjects and settings, and has it been drawn from an appropriate population? (Quantitative) Is the sample size adequate for the analysis used and has it been drawn from an appropriate population?	E
6	Data collection	Was the data collection adequately described and rigorously conducted to ensure confidence in the findings?	E
7	Data analysis	Was there evidence that the data analysis was rigorously conducted to ensure confidence in the findings?	E
8	Reflexivity	Are the findings substantiated by the data and has consideration been given to any limitations of the methods or data that may have affected the results?	D
9	Generalisability	Do any claims to generalisability follow logically, theoretically and statistically from the data?	D
10	Ethics	Have ethical issues been addressed and confidentiality respected?	D *

E=essential, D=desirable, *Ethics may be essential in some sensitive fields

Source: Croucher et al. 2003

APPENDIX E: Review Papers

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