



Countryside Recreation Network

**A countryside for health and wellbeing:**  
the physical and mental health benefits  
of green exercise

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## Foreword

*'For each of us one of the most important things in life is our own and our family's health'*

**Tony Blair, Prime Minister**

Those of us involved in the Countryside Recreation Network (CRN) and the government departments, and agencies that are represented, have a strongly held belief that the countryside of the UK and Ireland makes a significant contribution to the health and wellbeing of those people who experience what it has to offer.

As countryside recreation professionals, we feel intuitively that the activities, land and infrastructure for which the CRN agencies have responsibility make a significant contribution to preventing ill- health amongst the population and that there is the potential to accrue greater benefits if additional resources were made available. As we debated these issues back in 2003 it became apparent that it was insufficient to continue to preach the gospel that 'countryside and greenspace is good for you' and that we needed to provide the evidence.

The research that we have commissioned has three principal components

- ▶ to undertake a systematic review of the evidence linking recreation in greenspace and the countryside to health and wellbeing
- ▶ to provide a snapshot of current practical initiatives based on countryside recreation, illustrating their scope and scale and identifying any gaps
- ▶ to provide advice on the policy implications of investment in 'green exercise'

I hope you will enjoy reading the report and will be able to consider acting on its findings. In many respects the debate about the policy implications of this work has only just begun. CRN has sought to foster the discussions about the links between health and countryside recreation by hosting a conference for an invited audience of countryside and health professionals. It is hoped that this event, combined with the compelling evidence set out in the report, will stimulate a truly joined up approach to unlocking the potential of the countryside in the UK and Ireland for health and wellbeing. We aim to forge links between the health sector and those organisations involved in countryside recreation from which all will benefit.

I would like to thank my colleagues in CRN for their efforts in developing the brief and steering the project and to Professor Jules Pretty and his team. Particular thanks are due to those who funded the study (Department for Environment, Food and Rural Affairs, Environment Agency, Forestry Commission, The Countryside Agency, English Nature, Hampshire County Council, Sport England, Environment and Heritage Service Northern Ireland, British Waterways and Department for Culture, Media and Sport). Particular thanks are also due to Marcus Sangster of the Forestry Commission who has co-ordinated the programme.

**Geoff Hughes**

Chairman of the Countryside Recreation Network

# The CRN and the University of Essex research team

## The Countryside Recreation Network

The Countryside Recreation Network is an association of organisations with a role relating to access and open air recreation in the countryside. Most of its members are in the public sector, with countryside responsibilities. Its prime purpose is to promote effective liaison between its members on issues of countryside access and recreation, and associated tourism and economic development.

The aims of the Countryside Recreation Network are as follows

**Research** - to encourage co-operation between members in identifying and promoting the need for research related to countryside recreation and associated tourism and economic development, to encourage joint ventures in undertaking research, and to disseminate information about members' recreation research programmes.

**Liaison** - to promote information exchange relating to countryside recreation and associated tourism and economic development and to foster general debate about relevant trends and issues.

**Good practice** - to spread information to develop best practice through training and professional development in provision for and management of countryside recreation and associated tourism and economic activity.

The Network may pursue these aims through

- ▶ meetings of its members
- ▶ short-term working groups, committees or joint research projects to address specific topics
- ▶ dissemination of information about the research programmes of its members
- ▶ a programme of workshops and other events for practitioners in countryside recreation, aimed to promote best practice or debate contemporary issues; and through
- ▶ reports of workshops and conferences, a newsletter and other publications (paper or electronic) agreed by members

## The Department of Biological Sciences, University of Essex

The Department of Biological Sciences at the University of Essex has some 40 academic staff, 500 undergraduates, 45 research officers and over 150 postgraduates. The Department offers Honours degree schemes in Biochemistry; Biochemistry and Molecular Medicine; Biomedical Sciences; Cell and Molecular Biology; Biological Sciences; Ecology; Biodiversity and Conservation; Environment, Lifestyle and Health; Marine and Freshwater Biology; Sports and Exercise Science; and Sports Science and Biology. MSc schemes are offered in Biotechnology, Sports Science; and Environment, Science and Society. The Department's research activities are divided into four groups: Plant Productivity and Sustainable Agriculture; Environmental Microbiology; Biophysics and Chemical Biology; and Molecular Medicine. There are also two cross-disciplinary centres: the Centre for Environmental Sciences and the Centre for Sports and Exercise Science. A new Health, Exercise and Active Life research unit has recently been established to co-ordinate research into green exercise and the benefits of nature.

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## Executive summary

# A countryside for health and wellbeing: the physical and mental health benefits of green exercise

### Introduction

How does nature make us feel? Much, of course, depends on what else is important in our lives. Is it a good or a bad day? Irrespective of where we come from, it seems that the presence of living things makes us feel good. They help us when we feel stressed, and if there is green vegetation, blue sky and water in the scene, then we like it even more. This idea that the quality of nature affects our mental health is not a new one, but it has not greatly affected the planning of our urban and rural environments, nor the setting of public health priorities.

In the UK, more than 80% of people live in urban areas (Defra, 2004), though the greater growth is now in rural areas. Urban settings by definition have less nature than rural ones. And less green nature means reduced mental wellbeing, or at least less opportunity to recover from mental stress. As natural green environments have increasingly come under pressure from economic development, so it seems our own wellbeing has suffered as a consequence.

Today, stress and mental ill-health are becoming more common, and the associated public health costs are growing. The World Health Organisation estimates that depression and depression-related illness will become the greatest source of ill-health by 2020. This is partly because some other behaviours, such as smoking, over-eating and high alcohol consumption, are likely to be coping mechanisms for mental ill-health and stress, and have their own serious consequences. In addition, many urgent physical health challenges, including obesity and coronary heart disease, are also connected to sedentary lifestyles. Yet it is known that physically active people have a lower risk of dying from coronary heart disease, type II diabetes,

hypertension and colon cancer. In the UK, there is evidence of a dramatic fall in physical activity over the past 50 years.

### Purpose of research

There is substantial evidence that links the natural environment with good physical health and psychological wellbeing. The 'Biophilia Hypothesis' states that the desire for contact with nature is partly innate. As both physical activity and nature can positively affect wellbeing, we have undertaken research to explore the synergy in adopting physical activities whilst being directly exposed to nature. We have called this 'green exercise'.

### Evidence

The evidence indicates that nature can make positive contributions to our health, help us recover from pre-existing stresses or problems, have an 'immunising' effect by protecting us from future stresses, and help us to concentrate and think more clearly. We have discerned three levels of engagement with nature

- viewing nature - as through a window, or in a painting
- being in the presence of nearby nature - which may be incidental to some other activity, such as walking or cycling to work, reading on a garden seat or talking to friends in a park; and
- active participation and involvement with nature - such as gardening, farming, trekking, camping, cross-country running or horse-riding

Most evidence, though, comes from the USA, Scandinavia and Japan. There have been few UK studies on the effect of nature on health, and very little research has investigated the separate effects of social capital on wellbeing.

### Methodology

In this report, we have reviewed existing green exercise studies in the UK on the effects of the view from the window (University of Essex), on Walking for Health Initiatives, and Green Gyms (conservation activities for health).



We have also undertaken research on the effects of active participation in the countryside. To do this, we conducted a quantitative analysis of the effects of ten countryside activities in England, Scotland, Northern Ireland and Wales on the health of 263 people. The range of projects incorporated both group activities (such as the health walks) and activities which people undertook on their own. This enabled us to examine whether the health benefits of green exercise were affected by a variation in social capital context. The projects are shown in the box.

- 1 Arnside and Silverdale AONB, Lancashire, England - conservation work
- 2 Glentress Forest Recreation, Borders, Scotland - mountain biking and walking
- 3 Re-Union Canal Boats, Edinburgh, Scotland - canal boating
- 4 Close House Initiative, Herefordshire, England - woodland activities
- 5 Walking the Way to Health Initiative (WHI), Ballymena, County Antrim, Northern Ireland - walking
- 6 Horse-riding club, Lagan Valley, County Antrim, Northern Ireland - horse-riding
- 7 Afan Forest Centre, Port Talbot, West Glamorgan, Wales - mountain biking and walking
- 8 Torfaen Green Gym, Pontypool, Gwent, Wales - conservation work
- 9 Walking Out Project, Lincoln, England - walking
- 10 Layer Pit fishing club, Essex, England - fishing

The data from people taking part in the ten green exercise case studies was obtained in the field by means of a composite questionnaire, which was administered both before and after the activity. The questionnaire was designed to fit all scenarios including different levels of activity and engagement and contained questions relating to basic data, physical health, mental health and physical activity. It also included an opportunity to gather qualitative narratives. Components of the questionnaire

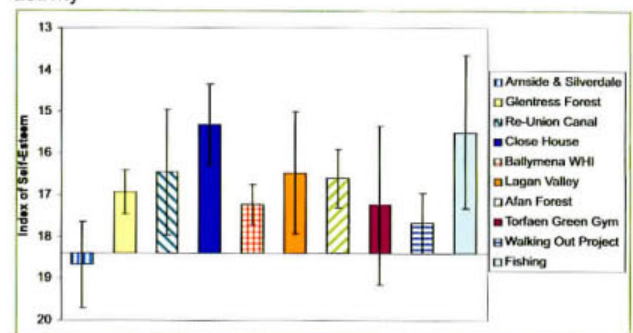
consisted of standardised and widely used formats (Euroqol EQ-5D, Rosenberg Self-Esteem Scale, Profile of Mood States Test), together with additional questions particular to this research.

### Results of the research

The ten case studies represented a variety of activities that took place in diverse contexts with varying durations and intensities. The amount of activity varied from 100 - 650 calories per hour and from 330 - 3,500 calories per visit.

As a result of green exercise, there was a significant improvement in self-esteem in nine out of the ten case studies, excluding Arnside and Silverdale (where participants had an arduous and long day) (Figure 1). The largest change was detected amongst the Close House participants, followed closely by the fishing group. The smallest increases in self-esteem were found in both the walking project groups and the Green Gym. (Note a decrease in score equals an increase in self-esteem).

**Figure 1** - Change in self-esteem after participating in the activity



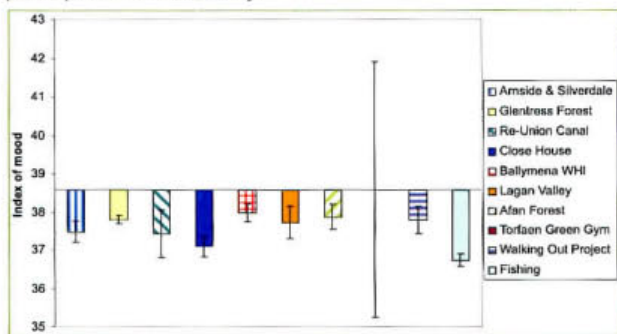
We found that self-esteem was significantly correlated with an individual's body weight. The heavier the body weight reported, the poorer the self-esteem score. We also found that self-esteem was not affected by the intensity of the green exercise activities, though it did appear to rise over very long visits. This is an encouraging finding as it implies that all intensities and durations of activity generate significant mental health benefits.

We also gathered data on the six mood measures assessed using the POMS method. Mood is measured according to six characteristic themes:

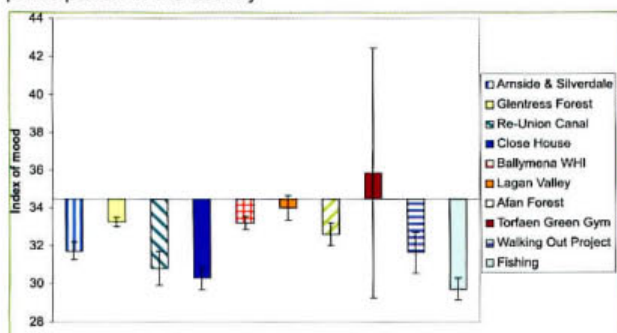


anger-hostility, confusion-bewilderment, depression-dejection, fatigue-inertia, tension-anxiety and vigour-activity. The majority of these showed significant positive changes in most of the projects (see Figures 2 and 3).

**Figure 2 -** Change in depression-dejection mood measure after participation in the activity



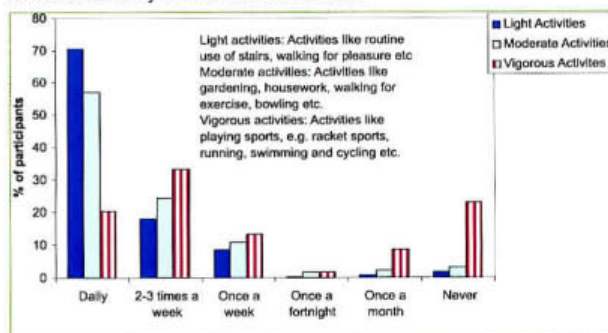
**Figure 3 -** Change in tension-anxiety mood measure after participation in the activity



An estimation of participants' physical fitness level was calculated. Some 70% of individuals reported participating in light activities daily, with the overall majority (97%) participating at least once a week. Only 20% engaged in vigorous activities daily. The average weekly duration for moderate activities was 404 minutes, which is equivalent to 58 minutes per day.

This data shows that the participants studied were a very healthy, active group, who currently meet the Chief Medical Officer's physical activity recommendations of 30 minutes of moderate activity, five times a week. It re-emphasises the difficulty in accessing those people who do not currently engage in regular activity. If this active group of individuals can derive numerous health benefits from participating in varying types and intensities of activity, the possible gains for a more inactive group may be substantial.

**Figure 4 -** How often participants have taken part in various levels of activity in the last six months



The full report presents detailed findings on each of the ten case studies, but from the range of initiatives examined for this research it can be noted that the synergistic effects of green exercise generate many positive physical and mental health benefits regardless of the level of intensity, duration or type of green activity.

## Research implications

We conclude therefore that green exercise has important implications for public and environmental health. A fitter and emotionally more content population would clearly cost the economy less, as well as reducing individual human suffering. Thus increasing support for and access to a wide range of green exercise activities for all sectors of society should produce substantial economic and public health benefits.

If green exercise can have such a positive effect on health, why then do more people not regularly take exercise and visit greenspace? First, it is clear from participation rates that many people in the UK already do engage in forms of green exercise. Each year, some 1.5 billion day visits are made to the UK countryside and seaside, and 2.5 billion day visits are made to urban parks. The Walking the Way to Health Initiative has already encouraged 900,000 people to walk more. Thus, there is already a health dividend being experienced. On the other hand, health data indicates that a substantial proportion of the population is obese and too sedentary. It is clear that barriers to participation (e.g. lack of time, feeling too tired from work, no motivation to take exercise) are affecting different groups of people in different ways. Many of these, however, have been

overcome in the best projects and factors that make up best practice in green exercise land-based and group-based projects, which include attention to good partnerships, opportunities for feedback, clearly-marked routes, good information, facilities, successful market research, good staff, a programme of events with clear dates and locations, personality of group leaders, and advertising to local people.

### Recommendations

We conclude with sectoral policy recommendations, addressing

1. **Access and recreation providers** - (including local authorities) - who need to address maintenance of paths, sustainable transport, promotion of facilities and provision of information.
2. **Agricultural managers and policy makers** - who need to increase countryside access and encourage the farming industry to promote opportunities for public health provision.
3. **School** - who should ensure that all primary age school children experience visits to a range of types of countryside, and where possible establish their own on-site gardens; they should also emphasise the public health value of physical activity for all children.
4. **Health sector** - which needs to consider the contribution that green exercise makes to public wellbeing and saving money for the NHS. The forthcoming Physical Activity Plan should emphasise the value of nature and greenspace for formal and informal use, and also stress the therapeutic value of the outdoors (both rural and urban) for delivering mental wellbeing.
5. **Planners and developers** - who should take account of the vital role that local greenspace (or nearby nature) plays for all people, and regard outdoor recreational activities as part of economic regeneration strategies in both rural and urban economically depressed areas.
6. **Social services** - who should acknowledge that green exercise has clear mental health benefits for those people who engage collectively with existing groups or new groups,

and so countryside and local authority agencies should ensure their provision of services at recreation and leisure locations is focused on encouraging families and other groups. Crime/social services agencies should also consider the therapeutic value of green exercise.

7. **Environmental managers** - local and national Biodiversity Action Plans should be rewritten to include a component on biodiversity activities that contribute to public health.
8. **Sports and leisure industry** - gyms and fitness centres should improve the green aspects of their facilities, and the formal sports sector should emphasise the health value of participation, as some sports (e.g. football, cricket) draw from a wider range of social groups than most countryside recreation.
9. **Partnerships** - green exercise has implications for many sectors, suggesting the need for cross-disciplinary and sectoral strategies and action, and so countryside agencies should market the countryside as a health resource. The private sector, particularly the food manufacture and retail industry, should be engaged in partnerships for provision of both healthy food and healthy places where the food is raised and grown.



# Chapter 1: Nature, greenspace and health

## 1.1 Nature, health and lifestyle

In the face of widespread and growing threats to the natural environment, two major arguments about the need for conservation have come to dominate: the environment should be conserved for ethical (Leopold, 1949; Eckersley, 1999) or economic (Costanza *et al.*, 1997; Sandifer *et al.*, 2004) reasons. Relatively little attention, though, has been paid to the potential emotional and health benefits. Nature and living things, it seems, tend to make most people feel good (Kellert and Wilson, 1993; Maller *et al.*, 2002). The idea that the quality of nature in people's home neighbourhood and the places they work in and visit affects their mental health is not a new one, but it has not greatly affected either the planning of urban and rural environments or public health priorities (Lindheim and Syme, 1983; Frumkin *et al.*, 2004).

During the 20th and 21st centuries, an increasing number of people have found themselves living in wholly urban settings. Indeed, within the next decade, the number of people living in urban areas will exceed those living in rural environments for the first time in human history, with more than 3 billion people dwelling in urban settlements. In the UK, more than 80% of people live in urban areas, though the greater growth is now in rural areas (Defra, 2004). Some of this will be by choice, as urban areas have more services and jobs concentrated together, with better access to schools, hospitals and leisure facilities. But urban settings by definition have less nature than rural ones. And less green nature means reduced mental wellbeing, or at least less opportunity to recover from mental stress (Pretty *et al.*, 2004). As natural green environments have increasingly come under pressure from economic development, so it seems our own wellbeing has suffered as a consequence.

Today, stress and mental ill-health are becoming more common, and the public health costs associated with these conditions are growing. The World Health Organisation (WHO, 2001) estimates that depression and depression-related illness will

become the greatest source of ill-health by 2020. This is because many other behaviours, such as smoking, over-eating and high alcohol consumption, are coping mechanisms for mental ill-health and stress, and have their own serious consequences. Stress, a major problem for people living in modern societies, is also a strong predictor of mortality, with industrialised countries increasingly having to raise expenditure for the provision of care, lost outputs and costs to individuals. In the late 1990s, some 24% of men and 29% of women in Britain reported having suffered '*a large amount of stress*' in the previous twelve months (Rainford *et al.*, 2000).

Depression is known to be a risk factor for a range of chronic physical illness, including asthma, arthritis, diabetes, strokes and heart disease (Hippisley-Fox *et al.*, 1998; Turner and Kelly, 2000; Ostir *et al.*, 2001). On the other hand, emotional wellbeing is known to be a strong predictor of physical good health (Goodwin, 2000). Mental ill-health in Britain costs some £77 billion per year for the provision of care, lost outputs and costs to individuals.

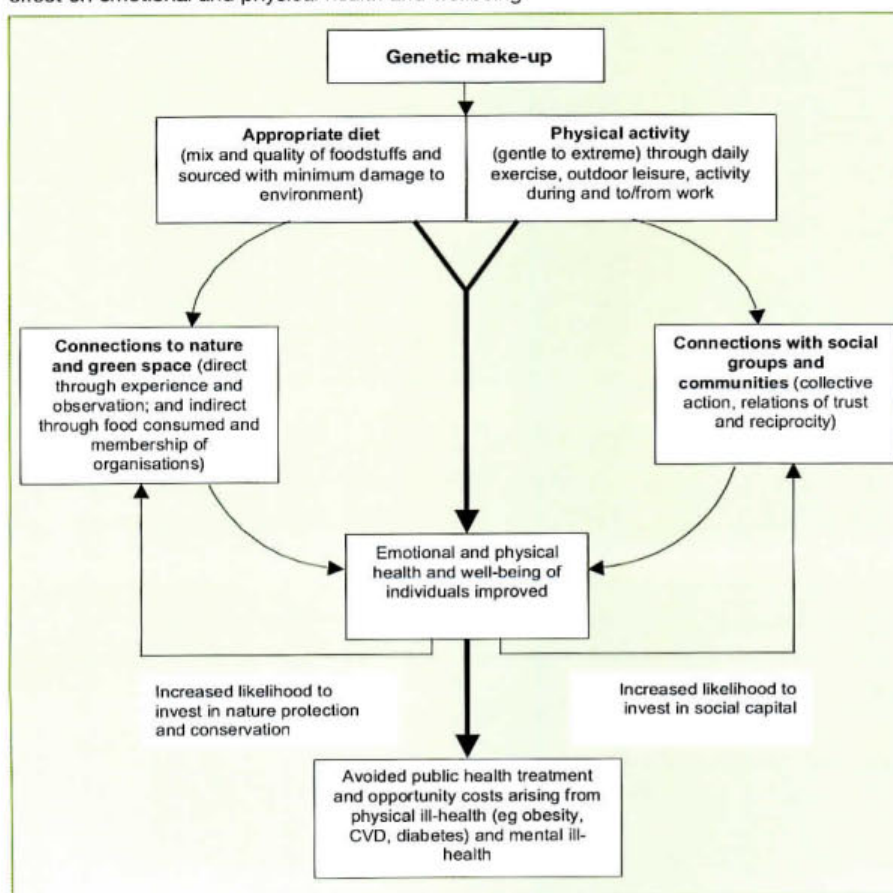
Many of these urgent physical and mental health challenges, including obesity and coronary heart disease, are also connected to sedentary and indoor lifestyles (CDC, 1996; DCMS, 2002; DoH, 2004). Physically active people have lower risk of dying from coronary heart disease, type II diabetes, hypertension and colon cancer. Activity also enhances mental health, fosters healthy muscles and bones, and helps maintain health and independence in older adults (Paffenbarger *et al.*, 1994; Scully *et al.*, 1998; Pretty *et al.*, 2004). The recent UK Chief Medical Officer's report (DoH, 2004) indicated that: '*physical activity helps people feel better, as reflected in improved mood and decreased state and trait anxiety. It helps people feel better about themselves through improved physical self-perceptions, improved self-esteem, decreased physiological reactions to stress, (and) improved sleep*'.



## 1.2 Health framework - influences of diet, physical activity, nature and social capital on health

Diet and physical activity are widely acknowledged to be two of the primary determinants of physical and mental health. A balanced diet and appropriate levels of physical activity are associated with substantial increases in life expectancy (CDC, 1996; Ferro-Luzzi and James, 2000; DCMS, 2002; DoH, 2004). Ironically, just as food shortages have been largely conquered in industrialised countries, so has come a recognition that ill-health arising from over-consumption of certain constituents of diets is now a major public health cost (Pretty, 2002; Wanless, 2002; Lang and Heasman, 2004). At the same time, the nature of work has changed and many people have adopted increasingly sedentary lifestyles, which have further contributed to ill-health. Both these trends are extremely costly, both to individuals and to the public health budget.

**Figure 1.1** - Framework describing interactions between diet, physical activity, connection to nature and social groups and the effect on emotional and physical health and wellbeing



The health framework in Figure 1.1 shows how a range of environmental factors interact with the genetic make-up of individuals to shape health and wellbeing. It illustrates the primary role played by diet and physical activity in emotional and physical wellbeing, and illustrates the secondary roles played by connections to nature and social communities. An appropriate balanced diet containing sufficient, but not excessive, calories, together with physical activity associated with work, commuting and leisure activities, contribute to the physical and emotional health of individuals.

Wellbeing is further enhanced through close connections to both nature and communities. These connections can involve direct interaction but are also made indirectly through consumption of food and membership of environmental organisations, and by contact with others through social institutions and cultural mechanisms (Jacobs, 1961; Freeman, 1984; Coleman, 1988; Kellert and Wilson, 1993; Pretty, 2002). Furthermore, connectedness with the environment might have

direct and indirect effects on the level and quality of physical activity. At the same time, connectedness to social groups is known to have a positive effect on health (Pevalin and Rose, 2003). Such connectedness is now often called social capital - a resource of trust, reciprocity and obligations that people can draw upon to provide personal benefits (Coleman, 1988; Putnam, 1993; Pretty *et al.*, 2003).

An emotionally and physically healthy population imposes low public health costs, and is also likely to improve the stocks of natural and social capital through their investments of time, effort and resources. Emotional and physical health and wellbeing is therefore an asset in itself -



a capital that can be built up over time with the right policies and behaviour.

In most health care systems, the predominant focus for both treatment and expenditure has come to be on people who have become ill. The same is also true for our environments - we tend only to become concerned when something important is harmed. Yet the best approach, and the cheapest, is to focus efforts upstream, and try to create healthy environments in which people can flourish rather than flounder. Thus we should be concerned with not just preventing mental and physical ill-health, but also with creating social and natural contexts that deliver wellbeing for all social groups.

Recent years, however, have seen declines in connections between people and nature, and people and people, with resulting falls in emotional and physical wellbeing and increases in public health costs. At the same time, as environmental resources (natural capital) and social and cultural aspects of communities (social capital) are degraded and diminished, so there is a further negative effect on wellbeing.

### 1.3 Lifestyle-related ill-health

The prevalence of a number of lifestyle-related health problems has grown rapidly in recent years (Wanless, 2002; DoH, 2004).

#### Obesity

The rapid rise in incidence of obesity is currently endangering the health of the UK population. Obesity is a recognised risk factor for a range of conditions, including type II diabetes, cardiovascular disease, specific cancers and diminished life expectancy. In England, during 2002, 22% of men and 23% of women were classified as clinically obese ( $\text{BMI} > 30 \text{ kg m}^{-2}$ )<sup>1</sup>. A relationship has also been identified between social class and obesity in adults. The number of obese individuals tripled between 1980 and 2002, and if current trends persist, it is estimated that one third of all adults will be obese by 2010. The obesity epidemic in England will then equal levels existing in the USA<sup>2</sup>.

The warning signs were apparent in 2002, when it was established that 30% of boys and girls aged 2-

15 years were at least overweight, with some 16% obese. The prevalence of obesity is ten times greater for girls and twelve times greater for boys if both parents are obese. Obesity during childhood persists into adulthood and instances of continuance are heightened if the child has one or two obese parents. *'26-41% of children obese at pre-school age and 42-63% obese school-age children become obese adults'* (DoH, 2004). Childhood obesity greatly increases the likelihood of acquiring type II diabetes in adulthood (Ferro-Luzzi and James, 2000). Recent estimations concerning the costs of obesity suggest that it contributes to 18 million days of sickness per year. A 5% decline in the number of inactive people could save £300 million annually (DoH, 2004).

#### Cardiovascular disease

Cardiovascular disease includes coronary heart disease and strokes and is the primary contributor to mortality and morbidity rates in the UK. More than 200,000 deaths in England annually are a result of this disease and it explains 39% of all deaths in men and women. Alarming, death rates from cardiovascular disease in England are higher in comparison to the average EU level. There is an explicit distinction between active and inactive individuals, with inactive people experiencing almost twice the risk of dying from cardiovascular disease.

#### Type II diabetes

The risk of developing type II diabetes (non-insulin-dependent diabetes) is increased by 33-50% in inactive people compared to physically active individuals. If there is a high risk of developing this condition, regular exercise can reduce this risk by up to 64%, thereby, offering a preventive effect. Regular physical activity of moderate intensity facilitates improved blood glucose control in sufferers of type II diabetes. Greater effects are

<sup>1</sup> Body Mass Index is weight in kg divided by height in metres squared ( $\text{kg m}^{-2}$ ). A value of  $>25$  indicates an adult is overweight, and one of  $>30$  indicates obesity.

<sup>2</sup> In the USA, the situation is much worse, with nearly 97 million adults overweight (51% of women, 50% of men) and 40 million obese (25% of women, 20% of men). The average American diet provides 3,800 kcal/day<sup>1</sup>, up by 500 kcal since 1970. This is approximately double the energy requirement for inactive women and 130% of the energy requirement for inactive men (Nestle, 1999). In some developing countries, including Brazil, Colombia, Costa Rica, Cuba, Chile, Ghana, Mexico, Peru and Tunisia, overweight people now outnumber the hungry (WHO, 1998).



observed with more intense physical activity. Consequently, the risk of all-cause mortality in patients with type II diabetes is diminished with moderate to high levels of physical fitness. In England 3.3% of men and 2.5% of women are currently estimated to be suffering from type II diabetes. However, the prevalence rate is likely to be substantially higher due to the significant proportion presently undiagnosed.

In 2001, there were 12.24 million people in the EU with type II diabetes, and this is predicted to increase to 15.4 million by 2020. The worst affected countries by proportion of population are currently Spain (7.3%), Italy (7.8%), Denmark (8.4%), Norway (8.6%) and Sweden (9.4%) (Astrup, 2001). The annual NHS budget for all types of diabetes is 9%, which corresponds to approximately £5.2 billion annually.

### **Osteoporosis**

Osteoporosis is a debilitating disease, whereby bones degenerate and become more fragile. It is often characterised by low bone mass and mineral density and bones are more inclined to fracture. Approximately 50,000 individuals in England endure an osteoporotic hip fracture annually and in 15-20% of instances death occurs within a year due to secondary complaints that relate to the fracture. Annual UK health and social care costs of osteoporosis are approximately £1.7-1.8 billion, with the majority of these expenses due to hip fractures.

### **Back pain**

In the UK, low back pain is commonly experienced by approximately 80% of the UK population at some point in their life. 40% of individuals have endured low back pain in the previous year, and out of these 40% had visited their doctor. Low back pain is also a costly factor within the UK, being accountable for 150 million lost working days per year.

### **Mental illness**

There are many different ideas about what constitutes mental health. For a long time, it has been taken to mean the absence of a recognisable illness. Yet this type of deficit model does not explain how mental health and psychological

wellbeing also positively influence us - helping to shape how we think and feel, how we learn and communicate, how we form and sustain relationships, and critically how we cope with shocks and stresses (HEA, 1995). Thus everyone has mental health needs, not just those with an illness. This is not widely accepted, and mental ill-health is commonly assumed to be the fault of the sufferer - for centuries, the policy response was to lock up the sufferers, to protect the rest of society from them.

Today, stress and mental ill-health is becoming more common, and the costs are high (Rainford *et al.*, 2000; WHO, 2001). As indicated earlier, depression is known to be a risk factor for the outcomes of a range of chronic physical illnesses, including asthma, arthritis, diabetes, strokes and heart disease. On the other hand, emotional wellbeing is known to be a strong predictor of physical health. In one study, elderly adults in the USA who scored highest in a survey on emotional health were twice as likely to be alive at the study's end (Goodwin, 2000). It is forecasted that depression will become the second most predominant cause of disability worldwide by 2020 (DoH, 2004). Mental ill-health is already problematic in the UK with at least one in six individuals suffering at any one time. In the UK, depression and mixed anxiety are commonplace with instances rising from 7.8% in 1993 to 9.2% in 2000. In England £3.8 billion of the annual NHS expenditure is concerned with treatment of mental illness, and a further £0.68 billion is required for personal social services expenditure.

### **Cancers**

More than 220,000 individuals are diagnosed with a form of cancer annually in England. Sadly, cancer also leads to the death of over 120,000 people a year, and 50% of all cases are the consequence of colorectal, breast, prostate or lung cancer. Statistics reveal that cancer affects at least one in three people during their lifetime and one in four will ultimately die from the disease. A significant proportion of cancers are influenced by diet, smoking and alcohol abuse and approximately 65% of incidents emerge in those over 65 years old.



## 1.4 Diets and health

In the last two generations, the diets of most people in industrialised countries, and of an increasing number of those in developing countries, have undergone enormous changes (Popkin, 1998, 1999; Pretty, 2002). On average, people now consume more food calories than they burn, and increasingly they consume types of food, such as those containing simple sugars and an excess of salt, that are making them ill.

The average UK diet has changed greatly in the past fifty years. According to the National Food Survey (Defra, 2002), which has been collecting data on weekly consumption of foods since 1942, the average Briton now consumes less milk/cream, eggs, vegetables, bread, direct sugar, fish and fats, and more cheese, fresh fruit, cereals and meat than in the 1940s. Consumption of sugar, meat, eggs, milk/cream and fats rose until the 1970s, and has since fallen. Of particular concern for public health is the 34% fall in vegetable consumption over 50 years, and the 59% decline in fish consumption. On the other hand, the consumption of fresh fruit and juice has increased by 129% since the 1940s – though this still leaves UK consumption the third lowest in the EU (fruit consumption ranges from 400 g day<sup>-1</sup> in Greece to 100 g day<sup>-1</sup> in Ireland). Vegetable consumption in Europe ranges from 440 g day<sup>-1</sup> in Greece to 60 g day<sup>-1</sup> in Iceland, with a value of 280 g day<sup>-1</sup> in the UK.

At first sight, this data may not be as expected. We eat more fresh fruit and less direct sugar and oils; and more cereal and fewer eggs. In addition, gross energy intake in the home increased to a peak in the 1970s. Paradoxically, since then it has fallen during a period in which obesity has substantially increased. It appears that increases in energy intake outside the home have played a critical role, particularly the consumption of fast food, soft drinks and alcohol. At the same time as diets and eating habits have shifted, physical activity has declined and this has a substantial impact on energy balance. Furthermore, Astrup *et al.* (2002) have shown that a dose-response relationship exists between the proportion of energy consumed as fat and weight gain or loss. Thus, although diets have shown some improvements over the past 25

years, people are still consuming too many fats and sugars, and too many calories from all sources, for physical wellbeing.

As a result of these broad changes in diet, diet-related illness now has severe and costly public health consequences (Ferro-Luzzi and James, 2000; Eurodiet, 2001). According to the comprehensive Eurodiet study, in the second half of the 20<sup>th</sup> century *'most of Europe has seen a very substantial increase in a number of chronic diseases in adult life. These become worse with age and are multifactorial. The principal factors, however, are diet and inactivity in coronary heart disease, strokes, obesity, maturity onset diabetes mellitus, gall-stones, osteoporosis and several cancers'*.

Worse still, the Eurodiet (2001) study concludes that *'disabilities associated with high intakes of saturated fat and inadequate intakes of vegetables and fruit, together with a sedentary lifestyle, exceed the cost of tobacco use'*. Some problems arise from nutritional deficiencies of iron, iodide, folic acid, vitamin D and omega-3 polyunsaturated fatty acids, but most are due to excess consumption of energy and fat (causing obesity), sodium as salt (high blood pressure), saturated and trans fats (heart disease) and refined sugars (diabetes and dental caries). Highly energy-dense diets rich in sugars are nearly as conducive to over-consumption of energy as diets containing excessive amounts of fatty foods. Consequently, many low-fat alternatives provide an illusion of 'healthfulness' as they are high in sugar.

Diet is thought to be a factor in 30% of cases of cancer in developed countries (Key *et al.*, 2002). The strongest association between diet and cancer is provided by the positive relationship between the consumption of vegetables and fruit and a reduction in the risk of cancers of the digestive and respiratory tracts, with some epidemiological evidence of an association between intake of salt and gastric cancer (Riboli and Norat, 2001). Low fibre content, vitamin and mineral insufficiency, high meat consumption and excessive alcohol intake have also been implicated as risk factors for cancer (Key *et al.*, 2002; Lang and Heasman, 2004).



## 1.5 Physical activity and health

Together with diet, physical activity is now known to be an important determinant of health and wellbeing. People in both industrialised countries and urban settlements in developing countries have become increasingly sedentary in all aspects of daily life, including during leisure time, in travelling to and from work, and during work itself (Table 1.1). In Europe, there is evidence for a dramatic fall in physical activity over the past 50 years with on average 2 MJ (500 kcal) less energy output per day in adults aged 20-60 years (Eurodiet, 2001). According to the NAO (2001), changes in lifestyle over this period have led to reduced physical activity equivalent to the running of a marathon each week. Yet the public health consequences of these changes have not been widely discussed or accepted, until very recently (DCMS, 2002). The recent Eurodiet (2001) study states *'the importance of physical activity has been underestimated for many years by both doctors and policy-makers'*.

Although similar trends have occurred across Europe and North America, the UK compares badly with many countries. Jobs themselves have become less physical, people are more likely to take the lift than walk the stairs, and adults and children are more likely to travel to work or school by car than to walk or cycle. When comparing the percentage of children aged 5-10 years who walked to school during 1985-86 (67%) to figures collated in 1999-2000 (54%), it is evident that the proportion decreased by 13%. In addition, the percentage of primary school children travelling by car increased from 22% to 39% during the equivalent period (DOT National Travel Survey, 2001; DoH, 2004). In the UK, the distance walked per year by each individual has fallen from 410 km yr<sup>-1</sup> in 1975-76 to 298 km<sup>-1</sup> in 1998-2000. Though walking has declined across the whole of the EU since 1970, only people in Greece walk less than people in the UK. Cycling varies from a low of 70 km yr<sup>-1</sup> in Greece to a high of 850-900 km yr<sup>-1</sup> in Denmark and the Netherlands, with the UK again well below the average for all 15 EU countries.

Our dependence on the car is further illustrated by the fact that the UK is one of only four EU countries

in which bus and coach travel per person has declined since 1980 (the others are Germany, Finland and the Netherlands). The 20% fall in the UK compares badly with a 40-80% increase in bus travel in Denmark, Italy, Spain and Portugal. Over the same period, car travel per person in the UK increased by 51%, and the road system has grown by 34,000 km since the early 1960s (DTLR, 2002).

**Table 1.1** - Prevalence of activity and inactivity among adults, by sex and age, England, 1998

	Achieving at least 30 mins of moderate intensity physical activity on 5 or more days of the week (%)		Achieving less than 30 mins moderate intensity activity per week (%)	
	Men	Women	Men	Women
All men and women aged 16 +	31		38	
Male	37		35	
Female	25		41	
Age (years)	Men	Women	Men	Women
16 - 24	58	32	16	33
25 - 34	48	31	22	28
35 - 44	43	32	28	29
45 - 54	36	30	33	34
55 - 64	32	21	44	42
65 - 74	17	12	52	61
75 +	7	4	72	82

Source: Health Survey for England 1998 in DoH 2004

Recent years have, however, seen a slight increase in leisure-time physical activity (Table 1.2). However, only 47% of adults in the UK participate in sport more than 12 times a year, compared with the highs of 70% in Sweden and 80% in Finland, and lows of 18% in Italy and 25% in Spain (DCMS, 2002). In almost all activities (except swimming and yoga), female participation is lower than male. In the group aged 16-24 years, 42% of men and 68% of women are inactive, and these proportions rise steadily as people age. Again, this trend is not the same everywhere - in Sweden and Finland, in particular, participation in organised sport increases amongst older people. One of the major problems is that although 80% of people in the UK correctly believe that regular exercise is good for their health, a majority wrongly believe that they take enough exercise to stay fit (Allied Dunbar, 1992).



**Table 1.2** - Trends in selected leisure-time physical activity, UK, 1987-1996

	Men (%)				Women (%)			
	1987	1990	1993	1996	1987	1990	1993	1996
Walking	41	44	45	49	35	38	37	41
Cycling	10	12	14	15	7	7	7	8
Swimming	13	14	15	13	13	15	16	17
Keep fit / Yoga	5	6	6	7	12	16	17	17

Source: Office for National Statistics. 1998. Living in Britain: Results from the 1996 General Household Survey, London. The Stationery Office

Home life has also become more sedentary, and though gym and fitness club membership has risen (though many have a low adherence rate) in the past 20 years there are some indications that people are becoming less likely to engage in organised sports and leisure activities<sup>3</sup>. There have also been worrying falls in the provision of opportunities for physical exercise in schools, which coincided with the sales of playing fields in the 1980s and 1990s.

A recent report by the Department for Culture, Media and Sport (2004) addressed the decline in physical activity levels by summarising its targets concerning school sport. It aims to *'increase the percentage of school children (5-16) who spend a minimum of two hours each week on high quality PE and school sport within and beyond the curriculum from one in four to three in four by 2006'* (DoH, 2004)<sup>4</sup>. Surveys compiled for Sporting Britain report highlighted that 62% of students typically spend a minimum of two hours per week involved in sporting activities at school both within and outside the curriculum. Only 44% of pupils achieve their recommended two hours within the curriculum and a meagre 31% of adults presently accomplish the CMO's recommendation of 30 minutes of moderate physical activity five times a week. Their primary aim is to increase this proportion by at least 1% annually. It was also established that an annual sports day took place in 96% of schools. Since 2001, £542 million has been invested in new sports facilities on playing fields, principally due to the new rules introduced to govern their sale. In

situations where they are sold it is recognised that 90% of communities will either profit from enhanced facilities or at least retain the amenities currently present.

Barry Popkin (1998, 1999) coined the phrase 'nutrition transition' to describe how modern and urbanising societies adopt different types and amounts of foods, with severe health consequences. Echoing Popkin's phrase, we believe that modern societies have also gone through an 'activity transition' in the past two to three generations, with people no longer active in the workplace, in travelling to and from work or during leisure time. This too has very significant health consequences for whole populations. Physical activity greatly reduces the risk of dying from coronary heart disease, and also reduces the risk of developing diabetes, hypertension and colon cancer. It enhances mental health, fosters healthy muscles and bones, and helps maintain health and independence in older adults (CDC, 1996; Parks *et al.*, 2003).

Compared with active people, those who are sedentary have a 1.2-2 fold increased risk of dying (Paffenbarger *et al.*, 1993), with levels of cardiovascular fitness strongly associated with overall mortality (Berlin and Colditz, 1990; Blair and Hardman, 1995). Paffenbarger *et al.* (1994) found that men reduced their risk of death by 33% if they walked 15 km or more per week, by 25% if they climbed 55 or more flights of stairs a week, and by 53% with three or more hours per week of moderate sports activity. There also appears to be a protective effect in later life, with Linstead *et al.* (1991) finding that the effects of activity early in life persists into the 70s and 80s age groups. Nonetheless, taking up activity later in life can also be protective, with men aged 45-84 who take up moderately intense sports adding on average 0.72 years to their lifespan (Paffenbarger *et al.*, 1993).

In 2002 The World Health Organisation (2002) documented that in developed countries physical inactivity is one of the ten principal causes of death, leading to 1.9 million deaths worldwide annually. Within developed countries physical inactivity levels are accountable for the following percentages of 'disability adjusted life years': **'23%**

<sup>3</sup> The average young person also spent 26 hours per week watching television in the 1990s compared with 13 hours in the 1960s (NAO, 2001).

<sup>4</sup> On 16 December 2004, the Prime Minister, Tony Blair, announced that 'All pupils in schools in England will be doing a minimum of two hours PE and sport at school by 2010 - and now facilities and staffing will be put in place to give young people the chance to take part in a further two to three hours of sport outside school hours' (DCMS press notice, 16.12.04).



*of cardiovascular disease in men and 22% in women, 16% of colon cancer in men and 17% in women, 15% of type II diabetes, 12% of strokes in men and 17% in women, and 11% of breast cancer'* (DoH, 2004). It is evident that participation in regular physical activity produces beneficial health gains. This dose-response relationship is witnessed between increasing physical activity levels and all-cause mortality, CHD and type II diabetes.

An active lifestyle can also enhance psychological wellbeing and a multitude of psychological benefits are inferred (Berger, 1996). Organised, regular, planned physical activity is linked with favourable psychological outcomes, which can be categorised into four augmented areas: *'enhanced mood, stress reduction, a more positive self-concept, and higher quality of life'* (Berger, 1996). Specific groups including clinically depressed or anxious individuals, coronary heart disease patients and the elderly may experience even more marked and distinct psychological benefits.

It is important to identify the underlying reasons for the decline in physical activity and highlight any potential barriers or facilitators to exercise participation. Owen *et al.* (2000) proposed that socioeconomic variants in health outcomes are determined by the immediate environment and consequently the individual's behavioural preferences. For example, a local community usually incorporates features such as a park, sporting facilities, shops and restaurants whereby individuals can choose to be physically active or sedentary. Typical physically active behaviours may include walking, jogging or participating in a sporting activity, whereas sedentary behaviours would comprise sitting and socialising, spectating or dining. Therefore, the behaviour settings can potentially influence the level of activity experienced and can either encourage or hinder participation. The augmentation of sedentary behaviour is becoming a principal issue and mounting evidence is demonstrating the association between prolonged TV viewing or computer and internet use with obesity and physical inactivity (Owen *et al.*, 2000).

The persuasive and undeniable scientific evidence for links between physical activity and health has

led the government to adopt a five times a week prescription for good health (Pate *et al.*, 1995; DoH, 2004). In 2002, the Department for Culture, Media and Sport and the Prime Minister's Strategy Unit jointly published the 'Game Plan' (DCMS, 2002). Its focal point addresses the immense recognised health benefits derived from increased physical activity participation. A recently established Activity Co-ordination Team (2003) engaged a cross-section of departments in designing a physical activity strategy for England. These issues were supported by the White Paper on Public Health (2004) that pledged its backing for these necessary changes. It is evident that a cross-government approach will endorse the promotion of physical activity and should be the precedence of numerous departments.

Sport England (2002) indicated that physical activity should be considered *'one of the best buys in public health, providing physical, social and mental health benefits.'* Moderate regular exercise reduces morbidity rates by 30-50%, having a particularly protective effect against maturity onset diabetes, coronary artery diseases, strokes and colon cancer, as well as reducing blood pressure and improving blood lipid and glucose profiles. Appropriate volumes of moderate exercise also induce physical fitness, which has a substantial influence on people's sense of wellbeing. The Physical Activity Level (PAL) is the ratio of total daily energy expenditure to estimated metabolic rate. The PAL target for health is 1.75, which can be achieved by 60-80 minutes of walking per day. This volume of exercise is sufficient to avoid weight gain on high-fat diets, and comfortably exceeds the 30 minutes per day that is necessary to reduce significantly the risk of CVD and diabetes (Schoeller *et al.*, 1997; Astrup, 2001). The UK Health Education Authority (1995) thus recommends that *'individuals accumulate 30 minutes of moderate intensity physical activity at least 5 days of the week'*, and suggests that appropriate activities include brisk walking, cycling and certain garden activities, as well as more formal structured sports and leisure activities.

The level of weekly physical activity required to achieve general health benefits has led to the



development of a universal recommendation. It advises that individuals should participate in '*at least 30 minutes a day, of at least a moderate intensity, on 5 or more days of the week*' (DoH, 2004). Accomplishing this target enhances psychological wellbeing, reduces the risk of premature death from cardiovascular disease and certain cancers and significantly diminishes the risk of developing type II diabetes. The major type of activity that is commonly used to reach this target is walking, as reported in the UK 2000 Time Use Survey. Other preferred activities include gardening, DIY and ball games.

The 30 minutes of recommended activity do not have to be completed in one bout, but alternatively can be subdivided into 10 minute sessions. Acceptable types of activity constitute 'lifestyle activity' (everyday life tasks, such as climbing stairs), or structured exercise or sport, or an amalgamation of them both. In the majority of circumstances, individuals may need to complete 45-60 minutes of moderate intensity physical activity daily to thwart obesity. Similarly, children and young adults should also do at least 60 minutes of exercise at this intensity daily. On at least two occasions each week they should include a range of activities to improve bone health (e.g. skipping, running, gymnastics etc.), muscle strength and flexibility. The elderly should also focus on specialised activities that encourage increased strength, co-ordination and balance.

For these targets to be met, a dramatic cultural modification is necessary. Perceptions need to be revolutionised, as many people erroneously believe they are already active enough. Research has shown that there are a number of barriers to participation relating not only to the costs of participating both in terms of time and expense but also from feeling that the individual does not belong in a particular environment. For example, gyms and fitness centres usually appear to be full of fit people, which can decrease the likelihood of overweight or unfit people also participating.

The annual costs of physical inactivity in England are reported to be approximately £8.2 billion (DoH, 2004). This figure excludes individuals who are obese due to inactivity, which contributes an extra

£2.5 billion annual cost to the economy. These figures incorporate both costs to the NHS and costs associated to the economy (e.g. work absenteeism).

## 1.6 Natural and urban environments and effects on health

There is substantial evidence that links the natural environment with good physical health and psychological wellbeing. Most of this work has comprehensively been explored by various disciplines, such as psychology, environmental health, ecology, horticulture, landscape planning, leisure and recreation, public health policy and medicine (Burgess *et al.*, 1988; Carney, 2001; Elson, 2004; Harrison *et al.*, 1995; Frumkin, 2001, 2002, 2003; Henwood, 2001, 2003; Seymour, 2003; Maller *et al.*, 2002; Morris, 2003; Jackson, 2003; Pretty *et al.*, 2003; Rohde and Kendle, 1994; St Leger, 2003; Tabbush and O'Brien, 2003; Pretty, 2004).

The concept originates from a theory referred to as the Biophilia Hypothesis (Wilson, 1984; Kellert and Wilson, 1993; White and Heerwagen, 1998). It states that humans have an '*innate tendency to focus on life and life-like processes*'. Therefore, this desire for contact with nature is something we inherit and act on instinctively without realising or appreciating the underlying evolutionary reasons. The theory proposes that this natural instinct is affiliated with our genetic fitness and competitive advantage and contributes to intensifying our wellbeing, mental development and personal fulfilment. It also underpins the reasons for a human ethic of care and the growing importance of conservation of the natural environment. As the environment has evolved over time, our current habitat is unrecognisable since its transformation by human ingenuity. However, our basic needs do not differ from our original ancestors. The natural environment is therefore a cardinal resource, paramount in influencing human wellbeing. As E O Wilson notes, though, this remains a hypothesis, as genetic mechanisms have yet to be identified<sup>3</sup>.

The psychological value of open space has long been recognised (Jackson, 1979; Taylor, 1979; Altman and Zube, 1989; Rubenstein, 1997). Several



studies have illustrated the '*power of the urban park or plaza to reduce stress, act as a social facilitator and encourage community cohesion*' (Rubenstein, 1997). Individuals residing in urban areas are often exposed to less vegetated environments; the introduction of an urban park can enhance their lives and provide communal benefits by encouraging social interaction (Brill, 1989). The evidence suggests that greenspace is important for mental wellbeing, and amounts are associated with longevity and decreased risk of mental ill-health in Japan, Scandinavia and the Netherlands (Takano *et al.*, 2002; DeVries *et al.*, 2003; Grahn and Stigsdotter, 2003). Other studies in the UK indicate that health for urban residents is generally worse than for rural residents, but clearly many factors are likely to play a role (Watt *et al.*, 1994). Lewis and Booth (1999) found a higher prevalence of psychiatric morbidity in urban than in country areas of the UK. Kaplan and colleagues indicate that such natural settings need not be remote wildlands, and emphasise the value of '*the everyday, often unspectacular natural environment that is, or ideally would be, nearby*' - parks and open spaces, street trees, vacant lots and backyard gardens, as well as fields and forests (Kaplan *et al.*, 1998). On the other hand, a dysfunctional built environment can often be a source of stress, and a malign influence over social networks and support mechanisms (Frumkin *et al.*, 2004).

<sup>5</sup> One component of the Biophilia Hypothesis not discussed or analysed in this report centres on relations with animals. Relationships with animals have attracted much attention in recent years due to the increasing number of households owning a pet. There are many identifiable health benefits of interacting with animals including reducing blood pressure, heart rate, enhancing stress coping, aiding relaxation and increasing the likelihood of survival after surgery (Serpell, 1996; Scheon, 2001; Maller *et al.*, 2002). More than 50% of households in the UK own a pet, and pet owners have been found to have lower blood pressure and cholesterol levels than non-pet owners in Australia (Anderson *et al.*, 1994) and to make fewer visits to doctors in the USA (Siegel, 1990). Dog-owners suffering from myocardial infarction were six times more likely to survive a year after the trauma than those with no dogs (Friedmann and Thomas, 1995) (though there was no effect for cat owners). Animals also have positive effects on depressed and asocial patients, in which usually unresponsive patients interacted with animals by holding, stroking and hugging, smiling and laughing, and also talking to the animals and their carers (Katcher and Wilkins, 1993). Finally, dental patients observing a live aquarium before treatment were more relaxed than control patients (Katcher and Wilkins, 1998), and fish-gazing in general has been shown to reduce stress (DeShriver and Riddick, 1990).

Open space is important for children (Kaplan and Kaplan, 1989; Kahn, 1999; Kahn and Kellert, 2002; Bingley and Milligan, 2004). The opportunities for children residing in urban and rural neighbourhoods to join in safe play are gradually diminishing. The primary reasons include rising crime rates, parental fear of crime and increasing road traffic. Bingley and Milligan (2004) assessed how recalled childhood play experiences influenced their subjects current mental wellbeing, along with childhood memories, imaginings and personified sensory experiences (recalled from ages 7-11 years). Also incorporated were young people's present everyday experiences. Donaldson (1986) acknowledges that this particular age group symbolises a distinctive stage of normal childhood whereby independent, discrete interactions with the physical, material world are developed. Scandinavian research demonstrates that factors such as children's social play, concentration and motor ability are all positively influenced following playing in nature (Fjortoft, 1999; Jorgensen, 2001). This was particularly apparent in Taylor *et al.*'s (2001) study involving children with Attention Deficit Disorder. Children worked better and their concentration improved after participating in activities in green surroundings.

Not all researchers see the attraction to natural spaces and the outdoors as innate, choosing to interpret the relationship as more pragmatic or instrumental, a term that suggests our attraction to landscape may be nothing more than a means to an end, or a rational solution of a goal (Westover, 1989). However, the social and physical environment has long been known to influence mental wellbeing, to affect behaviour, interpersonal relationships and actual mental states, as well as shape relations with nature. The design of the built and natural environment thus matters for mental health (Newman, 1980; Freeman, 1984, 1998; Halpern, 1995; Kaplan *et al.*, 1998; Pretty and Ward, 2001). Researchers have attempted to establish whether there is a link between the urban environment and individuals' mental health (Lewis and Booth, 1994; Dalgard and Tambs, 1997; White and Heerwagen, 1998; Judd *et al.*, 2002; De Vries *et al.*, 2003; Watt *et al.*, 1994). Initial findings indicate that the prevalence of psychiatric morbidity



is prominent in built-up urban areas and less incessant in rural domains (after adjusting for confounding variables). Access to gardens or open spaces, however, abates prevalence.

Problems arising from physical features of the built environment include sick building syndrome (caused by materials used in some buildings and ill-designed air conditioning systems), long distance commutes to work, and suburban communities with self-contained homes that encourage little contact with neighbours. By contrast, positive social features include access to an immediate family environment or extended networks of friends and neighbours, as well as the presence of greenspaces, meeting places and opportunities for interactions, all of which lead to improvements in mental and spiritual wellbeing (Newman, 1980; Garreau, 1992; Pretty and Ward, 2001). Social connectivity has been shown to be important for health in both rural and urban areas (Dalgard and Tambs, 1997; Taylor *et al.*, 1997; Judd *et al.*, 2002). Greenspace in the form of parks, streets, squares and allotments can be especially valuable in urban areas for social contact and helping to bring people together (Ward Thompson, 2002).

Kuo *et al.* (1998) hypothesised that *'greener neighbourhood common spaces give rise to stronger neighbourhood social ties (NSTs)'*, and has found a difference in the level of NSTs and the amount of vegetation in the common space, with the strongest ties occurring in areas rich in green matter. These residents had *'more social activities and more visitors, knew more of their neighbours, reported their neighbours were more concerned with helping and supporting one another and had stronger feelings of belonging'*. The study reinforces the notion that regular contact with nature is indispensable, as residents prefer areas with trees and grass and negatively respond to areas devoid of vegetation. The mere presence of trees encourages more frequent use of the outdoor space, and experiencing nature reduces mental fatigue, diminishes sensations of stress and has emphatic effects on mood (Kuo *et al.*, 1998; De Vries *et al.*, 2003).

Public health has also been compromised during the development of 'urban sprawl' (Frumkin *et al.*,

2004). Cities have rapidly been diffusing into previously defined rural areas and the typical traits of sprawl - *'low density land use, heavy reliance on automobiles for transportation, segregation of land uses, and loss of opportunity for some groups, especially those in inner cities'* - are rife and well known (Frumkin, 2002). Key health issues affected by urban sprawl include air pollution, heat, physical activity patterns, motor vehicle crashes, pedestrian injuries and fatalities, water quality and quantity, mental health and social capital. This leads to significant health consequences which need to be acknowledged and resolved, especially for those people principally affected.

Some of the most obvious effects on health can be observed when environments are transformed. After slum clearances, for example, people gain from improvements in physical assets and services, but lose out when social networks deteriorate and distinct cultures break down. As Hugh Freeman (1998) puts it, such clearances often involved *'the demolition of a neighbourhood and not just the destruction of buildings, but also that of a functioning social system, with a characteristic culture of its own and important social networks that could never be reproduced artificially'*. One study of social change amongst the 20,000 people originally settled in 1920s Dagenham in east London found that there were wide variations in sociability according to the make-up of the streets. People living in small, narrow streets and cul-de-sacs had more social connections and reciprocal arrangements than those in wider, busy streets, where few people could get to know their neighbours or described them as friendly. When replaced by large modern estates, these social support networks based on geographic proximity broke down, leading to an atomised community.

Another study of a forty-three block project in St Louis, Minnesota, built in the mid-1950s to house 12,000 people, found that although residents had a similar number of friends as non-project dwellers, these *'bore little or no relation to the physical proximity of families to each other'*. Neighbours had become much more hostile, and the quality of life fallen, even though individuals were generally satisfied with their own apartments. The problem



was that the project offered no natural, or defensible space as Oscar Newman later came to call it, or common facilities around which neighbourly relationships could develop. The space between the blocks was soon called 'wasted space' by residents. By 1972, only eighteen years after the project had been opened, all the blocks were demolished after years of vacancy rates exceeding 70%. Ironically, the design won architectural praise, but only before the people had to live in it (Newman, 1972; Halpern, 1995).

Analysing the use of urban open greenspaces and people's resultant health status can aid landscape planning. Grahn and Stigsdotter (2003) reported a significant relationship between the number of times an urban open greenspace was visited and the level of self-reported stress experienced. Similar findings were acknowledged for the amount of time spent per week in these urban green areas. Other important aspects included the distance to public urban open green areas and access to a garden. People who live 50 m or less from the nearest green area generally visit urban open greenspaces three to four times per week. If this distance is increased to 300 m, the number of visits is reduced to an average of 2.7 times per week, and if the distance is 1,000 m, visits usually occur only once a week. If residents have a scarcity of green environments within their local area they do not recompense for this by visiting public parks or urban forests more frequently.

The design of landscaped grounds is also of great importance to elderly residents in retirement communities. The incorporation of natural elements within the setting enhanced psychological, social and physical wellbeing amongst residents. When they were questioned concerning their preferences of settings, the following favourites were quoted: *'outdoor spaces that support informal and passive activities, such as walking and talking with friends, gardening, nature observation of water, vegetation and fauna and panoramic views of a naturalistic softscape'* (Browne, 1992).

The built environment, therefore, affects the likelihood of taking non-leisure-based physical activity, such as cycling and walking (Ross, 2000; Berrigan and Troiano, 2002; Craig *et al.*, 2002;

Handy *et al.*, 2002, Parks *et al.*, 2003). Parks *et al.* (2003) have shown that there is a dose-response between the number of places to exercise in a neighbourhood and the likelihood of meeting physical activity recommendations.

### 1.7 Therapeutic places

The built and natural environment can be therapeutic or harmful (Canter and Canter, 1979; Godkin, 1980; Freeman, 1984; Olds, 1989; Gesler, 1992; Hull and Vigo, 1992; Williams, 1999; Philipp, 2003). As Hugh Freeman puts it *'there is a need to restore human settlements the benefits of ... a social matrix in which a worthwhile quality of life and work can grow'*. This sense of place is important, and many of us have a positive sentiment for specific places - things happened there, and we remember them. Places are not just geographic locations, but are full of stories and meaning (Langenbach, 1984; Tall, 1996; Nabhan and St Antoine, 1993; Okri, 1996; Schama, 1996; Bell, 1997). Ralph Metzner (2000) uses the term reinhabitation to describe the need to dwell in a place in a balanced way, with respect for the stories of the other inhabitants, and quotes Wallace Stegner, *'no place is a place until things that have happened in it are remembered in history, ballads, yarns, legends or monuments'*. Some argue that an important part of personal identity is created through interactions with specific places, and the attachments we then develop (Metzner, 2000; Milton, 2002).

What do we know about these attachments? Fredrickson and Anderson (1999) indicate *'past research on place and place attachment has typically focused in a one-way direction, that of individual to place; often overlooking the relationship of place to individual, that is, the affective appeal that place impresses upon the individual'*. Thus we are partly shaped by the environment, by our attachments developed during specific experiences and interactions. The personal benefits include psychological wellbeing, self-image and self-esteem, and the social ones include family stability, community pride and cultural identity (Pretty, 2002). So, is contact with nature and place a fundamental part of the way we establish self-identity? Identity is a relationship in which something is shared, and

linkage with nature and communities partially helps to do this (Fox, 1995; Milton, 2002). To a certain extent, who and what we are is constructed through relationships with people and with nature. Thus, if we lack these relationships and connections, we must lose a sense of personal identity and self-esteem.

People need nature or the otherness of nature - yet nature has been harmed by the unwise management of land managers, developers and planners (Adams, 1996; Pretty, 1998). A sense of identity emerges out of daily, or at least regular, personal contacts, whereby self is formed in relation to the other (Ingold, 1986; Naess, 1989). Some go further to argue that the rest of nature is therefore an extension of personhood (Milton, 2002). Naess (1989) indicates *'the identity of the individual that I am something is developed through interaction with a broad manifold, organic and inorganic'*. If we break the connections, the sense of identity is broken, so increasing the likelihood of ill-health. Deep ecologists suggest that separation from nature leads to greater alienation of people from each other (Seed *et al.*, 1988; Naess, 1989).

Outdoor natural settings are sometimes seen as 'healing places' and this concept was evidenced via a process of workshop visualisations and artwork (Olds, 1989). Initially participants were asked to mentally recall an occasion when they experienced feelings of helplessness, pain or distress. Subsequently, they were told to envisage the ideal environment whereby immediate healing could occur and to transmit this image by drawing it. Outdoor scenes featuring trees, grass, water, rocks, flowers and birds were evident in over 75% of the drawings. Even the interior settings that represented less than 25% of the pictures still contained elements typical of outdoor settings. For example, *'a prominent window through which are visible sky, trees, the sun, a garden or yard, indoor potted plants, flowers and growing things'*. This emphasises how significant an environment embracing nature can be during the healing process.



## Chapter 2: The evidence that engagement with greenspaces and nature affects health

### 2.1 Overview

As physical activity can positively affect both physical and psychological wellbeing (Scully *et al.*, 1998), we have hypothesised that there may be a synergistic benefit in adopting physical activities whilst at the same time being directly exposed to nature (Hayashi *et al.*, 1999). We have called this 'green exercise' (Pretty *et al.*, 2003). It is increasingly well established that the natural and built features of the environment affect behaviour, interpersonal relationships and actual mental states (Tuan, 1977; Freeman, 1984; Kellert and Wilson, 1993; Tall, 1996; Frumkin, 2001). The environment can, therefore, be therapeutic or pathogenic (Burgess, 1988; Gesler, 1992; Lewis and Booth, 1994). Why, then, does nature still seem to have a positive effect on people, despite the increasing urbanisation of modern societies?

The evidence indicates that nature can make positive contributions to our health, help us recover from pre-existing stresses or problems, have an 'immunising' effect by protecting us from future stresses, and help us to concentrate and think more clearly. We have discerned three levels of engagement with nature (Pretty *et al.*, 2004; Pretty, 2004)

- ▶ the first is viewing nature, as through a window or in a painting (Moore, 1981; Ulrich, 1984; Tennessen and Cimprich, 1995; Leather *et al.*, 1998; Kaplan, 2001; Kuo and Sullivan, 2001; Diette *et al.*, 2003)
- ▶ the second is being in the presence of nearby nature, which may be incidental to some other activity, such as walking or cycling to work, reading on a garden seat or talking to friends in a park (Cooper-Marcus and Barnes, 1999; Hayashi *et al.*, 1999; Ulrich, 1999; Whitehouse *et al.*, 2001)
- ▶ the third is active participation and involvement with nature, such as gardening or farming, trekking or camping, cross-country running or

horse-riding (Rossman and Ulehla, 1977; Hartig *et al.*, 1991, 2003; Fredrickson and Anderson, 1999; Frumkin, 2001; Williams and Harvey, 2001; Herzog *et al.*, 2002)

What is interesting about this evidence is that most of it relates to the USA, Scandinavia and Japan. There have been very few empirical studies to investigate the effect of nature and greenspace on health in the UK (for example, see Reynolds, 2004; Countryside Agency, 2003; Trchalik, 2004; Willis, 2004; Pretty *et al.*, 2005). In addition, very little research has investigated the separate effects of nature on social capital and collective wellbeing (see Burgess, 1988; Coley *et al.*, 1997; Fredrickson and Anderson, 1999; Ulrich, 1999; Ward Thompson, 2002).

### 2.2 The View from the window

The evidence for the benefits of windows comes from the workplace, hospital and home, and from travelling to work (Tennessen and Cimprich, 1995; Leather *et al.*, 1998; Parsons *et al.*, 1998; Kaplan, 2001; Laumann *et al.*, 2003; Verderber and Reuman, 1987). Windows in the workplace buffer the stresses of work, and over long periods people with windows have been shown to have fewer illnesses, feel less frustrated and more patient, and express greater enthusiasm for work. People are better able to think with green views, including university students. Those in offices without windows often compensate by putting up more pictures of landscapes or by keeping indoor plants (Heerwagen and Orians, 1993). Those who cannot compensate, however, may respond by becoming more stressed and aggressive. One study of Alzheimer patients in five homes found that those in the three with gardens had significantly lower levels of aggression and violence than those in the two with no gardens (Ulrich, 1993). Ulrich (1993) also reports on a Swedish psychiatric hospital in which patients over a fifteen-year period had often complained about and damaged paintings on the walls. Damage, though, was only ever done to abstract paintings, and there was no recorded attack on any depicting nature and landscapes.

At home, the view is equally important. Kuo and colleagues have demonstrated that small amounts



of green in the barren urban environment of Chicago make a large difference to people's wellbeing (Kuo *et al.*, 1998; Taylor *et al.*, 1998, 2001; Kuo and Sullivan, 2001). Green views from home, plus nearby nature in which to play, have a positive effect on the cognitive functioning of children and their capacity to think. Residents of two of the ten poorest neighbourhoods in the USA positively responded to trees and grass near their blocks, and they said the greener the better. Buildings with more vegetation also had 52% fewer property and violent crimes than those with none, and these residents also reported lower levels of fear and less generalised aggressive behaviour in the local neighbourhood. Interestingly, there was a greater difference between non-green and moderately green buildings than between moderately and very green, suggesting more of a benefit would accrue from a light-greening of all urban spaces rather than a dark-greening of just a few. Indeed, well-maintained vegetation may be a clue to care, as it suggests that local people care for their environment and so are more vigilant (Kuo and Sullivan, 2001).

Another study of people exposed to different types of roadside corridors on a potential commute to work found that those people on the urban drive dominated by human artefacts were more stressed than those driving through the nature-dominated scenes of forests or golf-courses. The nature drive also seemed to have a protective effect against future stresses that might arise during the day (Parsons *et al.*, 1998). However, there is a distinct tension between these findings and what civic and park authorities tend to do. Greenspaces are frequently removed to keep down maintenance costs, and there is often a fear that well-vegetated places offer more opportunities for criminals and drug-dealers to hide - echoing back to centuries' old fears of thieves and highwaymen in the forests (Schama, 1996).

This evidence also suggests that greenspaces and nearby nature should be seen as a fundamental health resource (Frumkin, 2001; Maller *et al.*, 2002). Two classic studies from the 1980s confirm this (Moore, 1981; Ulrich, 1984). The first found that prisoners in Michigan whose cells faced farmland

and trees had a 24% lower frequency of sick cell visits than those in cells facing the prison yard. The second was a ten-year comparison of post-operative patients in Pennsylvania whose rooms looked out on trees or a brick wall, in which it was found that patients with tree views stayed in hospital for significantly less time, needed less strong or moderate medication and had fewer negative comments in the nurses' notes.

A more recent study of hospital patients has shown the clear value of a picture and the sounds of nature. One group of patients preparing for bronchoscopy (in which a fibre-optic tube is inserted into the lungs) were given a large landscape picture to look at by their bedside, and listened to the sounds of birdsong and a babbling brook prior to the operation. This group had a 50% higher level of very good or excellent pain control than those who did not have the picture or sounds. What such a simple intervention means is that less money needs to be spent on painkilling drugs for patients (Diette *et al.*, 2003). Another simple idea has been to put an aquarium full of fish into the waiting room at a dental surgery. Those exposed to this kind of nature are more relaxed than patients awaiting treatment in a room without an aquarium (Katcher and Wilkins, 1993; Beck and Meyers, 1996).

Some of this evidence should not be a surprise. Frumkin (2001) points out that *'hospitals have traditionally had gardens as an adjunct to recuperation and healing'* and 95% of people living in retirement communities say windows facing green landscapes are essential to wellbeing. Ulrich (1984) states that this aesthetic preference for nature may be universally expressed across human cultures: *'one of the most clear cut findings in the literature is the consistent tendency to prefer natural scenes over built views, especially when the latter lack vegetation and water'*.

The value of the view from a window has been demonstrated by various studies that have shown increased economic value for both hotels and housing (Peiser and Schwann, 1993). Greenspace alters room pricing policy in hotels in Zurich (Lange and Schaeffer, 2001), and increases by a quarter the value of homes with gardens looking onto lakes



and parks in the Netherlands (Luttik, 2000). Street trees in Berlin increase real estate value by 17% (Luther and Gruehn, 2001), and the value of housing near to water is greater in Merseyside (Wood and Handley, 1999).

### 2.3 The effects of rural and urban views on health

In a study at the University of Essex, we have tested the effect of the first of these three categories of engagement with nature (the view through the window) on mental and physical health (Pretty *et al.*, 2005). Studies to investigate these health benefits have tended to be of two types - either observational studies of the effects of different views on different cohorts of subjects, or experimental studies to test the effects of views on randomly selected groups of people. The first type includes studies that have demonstrated clear health benefits for both prisoners and hospital patients of windows overlooking greenspace compared with those facing brick walls (Moore, 1981; Ulrich, 1984), and for bronchoscopy patients exposed to a bedside landscape photograph before surgery (Diette *et al.*, 2003).

The second type of study uses photographs to investigate the effects of different scenes on cognition and emotions (Coughlin and Goldstien, 1970; Shafer and Richards, 1974; Zube *et al.*, 1974; Sorte, 1975; Russell and Mehrabian, 1976). For example, in a comparison of videos of different roadside corridors on a virtual drive to work, the urban drive was more stressful and drives through nature were more protective against stresses that subsequently arose during the working day (Parsons *et al.*, 1998). Most studies of this type have used still photographs, mainly comparing urban with rural scenes (Honeyman 1992; Schroeder, 1995; Purcell and Lamb, 1998; Staats and Hartig, 2004), and all have consistently shown reduced stress and improved mental wellbeing in the presence of nature scenes. Relatively few studies have investigated the effects of exposure to different scenes on physiological measures such as heart rate and blood pressure (Ulrich, 1981; Hartig, 2003; Laumann, 2003) and none has analysed the potential synergistic effects of physical activity.

The aims of our study were to determine the physiological and psychological effects of exercise conducted on a treadmill whilst exposed to rural and urban photographic scenes. Each of these was subdivided into pleasant and unpleasant categories in order to explore, on the one hand the effect of rural scenes compromised with pollutants or other visual impediments, and on the other hand of clearly urban scenes enhanced by the presence of nearby nature in the form of greenspace. Thus five groups of twenty subjects were exposed to a sequence of thirty scenes projected on a wall whilst exercising on a treadmill. Four categories of scenes were tested: rural pleasant, rural unpleasant, urban pleasant and urban unpleasant. The control was running without exposure to images. Blood pressure and two psychological measures (self-esteem and mood) were measured before and after the intervention. In this study, we only investigated the effects of green exercise on individuals, and thus did not assess the value of social interactions in greenspaces (Burgess, 1988; Coley, *et al.* 1997; Fredrickson and Anderson, 1999; Ulrich, 1999; Ward Thompson, 2002).

The materials and methods are described in full in Appendix A.

Table 2.1 - Effects of exercise on physiological and psychological measures in all subjects (n=100)

Measures	Before exercise	After exercise	Significance of difference
<b>Physiological</b>			
Systolic blood pressure	121.74 ± 1.25	118.02 ± 1.31	***
Diastolic blood pressure	74.22 ± 0.90	72.47 ± 1.01	*
Mean arterial pressure (MAP)	90.06 ± 0.89	87.65 ± 0.98	**
<b>Psychological</b>			
Self-esteem	19.43 ± 0.40	18.09 ± 0.43	***
<b>Psychological</b>			
Mood			
Anger-Hostility	38.19 ± 0.25	37.86 ± 0.29	NS
Confusion-Bewilderment	36.94 ± 0.41	35.90 ± 0.40	**
Depression-Dejection	37.75 ± 0.17	37.55 ± 0.18	NS
Fatigue-Inertia	40.08 ± 0.54	39.92 ± 0.51	NS
Tension - Anxiety	35.10 ± 0.34	32.64 ± 0.28	***
Vigour-Activity	36.97 ± 0.62	39.91 ± 0.73	***

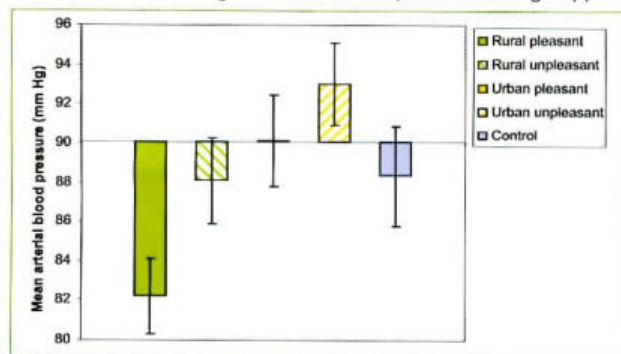
Notes: Values are means ± standard errors  
Significance tested with 1-tailed t test (\* p<0.05; \*\* p<0.01; \*\*\* p<0.001)

Table 2.1 shows that there were significant reductions in both systolic and diastolic blood pressure following twenty minutes of 'fairly light' exercise when data for all five groups were pooled.



Mean arterial blood pressure decreased from 90.1 to 87.7 mm Hg. There were also significant increases in self-esteem, significant reductions in two of the six mood measures (confusion and tension), and a significant improvement in one mood measure (vigour) following exercise. The changes in the other three mood measures were not significant.

**Figure 2.1** - Change in mean arterial blood pressure after exercise whilst viewing different scenes (n=20 in each group)



When analysed by group, only those subjects viewing rural pleasant scenes experienced significant reductions in all three measures of blood pressure (systolic, diastolic and MAP). Figure 2.1 shows the changes in mean arterial pressure normalised to the starting average for all five groups. There was also a decline for rural unpleasant pictures, but this was not significant. The urban pleasant pictures had no effect on MAP, whilst the urban unpleasant slightly increased it. As control subjects experienced a slight decrease in blood pressure, it is clear that both pleasant and unpleasant urban scenes increased blood pressure relative to the controls. The urban scenes therefore appear effectively to negate the marginal, but potentially beneficial, impact of exercise on blood pressure.

**Figure 2.2** - Change in self-esteem after exercise whilst viewing different scenes (n=20 in each group)

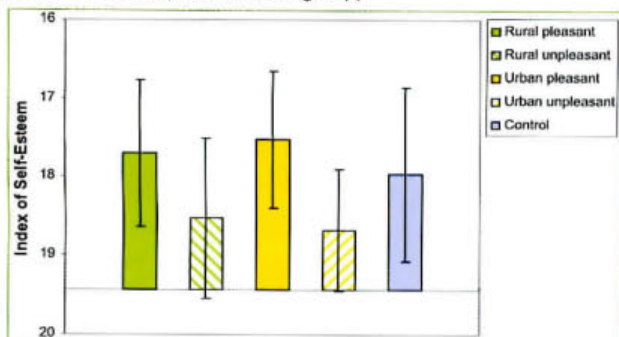


Figure 2.2 shows the changes in self-esteem in the five groups (as measured before and after exercise using the Rosenberg questionnaire) with starting self-esteem averaged for all groups. Self-esteem was significantly improved in all five groups ( $p < 0.001$  for rural pleasant;  $p < 0.01$  for rural unpleasant, urban pleasant and control;  $p < 0.05$  for urban unpleasant). The control treatment (exercise with no scenes) produced a greater improvement in self-esteem than the two unpleasant treatments (rural and urban), implying that the latter have a depressive effect on self-esteem relative to exercise alone. Both pleasant treatments, however, produced the greatest increases in self-esteem.

Our findings show clear effects of exercise and viewing different scenes during exercise on both blood pressure and two psychological measures (self-esteem and mood). Exercise alone slightly reduced blood pressure (systolic, diastolic and mean arterial), significantly increased self-esteem, and had a positive significant effect on four of six mood measures.

The four types of scene viewed also had a variety of effects on subjects. We found that rural pleasant scenes had the greatest effects in reducing blood pressure - both in terms of the average reduction in mean arterial blood pressure in all subjects in this class (from 94.1 to 85.8 mm Hg), and also the fact that all participants in this class experienced declines in blood pressure (unlike all other treatments where, by contrast, 35-40% of subjects experienced increases in MAP). It is well established that exercise has a hypotensive effect, with long term reductions of 2-3 mm Hg being achieved in hypertensive patients even without weight loss (Bacon *et al.*, 2004). Although reductions in blood pressure were small in the current study, pre-exercise population mean values for all groups were in the normotensive range and there was little scope for further reduction. Further studies are planned that will test subjects with borderline hypertension.

Rural pleasant scenes also had a positive effect on self-esteem, which like urban pleasant scenes produced a greater effect than exercise alone. This shows the synergistic effect of exposure to both rural and urban pleasant environments, when



combined with exercise. Although both rural and urban unpleasant scenes produced increases in self-esteem, this was to levels lower than the control. This indicates that both sets of unpleasant scenes had a depressive effect on self-esteem compared with exercise with no scenes.

We found that 62% of subjects in all conditions experienced an increase in self-esteem following exercise. For those starting with high self-esteem, a greater proportion of those subjects viewing rural pleasant scenes further increased their self-esteem, whilst a smaller proportion than the control viewing the rural and urban unpleasant scenes further increased their self-esteem. For those subjects starting on low self-esteem, a larger proportion in the rural pleasant group showed increases.

For the six measures of mood, viewing rural pleasant scenes during exercise produced consistent, though not always significant, improvements relative to viewing other scenes. Viewing urban pleasant scenes also resulted in improvements in all six mood measures (five of six were significant). Unexpectedly, exercise whilst viewing urban unpleasant scenes produced significant improvements for anger-hostility, confusion-bewilderment and tension-anxiety. The rural unpleasant scenes had the most differentiated effect on mood measures. There were negative effects on three mood states ( $p < 0.05$  for tension-anxiety), the most for any type of scene. It appears that views embodying threats to the countryside had a greater negative effect on mood than already urban unpleasant scenes.

#### 2.4 Incidental exposure to nearby nature

The second category of engagement with nature is incidental exposure whilst engaged in some other activity, such as nearby nature in neighbourhoods or in the grounds of hospitals and care homes (Verderber and Reuman, 1987; Whitehouse *et al.*, 2001; Ulrich, 2002). Wells and Evans (2003) found that those 8-10 year old children in five upstate New York communities exposed to both indoor and outdoor vegetation were less stressed and more able to recover from stressful events than those in greenless homes and backyards. This confirmed earlier work on younger children in day facilities

either surrounded by orchards, pasture and forests or by tall buildings in the city. Those in the all-weather mode of operation with regular outdoor exposure to nature had better attention capacity and motor co-ordination.

Wells (2000) also found that children in families moving to houses with more nearby nature had higher levels of cognitive functioning - though it could have been that these types of families were able to select these types of preferred homes. Cause and effect can be difficult to disentangle. In New York City, children in poor neighbourhoods have access to some 17 square metres of park per person, whilst those in better-off districts have access to about 40 square metres of park.

Plants in offices have been found to be important (Lewis, 1992; Randall *et al.*, 1992; Ulrich and Parsons, 1992; Larsen *et al.*, 1998). Randall *et al.* (1992) conducted a study that required all office plants to be removed for a period of three months. This period of time was sufficient to obtain baseline measurements of air quality. After the three months, questionnaires were dispensed to all employees one week prior to one office floor being professionally landscaped. To maintain a sense of environmental change, the floor with no plants possessed artwork on the walls. Six months after the plants had been reinstated, a second questionnaire was administered. It was revealed that employees preferred their own plants and enjoyed looking after the plants themselves. Employees were also more aware of the plants at the time of completing the second questionnaire in comparison to the initial stages. Nearly half of the employees situated on the plantless floor visited the other floor purposely to view the plants.

Another experiment measured the effect of indoor plants on participants' productivity, attitude towards the workplace, and overall mood in the office environment (Larsen *et al.*, 1998). A selected office was randomly transformed to incorporate either i) no plants, ii) a moderate number of plants and iii) a high number of plants. All participants were requested to complete a timed productivity assignment and a survey questionnaire. The statistical results told a dissimilar story to the self-reported assessments. Statistical analysis implied



that productivity was worse with more plants present but participants' assessment of performance increased relative to the number of plants in the office. In situations where plants were present, participants perceived the office to be more attractive, were more comfortable and described an enhanced level of mood.

A report by Ulrich (2002) provides detailed information concerning the health benefits of nature and in particular gardens in hospitals. Nakamura and Fujii (1990, 1992) were responsible for two studies in Japan that compared brain wave activity in unstressed participants (non-patients) when viewing either plants or human-made objects. Alpha rhythm activity was evaluated whilst subjects viewed: *'2 types of potted plants, each with and without flowers (Pelargonium and Begonia); the same pots without plants; or a cylinder similar to the pots'*. Viewing plants with flowers significantly influenced subjects' relaxation state in comparison to pots without plants. Electroencephalograms (EEGs) were monitored whilst subjects were situated in a real outdoor setting viewing either a green hedge, concrete fence of similar proportion or a combination of both. Again greenery induced relaxation, whilst the concrete alluded stressful experiences.

In medieval Europe, monasteries often designed intricate gardens to offer a pleasant, relaxing environment for the ill to visit for a respite (Gerlach-Spriggs *et al.*, 1998). As far back as the 1800s, European and American hospitals were renowned for their surrounding gardens and array of plants (Nightingale, 1860). Unfortunately, as time has progressed, hospitals have become more concerned with reducing the risk of infection and focusing on efficiency, and this has been reflected in their design and lack of greenery. They are now considered to be more stressful establishments that do not meet the emotional needs of patients, their families and staff (Lindheim and Syme, 1983; Ulrich, 1991; Horsburgh, 1995).

A range of hospitals and patient groups has been embroiled in the research and only one clear message emerges: the presence of nature, including window views of nature, indoor and outdoor gardens and plants, all significantly

enhance patient and family contentment (Cooper-Marcus and Barnes, 1995; Whitehouse *et al.*, 2001; Picker Institute and Centre for Health Design, 1999). Gardens and nature in hospital environments enhance mood, reduce stress and improve the overall appreciation of the healthcare provider and quality of care.

Healing gardens are acknowledged to be beneficial for hospital patients (Cooper-Marcus and Barnes, 1999). Whitehouse *et al.* (2001) found that a healing garden at a children's hospital in California had positive effects on users, with 54% reporting they were more relaxed and less stressed, 24% refreshed and rejuvenated, 18% more positive and able to cope, and only 10% having no difference in mood. Even very short visits were beneficial, as nearly half of all observed visitors spent less than five minutes at a time in the garden. However, 28% of staff, 95% of visiting families and 90% of patients had never been to the garden; 10% of staff and 65% of visitors did not even know of its existence. Those who did go to the garden went *'to escape the stresses of the hospital and enjoy the relaxing and restorative elements of nature'*. Such principles are applied in the Eden Alternative nursing homes in Texas, where healing gardens, greenhouses, atriums and plants have been deployed. After conversion, there were 57% fewer bedsores, an 18% reduction in patients restrained, a 60% reduction in behavioural incidents, and a 48% reduction in staff absenteeism. The costs of such nature-based treatments are expected to be much less than expenditure for drugs and surgery to achieve the same outcomes (Eden Alternative, 2002).

Ulrich (2002) reports that the health benefits acquired from simply viewing particular types of nature and garden scenes occur within five minutes. Additional research has implied that viewing nature for extended periods encourages patients to relax and facilitates recovery. This notion is supported by classic studies discussed earlier, whereby pain control was enhanced, hospital stays were reduced and less medication was required. Well-designed hospital gardens, such as the homeopathic one in Glasgow, UK (NUFU, 2002), provide countless health, social and environmental



benefits. The views are evidently invigorating and restorative, but most importantly, they facilitate the reduction of stress, encourage social cohesion and offer a relaxing environment for escape.

### 2.5 Active participation and involvement with nature and greenspaces

The third category of engagement with nature comprises direct participation in some activity in greenspaces, and includes gardening, trekking, walking, mountaineering, running, camping, cycling, water-based activities and Forest Schools. This differs from the second category as it implies a positive decision to go to places where there is green nature, rather than be incidentally exposed to it whilst doing something else. This category includes exposure to nearby nature, such as in gardens or nature reserves, or in distant ecosystems, such as national parks and wildernesses. Once again, most of the research derives from non-UK contexts. Chapter 4 contains details of our research on ten case studies in England, Scotland, Wales and Northern Ireland.

Hartig and colleagues have pioneered the idea that nature can restore deficits in attention arising from overwork or over-concentration, making people both feel and think better (Hartig *et al.*, 1991, 2003). They found that sitting in a room with tree views promoted more rapid blood pressure decline than sitting in a windowless room, and also that walking in a nature reserve reduced blood pressure more than a walk along an urban and non-green street. In both contexts, the green room and green walk, people recovered more rapidly from attention-demanding tasks. They also found that the benefits of the nature walk lasted for about 30 minutes, after which the difference converged, probably because the physical benefits of the walk itself began to override any unpleasantness of the urban street.

This shows that short or occasional exposures to nature can be highly beneficial. However, the research does not tell us whether cumulative short exposures, such as looking out of the window or short walks, equate to longer, less frequent exposures to nature, such as a weekend away in the hills (Hartig *et al.*, 2003). It also does not tell us whether there is an enhanced or different effect of

exposure to specific places because they have memories and stories associated with them for certain people. In other words, some environments may be green and beneficial, but anonymous, whereas others may be evoking pleasant memories as well (Tuan, 1977; Gallagher, 1994).

Private and community gardens provide an important direct link to nature for many people, and are particularly valuable in urban settings. The average family spends 3.5 hours per week gardening. In the UK, there are also some 300,000 occupied allotments on 12,000 hectares of land (down from 120,000 hectares in the 1940s). These allotments yield some 215,000 tonnes of fresh food each year. But more importantly, they provide an opportunity for regular contact with nature. There are now several hundred city farms or community gardens in the UK (Pretty, 1998). They provide food, especially vegetables and fruit, for poorer urban groups, and a range of other natural products such as wood, flowers and herbs. They also mean that derelict or vacant land is transformed into desirable areas for local people to visit and enjoy, resulting in the creation of quiet, tranquil places for the community that can increase wildlife. They also provide the opportunity for mental health patients to engage in work that builds self-esteem and confidence, and for unemployed people to use their time productively in their own community.

The American National Gardeners' Association estimates that some 35 million people are engaged in growing their own food in back gardens and allotments. Their contribution to the informal economy is estimated to be about \$12-14 billion per year. Private gardeners cultivate mostly to produce better tasting and more nutritious food, but also to save money, for exercise and for therapy. It makes them feel better. This is particularly true of community gardens and farms that seek to enhance both food production and social benefits. In New York, 87% of community gardeners invest their time in gardening so as to improve the neighbourhood, 75% for fresh vegetable production, 62% for fun and self-esteem, and 42% to save money (Weissman, 1995a, b). Many of the recently established Community Supported Agriculture (CSA) farms, with direct links to their



consumers, not only provide weekly food boxes but also run horticultural therapy and educational sessions (Pretty, 2002).

Based on these experiences of the value of gardening for mental health, a tradition of horticulture therapy has also emerged in recent years (Lewis, 1992; Ulrich, 1999; Sheffield Healthy City Team, 2001; Sempkirk *et al.*, 2002).

Therapeutic horticulture is defined as *'the process by which individuals may develop wellbeing using plants and horticulture. This is achieved by active or passive involvement'* (Growth Point, 1999).

Sempkirk *et al.* (2002) explored the utilisation of social and therapeutic horticulture in a variety of diverse groups and identified the key emanating messages and benefits that the groups experienced. The groups were comprised of patients recovering from major illness or injury, those with physical or learning disabilities, mental ill-health, the elderly patients (mental health patients), offenders and drug or alcohol abusers. The array of benefits gained included *'increased self-esteem and self-confidence, the development of horticultural, social and work skills, literacy and numeracy skills, an increased sense of general wellbeing and the opportunity for social interaction and the development of independence'* (Sempkirk *et al.* 2002). Inclusion in social and therapeutic horticultural programmes has also been known to lead to employment opportunities or aid the individual in training or education progression. Like many other areas where nature has been used as a therapy, hard evidence of effectiveness is surprisingly scant (Frumkin, 2001).

Forest Schools are another example of active participation in the countryside. The idea of Forest Schools came from Scandinavia in the 1950s as a way of teaching about the natural world had become an integral part of the Danish primary education syllabus. By the 1980s in the UK - the Forest Education Initiative is responsible for Forest Schools and it is now a wide initiative involving eight partners<sup>6</sup>.

<sup>6</sup> Forest Education Initiative partners are: BTCV, Field Studies Council, Forestry Commission, Forest Industries Development Council, Groundwork, Timber Trade Federation, The Tree Council and the Woodland Trust. More information can be found at: [http://www.foresteducation.org/about\\_fei.php](http://www.foresteducation.org/about_fei.php)

The concept of Forest Schools was originally designed to provide hands-on learning in a woodland environment for children of all ages. There are currently several schools set up in England and Wales with the main aim of providing contact for young people with woodlands on a regular basis and over an extended period of time. Participation in the Forest School is said to improve children's confidence, wellbeing, self-esteem and motivation to learn and gives them pride and ownership of their local environment (Bishops Wood Centre, 2005).

The benefits of wilderness experiences date back to the testimony of 19<sup>th</sup> century writers such as John Muir and Henry David Thoreau. Muir's writing on the Sierra Nevada, and the importance of such wild areas for wellbeing, was instrumental in the establishment of the world's first national park at Yellowstone in 1872 (Muir, 1911, 1992; Thoreau, 1837-53, 1902; Pretty, 2002). A number of studies have shown that people both seek and derive a variety of values when they visit wildernesses, in particular a desire for tranquillity and natural beauty, escape from the stresses of urban life, and the potential for dramatic 'peak experiences' (Scott, 1974) or transcendent moments. Herzog and colleagues conclude that *'the restorative potential of natural settings is probably underappreciated'*, as many people do not appreciate the full benefits of such settings - particularly in the face of competition for multiple other leisure and entertainment opportunities of modern life (Rossman and Ulehla, 1977; Williams and Harvey, 2001; Herzog *et al.*, 2002).

Fredrickson and Anderson (1999) explored the effects of a wilderness experience on two groups of women in two areas of Minnesota and Arizona. Participants stated that benefits arose from both individual contact with nature, and from connections with their social group sharing the experiences. Personal testimony showed that the experience left a lasting impression on most participants, particularly as these experiences were so different to those of their daily lives at home. Many spoke of renewed hope, a reawakening of emotions and a new sense of identity. One said *'It was so incredible being able to hear the birds... The*



*sounds of the forest, the snapping of twigs, hearing the tiny sigh of the wind through the treetops at night.'* Another noted that, *'I noticed more, I felt more. I felt more connected to myself and even to other people on the trip.'* And another, *'I can't even fully capture in words what happened to me when I was out there... It's like the spirit is burning deep inside me again, and I'm looking at my life a little differently.'*

The study found that person-person interactions were just as important as person-place connections: *'the affective appeal of a particular place setting has as much to do with the social interactions that occur there, as with the overall visual appeal of the landscape itself'*. The researchers concluded that these wildernesses contributed substantially to participants' wellbeing. Similar experiences have been noted in the forests of Australia, where so-called 'transcendent' experiences were found to provoke a sense of harmony, freedom and wellbeing that were sufficiently long-lasting to change long-term attitudes to the environment. Several other studies have noted the value of natural and wilderness experiences and their therapeutic potential, and the additional role that physical hardship can play in triggering more profound experiences (Mitchell, 1983; Kaplan, 1995; Fredrickson and Anderson, 1999; Williams and Harvey, 2001; Herzog *et al.*, 2002).

There is a long experience of the use of adventure therapy for a wide variety of people, particularly in the USA (Kaplan and Talbot, 1983; Martin, 1996; Richards and Smith, 2003). These have mostly involved deep immersion in natural and wild areas far from urban development, with participants camping and taking part in a range of physical activities, such as rock climbing, swimming, canoeing and hiking. The effects of such therapeutic camping have been assessed for bereaved children (Moyer, 1988), mental health patients (Jerstad and Stelzer, 1973; Berman and Anton, 1988; Davis-Berman and Berman, 1989), children with renal disease (Warady, 1994), emotionally-disturbed adolescents (Hobbs and Shelton, 1972), addiction recoverers (Bennett *et al.*, 1998; Kennedy, 1993), children with learning

difficulties (Michalski *et al.*, 2003) and urban adults (Fredrickson and Anderson, 1999; Williams and Harvey, 2001). Such programmes gave rise to the Outward Bound movement (Kaplan and Talbot, 1993; Hyer *et al.*, 1996; Stys, 2001). Some studies have emphasised the spiritual benefits of wildernesses (Hayashi, 2002; Johnson, 2002), and how activities in nature can change world views and behaviour (Martin, 1996).

It is evident that the lives of the individuals participating in these diverse programmes are significantly enhanced. Engaging in these challenges often leads to a significant transformation in at least one feature of their lives (Stys, 2001). Research generally indicates that the effects of wilderness experiences are positive, but once again there is surprisingly little quantitative data. An important unanswered question for those concerned about sustainability is to what extent do the benefits of such wilderness experiences continue off-site? Do they provoke long-term changes in thinking, which could lead to deep social and political transformations? It is also true that people with positive environmental values may be predisposed the restorative potential of nature, and that these values help to shape environmental attitudes (Kaiser *et al.*, 1999; Kals *et al.* 1999; Schultz and Zelezny, 1999).

## 2.6 Impacts of the Walking the Way to Health Initiative and Green Gym programmes

The two green exercise activities to have seen growth in the UK in recent years are the Walking the way to Health Initiatives and Green Gyms.

### The Walking the Way to Health Initiative (WHI)

One of the most beneficial and preferred ways of enhancing physical health and psychological well-being is walking. As indicated earlier, we now walk less as part of our daily lives, though efforts to encourage walking for health are having some positive effects. Walking is increasingly seen as a relatively cheap policy goal by agencies across the UK (e.g. HoC, 2001; SNH, 2002; WHI in Ballymena - see section 4.5 for further details). Health experts have described walking as almost perfect exercise. It requires no equipment or expense and is the ideal way for most people to become more active.



It has a higher adherence rate than most other activities. Walking is known to be beneficial to health (Hayashi *et al.*, 1999; Takano *et al.*, 2002), and as it is an everyday activity, it is potentially available to almost all people (Countryside Agency, 2000, 2003; Faber Maunsell, 2003). People are more likely to walk with company or a pet (Ball *et al.*, 2001), and more likely to walk in aesthetically-pleasing environments.

The WHI was set up in 2000 as a joint venture between the Countryside Agency and the British Heart Foundation, receiving additional income from the Big Lottery Fund. Its principal aim is to *'encourage more than a million people in poor neighbourhoods, across town and country, to walk more'*. The target audience consists of individuals who do not participate in regular exercise, are not perceived to be regular walkers, and are disadvantaged by living in areas of poor health. Research has implied that this requires concentrating on those over 50 years of age, of ethnic minority origin, or residing in the north or midlands. However, the scheme is also involved in working with other high health risk groups comprised of respiratory or cardiac rehabilitation patients, diabetics, 'Sure Start' families, individuals with mental health problems or learning difficulties and those involved in weight management programmes.

Volunteers are trained to lead walks and encourage regular participation in a variety of weekly routes established by local people. All proposed routes are initially assessed for potential risks and subsequently publicised via a number of diverse sources. Some participants are referred by general practitioners or other health professionals, while others join to become part of a social group and are self-referred. All members have the choice of walking with companionship or using the publicised routes to walk independently. Pedometers (step-o-meters) are used to encourage regular activity and have become extremely popular nationally<sup>7</sup>.

<sup>7</sup> The value of step-o-meters: 'patients report that 93% said having a step-o-meter made them walk more. On average, patients increased their daily walking by at least 1,500 steps – a 50% improvement on the increases found during their 2002 campaign when WHI simply gave step-o-meters to people and did not provide any face-to-face support.' (Countryside Agency, 2004).

The key assets of the scheme include its database of walking routes, a popular website, the WHI brand name and profile, equipment, accredited training course and manuals, and evaluation results and stories. However, the underlying elements behind its success relate to the number of schemes set up and the quantity of volunteers involved. Three-quarters of the way through the initiative it had encouraged approximately 900,000 people to walk more. Presently, there are in excess of 350 local walking for health schemes established and over 10,000 trained volunteer walk leaders.

**Table 2.2** - The overall profile summary of WHI participants at the end of Year 3

	Local Schemes Led Walks only	National Activities	Total
<b>Number of people</b>	31,866	377,000	408,866
<b>Gender (%)</b>			
Male	31	38	37.05
Female	69	62	62.95
<b>Age Profile (%)</b>			
Under 16	4	4	4
16-65	60	65	64.61
65+	36	31	31.39
<b>Ethnicity</b>			
White British	87.05	90.2	89.97
Black	3.04	1.6	1.70
Caribbean			
Asian Indian	6.15	5.3	5.37
Asian	2.78	0.6	0.86
Chinese			
Misc/dk	0.98	2.3	2.10

Source: Countryside Agency (2004) WHI NOF Overall Profile Summary

The evaluation of the Thames Valley Health Walks Scheme, 'It's good to walk', reported that during its first two years it encouraged more than 750 people to participate in its led walks (Countryside Agency, 2000). This scheme acknowledged the value of developing social networks as 54% of the participants joined on their own. Participants were mainly over 50 years old and adherence rates were exceptionally high as 90% of walkers anticipated continuing this type of walking. Reasons for participation were fairly diverse, ranging from the enjoyment of the countryside, convenience of the walks, and maintaining or enhancing fitness levels to simply the enjoyment and fun. Half of the participants believed the scheme had encouraged them to do more walking, especially for shorter journeys where previously they had used the car.



Current national data reports fewer journeys on foot, so these schemes are an excellent way of addressing this trend.

The first randomised control trial involving the Thames Valley Health Walks Scheme found that Healthy Walks projects are more likely to keep adherence rates high (Countryside Agency, 2003). Sedentary volunteers were selected and subdivided into two groups. General advice concerning the importance of exercise and health was provided for all participants, focusing particularly on the intensity and duration required to ensure fitness. However, members of one group were exclusively encouraged to participate in the Health Walks scheme. Various measurements were collated during the first year concerning activity and fitness levels, overall quality of life and what factors successfully motivated individuals to exercise. Comparisons were subsequently completed between the two groups at the end of the year.

Some 36% of the participants in the Health Walk group introduced activity into their lifestyles and remained active compared to only 23% in the group solely receiving advice. Some findings were reflected in both groups and these included the significant decrease in the number of people who had '*no intention of doing exercise*' and in those who were '*thinking of doing exercise*'. Encouragingly, there was also a significant increase in the proportion of participants who had '*started recently doing exercise*' and in those who took regular exercise. The key emerging message was that '*this overall approach is more effective than simply telling people to do more exercise*'.

Other than the studies described above there is little empirical data on the outcomes of the WHI to date, though currently an independent evaluation of 500 participants is being processed which identifies the extent of changes to physical activity levels of WHI participants (Dawson *et al.*, 2003). The most compelling data source at present is the extensive number of qualitative stories documented (see Boxes 2.1 and 2.2). Box 2.2 summarises a story of one particular scheme based in Goring and provides an informative insight into the numerous potential benefits the community, the individual and the local environment all acquire.

#### Box 2.1 - A selection of comments from WHI participants

*'I'm still there after two and a half years and go out every Tuesday in all weathers! I've lost weight, got my confidence back, become involved in lots of projects at the community centre and got to know lots of people.'*

*'Not only have our fitness levels risen, but, just as important, our mental inspiration to meet and mix has greatly improved.'*

*'I thought I'd give it a go, really enjoyed it and decided to train as a walk leader. Now I lead or back mark eight walks a week. I take out lots of groups of people and I can talk to people with food disorders because I know what it's like. What I've lost is more than the body weight of some of the walkers. I'm stronger mentally and physically.'*

*'Everybody should try walking, it's so good for you. I'll be 70 at the end of this year but everyone says I have been looking younger since I started the walks.'*

*'The walks have done me a world of good. I've got the confidence now and seen the improvements. The social activity is enjoyable as well.'*

Source: WHI 2004

<http://www.whi.org.uk/results.asp?key=AX9091123C57247699481p157210&parentkey=AX9091019815233292671p15210>

#### Box 2.2 - Summary of WHI Goring

*'Every Saturday morning a substantial crowd gathers outside Goring Village Hall. You might think they were a local rambling group, but you'd be wrong. Not a rucksack, or a hiking boot, or a map, or a stick in sight - apart from a few walking sticks that some of the much older folk are carrying. If you were local, you might recognise your GP amongst the participants. The group chats noisily until the leader gets their attention and tells them where they are about to walk, and runs through some safety points. Some of this group of more than 40 people will be doing just a short, one to two mile walk; some of them will do a more challenging four miles with hills. All will be back within the hour because this is a Health Walk. They will be encouraged to walk at a good pace, faster than they would do on their own.'*

*'Despite being a broad cross-section of ages and backgrounds, these people have a few things in common: they all live locally and they are all here to improve their health. But that is not the main reason they turn out every week (sometimes several times a week). They come back because it's fun, sociable'*



*and they get a real buzz from getting into the countryside.*

*'This scene is repeated nearly every day of the week outside the Village Hall as the 25 trained volunteer walk leaders take it in turns to lead different groups out on yet another health walk.*

*'More than 280 people from the village walk regularly with the group; the youngest is 8 and the oldest is 92. The only funding the scheme has received since it was started by a keen volunteer in 1996 is £750. Since then more than 500 people have benefited and the volunteers now run the scheme themselves, organising rotas for the leaders and even setting up their own website. New people join the group regularly, often having read about it in the local press and sometimes being recommended to join by their GPs. The local health centre helps the group out with first aid kits, venues for meetings and a place to leave leaflets and posters. The impact of the scheme can be seen throughout the community - more people are out walking and the footpaths hardly ever need clearing in the summer months as they are all used much more than before.'*

Source: Peter Ashcroft, Personal Communication. 2004.

### **BTCV 'Green Gyms'**

BTCV (British Trust for Conservation Volunteers) is responsible for establishing and organising the nationwide *Green Gym* scheme. William Bird (2003) and BTCV conceived the idea and a successful pilot was conducted in 1997 in Sonning Common. This concept primarily promotes physical and mental health through active, supervised participation in conservation work within the local environment. *'Green Gym is a registered trademark of BTCV and refers to a specific model of promoting health through conservation work, which follows an agreed set of quality standards.'* The gyms encourage social networks and projects vary, including creating community gardens, managing local woodlands, tree-planting and maintenance of public footpaths.

Members are self-referred or enrol due to a referral from their GP, and the scheme attracts people of all ages, fitness levels and walks of life. Sessions are held at least once a week and the most common duration is three hours. Each session commences with a series of warm-up exercises and concludes with a cool-down workout. Participants are

constantly supervised by trained instructors and encouraged to work at a level that is relative to their fitness and ability.

Some thirty-five Green Gyms have been established in England, six in Wales, eight in Scotland and twelve in Northern Ireland. The Green Gyms in Northern Ireland are run jointly with day centres and target specific groups, such as those with learning disabilities or more severe mental illness. The remaining UK-based gyms follow a more general approach targeting primarily sedentary individuals and sometimes those suffering from some degree of mental illness. There are an additional fourteen Green Gyms awaiting funding approval. A summary of attendance is shown in Table 2.3. Adherence rates are favourable when compared with those recorded in traditional gym-based schemes.

During the past seven years, Green Gyms have been subject to both internal and external evaluation, including by the Oxford Centre for Health Care Research and Development at Oxford Brookes University (pilot project in Sonning Common and Portslade Green Gym). Additionally, in October 2004, a national evaluation of Green Gyms was conducted for BTCV. The findings were compiled according to 290 questionnaire-based respondents. A sample of the information collated is provided in Table 2.4.

The initial evaluation of the pilot project was carried out over a six month period, with identical measurements taken prior to joining the Green Gym and six months later on. A combination of physical fitness measures, quality of life measure, qualitative interviews and the Green Gym questionnaire was completed on both occasions. A similar evaluation was subsequently conducted on the Portslade Green Gym, which assessed physiological changes, changes in quality of life, psychological health and social support and identified factors affecting adherence rates. Again the evaluation took place over a six month period. On this occasion, however, measurements were taken at three points - at baseline, three months and six months. An extended variety of standardised questionnaires was used along with in-depth interviews. Table 2.5 summarises the main findings.



Table 2.3 BTCV - Green Gym Attendance Figures 15 December 2004

BTCV Green Gym	Average attendance per session	Drop out rate (approx.)	Active volunteers on mailing list	Make-up of volunteers
Stockport	7	18%	22	1 - diabetic, heart condition, unfit - referred through Exercise on Prescription 1 - self-referred - heart condition and related depression 4 - self-referred because of depression 2 - referred (via care manager) due to learning difficulties Remaining - varying levels of fitness. Some for keeping fit, some for weight loss.
Derwent, Derby	13	15%	40	Most have disabilities of one sort or another. Only 2 would be able to go on a task on a regular conservation volunteering event. The day would be too long or the ground too uneven or they'd be concerned about the distance from a toilet. A variety of referrals, most commonly from Mencap, but several other organisations as well.
Sonning Common	14	10% dropped out this year	30	4 are under 30 yrs old, 5 are between 30 and 50 and the rest are over 50 (2 approaching 80) 12 have health problems of various kinds, of whom 5 have mental health problems and 1 has been referred with learning disability 11 of the 30 are female

Source: Trchalik, Personal Communication, 2004.

Table 2.4 - A selection of the results compiled from 290 questionnaires of Green Gym participants

Factor	Description
Age range	18 - >75 yrs Majority in 25-34 yr age range (23%) and 55-64 yr age range (20%)
Gender	65.5% male and 34.5% female
Marital status	2 main groups - 57.8% single, 23.9% married
Accommodation	2 main groups - 41.7% owner occupier, 23.4% Council/Housing Association
Education level	3 main categories - 33.8% no formal qualification, 32.1% degree, 15.5% GCSE
Source of information concerning Green Gym	5 main responses: GP/health professional, colleague, local media, day centre, BTCV
% of participants involved in other volunteering activities	39.9%
% of participants involved in previous conservation work	33%
Motivation for joining a Green Gym - order of priority	Being outdoors, improving environment, meeting people, keeping fit, learning new skills, community involvement, health benefits, stress relief, losing weight, family involvement
Benefits of Green Gym	1) Health and confidence, 2) Contribution to environment, 3) Skills and training

Source: Yerrell (2004)

Green Gyms do benefit both physical and mental health (Reynolds, 1999, 2002), but relatively small numbers of participants were studied. The National Green Gym Evaluation, launched last year, is gathering results from larger numbers of participants (290 to date), and a final report is due

in 2006. However, it is evident that Green Gyms are providing an innovative way for participants to improve their physical and mental health, whilst simultaneously enhancing the environment.



Table 2.5 - Results of an evaluation of Portslade Green Gym

Area of interest	Findings
Conservation/ volunteering element	86% of participants had never been involved in conservation work prior to joining the Green Gym The Green Gym offered new opportunities for volunteering and attracted a new breed of conservation volunteer – those who joined for health reasons
Participant information	30% of participants were unemployed 44% of participants reported moderate or severe impairments in anxiety and depression Adherence rates – 48% of participants stayed involved for at least 6 months Participants who had been given fitness tests during the research were significantly more likely to attend more frequently and adhere long term
Findings after the first 3-month period	A significant increase in the mental health component score A strong trend in decreasing depression scores A small sample of participants showed a significant increase in their fitness levels Waist to hip ratio decreased A trend towards weight loss
Qualitative evidence	Implied participants valued the opportunity to meet other people Participants reported deriving a great deal of satisfaction from the tasks with which they were involved

Source: Reynolds (2002)

Box 2.3 - Groundwork project examples

**The South Leeds Elderly Group** comprises a dozen men from the city's Pakistani, Bangladeshi and Indian communities. The members had already decided they needed to take more exercise but were having difficulty finding somewhere they felt safe to walk, run or cycle. Groundwork Leeds introduced the group to Rothwell Country Park, created on the site of an abandoned colliery as part of Groundwork's millennium Changing Places programme. Groundwork's project officers encouraged the men to take part in guided rambles which built their confidence and fired their enthusiasm - to such an extent that they are now a regular sight walking across the moor.

**The Spinney Hospital in Wigan** provides assessment and treatment in secure surroundings for people with mental health difficulties. The hospital trust has been working with Groundwork Wigan and Chorley for a number of years to develop the 4 ha grounds to provide patients with the opportunity for exercise and horticultural therapy. Ponds have been cleared, pathways built and a new landscape designed to attract wildlife and provide opportunities for simple maintenance tasks which can be carried out by volunteers. With part of the site open to the public, Groundwork also helped patients and local residents work together to create a woodland and a small farm area which doubles as an outdoor classroom for local schools.

Source: Groundwork 2004.

## Groundwork

The environmental regeneration charity, Groundwork, plays a key role in recognising the links between poor quality environments and poor health, and aims to encourage individuals to value, use and improve open spaces and to adopt healthier lifestyles. Two prime examples from Groundwork projects are detailed in Box 2.3.

## Chapter 3: Countryside green exercise case studies

### 3.1 Choice of case studies

There is a wide variety of green exercise initiatives and projects in the UK. Many are in the initial stages, while others such as Walking the way to Health Initiative and Green Gyms are more established. Examples of UK-based green exercise initiatives and projects are contained in Appendix C. Several initiatives have qualitative evidence on the health benefits they offer to participants but very few projects have been studied and evaluated in quantitative terms.

Green exercise initiatives in the UK (and therefore potential case studies for this research) can be broadly categorised in five different ways; those that are

**geography based** - a project started in a specific area or region

**issue based** - a project started to address a particular health issue

**habitat based** - a project started with a conservation or particular habitat focus

**activity based** - an initiative started for a particular sport or activity e.g. mountain biking, fishing, walking

**group based** - a project started to target a specific group of people, such as coronary care patients, overweight people, disabled people, refugees, youth offenders, people with learning difficulties

In addition, green exercise initiatives vary in a number of other ways, including level of physical intensity, duration, type of habitat in which exercise is taking place, group or individual activity, organised sessions, informal or chance groups and meetings. All of these factors can affect the health benefits gained, the level of social capital and accessibility for or inclusion of different people.

The intensity level of the activity can vary: off-road mountain biking is likely to burn off more calories and be more exhausting than walking, but may not be a realistic exercise option for many people. The duration of green exercise sessions also varies from project to project, some sessions may consist of

walking for an hour while others (e.g. fishing) may take place over several hours or the whole day. Some initiatives are more formal organised groups of people with sessions co-ordinated and managed by an organisation or volunteers whilst others are designated areas of land, such as forests or parks, where people go to take part in activities of their own accord. Some activities require specialist or expensive equipment (e.g. mountain biking, canoeing, sailing, climbing) which may not be affordable or practical for some, whereas for other activities the only necessary equipment is a waterproof jacket and a pair of trainers.

Our choice of ten detailed case studies aimed to include initiatives that fall into each of the five categories and that also illustrate variety in intensity, duration, number of participants and habitat. Two case studies were chosen in Scotland, two in Wales, two in Northern Ireland and four in England. Glentress Forest in Scotland and Afan Forest in Wales are examples of woodland managed and made available to the public to walk, ride or cycle around as individuals or in informal groups. Layer Pit in England is an example of a lake managed for anglers to fish in. The Walking the way to Health Initiative in Ballymena and the Walking Out project in Lincolnshire are both examples of organised and led walks taking place at regular, pre-arranged times and locations. Participants for the Walking the way to Health Initiative may have been referred to the scheme by their doctors or be there of their own volition and the Walking Out project may be targeting a specific group of the population, such as refugees, older people or the disabled. The two more formally organised conservation-based projects, (Arnside and Silverdale AONB and Torfaen Green Gym) vary in that the main focus for Arnside is the maintenance of the habitat whereas the Green Gym highlights the potential health benefits to participants.

The Re-Union Canal Boats case study in Edinburgh was chosen as an example of low-intensity activity to determine if the health benefits of green exercise can also be derived from participating in a fairly gentle activity as well as the more vigorous pastimes of mountain biking, running and others. The fishing case is also a relatively sedentary



activity, but one that participants spend a long time doing.

The choice of projects involving both group activities (such as the health walks) as well as activities people take part in on their own was designed to examine whether the health benefits of green exercise are affected by any variation in social capital context. More details of the ten case studies chosen can be seen in Table 3.1

**Table 3.1** - Details of the ten case studies selected for the research

	<b>Name and location of initiative</b>	<b>Type and duration of activity</b>	<b>Type of habitat</b>	<b>Management or organisation details</b>
1	Arnsdale & Silverdale Area of Outstanding Natural Beauty - Conservation Volunteers, Lancashire, England	Various types of practical conservation work - digging, scrub clearing (all day)	Varied - open countryside, fells, woodland, shoreline	Conservation volunteer group managed by AONB staff
2	Glentworth Forest Recreation, Borders, Scotland	Mountain biking and walking Duration of visit varied from 1 hour to all day	Mixed and coniferous woodland	A partnership: forest and trails managed by Forestry Commission Scotland; The Hub mountain biking and café facilities are run as a private business
3	Re-Union Canal Boats, Edinburgh, Scotland	Canal trip Boat trip lasted all day	Varied countryside along banks of Union Canal	Re-Union Canal Boats is a Social Enterprise
4	Close House Initiative, Herefordshire, England	Various outdoor activities Sessions vary from a morning or afternoon to a weekend camp	Mixed woodland	Charity - BODS Youth Work Initiatives
5	Walking the Way to Health Initiative (WHI), Ballymena, County Antrim, Northern Ireland	Walking Walks last for 1½ hours	Varied countryside - woodland, open country, shoreline, country parks etc.	Walking the Way to Health Initiative (WHI) - A UK initiative. For Ballymena a partnership between Northern Partnership for Physical Activity and Ballymena Borough Council
6	Horse riding, Lagan Valley, County Antrim, Northern Ireland	Horse riding Average duration 2 hours	Varied countryside - woodland, open country, shoreline, country parks etc	Lagan Valley Equestrian Group (part of British Horse Society Ireland)
7	Afan Forest Centre, Port Talbot, West Glamorgan, Wales	Mountain biking and walking Duration of visit varied from 1 hour to all day	Coniferous and mixed woodland	Forest managed by Forestry Commission; Forest Enterprise Centre managed by FC and Neath and Port Talbot Council
8	Torfaen Green Gym, Pontypool, Gwent, Wales	Various types of practical conservation work - digging, scrub clearing etc Session lasts 2½ hours	Varied countryside - woodland, open country, community gardens, community farm	Torfaen Green Gym - part of a nationwide Green Gym initiative managed by BTCV
9	Walking Out Project, Lincoln, England	Walking Duration average 2 hours	Varied countryside - woodland, open country	Walking Out project is managed by the Ramblers Association
10	Fishing, Essex, England	Fishing Average duration of visit over 10 hours	Lakeside	Layer Pits lake managed by Colchester Angling Preservation Society

## 3.2 Methods used in research

The data from people taking part in the ten green exercise case studies were obtained in the field by means of a composite questionnaire, the first part of which was completed before taking part in activity and the second part immediately afterwards.

### The composite questionnaire

The questionnaire was designed to fit all scenarios including different levels of activity and engagement.



It contained questions relating to basic data, physical health, mental health and physical activity, and it also included an opportunity to gather qualitative narratives. Components of the questionnaire consisted of standardised and widely used formats together with additional questions particular to this research.

Basic data of participants included details of age, gender, weight, occupation and educational level. Health questions were asked relating to smoking, serious illness, caring for others, ability to look after oneself, mobility, anxiety and pain. Other questions to determine how 'healthy' a participant was were used, including asking how many times in the last year a participant had been to the doctor, specialist or to hospital or had been prescribed drugs. Respondents were also asked to indicate on a scale of 0 to 100 how good they thought their health was on the day of activity, with 0 being the worst health state imaginable and 100 the best health state imaginable.

Much of this health information was obtained using the Euroqol EQ-5D questionnaire, which is a '*standardised instrument for use as a measure of health outcome*' and also provides a simple descriptive profile and a single index value for health status. This single value for health status is converted into a weighted health state index by applying scores from 'value sets' elicited from UK general population samples. Euroqol EQ-5D is increasingly being used as a 'stand alone' measure, and its usage in clinical and economic evaluation of health care, as well as in population health surveys, is increasing. In the UK, The National Institute for Clinical Excellence (NICE) has recommended the use of measures like EQ-5D that have been UK population weighted, and a NHS Task Group has been set up to co-ordinate the testing of EQ-5D as an outcome measure for use by clinicians and managers.

Questions were also included to determine any changes in psychological states derived from the green exercise activity. Mood change was measured before and after activity using the standardised, short- form, one-page version of the Profile of Mood States test (POMS), which has a background of successful use for mood change

post-exercise. This was measured using the McNair *et al.* (1971) Profile of Mood State questionnaire (POMS). According to Biddle (2000), the POMS is the dominant instrument for measuring mood in studies examining the relationship between mood and exercise. A meta-analysis by McDonald and Hodgedon (1991) examined the relationship between physical activity and mood, and demonstrated a clear relationship between exercise and lack of negative mood. The short version of POMS was used to minimise the amount of time between filling out the questionnaire and the start and the end of the activity. Reliability and validity of the shortened edition of POMS for use in sports settings was established by Grove and Prapavessis (1992). The POMS subscales measured were anger, confusion, depression, fatigue, tension and vigour.

Self-esteem was measured before and activity using the one-page Rosenberg Self-Esteem Scale (RSE) (Rosenberg, 1989), which is a widely used measure of self-esteem in health psychology. According to Fox (2000), this is one of the best validated and most conservative measures of self-esteem and has been used in many studies of the relationship between self-esteem and exercise including Cusumano and Robinson (1992), Desharnais *et al.* (1993), Brown *et al.* (1995), Palmer (1995) and Mactavish and Searle (1992).

The General Health Questionnaire (Chisholm *et al.* 1975) was also included in the questionnaire, as according to Goldberg and Williams (1991) it is the industry standard for measuring psychological health. It was originally designed for use in London but it has been translated into 38 languages and validated by over 50 studies. It has performed as well in south London as in Calcutta and rural Iceland. It performs more than favourably when compared with other measures of disorder across more than eight studies on over 3,000 subjects.

The level of physical fitness of respondents was examined by including questions relating to the amount of physical activity of differing levels undertaken daily, weekly, monthly, six monthly or not at all. Light activities included using the stairs or walking for pleasure; moderate activities included gardening, housework and bowls; and vigorous



activities included playing sports, running and swimming.

Finally, to pick up any extra information that respondents wanted to include and to gain a qualitative element, an open question was incorporated which asked participants what they felt was special about the outdoor activity they had just been doing.

### Population sampling

Different case study initiatives presented a variety of different sampling scenarios. Where the initiative was an organised group activity such as the Walking the way to Health Initiative, conservation volunteers or Re-Union Canal Boats it was relatively easy to give out questionnaires before and after exercise and to collect up completed questionnaires at the end. At projects where people access a specific area, such as Glentress or Afan Forest, to participate in activities independently or in informal groups of friends, it was necessary for researchers to position themselves at a central point (e.g. entrance/exit, central car park or café/information centre) in order to access the population both before and after their outdoor exercise.

The questionnaire format was not suitable for completion by children or those with learning difficulties, and prior informed consent would have been needed to approach young people under 18 who were not with a parent or guardian. Participants who had been referred to a project or scheme as part of a course of treatment for a health condition (e.g. coronary heart disease, obesity, depression) were also not included in this survey as this may have affected patient confidentiality and would have to be considered by an ethics committee.

Further information and practical guidelines and questions for the effective evaluation of green exercise projects can be found in Appendix E.

### 3.3 Aggregate results from the ten case studies

#### Project information

The ten case studies selected therefore represent a variety of activities that take place in diverse contexts with varying durations and intensities.

Table 3.2 highlights the different amount of calories used i) per hour and ii) per visit according to the average body weight of the subjects (McArdle *et al.*, 1996).

It is evident from Table 3.2 that cycling at Glentress and Afan Forest was the most vigorous activity, followed closely by horse-riding in Lagan Valley. The activity that used the least calories per hour was the comparatively sedentary trip on the canal boat. Fishing was also a fairly light pursuit, the calories used per visit appear greater because the average duration is three times that of more vigorous activities. The statistical analysis that follows will allow comparisons of these diverse activities in relation to the derived health benefits and emphasises the key message that all levels of green exercise are advantageous to health.

Table 3.2 – The amount of calories used by participants in each case study

Case study	Main activity	Calories used per hr (kcal)	Duration of activity (hrs)	Calories used per visit (kcal)
Arnsdale & Silverdale	Conservation	300	5	1,500
Glentress Forest	Mountain biking	606	4	2,424
Re-Union Canal	Boating	102	6	612
Close House	Woodland activities	516	6	3,096
Ballymen a WHI	Walking	336	1	336
Lagan Valley	Horse riding	540	2	1,080
Afan Forest	Mountain biking	654	4	2,616
Torfaen Green Gym	Conservation	330	2.5	825
Walking Out Project	Walking	324	2	648
Fishing	Fishing	294	12	3,528

#### Population data

There were 263 participants involved in this research, of which 134 were male (51%) and 129 were female (49%) - see Table 3.3. The walking groups were predominantly female, whereas the

conservation and fishing activities were principally male. The mountain biking activities in both Glentress and Afan Forest attracted more male participants but in contrast the horse-riding at Lagan Valley involved mainly female participants.

**Table 3.3** - The proportion of male and female participants in each case study

Case study	Male	Female	Total
Arnside & Silverdale	12	5	17
Glentress Forest	47	15	62
Re-Union Canal	5	6	11
Close House	7	4	11
Ballymena WHI	17	82	99
Lagan Valley	1	6	7
Afan Forest	33	8	41
Torfaen Green Gym	2	0	2
Walking Out Project	2	3	5
Fishing	8	0	8
<b>Total</b>	<b>134</b>	<b>129</b>	<b>263</b>

**Figure 3.1** - Percentage of participants' taking part in each activity category

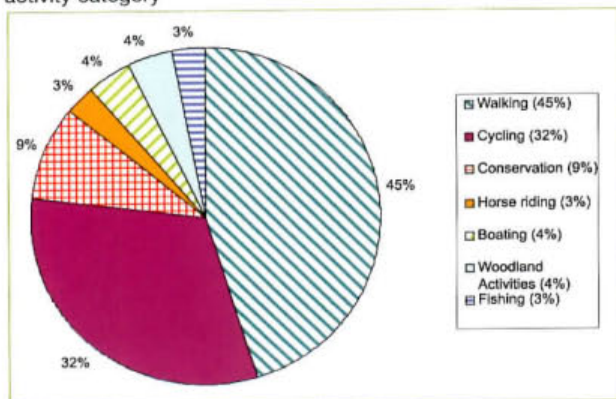
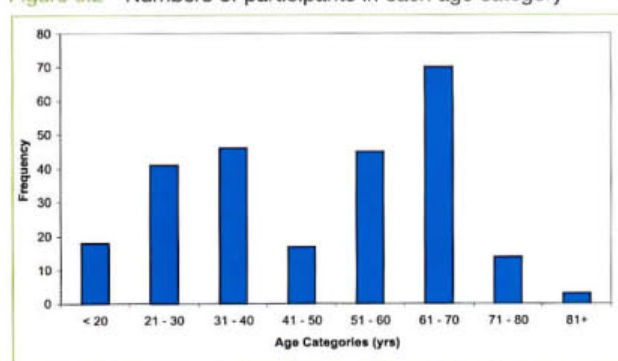


Figure 3.1 shows the proportion of participants taking part in the various activities. The majority of subjects were involved in walking and cycling (77%) with the remainder representing the other five activities. It is important to acknowledge walking as a key activity as everyone can take part, it is inexpensive, and the health benefits it bestows

have been clearly documented. It is also a form of exercise that can easily be integrated into a daily routine that facilitates the achievement of the Chief Medical Officer's physical activity recommendations (DoH, 2004).

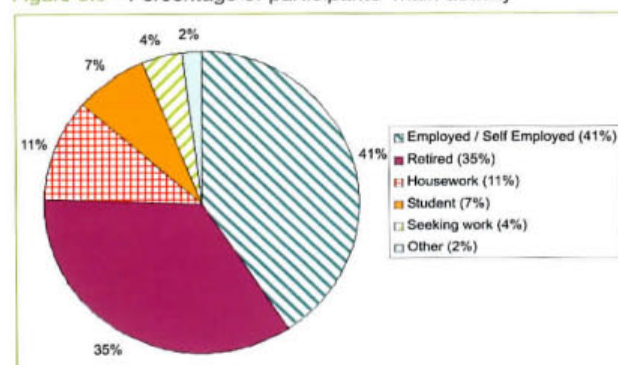
The average age of the participants was 47.8 and their ages ranged from 13 to 84. Figure 3.2 shows subjects in age bands to demonstrate the population spread.

**Figure 3.2** - Numbers of participants in each age category



The majority of subjects were in the 61 -70 years age group, primarily because both of the walking groups had many members in this age range. The Close House case study in Hereford had the lowest mean age of 20, as this project mainly targeted college-age youths. The activities in both Glentress and Afan Forest attracted the widest range of age groups including family outings and social groups of all ages.

**Figure 3.3** - Percentage of participants' main activity



Details of subjects' main occupation were also collated and Figure 3.3 highlights the percentage of subjects in each category. A significant proportion of the participants were either employed / self employed or retired. The case studies that attracted



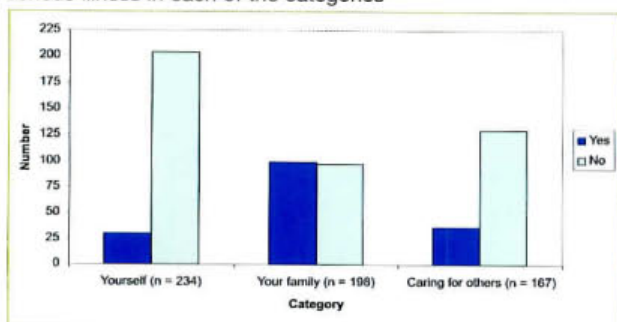
the majority of the retired participants were both of the walking groups and the conservation work in Arnside and Silverdale. In contrast, participants at Glentress and Afan forest were predominantly employed/self-employed.

Some 66.4% of participants continued their education after the minimum school leaving age, and 38.7% indicated that they had a degree or equivalent professional qualification.

### Physical health of subjects

As described previously, subjects were also requested to indicate on a scale of 0-100 how good or bad they perceived their current health state to be. The worst imaginable health state is defined by a 0 and the best imaginable health state as 100. The average current health state for this population was  $81.4 \pm 1.0$  and was slightly below the recognised normal value for this country ( $-0.70$  standard deviations below the mean score for UK adults in this age group). The ratings ranged from the minimum of 0 to the maximum of 100 and the most popular score was 90.

Figure 3.4 - Numbers of participants who have experienced serious illness in each of the categories



Using appropriate independent t-tests it was established that those participants whose education continued after school leaving age had a significantly higher general health score ( $82.9 \pm 12.9$ ) than those whose education ceased after school ( $77.5 \pm 20.9$ ;  $p=0.0175$ ).

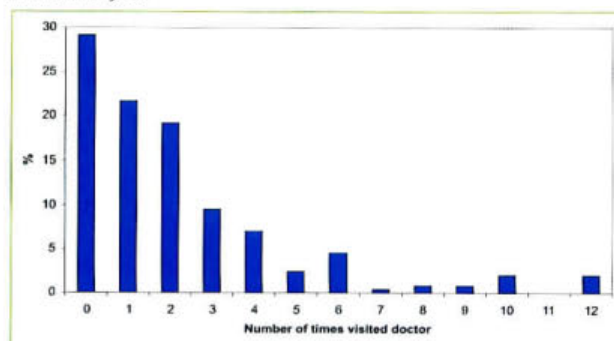
Statistical tests also revealed that those participants with a degree or equivalent professional qualification had a significantly higher health score ( $85.5 \pm 10.6$ ) than those who did not ( $78.3 \pm 18.2$ ;  $p<0.000$ ). It is interesting to note that the general health score continues to increase as an individual's education status is enhanced to a level of 4.18 (4.9%) above the population average.

Those participants whose education concluded after school had a general health score 3.88 (4.8%) below the population average. There is a strong link between an individual's perceived general health status and their education level, therefore promoting continual educational development as a key factor in contributing to excellent health.

Subjects were also asked to indicate whether they had experienced any serious illness either personally, their family or in caring for others. Figure 3.4 shows an aggregate picture in relation to this question amalgamating all of the various case studies.

The majority of participants had not experienced serious illness themselves or in caring for others. However, an equal proportion of subjects had experienced serious illness in their family to those that had not. An independent t-test showed that those people who had experienced serious illness themselves had a significantly lower general health state value ( $74.0 \pm 20.7$ ) than those who had not ( $82.8 \pm 13.9$ ;  $p=0.017$ ). In addition, they had visited their doctor significantly more times ( $4.2 \pm 3.6$  as opposed to  $1.8 \pm 2.2$ ;  $p=0.001$ ), been referred to a specialist more times ( $0.69 \pm 0.88$  as opposed to  $0.23 \pm 0.48$ ;  $p=0.007$ ) and been admitted to hospital more times ( $0.30 \pm 0.47$  as opposed to  $0.07 \pm 0.30$ ;  $p=0.011$ ). These consistent results enhance the reliability and validity of the overall questionnaire.

Figure 3.5 - The number of times participants visited their doctor in the last year



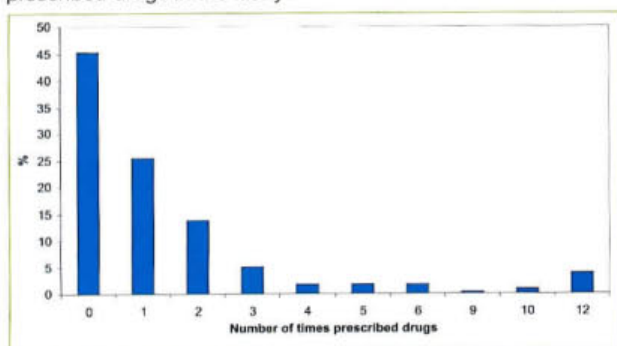
To provide further information about current general health state, subjects were questioned about the number of times they had visited their doctor, been prescribed drugs, been referred to a specialist or for treatment and been admitted to hospital in the

last year. The majority of participants had not visited their doctor at all in the last year and 87% of the population had visited their doctor four times or less. Only 6% of the subjects had visited their doctor seven or more times in the past year. The population mean number of visits to the doctor in the past year was  $2.20 \pm 0.17$  and the number of visits ranged from 0 to 12.

Women visited their doctors ( $2.7 \pm 2.7$ ) significantly more times than men in the last year ( $1.76 \pm 2.5$ ;  $p=0.0035$ ). This supports current thinking and research that men view visiting the doctor as a last resort. *'Women are 100% more likely to visit the doctor for annual examinations and preventative services than men'*(CDC, 2001).

Level of education also appeared to influence the number of times participants had visited their doctor in the last year. Independent t-tests indicated that those whose education had continued after the minimum school leaving age had visited their doctor fewer times ( $2.00 \pm 2.35$ ) than those whose education discontinued at this point ( $2.7 \pm 2.9$ ;  $p=0.0395$ ). Again, similar trends were found for those participants who had a degree or equivalent professional qualification. These particular individuals visited their doctor less ( $1.7 \pm 2.2$ ) than those without the qualifications ( $2.5 \pm 2.9$ ;  $p=0.0085$ ). Continued education again reported a 21% reduction in the number of visits per year.

Figure 3.6 - The number of times participants had been prescribed drugs in the last year

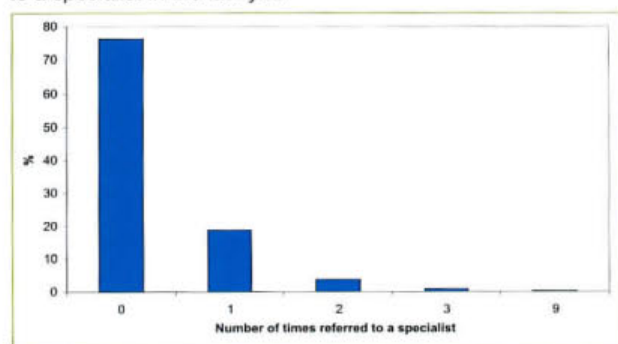


It was also apparent that the number of times subjects visited their doctor was significantly correlated with their health score. The more times an individual visited their doctor, the poorer their general health state score ( $-0.420$ ;  $p < 0.000$ ), which again shows the consistency of the questionnaires.

The same technique found that age was significantly correlated with the number of visits to the doctor ( $0.149$ ;  $p=0.022$ ): older people visited their doctor more often.

It was established that the general health state score is the strongest predictor of the number of times subjects had visited their doctor ( $r = -0.399$ ;  $p < 0.000$ ). Those who visited their doctor the least number of times had a significantly enhanced general health score. Once more the majority of participants had not been prescribed any drugs in the past year, with 90% of the population having been prescribed with drugs on three or fewer occasions. The mean number of prescriptions was  $1.53 \pm 0.17$ , with a range of 0 to 12. Women were once again prescribed significantly more drugs ( $1.97 \pm 2.8$ ) than men in the last year ( $1.15 \pm 2.4$ ;  $p=0.0095$ ).

Figure 3.7 - The number of times participants had been referred to a specialist in the last year



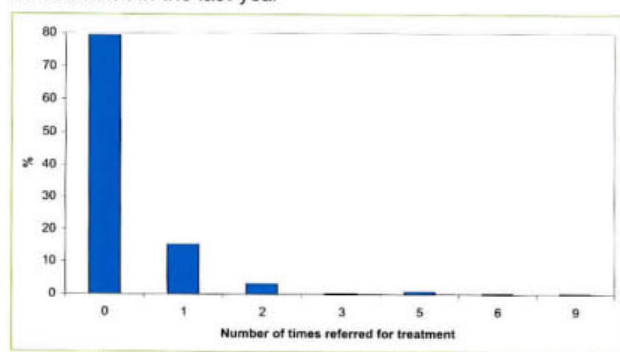
As expected, the general health state score significantly correlated with the number of times subjects had been prescribed drugs ( $-2.00$ ;  $p=0.003$ ) - the more times someone has been prescribed drugs, the poorer they perceive their general health state. There was also a significant correlation between people's age and the number of times they had been prescribed drugs ( $0.21$ ;  $p=0.001$ ). The expectant results found that the older the individual the more instances they had been prescribed with drugs.

Figure 3.7 indicates that most people had not been referred to a specialist in the last year. Only 5% had been referred to a specialist on two or more occasions within the past year. The mean number of times was reported as  $0.32 \pm 0.05$  and the range of instances was 0 to 9. It was established that



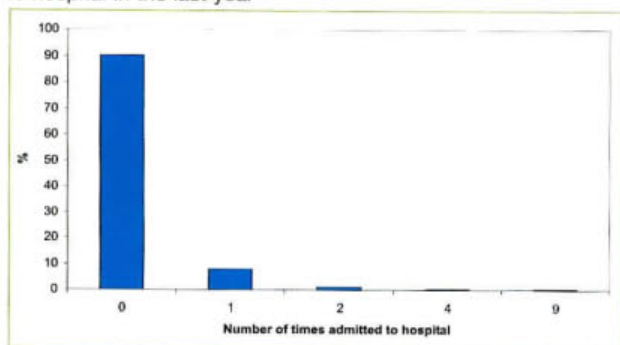
women had been referred to a specialist ( $0.42 \pm 1.00$ ) more times than men ( $0.24 \pm 0.54$ ;  $p=0.046$ ). Again, the general health state score significantly correlated with the number of occasions subjects had been referred to a specialist ( $-0.21$ ;  $p=0.001$ ), with higher general health scores correlating with fewer referrals. There was also a significant correlation between the number of referrals to a specialist and the number of instances involving drug prescription ( $0.39$ ;  $p<0.000$ ) - more referrals correlated with an increased number of drug prescriptions.

**Figure 3.8** - The number of times participants had been referred for treatment in the last year



Some 79% of participants had not been referred for treatment at any time during the previous year. Only 5.4% of the population had received treatment on two or more occasions. The mean number of treatment referrals was  $0.33 \pm 0.06$  ranging from 0 to 9 times.

**Figure 3.9** - The number of times participants had been admitted to hospital in the last year



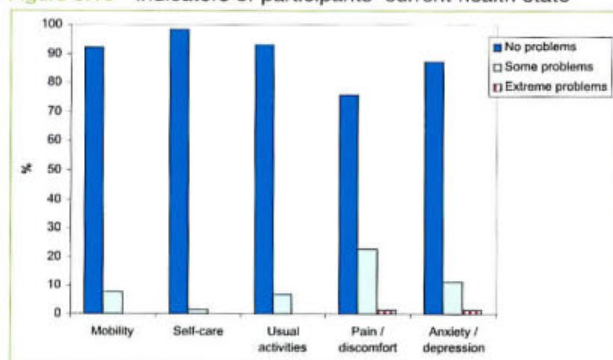
Further statistical analysis confirmed that there were significant correlations between the number of times a subject was referred for treatment and the number of drug prescriptions ( $0.24$ ;  $p < 0.000$ ) and referrals to a specialist ( $0.734$ ;  $p < 0.000$ ). Inevitably,

the higher the number of referrals for treatment, the higher the rate of drug prescription and amount of referrals to a specialist.

Just over 90% of respondents had not been admitted to hospital in the previous year and only 7.8% had been admitted once. Although the number of admittances ranged from 0 to 9, the mean value was  $0.16 \pm 0.05$  due to the significant proportion that had never been admitted.

A number of further correlations were found. The general health state score was significantly correlated with the number of admissions to hospital ( $-0.17$ ;  $p=0.010$ ). Thus, those participants admitted to hospital perceived their general health state scores to be lower. The number of times subjects had been admitted to hospital also significantly correlated to the number of drug prescriptions ( $0.21$ ;  $p = 0.001$ ), the number of referrals to a specialist ( $0.71$ ;  $p < 0.000$ ) and the number of referrals for treatment ( $0.62$ ;  $p < 0.000$ ). As expected, the higher the number of admissions to hospital the more occasions a referral to a specialist or for treatment had occurred and the more drugs had been prescribed. The final significant correlation was between the participants' age and the number of hospital admissions ( $-0.16$ ;  $p = 0.16$ ). Unsurprisingly, older participants had been more frequently admitted to hospital.

**Figure 3.10** - Indicators of participants' current health state

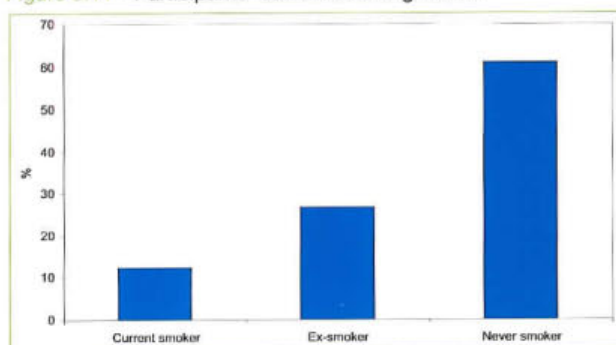


Interestingly, it was also found that participants who had a degree or equivalent professional qualification had been admitted to hospital on fewer occasions ( $0.05 \pm 0.22$ ) than those who had no qualification ( $0.24 \pm 0.91$ ), once again emphasising the link between continued education and health.

Part of the standardised EuroQol questionnaire requests participants to indicate which statements out of a choice of three they feel most adequately describes their own current health state. The question is comprised of five separate elements and for each constituent they choose one of the three statements. The choices range from having 'no problems' to 'some problems' or 'extreme problems'. The five elements are mobility, self-care, usual activities, pain/discomfort and anxiety/depression. Over 75% of the participants suffered no problems with any of these aspects, with 98% of individuals suffering no problems with self-care. The pain/discomfort element had the highest proportion of participants suffering from some problems (23%). People suffering from extreme problems are only apparent in the pain/discomfort and anxiety/depression constituents (1.2%).

Additional detailed statistical analysis involving independent t-tests and ANOVAs exposed a number of significant findings shown in Appendix B. These findings confirm how interrelated and reliable the various components of the questionnaires are and therefore how confident we can be about the findings of the research.

Figure 3.11 - Participants' current smoking habits



The majority of the participants had never smoked during their lifetime (61%) and only 12.3% were currently smokers. This figure is a lot lower than the national average (26%) reported by the National Statistics survey in 2003 (ONS, 2003). This suggests that the people already participating in green exercise activities possibly lead healthier lifestyles than the national average and are already aware of the health implications of a poor diet and sedentary lifestyle. If these people are acquiring

significant physical and mental health benefits, imagine the immense gains individuals with relatively unhealthy lifestyles will witness.

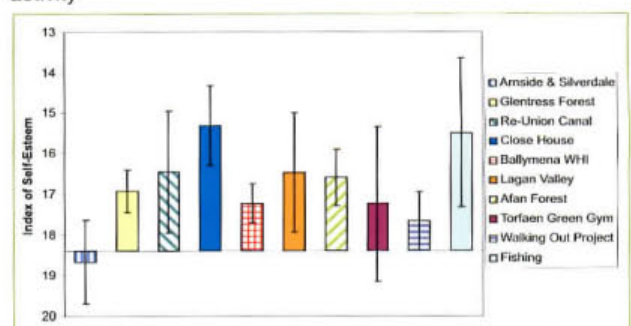
The appropriate independent t-tests and ANOVAs confirmed that current smokers have a significantly poorer perceived general health state score (73.7) than people who had never smoked (84.2;  $p=0.0015$ ). Ex-smokers perceived their health to be better than current smokers (78.9) but significantly poorer than those who had never smoked (84.2;  $p = 0.033$ ).

Interestingly, ex-smokers weighed significantly more (76.5 kg) than those who had never smoked (70.9 kg;  $p = 0.0115$ ). This implies that individuals giving up smoking increase their body weight, which tends to be the main psychological barrier to giving up. Predictably, ex-smokers visited their doctor significantly more times (2.98) than individuals who had never smoked (1.78;  $p=0.004$ ). Current smokers had been admitted to hospital on more occasions (0.45) than non-smokers (0.12;  $p = 0.032$ ).

### Green exercise effects on mental health

Our results show that as a result of the green exercise activities, there was a significant improvement in self-esteem from 18.39 to 16.9 ( $p<0.001$ ). [Note - the lower the value, the higher the self-esteem.] Figure 3.12 clearly demonstrates that self-esteem was enhanced in nine out of the ten case studies, excluding Arnside and Silverdale. The largest change was detected amongst the Close House participants, followed closely by the fishing group. The smallest increases in self-esteem were found in both of the walking project groups and the Green Gym.

Figure 3.12 - Change in self-esteem after participating in the activity





Further statistical analysis reported that men had significantly higher self-esteem ( $17.59 \pm 4.6$ ) than women ( $19.24 \pm 4.5$ ) before green exercise activities commenced ( $p=0.002$ ). This pattern continued after the conclusion of the green exercise activities with men's average self-esteem being  $16.24 \pm 4.5$  compared to women's  $17.75 \pm 4.4$  ( $p=0.0035$ ). It is worth noting that women's self-esteem after the activity (17.75) was still poorer in comparison to the male score prior to the activity (17.59).

The subjects' main occupation also seemed to influence their self-esteem as employed/self-employed individuals had a significantly higher self-esteem score (17.52) in comparison to students ( $20.89$ ;  $p=0.0185$ ). A strong correlation was observed between the self-esteem scores reported before the activities and those calculated after the activity. Clearly, high self-esteem scores prior to the activity correlated with high self-esteem scores after the activity ( $0.67$ ;  $p<0.000$ ). Self-esteem also significantly correlated with an individual's body weight. The heavier the body weight, the poorer the self-esteem score ( $0.23$ ;  $p<0.000$ ).

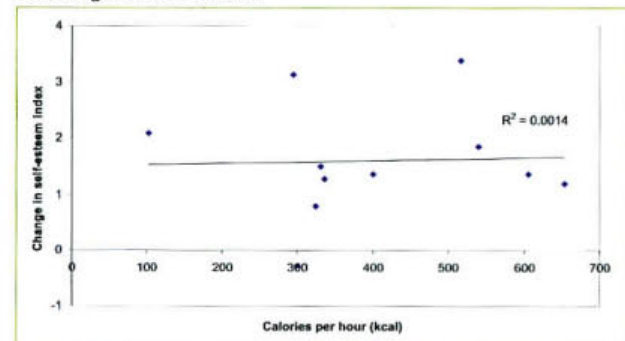
Continued education again appeared to have a significant impact on an individual's self-esteem. If their education continued after the minimum school leaving age they reported a significantly better self-esteem ( $17.38 \pm 4.2$ ) than those who did not ( $20.16 \pm 4.9$ ;  $p<0.000$ ). Similarly, participants who had a degree or equivalent professional qualification reported a significantly better self-esteem ( $16.12 \pm 3.8$ ) than those without ( $19.71 \pm 4.6$ ;  $p < 0.000$ ).

An individual's general health state influenced their self-esteem score. The general health state score significantly correlated with the participants, self-esteem score ( $-0.35$ ;  $p < 0.000$ ) predicting that the higher the health state score the better the self-esteem. If participants had indicated that they had experienced serious illness themselves, they had a significantly poorer self-esteem ( $19.6 \pm 5.5$ ) than others reporting no such problems ( $17.9 \pm 4.4$ ;  $p=0.0325$ ). The EuroQol questionnaire responses supplemented these findings as participants suffering from no problems with mobility revealed a significantly better self-esteem score ( $18.1 \pm 4.4$ ) than those with some problems ( $21.8 \pm 5.7$ ;  $p=$

$0.0075$ ). In addition, participants suffering from no problems with usual activities, provided significantly better self-esteem scores ( $18.1 \pm 4.4$ ) than those with some problems ( $22.6 \pm 5.2$ ;  $p<0.000$ ).

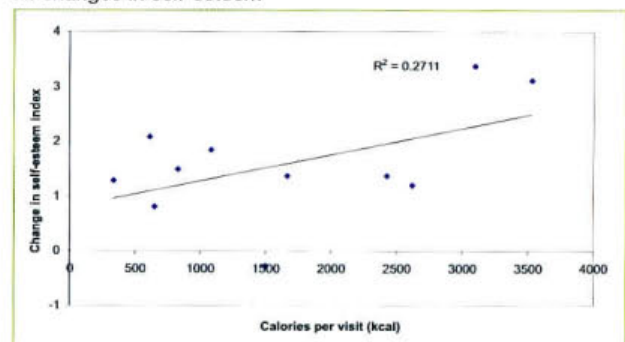
Subjects reporting no problems with anxiety/depression again revealed significantly higher self-esteem scores (17.9) than those with some problems ( $22.0$ ;  $p<0.000$ ).

**Figure 3.13** - Effect of green exercise activities (calories per hour) on changes in self-esteem



A familiar pattern emerged when considering the number of times an individual had visited their doctor in the past year. Self-esteem was significantly enhanced if the participant had visited on fewer occasions ( $0.13$ ;  $p=0.05$ ). Additionally, self-esteem was significantly improved if the subject had been referred to a specialist on fewer occasions ( $0.15$ ;  $p=0.18$ ) and been admitted to hospital less frequently ( $0.13$ ;  $p=0.037$ ).

**Figure 3.14** - Effect of green exercise activities (calories per visit) on changes in self-esteem

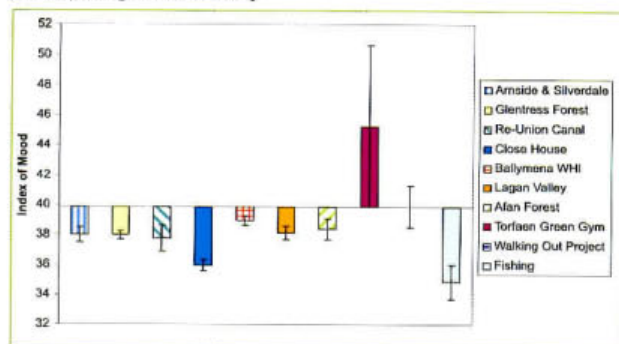


Plotting the calories used per hour and per visit against the change in self-esteem revealed no significant differences. This is an encouraging finding as it implies that all intensities and durations of activity generate significant health benefits and not solely time-consuming, vigorous workouts.

However, self-esteem did improve as calories per visit increased, particularly with the all day activities.

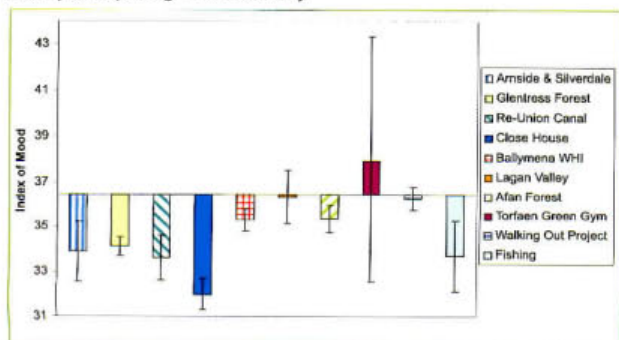
We also gathered data on the six mood measures assessed using the POMS method.

**Figure 3.15** - Change in anger - hostility mood measure after participating in the activity



The overall change in anger-hostility was especially significant ( $p < 0.001$ ), with the average value decreasing from 39.86 to 38.27. In eight out of the ten case studies there was a reduction in this mood factor, with only Torfaen Green Gym reporting an increase and the Walking Out project remaining constant. The main reasons for these two anomalies involve the number of subjects in each group, as there were only two members of the Green Gym project and five in the walking project. The biggest decrease in anger was observed in the fishing activity, and interestingly, members reported the ability to relax as being an important attraction to the sport.

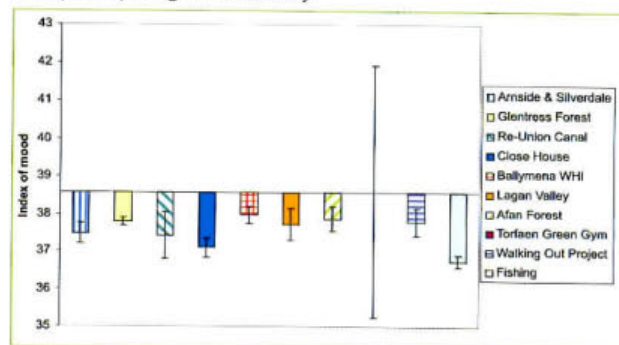
**Figure 3.16** - Change in confusion-bewilderment mood measure after participating in the activity



The overall change in confusion-bewilderment was also highly significant ( $p < 0.001$ ), with the average value being reduced from 36.46 to 34.72. Of the case studies 90% reported a decrease with the

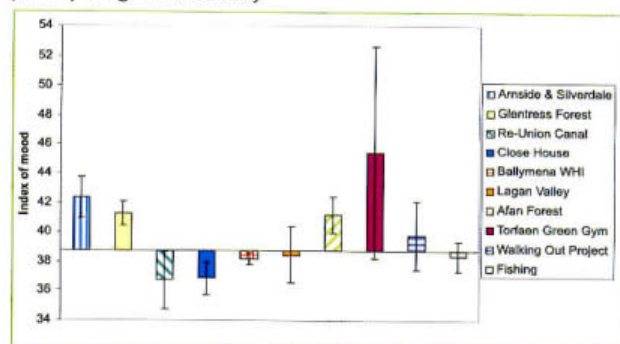
exception of the Torfaen Green Gym. This time, the largest improvement was found in the Close House group, with Arnside and Silverdale, Re-union and fishing activities also featuring strongly.

**Figure 3.17** - Change in depression-dejection mood measure after participating in the activity



A third impressive significant change was noted in the depression-dejection mood factor ( $p < 0.000$ ). The average value was decreased from 38.59 to 37.78, and once again the same nine case studies showed improvements in this aspect. Fishing yet again reported the largest change, but similar reductions were seen amongst all of the remaining case studies.

**Figure 3.18** - Change in fatigue-inertia mood measure after participating in the activity

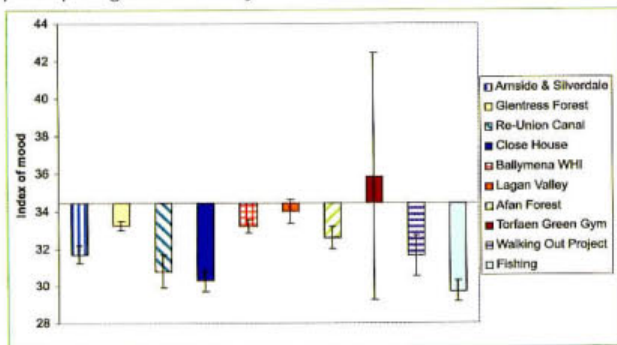


The overall change in fatigue-inertia was significant ( $p < 0.05$ ) and increased from 38.73 to 39.67. Half of the case studies witnessed this increase in fatigue whereas the remaining 50% actually saw a decrease in fatigue levels. Participants who felt more fatigued after their activity included the conservation groups, the vigorous cycling groups in Glentress and Afan Forest and members of the Walking Out Project. The intensity of the exercise in comparison to the other groups may have caused this change in both of the forest groups. Similarly,



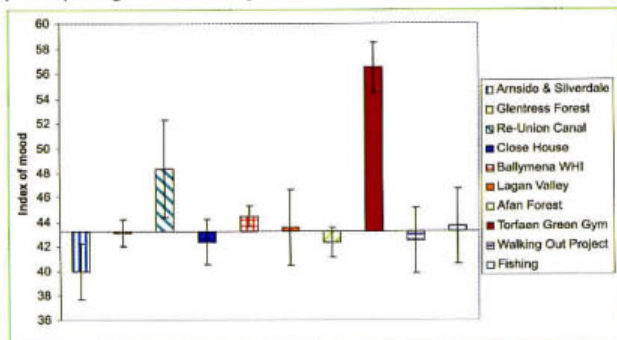
factors such as age, duration and type of activity may have also contributed. The biggest reduction in fatigue levels was seen in the Re-Union Canal group, which represented the most gentle, sedentary type of activity.

**Figure 3.19** - Change in tension-anxiety mood measure after participating in the activity



The overall change in tension-anxiety was also significant ( $p < 0.05$ ), with the average decreasing from 34.45 to 32.67. Of the case studies 90% witnessed a reduction in tension, with only Torfaen Green Gym demonstrating an increase. The reasons previously listed probably contributed to this anomaly. The largest reduction was evident in the fishing group, followed by Close House, Re-Union Canal, Arnside and the Walking Out Project.

**Figure 3.20** - Change in vigour-activity mood measure after participating in the activity



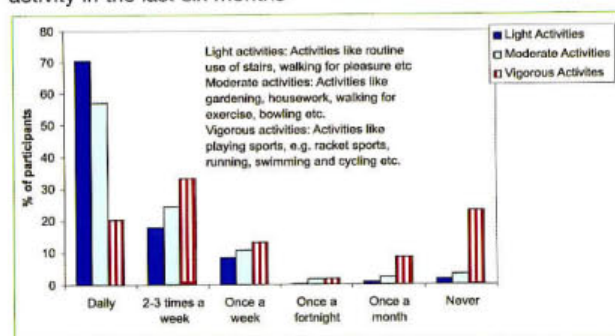
The general change in vigour-activity was not significant, primarily because some groups witnessed an increase and others a reduction in this measure. Overall the average value increased from 43.22 to 43.51, which represents only a 0.67% improvement. Torfaen Green Gym showed the largest increase, followed by Re-Union Canal. The other groups to see an improvement overall were Ballymena WHI, Lagan Valley and the fishing group.

The remaining groups felt less vigorous after completing their respective activities. However, variables such as age, type, intensity and duration of activity could all have been a factor in this finding.

We conducted statistical analyses to check for correlations between the mood measures (using POMS) and the state of health found with the EuroQol questionnaire and General Health questionnaire (see Appendix B for full details).

### Physical activity

**Figure 3.21** - How often participants took part in various levels of activity in the last six months



An estimation of participants' physical fitness level was calculated from questions concerning the type, duration and intensity of any activities they had regularly participated in during the last six months. The type of physical activity was divided into three categories referred to as light, moderate and vigorous. Figure 3.21 provides further explanation by detailing examples for each category. It also reports the percentage of subjects that participated in light, moderate or vigorous activities on a daily, weekly or monthly basis. Some 70% of individuals reported participating in light activities daily, with the overall majority (97%) participating at least once a week. A smaller percentage (57%) reported participating in moderate activities daily, with an even smaller proportion (20%) engaging in vigorous activities daily. Of the subjects, 93% reported participating in moderate activities at least once a week in comparison to 67% who reported engaging in vigorous activities at least once a week. Some 23% of participants did no vigorous activities, whereas only 3% had never taken part in moderate activities and only 2% had never performed any light activities. An indication of the average duration



spent participating in the varying levels of activity is shown in Table 3.4, which provides statistical data collated from all participants relating to the weekly duration of each activity.

**Table 3.4** - Statistical data concerning the weekly duration of each type of activity

	Weekly duration (mins)		
	Light activities (n = 134)	Moderate activities (n = 125)	Vigorous activities (n = 139)
Mean	293.0	403.8	222.6
S.E	27.3	34.7	29.8
Median	210	300	60
Mode	210	420	0
Standard Deviation	315.4	388.3	351.4
Range	0-1680	0-2100	0-1680

It is apparent from Table 3.4 that the average weekly duration for light activities is 293 minutes, which equates to 42 minutes a day. The most common duration was 210 minutes per week, equating to 30 minutes a day. The average weekly duration for moderate activities, which include gardening and housework, was higher (404 minutes), which is equivalent to 58 minutes a day. The most common duration in this category was 420 minutes, which equates to 60 minutes a day. The levels for vigorous activity were lower, equating to 32 minutes a day. However, the most common duration was never, which tells a different story. These data show that the participants studied were a very healthy, active group, who currently meet the CMO's physical activity recommendations of 30 minutes of moderate activity, five times a week. It re-emphasises the difficulty in accessing the proportion of the population that does not currently engage in regular activity. If this active group of individuals can derive numerous health benefits from participating in varying types and intensities of activity, the possible gains for a more inactive group may be substantial.

Following detailed statistical analysis, the following findings were established

- Women participate in significantly more moderate activities, such as walking,

housework and gardening per week ( $485.6 \text{ mins} \pm 415.9$ ) than men ( $343.6 \text{ mins} \pm 357.7$ ;  $p = 0.0215$ ).

- Men participate in significantly more vigorous activities, such as playing sports, each week ( $328.5 \pm 424.5$ ) than females ( $94.8 \pm 162.9$ ;  $p < 0.000$ ).
- Age significantly correlated with the duration for weekly moderate activities ( $0.298$ ;  $p = 0.001$ ). This indicates that the older a participant is the more time they spend each week taking part in moderate activities.
- Age also significantly correlated with the duration of weekly vigorous activities ( $-0.378$ ;  $p < 0.000$ ). In this case the younger a participant was, the more vigorous activities they took part in.
- The duration of weekly vigorous activities reported a significant relationship with many other factors. It was discovered that an individual's self-esteem was significantly enhanced if they participated in vigorous activity daily ( $17.17$ ) compared to only once a month ( $21.00$ ;  $p = 0.013$ ) or two to three times a week ( $17.32$ ) compared to only once a month ( $21.00$ ;  $p = 0.0105$ ). An individual's mental health score (GHQ) was significantly improved if they participated in vigorous activities daily ( $6.71$ ) compared to never ( $9.33$ ;  $p = 0.012$ ), once a month ( $10.53$ ;  $p = 0.0065$ ) or once a week ( $10.60$ ;  $p = 0.0005$ ). Therefore, it is self-explanatory that the more time an individual spends participating in vigorous activities the better their overall mental health. It was interesting to find that those participants whose education continued after the minimum school leaving age also participated in significantly more vigorous activities ( $260.1 \pm 362.9$ ) in comparison to those who didn't ( $150.2 \pm 330.5$ ;  $p = 0.045$ ), once again implying a link between further education and health.

### Qualitative responses

The research process generated a myriad of positive narratives from participants in the ten cases studied. These can be seen by individual case study results in Chapter 4, but a selection can be seen in Box 3.1. Participants were very aware of the physical and psychological health benefits of



the green exercise they were undertaking and many commented on the health benefits of the increased social interaction of participating in a group.

**Box 3.1** - A selection of What is Special? comments from participants

*'It is putting something back into the countryside in return for all the pleasure it gives us. Also good exercise and companionship'*

*'Good exercise, company and scenery, a fair challenge also!'*

*'The fact I can go into the hills and enjoy peace and quiet, the exercise and relax. My troubles take a back seat on a day like today'*

*'I like to see the forest changing with the seasons. I feel refreshed when I return home. The dog loves walking here and it gets me some time for me.'*

*'It is relaxing mentally where I can get away from responsibilities of a managerial job and being a parent. I find it refreshes me for everyday life and its problems. A great day.'*

*'Therapeutic. Socially, talking to people. The exercise of walking is a healthy activity physically and mentally'*

*'Walking with friends, enjoying the beauty of the autumn countryside and the fellowship over the cup of coffee and biscuits.'*

*'Relaxing, exercises the body, clears the head.'*

*'Horse-riding helps maintain my fitness and most of all my sanity.'*

*'The scenic forest and the exercise is rewarding.'*

### 3.4 Concluding comments

A range of different projects and initiatives were included as case studies and these varied in many ways. Some initiatives were 'land focused' and others were 'group focused', some participants were part of formally managed groups, some were in informal groups and others were participating as individuals. The cases studies also varied in intensity level, duration and type of activity.

However, key findings from the analysis of all ten case studies shows that

- the average health state (as perceived by the respondents themselves) of the 263 people

studied was 81.4 out of a possible 100. This is slightly below the UK norm

- the majority of the population studied had not visited their GP or been admitted to hospital at all in the last year. However 87% had visited their GP up to four times in the last year
- 75% of the study population had no problems with mobility, self-care, pain and discomfort or fulfilling their usual activities
- the majority (61%) of the respondents had never smoked in their lifetime and only 12% were current smokers, which is lower than the national average (26%)
- as a result of participating in green exercise activities, there was an overall increase in the self-esteem of our study population
- self-esteem was significantly correlated with an individual's body weight. The heavier the body weight reported, the poorer the self-esteem score. Self-esteem was also found not to be affected by the intensity of the green exercise activities, though it did appear to rise over very long visits
- as a result of participating in green exercise activities, the overwhelming majority of the participants showed an overall improvement in mood, with anger and hostility, confusion and bewilderment, depression and dejection and tension and anxiety all decreasing post activity
- the participants studied were generally a very healthy, active group, who currently meet the Chief Medical Officer's physical activity recommendations of 30 minutes of moderate activity, five times a week

From the range of initiatives studied for this research, it can be concluded that green exercise synergistically generates many physical and mental health benefits regardless of the level of intensity, duration or type of green activity undertaken.



## Chapter 4: Individual case study results

### 4.1 Case study 1 - Arnsdale and Silverdale AONB, Lancashire, England



#### Project information

Arnsdale and Silverdale Area of Outstanding Natural Beauty (AONB) in Lancashire is one of 41 AONBs in England and Wales. The AONB represents a variety of different wildlife habitats, including woodland, heathland, grassland, tidal mudflats and coastal saltmarshes, and the area has picturesque views

over Morecombe Bay. The work of the Arnsdale and Silverdale AONB Conservation Volunteers is co-ordinated and managed under supervision from AONB staff and is an organised group activity. The project has been running for eighteen years and volunteers meet twice a week, every week, all year round, whatever the weather.

Conservation volunteers carry out various conservation activities depending on the tasks for the day, but on the day studied, activities included: clearing cut grass (raking and lifting), scattering seeds and clearing scrubland, all of which were fairly hard physical work. The volunteers are usually outside working from 10am until 4pm.

The conservation volunteers are a very enthusiastic and friendly group of people, largely composed of older men. Many of the volunteers have recently retired and find that volunteering gives them a chance to be outside in the countryside, to take part in useful physical activity and to socialise with other people interested in conservation. There are usually at least ten people every session although numbers vary from week to week.

The attendance rates and adherence to this project are very good and there is a real sense of teamwork and camaraderie. Volunteers love the countryside and enjoy learning more about plants, animals, birds and countryside management both from staff and each other.

#### Population data

Key information on Arnsdale and Silverdale AONB volunteers can be seen in Table 4.1. Seventeen Arnsdale and Silverdale conservation volunteers completed the questionnaires and the majority of the group was male and retired. Ages ranged from 31 to 84, with an average age of 62. The average calories (kcal) used per volunteering session was 1,500, and at 300 calories per hour this represents

Table 4.1 - Arnsdale and Silverdale AONB key basic data

Activity/ Initiative	Calories used per hour (kcal)	Calories used per session (kcal)	No. of subjects	Male: Female Ratio	Age Range (yrs)	Average age (yrs)	Main occupation categories of participants	General health state score (out of 100)
Conservation work - raking, clearing scrubland etc.	300	1,500	17	12:5	31 - 84	62	87% retired	86.81



moderate physical activity. Some 67% of volunteers continued their education after the minimum school leaving age and also had a degree or equivalent professional qualification. Over half of the group used to smoke (which is a higher proportion than in other case studies), a third had never smoked and 13% were smokers.

## Health status

The general health state of the conservation volunteers at Arnside was 86.8 (out of a possible 100) which represents a norm score just above the UK population average for this age group and which was also higher than the average for all 263 respondents. The majority of volunteers (73%) had experienced serious illness in their family, many had experienced it in caring for others (33%) and 14% had experienced it themselves. All of these proportions of those experiencing serious illness were slightly higher than for averages for the whole of the survey population. The measures show that the Arnside conservation volunteers have received medical treatment fewer times in the last year compared to the rest of the study population (see Table 4.2) so can be deemed slightly healthier than our average.

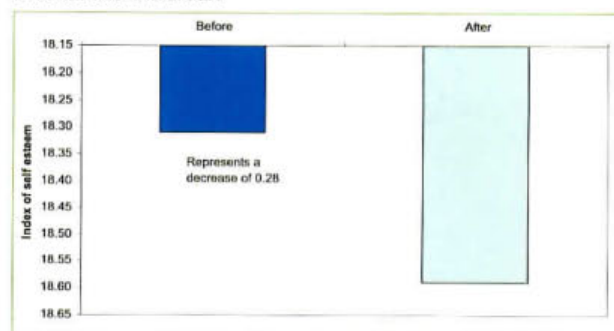
**Table 4.2** - Average number of times participants received medical treatment in the last year compared to average scores for the study population

	Arnside and Silverdale	Whole study population	Comparison
No. of visits to the doctor in the last year	2.06	2.2	fewer
No. of times referred to a specialist	0.25	0.32	fewer
No. of times been prescribed drugs	1.20	1.53	fewer
No. of times referred for treatment	0.18	0.33	fewer
No. of times admitted to hospital	0	0.16	fewer

Over 90% of volunteers said that they had no problems at all with mobility, self-care or their usual daily activities. Three-quarters of Arnside volunteers said they experienced no problems with anxiety or

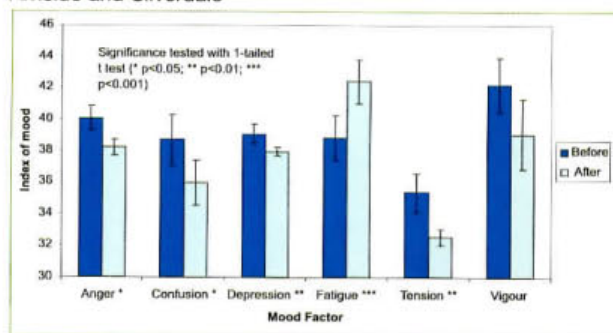
depression and 69% did not suffer from pain or discomfort.

**Figure 4.1** - The changes in self-esteem following the activity in Arnside and Silverdale



Psychological health elements of the questionnaire showed that as a group the self-esteem of Arnside and Silverdale conservation volunteers did not improve as a result of the activity (see Figure 4.1). This was unusual when compared to the situation in other cases studied. However, self-esteem scores in this group were relatively high to start with and factors such as the physically demanding nature of the activity combined with the torrential rainfall immediately prior to finishing the conservation work on the day may have influenced these results.

**Figure 4.2** - The changes in all mood factors after the activity in Arnside and Silverdale



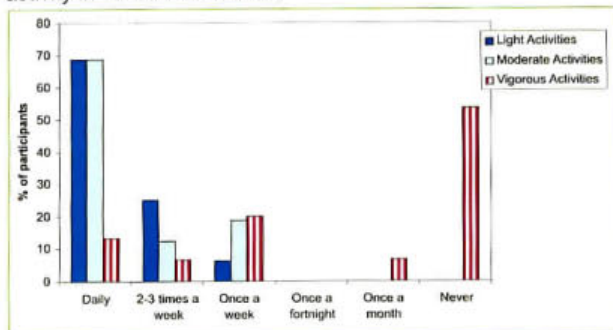
Changes in mood after the conservation activities is shown in Figure 4.2. Anger, confusion, depression and tension all decreased after the activity, suggesting an overall improvement in mood. Levels of fatigue increased while vigour decreased, which suggests that participants were physically tired after the conservation activities. This picture was similar to that shown by results from all ten case studies. The average General Health Questionnaire score (GHQ), which measures overall psychological health, for volunteers was 8.47. This is slightly

lower than the average score for the rest of the study population (8.73) (this represents a better level of psychological health).

### Physical activity

The level of physical fitness of volunteers was examined by including questions relating to the amount of physical activity of differing levels undertaken daily, every week, every month, every six months or not at all. Light activities included using the stairs or walking for pleasure; moderate activity examples included gardening, housework and bowls; and vigorous activities included playing sports, running and swimming. Results can be seen in Figure 4.3.

**Figure 4.3** - How often participants took part in various levels of activity in the last six months



Several Arnside volunteers took part in vigorous activities once a week, although the majority of people did not. However, nearly 70% of volunteers said they participated in moderate and light activities on a daily basis, with several people taking part in moderate and vigorous activities once a week. These measures indicate that the Arnside and Silverdale volunteers were reasonably physically fit and active for their age.

### Qualitative responses

Comments that volunteers have written can be seen in Box 4.1, and clearly show that it is the combination of the exercise, the natural surroundings and the meeting up with other people that means so much to participants. Health benefits from participating in conservation activities in the Arnside and Silverdale AONB can be said to include improvements to physical health, improvements to general mood and mental health, the social benefits of meeting up with other people and, in addition, improvements to the

environmental health of the AONB from the conservation work performed.

**Box 4.1** - Arnside and Silverdale AONB: What is Special? comments from participants

*'Being out in the countryside with other volunteers, working and chatting instead of being alone gardening.'*

*'It is putting something back into the countryside in return for all the pleasure it gives us. Also good exercise and companionship.'*

*'Being outside!!'*

*'Fresh air and exercise, meeting people, caring for the landscape of AONB.'*

*'The people, the place and the conservation element.'*

*'Doing something worthwhile, in good company in wonderful surroundings.'*

*'Dry stone walling - a craft I have learnt and enjoy doing, hard work but very satisfying, something that hopefully will last for many, many years.'*

For more information about Arnside and Silverdale AONB Conservation Volunteers please contact:

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Photos courtesy of Tony Riden



#### 4.2 Case Study 2 - Glentress Forest and 'The Hub' Mountain Bike Centre, Borders, Scotland



##### Project information

Glentress Forest is the oldest Forestry Commission forest in south Scotland and is situated two miles east of Peebles in the Scottish Borders. Glentress Forest offers many outdoor activities including mountain biking, walking and running, with signposted trails, walks and mountain bike routes through habitats which include mixed woodland and moorland tops. The forest is owned and maintained by the Forestry Commission Scotland, but 'The Hub' mountain bike shop, bike hiring facility and café are leased and privately run by a team of people led by two former professional mountain bike riders, Emma Guy and Tracy Brunger.

Many people come independently to the forest for family days out, mountain biking, walking and bird watching. Up to 1,000 mountain bikers use the Glentress Forest trails each week and take advantage of the excellent facilities including bike hire, parts, sales and repairs, toilets and changing

rooms, a pressure wash to clean the mud off your bike and a café for wholesome refreshments. Many visitors arrive on their own, some arrive on their own and aim to meet up with other individuals, some arrange to meet groups of friends at Glentress to go cycling or walking and there are also organised trips and courses to learn new biking skills.

The activity levels for those enjoying the forest vary from intense, physically and skillfully demanding cycle routes that take several hours to complete, to gentle forest strolls. Mountain bike and walking routes are clearly marked and graded, with maps available free of charge showing all routes. The Osprey Centre at the rear of the bike shop allows both interested cyclists and bird enthusiasts alike to see the progress of nesting ospreys in the forest via live video footage from the nest site.

Many different people use the forest at Glentress, varying in age, ability, physical fitness, educational level, background and culture. The main car park situated in front of The Hub, the café, the Forestry Commission offices and the Osprey Centre allows a central location for people to meet up with others, and as a result there is a very friendly and welcoming atmosphere in the forest. On the two days that fieldwork took place, people arrived at the forest at all times of day.

##### Population data

Key information on visitors to Glentress Forest is shown in Table 4.3. Sixty-two visitors to the forest completed the questionnaires, and the majority were in their twenties and male. Although ages ranged from 13 to 65, the average age of volunteers was 32. Over 90% of people participated in mountain biking and the remainder went walking. The average calories (kcal) used per visit was 2,424, and at 606 calories per hour this represented vigorous physical activity.

Over 70% of visitors were employed or self-employed and 16% were students. The majority of participants (87%) continued their education after the minimum school leaving age and 60% had a degree or equivalent professional qualification.

Table 4.3 - Glentress Forest key basic data

Activity/ Initiative	Calories used per hour (kcal)	Calories used per session (kcal)	No. of subjects	Male: Female Ratio	Age Range (yrs)	Average age (yrs)	Main occupation categories of participants	General health state score (out of 100)
90% mountain biking 10% walking	606	2,424	62	47:15	13 - 65	32	74% employed or self-employed 16% student	84.48

### Health status

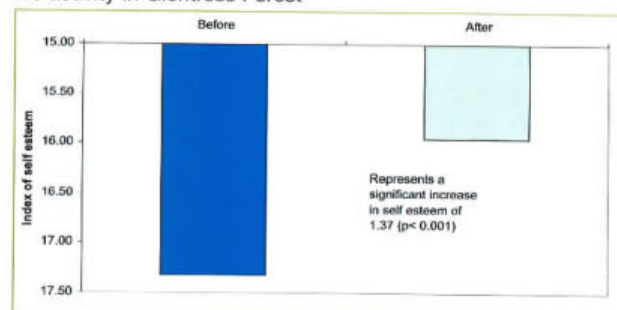
The general health state of the visitors to Glentress was 84.48 (out of a possible 100) which represents a score just below the UK population average but which is higher than the average for all 263 respondents. Approximately half of visitors (53%) had experienced serious illness in their family; many had experienced it in caring for others (23%); and only 9% had experienced it themselves. The proportions of those experiencing serious illness were very similar to those averages for the whole of the survey population except for experiencing serious illness themselves, which was below average for the population, implying less illness in this group of people. The measures show that the Glentress participants received medical treatment much fewer times in the last year compared to the rest of the study population and is shown in Table 4.4. The people visiting Glentress Forest can therefore be said to be healthier than our average.

Table 4.4 - Average number of times participants received medical treatment in the last year compared to average scores for the study population.

	Glentress	Whole study population	Comparison
No. of visits to the doctor in the last year	1.42	2.2	fewer
No. of times referred to a specialist	0.16	0.32	fewer
No. of times been prescribed drugs	0.85	1.53	fewer
No. of times referred for treatment	0.21	0.33	fewer
No. of times admitted to hospital	0.05	0.16	fewer

All of the visitors to Glentress said that they encountered no problems at all with mobility, self-care or their usual daily activities. Some 95% said they experienced no problems with anxiety or depression, and 90% did not suffer from pain or discomfort. Smoking habits of the people using Glentress were markedly below our average for the study population, with only 7% current smokers, 13% ex-smokers and 81% never smokers compared to 12%, 26% and 62% respectively. Elements of the questionnaire that examined the psychological health of those visiting Glentress showed that, as a group, the self-esteem of visitors improved as a result of the activity (see Figure 4.4). This was similar to the story in the majority of other cases studied. Self-esteem scores in this group were one of the highest to start with. Factors such as the anticipation and excitement expressed by people preparing for challenging mountain biking sessions either on their own or with friends, together with the beautiful sunshine on the two fieldwork days may have influenced these results.

Figure 4.4 - The changes in self-esteem after participating in the the activity in Glentress Forest

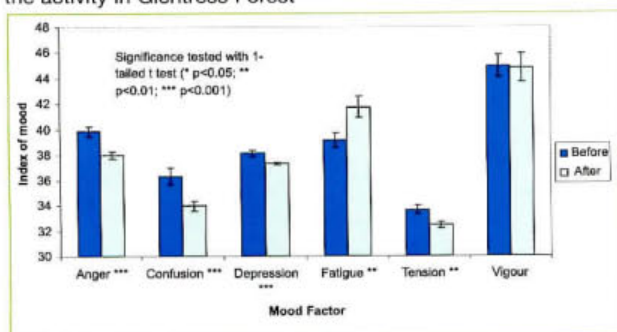


Changes in mood after the conservation activities is shown in Figure 4.5. Anger, confusion, depression and tension all decreased after the activity, suggesting an overall improvement in mood. Although levels of fatigue increased, vigour levels remained the same. This suggests that participants



were physically tired after the exercise but remained full of energy. This picture was similar to that shown by results from all ten case studies.

**Figure 4.5** - The changes in all mood factors after participating in the activity in Glentress Forest

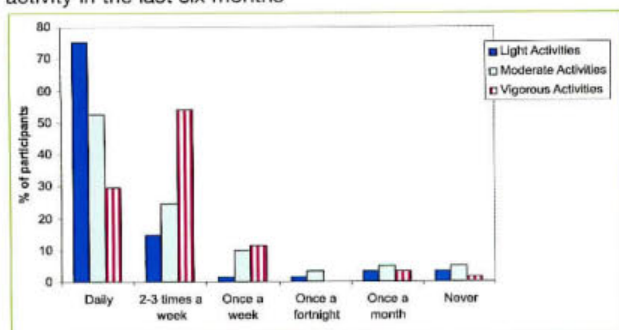


The average General Health Questionnaire score (GHQ), which measures psychological health, was 8.26, for participants which is lower than the average score when compared to the rest of the population (8.73) but which actually represents a better level of psychological health.

### Physical activity

The level of physical fitness of volunteers was examined by including questions relating to the amount of physical activity of differing levels undertaken daily, every week, every month, every six months or not at all. Light activities included using the stairs or walking for pleasure; moderate activity examples included gardening, housework and bowls; and vigorous activities included playing sports, running and swimming. Results can be seen in Figure 4.6.

**Figure 4.6** - How often participants took part in various levels of activity in the last six months



Visitors to Glentress are reasonably active people. Over half of those studied took part in light and moderate activities every day and engaged in

vigorous activities two or three times a week. This frequency of vigorous activities is higher than that of our average, which suggests that visitors to Glentress are fitter than average.

### Qualitative responses

Comments that visitors gave are shown in Box 4.2. These clearly demonstrate that it is the combination of the exhilaration of the exercise, the beautiful woodland surroundings and the meeting up with other people that means so much to participants. Several people also mentioned the stress-relieving properties of getting back to nature. In addition, many commented that they enjoyed the opportunity to clean the mud off themselves and their bikes and then to relax and enjoy a cup of tea and a cake at the Hub Café whilst chatting about their experiences post-adventure.

**Box 4.2** - Glentress Forest: What is Special? comments from participants

*'It gave me a big buzz.'*

*'The scenery, the fresh air and getting away from the city.'*

*'Exercise, being outdoors, enjoying the environment.'*

*'Good exercise, company and scenery, a fair challenge also!'*

*'The fact I can go into the hill's and enjoy peace and quiet, the exercise and relax. My troubles take a back seat on a day like today.'*

*'I don't often get the opportunity to walk in a forest due to general lifestyle responsibilities. It was great to get away from everything and feel close to nature.'*

*'Weather was dry, children ran, played sticks and generally had a ball, company was good'*

*'Keeping fit and good fun in the fresh air. Enjoyable whatever the weather.'*

*'Fun to do, great exercise and in a beautiful location which helps keep me fit and happier.'*

*'I like to see the forest changing with the seasons. I feel refreshed when I return home. The dog loves walking here and it gets me some time for me.'*

*'It is exhilarating and really gets your adrenaline flowing, which is more fun than going for a jog'*

*'Feels good - makes me smile!'*

*'It was invigorating, a sense of excitement, apprehension and enjoyment all rolled into one'*

Health benefits from taking part in mountain biking and walking at Glentress can be said to include improvements to physical health, big improvements to general mood and mental health and the social benefits of meeting up with other like-minded people.

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Photos courtesy of The Hub



### 4.3 Case Study 3 - Re-Union Canal Boats, Edinburgh, Scotland



#### Project information

The Union Canal was one of the last canals to be built in Britain and was closed in 1965. The canal sank into decline but now, over 30 years later, British Waterways Scotland has re-opened it and the canal now forms a unique wildlife corridor connecting the heart of the city of Edinburgh with the rural countryside and country parks of Mid Lothian and West Lothian. The Re-Union canal boat travels along the Union Canal and the Re-Union project is run as a social enterprise that aims to help community organisations access the water of the canal for the benefit of people in canal linked communities.

On the day of study a group of people from a local community group called 'Broomhouse Empowerment Project' were going out for the day on the barge. Green exercise activity on the barge was very gentle and sedentary. Some group training took place, but participants were surrounded by countryside and waterside views.

#### Population data

Key information concerning people on the canal boat trip can be seen in Table 4.5. The eleven

people who completed the questionnaires represented a fairly even mix of men and women. Although ages ranged from 28 to 63, the average age of volunteers was 50. The average calories (kcal) used per visit was 612, and at 102 calories per hour this represented very light physical activity.

Over 60% of visitors were employed or self-employed and 27% were retired. The majority of participants (70%) continued their education after the minimum school leaving age and 64% had a degree or equivalent professional qualification.

#### Health status

The general health state of the participants on Re-union was 65.27 (out of a possible 100). This represents a score well below (-0.49) the UK population average and is lower than the average for all 263 respondents to this survey. Of those people on the Re-Union barge, 60% had experienced serious illness in their family and in caring for others and 20% had experienced it themselves. These proportions of those experiencing serious illness were all higher than the averages for the whole of the survey population.

The measures show that the Re-Union participants received medical treatment more times in the last year compared to the rest of the study population (see Table 4.6). The participants on the Re-Union barge on this day can therefore be said to be less healthy than our average.

Half of the visitors on Re-Union canal said that they encountered no problems at all with mobility, all encountered no problems with self-care and 82% had no difficulty with their usual daily activities. Some 64% said they experienced no problems with anxiety or depression but only 37% did not suffer from pain or discomfort. Smoking habits of those on the barge were above our average for the study population, with 27% current smokers, 46% ex-

Table 4.5 - Re-Union Canal Key Basic Data

Activity/ Initiative	Calories used per hour (kcal)	Calories used per session (kcal)	No. of subjects	Male: Female Ratio	Age Range (yrs)	Average age (yrs)	Main occupation categories of participants	General health state score (out of 100)
Boating	102	612	11	5:6	28 - 63	50	64% employed or self-employed 27% retired	65.27

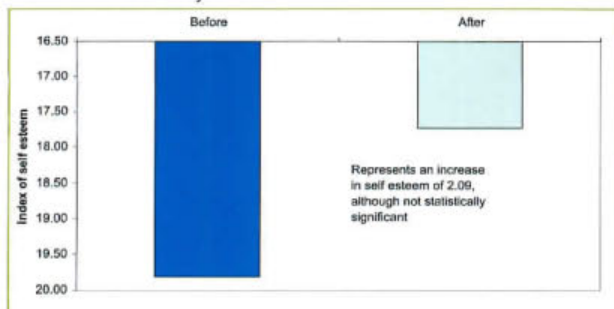
smokers and 27% never smokers compared to 12%, 26% and 62% respectively.

**Table 4.6** - Average number of times participants received medical treatment in the last year compared to average scores for the study population.

	Re-Union	Whole study population	Comparison
No. of visits to the doctor in the last year	4.78	2.2	more
No. of times referred to a specialist	1.9	0.32	more
No. of times been prescribed drugs	3.44	1.53	more
No. of times referred for treatment	1.9	0.33	more
No. of times admitted to hospital	1.10	0.16	more

Elements of the questionnaire that examined the psychological health of those taking the barge trip showed that, as a group, the self-esteem of visitors improved as a result of the activity (see Figure 4.7). This was similar to the story in the majority of other cases studied.

**Figure 4.7** - The change in self-esteem following participation in the Re-Union activity

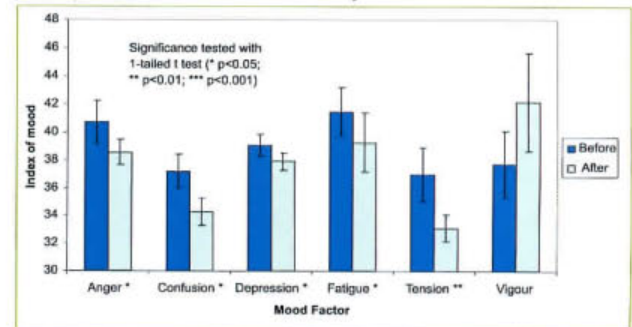


Changes in mood after the Re-Union barge trip is shown in Figure 4.8. Anger, confusion, depression and tension all decreased after the activity, suggesting an overall improvement in mood. Unusually, levels of fatigue decreased and vigour levels increased. This suggests that participants were physically rested after the relatively low intensity of the activity aboard the barge.

The average General Health Questionnaire score (GHQ) for participants was 12.14, which was the highest score compared with the other case studies

and the average score when compared to the rest of the population (8.73) (this represents a lower level of psychological health).

**Figure 4.8** - The changes in all mood factors following participation in the Re-Union activity

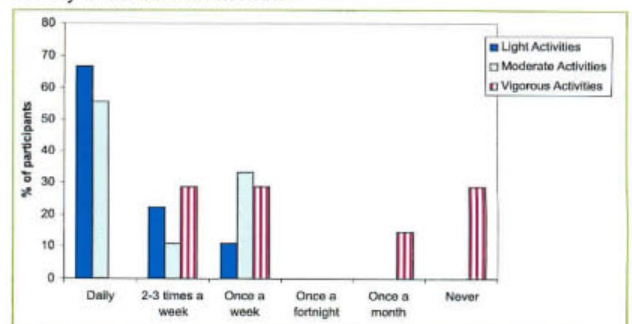


### Physical activity

The level of physical fitness of volunteers was examined by including questions relating to the amount of physical activity of differing levels undertaken daily, every week, every month, every six months or not at all. Light activities included using the stairs or walking for pleasure; moderate activity examples included gardening, housework and bowls; and vigorous activities included playing sports, running and swimming. Results can be seen in Figure 4.9.

Participants on the canal trip were fairly active people. Over half of those studied took part in light and moderate activities every day, but nobody took part in vigorous activity daily. However, nearly a third of people said they did take part in vigorous activities two or three times a week, and a third said once a week.

**Figure 4.9** - How often participants took part in various levels of activity in the last six months





The results show that although the barge trip was a relatively sedentary activity, mental health benefits were still evident.

#### Qualitative responses

Comments that visitors have given are shown in Box 4.3. These demonstrate that although they were not taking part in much activity, the countryside surroundings and the fresh air helped them both to relax and to focus more. Participants also appreciated socialising and communicating with other people on the barge.

Box 4.3 - Re-Union Canal: What is Special? Comments from participants

*'I have found it easier to keep my concentration. Great day.'*

*'Fresh air'*

*'I like boating, relaxing, fresh air, change of scenery.'*

*'Use of communication skills, social interaction and learned about the legal set up and background to charities and voluntary groups. The background of the barge trip was superb.'*

*'I feel good and fresh air and meeting other people.'*

*'Fastest way of slowing down - gives you enough to do that you've no need to feel guilty and little enough that you relax.'*

For more information about Re-Union Canal Boats please contact

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Photos courtesy of Re-Union Canal Boats

#### 4.4 Case Study 4 - Close House Project, Herefordshire, England



##### Project information

The BODS Youth Work Initiatives<sup>8</sup> charity runs three projects: i) Close House, a coffee shop/drop-in centre for young people in Hereford town centre, ii) Round House, an environmental education resource and iii) On a Mission, an outdoor adventure education scheme. Aspects of all three of these projects were included on the study day. The Round House project where the fieldwork took place is based in Werndee Woods (a managed,

mixed deciduous woodland area) at St Weonards in Herefordshire, England.

On the study day a group of young people who frequent the Close House coffee shop were taken to Werndee Woods for outdoor adventure and activities. Many varied outdoor pursuit activities took place such as climbing, team games involving physical exercise and lessons in trust and working together. Activities such as chopping wood, camp cooking and using the zip-wire were also included. Many of the young people had never taken part in these sorts of activities before. Most of the activities were of a fairly physical nature.

##### Population data

Key information on participants in the Close House study is shown in Table 4.7. Eleven people completed the questionnaires. The majority were under twenty and there were slightly more men than women. Although ages ranged from 16 to 43, the average age of participants was 20. All eleven people participated in woodland activities. The average calories (kcal) used per session was 3,096, and at 516 calories per hour, this represented one of the most vigorous physical activities in the study.

Over half of the participants were students and 36% were employed or self-employed. All of the participants continued their education after the minimum school leaving age (most were still at sixth form college) and 27% (those who were old enough) had a degree or equivalent professional qualification.

##### Health status

The general health state of the participants at Close House was 83.00 (out of a possible 100). This represents a score just below (-0.34) the UK

<sup>8</sup> BODS stems from the Bermondsey Outdoors Project, but now refers to an umbrella charity covering a number of projects and areas.

Table 4.7 - Close House key basic data

Activity/ Initiative	Calories used per hour (kcal)	Calories used per session (kcal)	No. of subjects	Male: Female Ratio	Age Range (yrs)	Average age (yrs)	Main occupation categories of participants	General health state score (out of 100)
Woodland activities	516	3,096	11	7:4	16 - 43	20	55% students 36% employed or self-employed	83.00



population average but higher than the average for all 263 respondents. Over half of participants (67%) had experienced serious illness in their family; many had experienced it in caring for others (30%) and none had experienced it themselves. The proportions of those experiencing serious illness were very similar to those averages for the whole of the survey population except for experiencing serious illness themselves which was well below average for the population, implying less illness in this group of people. This, however, could be related to the relatively young age of the group.

The measures show that the Close House participants saw the doctor and were prescribed drugs fewer times in the last year compared with the rest of the study population, but have been referred to a specialist, referred for treatment and admitted to hospital more times (see Table 4.8). However, these figures may be elevated because some rugby playing members of the group had received much treatment for sporting injuries. The young people at the Round House site were generally healthy.

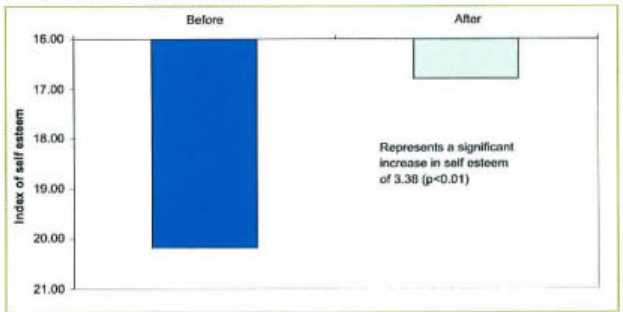
**Table 4.8** - Average number of times participants received medical treatment in the last year compared to average scores for the study population.

	Close House	Whole study population	Comparison
No. of visits to the doctor in the last year	2.00	2.2	fewer
No. of times referred to a specialist	0.40	0.32	more
No. of times been prescribed drugs	0.60	1.53	fewer
No. of times referred for treatment	0.60	0.33	more
No. of times admitted to hospital	0.80	0.16	more

All of the participants in Close House said that they encountered no problems at all with mobility or self-care, and 90% had no problems with their usual daily activities. Some 80% said they experienced no problems with anxiety or depression, and 100% did not suffer from pain or discomfort. Smoking habits of the participants were

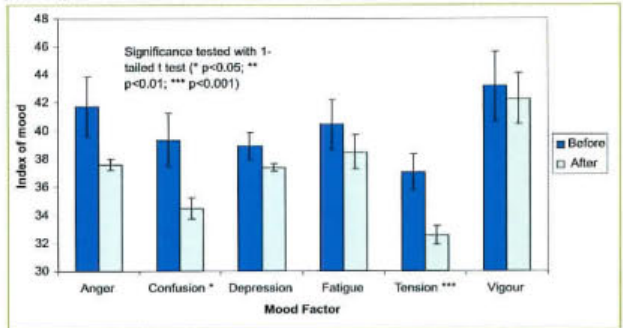
markedly lower than our average for the study population, with only 9% current smokers, 18% ex-smokers and 73% never smokers compared to 12%, 26% and 62% respectively. This, of course, may have been affected by the relatively young age of most of the respondents.

**Figure 4.10** - The change in self-esteem following participation in the activities at Close House



Elements of the questionnaire that examined the psychological health of those taking part in the woodland activities showed that, as a group, the self-esteem of visitors improved greatly as a result of the activity (see Figure 4.10). This was the highest rise in self-esteem shown by any of the other case studies. Self-esteem scores in this group were one of the lowest to start with. Factors such as the uncertainty about the sorts of things they would be doing in the forest may have affected the scores.

**Figure 4.11** - The changes in all mood factors following participation in the activities at Close House



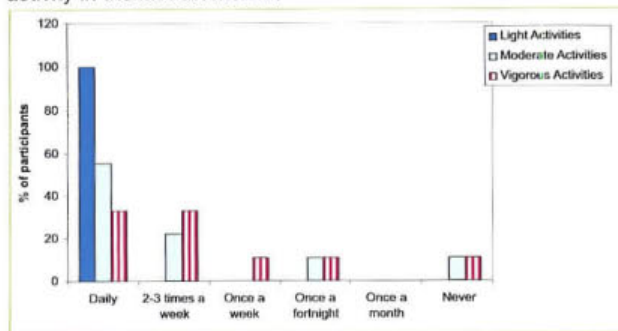
Changes in mood after the woodland activities is shown in Figure 4.11. Anger, confusion, depression and tension all decreased after the activity, suggesting an overall improvement in mood. Levels of fatigue decreased but vigour levels also decreased slightly. This picture was similar to that shown by results from all ten case studies. The average General Health Questionnaire score (GHQ)

for participants was 7.60, which is lower than the average score when compared with the rest of the population (8.73) (which represents a better level of psychological health).

### Physical activity

The level of physical fitness of volunteers was examined by including questions relating to the amount of physical activity of differing levels undertaken daily, every week, every month, every six months or not at all. Light activities included using the stairs or walking for pleasure; moderate activity examples included gardening, housework and bowls; and vigorous activities included playing sports, running and swimming. Results can be seen in Figure 4.12.

Figure 4.12 - How often participants took part in various levels of activity in the last six months



Close House participants are active people. All of the group studied took part in light activities daily and over half took part in moderate activities every day. Two-thirds of the group took part in vigorous activities either daily or two to three times a week. This frequency of vigorous activities is slightly higher than that of our average which suggests participants in Close House were fitter than our average respondents.

### Qualitative responses

Some of the comments made by participants are shown in Box 4.4. These show that the activities and the social engagement were enjoyed greatly by the group. Health improvements are shown by the results, in addition to the physical benefits of the woodland activities.

Box 4.4 - Close House: What is Special? comments from participants

*'I joined in more than I normally would. No pressure. Fun.'*

*'Fun, with all friends, good laugh, teamwork and team building, physical work (all good).'*

*'Very fun, being with friends, doing physical activities, more confident to do things.'*

*'Fun, team work, physically enduring.'*

*'It's back to basics, there are no 'cool' people or 'uncool' people.'*

*'Away from phones, work etc. and a chance to relax and have fun with other people.'*

*'It is relaxing mentally where I can get away from responsibilities of a managerial job and being a parent. I find it refreshes me for everyday life and its problems. A great day.'*

*'Doing the activities in a natural setting.'*

For more information about BODS please contact

**David Davoll**

**BODS Youth Work Initiatives**

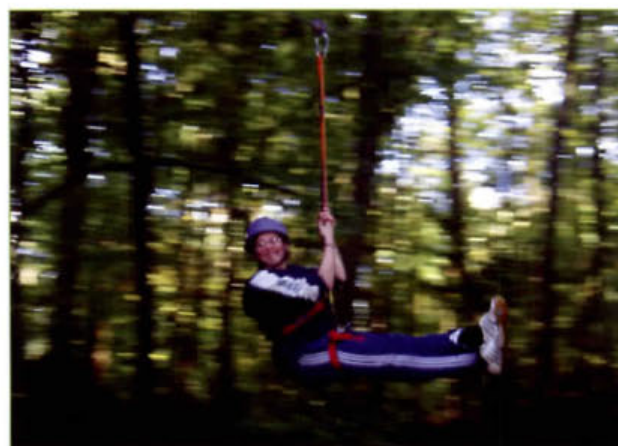
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Photos courtesy of BODS



#### 4.5 Case Study 5 - Walking the Way to Health Initiative (WHI), Ballymena, Co. Antrim, Northern Ireland



##### Project information

The Walking the way to Health Initiative group in Ballymena is linked to a nationwide initiative between the British Heart Foundation and the Countryside Agency, called Walking the way to Health Initiative. This aims to improve the health and fitness of more than a million people, particularly those who do little exercise or live in areas of poor health (see section 2.6 for more details).

The Ballymena group has been running for two-and-a-half years, with support from Ballymena Borough Council. Over 200 people have signed up for the group since then. The walkers meet every Wednesday for organised short health walks with trained walk leaders. Walks take place in and around Ballymena on various routes through different countryside. On the day of fieldwork, the Ballymena group was joined by the Antrim Walking the way to Health Initiative group and the walks took place in the grounds of the Ecos Centre, Ballymena. The group organisers produce a programme with details of forthcoming walks every couple of months, and during the summer months the group often travels to other rural areas of Northern Ireland in order to experience new walks.

There are walks for different abilities: those people who want to walk further can go on the longer walk and those who are not as able can opt to go on a shorter walk. Walks vary in length but usually take between 30 minutes and 1.5 hours. The majority of people in the Ballymena group are older women, although 25% are male. This group of walkers show great enthusiasm for their walks on Wednesdays and there is a real sense of camaraderie and good humour amongst them.

##### Population data

Key information on participants for Walking the way to Health Initiative Ballymena is shown in Table 4.9. Ninety-nine people completed the questionnaires (the largest number for one case study), and the majority were over 50 and female. Although ages ranged from 40 to 84, the average age of respondents was 64. Walking was obviously the main activity. The average calories (kcal) used per visit was 336, and at 336 calories per hour this represented moderate physical activity.

Table 4.9 - Walking the way to Health Initiative (WHI) Ballymena key basic data

Activity/ Initiative	Calories used per hour (kcal)	Calories used per session (kcal)	No. of subjects	Male: Female Ratio	Age Range (yrs)	Average age (yrs)	Main occupation categories of participants	General health state score (out of 100)
Walking	336	336	99	17:82	40 - 84	64	64% retired 25% house person	86.81

Over 60% of walkers were retired and 25% were described as a 'house person'. Half of participants continued their education after the minimum school leaving age and 27% had a degree or equivalent professional qualification.

### Health status

The general health state of the walkers was 86.81 (out of a possible 100), representing a score just above (0.14) the UK population average and higher than the average for all 263 respondents. Many of the walkers (40%) had experienced serious illness in their family; some had experienced it in caring for others (19%) and only 15% had experienced it themselves. The proportions of those experiencing serious illness were very similar to the averages for the whole of the survey population.

The measures show that the Ballymena walkers received medical treatment in terms of visits to their doctor and drug prescription more times in the last year compared to the rest of the study population, but that they were referred for treatment or to the specialist and admitted to hospital fewer times than average (see Table 4.10). The Ballymena walkers can be said to be of average health.

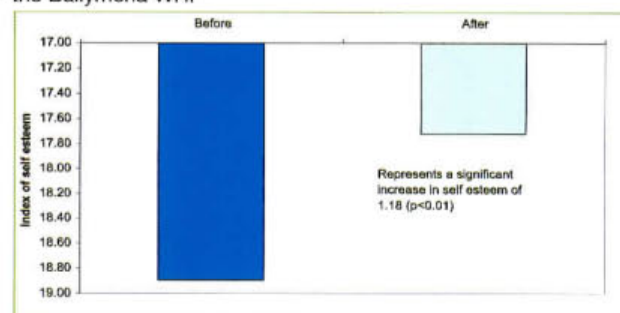
**Table 4.10** - Average number of times participants received medical treatment in the last year compared to average scores for the study population.

	Ballymena WHI	Whole study population	Comparison
No. of visits to the doctor in the last year	2.66	2.2	more
No. of times referred to a specialist	0.26	0.32	fewer
No. of times been prescribed drugs	1.99	1.53	more
No. of times referred for treatment	0.19	0.33	fewer
No. of times admitted to hospital	0.06	0.16	fewer

The majority of the walkers (88%) said that they encountered no problems at all with mobility, 97% had no problems with self-care and 90% with their usual daily activities. Some 90% said they experienced no problems with anxiety or

depression, and 71% did not suffer from pain or discomfort. Smoking habits of the walkers were markedly below our average for the study population, with only 6% current smokers, 24% ex-smokers and 70% never smokers compared to 12%, 26% and 62% respectively.

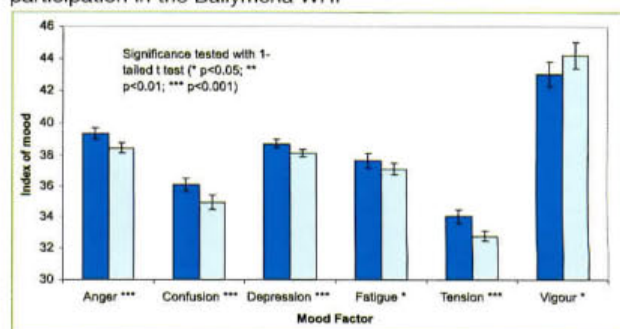
**Figure 4.13** - The change in self-esteem following participation in the Ballymena WHI



Elements of the questionnaire that examined the psychological health of the Ballymena walkers showed that, as a group, their self-esteem improved as a result of the activity (see Figure 4.13). This was similar to the story in the majority of other cases studied.

Changes in mood after the walk are shown in Figure 4.14. Anger, confusion, depression and tension all decreased after the activity, suggesting an overall improvement in mood. Levels of fatigue decreased and vigour levels increased. This suggests that participants were not physically tired after the exercise and remained full of energy. This picture was similar to that shown by results from all ten case studies.

**Figure 4.14** - The changes in all mood factors following participation in the Ballymena WHI



The average General Health Questionnaire score (GHQ) for walkers was 8.98, which is slightly higher than the average score when compared to the rest

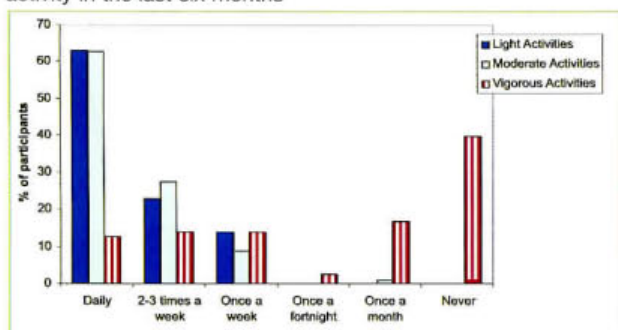


of the population (8.73) (a lower level of psychological health).

### Physical activity

The level of physical fitness of volunteers was examined by including questions relating to the amount of physical activity of differing levels undertaken daily, every week, every month, every six months or not at all. Light activities included using the stairs or walking for pleasure; moderate activity examples included gardening, housework and bowls; and vigorous activities included playing sports, running and swimming. Results can be seen in Figure 4.15.

Figure 4.15 - How often participants took part in various levels of activity in the last six months



Ballymena walkers are reasonably active people. Although levels of vigorous activity were slightly lower than for other case studies, over 60% of those studied took part in light and moderate activities every day, and all walkers did light activities at least once a week and moderate activities at least once a month. Approximately half of the walkers took part in some kind of vigorous activity at least once a month.

### Qualitative responses

The walkers were a reasonable mix of people from different walks of life with differing levels of civil engagement and education. Most of the walkers enjoyed the meeting up and getting out of the house element as much as the walking. Many participants had recently lost a husband or wife and found meeting up with other walkers helpful. Some of the comments that Ballymena walkers gave are shown in Box 4.5.

Box 4.5 - Ballymena Walking the Way to Health: What is Special? comments from participants

- 'Feel refreshed - better for taking part, enjoy social aspect.'*
- 'Companionship, keeping active, making an effort to get up and get out.'*
- 'It perks you up - nice to meet people and keeps your body active.'*
- 'I feel much more alive and my spirits have lifted by the walk and the company of other walkers.'*
- 'I feel it helps my wellbeing and I feel more healthy.'*
- 'Relaxing, exercises the body, clears the head.'*
- 'Exercise, social element.'*
- 'I feel like a recycled teenager!'*
- 'As a retired person it is valuable to me to meet other people for recreation or conversation.'*
- 'Enjoyment, especially the social interaction and meeting and talking to people we wouldn't ordinarily meet!'*
- 'It makes you feel good, gives you more energy and it is good socially.'*
- 'Enjoyed every minute - good weather, good crack, good company.'*
- 'Good for my health in general after having had a coronary.'*
- 'Therapeutic. Socially, talking to people. The exercise of walking is a healthy activity physically and mentally.'*
- 'Walking with friends, enjoying the beauty of the autumn countryside and the fellowship over the cup of coffee and biscuits.'*

These comments clearly show that that it is the *combination* of three factors that make the walks so popular with this example: i) meeting up with others, ii) the exercise of walking and iii) the beautiful countryside surroundings the walks and the adherence rates so high with this example. Walkers are certainly aware that these walks provide benefits to both physical and mental health and that the social element plays a very important part. The group organisers, all of whom have received WHI training, also play a very important role in the success of the events.

For more information about the Ballymena Walking the way to Health Initiative group please contact

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Photos courtesy of Lindsay Dunlop



#### 4.6 Case Study 6 - Horse-riding, Lagan Valley, Co. Antrim, Northern Ireland



##### Project information

The Lagan Valley Riding Club is part of the British Horse Society, Northern Ireland, and members are based in and around Lagan Valley, Belfast. The British Horse Society is a charity and is the largest equestrian membership organisation in the UK. Riders take their horses through a variety of local countryside habitats, for differing lengths of time. The members of the Lagan Valley club have a range of different abilities and so lengths of rides and time spent outside vary. Members can also take

advantage of the indoor equestrian centre at Dunmurry during the winter.

For this case study individuals were given questionnaires which they filled out before they went riding on their own or with friends and then again afterwards. The members of the Lagan Valley Riding Club are largely female, with an average age of 38, and are a very friendly group of people.

##### Population data

Key information on the Lagan Valley horse-riding group is shown in Table 4.11. Seven people completed the questionnaires and the majority were in their thirties and female. Although ages ranged from 15 to 54, the average age of volunteers was 38. The main activity was horse-riding. The average calories (kcal) used per visit was 1,080, and at 540 calories per hour this represented moderate physical activity.

Over 85% of riders were employed or self-employed and 14% were students. All of the participants had continued their education after the minimum school leaving age and 50% had a degree or equivalent professional qualification.

##### Health status

The general health state of the Lagan Valley horse riders was 86.81 (out of a possible 100), which represents a score 0.22 above the UK population average and higher than the average for all 263 respondents. The majority of riders (71%) had experienced serious illness in their family; many had experienced it in caring for others (33%); and 17% had experienced it themselves. These proportions of those experiencing serious illness were higher than the averages for the whole of the survey population, implying more illness in this group of people.

Table 4.11 - Lagan Valley Horse-riding key basic data

Activity/ Initiative	Calories used per hour (kcal)	Calories used per session (kcal)	No. of subjects	Male: Female Ratio	Age Range (yrs)	Average age (yrs)	Main occupation categories of participants	General health state score (out of 100)
Horse-riding	540	1,080	7	1:6	15 - 54	38	86% employed or self-employed 14% student	86.81

**Table 4.12** - Average number of times participants received medical treatment in the last year compared to average scores for the study population.

	<b>Lagan Valley</b>	<b>Whole study population</b>	<b>Comparison</b>
No. of visits to the doctor in the last year	3.0	2.2	more
No. of times referred to a specialist	0.29	1.53	fewer
No. of times been prescribed drugs	3.29	0.32	more
No. of times referred for treatment	0.57	0.33	more
No. of times admitted to hospital	0.29	0.16	more

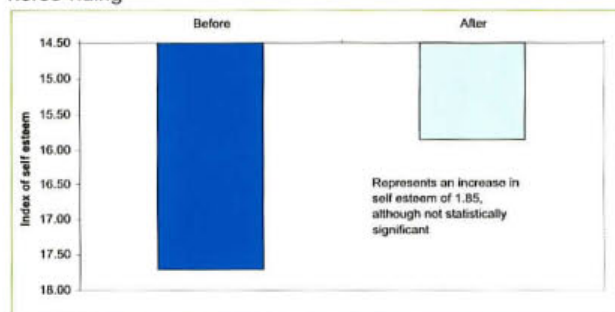
The measures designed to show how healthy a person is, revealed that the Lagan Valley participants received medical treatment more times in the last year compared to the rest of the study population (with the exception of number of times referred to a specialist, which is lower) and is shown in Table 4.12. Although this could mean that the riders are slightly less healthy than our average, one of the riders has fibromyalgia and requires frequent visits to the doctor and regular drug prescriptions, so this is likely to have influenced the higher figures.

All of the members of the riding club said that they encountered no problems at all with mobility, self-care or their usual daily activities. 71% said they experienced no problems with anxiety or depression, and 57% did not suffer from pain or discomfort.

Smoking habits of the riders were markedly below our average for the study population, with 0% current smokers, 71% ex-smokers (a particularly high proportion) and 29% never smoked (compared to 12%, 26% and 62% respectively for our average).

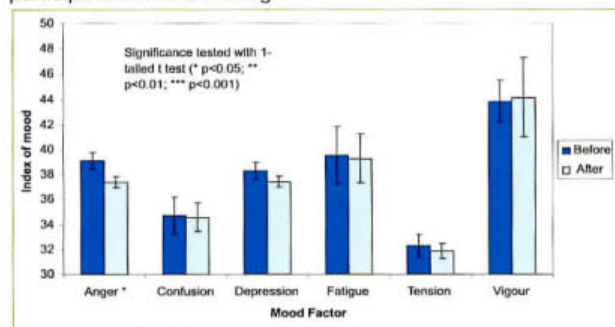
Elements of the questionnaire that examined the psychological health of the riders showed that, as a group, the self-esteem of visitors improved as a result of the activity (see Figure 4.16). This was similar to the story in the majority of other cases studied.

**Figure 4.16** - The change in self-esteem following participation in horse-riding



Changes in mood after the activities is shown in Figure 4.17. Anger, confusion, depression and tension all decreased after the activity, suggesting an overall improvement in mood. This picture was similar to that shown by results from all ten case studies. Levels of fatigue and vigour remained largely the same.

**Figure 4.17** - The changes in all mood factors following participation in horse-riding



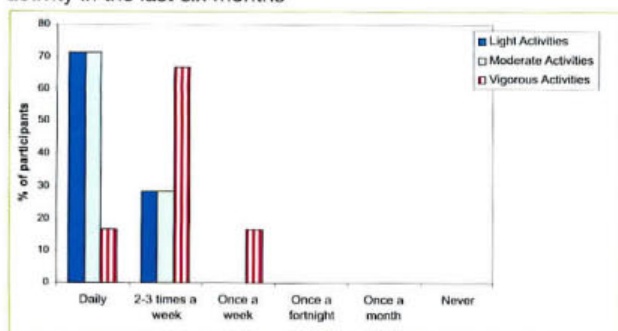
The average General Health Questionnaire score (GHQ) for riders was 11.29, higher than the average score when compared to the rest of the population (8.73) (which represents a lower level of psychological health).

### Physical activity

The level of physical fitness of members of the riding club was examined by including questions relating to the amount of physical activity of differing levels undertaken daily, every week, every month, every six months or not at all. Light activities included using the stairs or walking for pleasure; moderate activity examples included gardening, housework and bowls; and vigorous activities included playing sports, running and swimming. Results can be seen in Figure 4.18.



Figure 4.18 - How often participants took part in various levels of activity in the last six months



The members of Lagan Valley Riding Club were one of the most active groups in this study. Over 70% of people took part in light and moderate activities daily, and 100% took part in vigorous activity at least once a week. This frequency of vigorous activities is higher than that of our average, which suggests that the riders are fitter than average.

#### Qualitative responses

Box 4.6 - Lagan Valley Horse-riding: What is Special? comments from participants

*'Horse-riding - special bond with animal, sense of achievement, companionship with other riders in my club, great night out, exercised both myself and my horse, enjoyment.'*

*'I love horses and mucking them out is very therapeutic. Life does not seem so stressful when up to your elbows in dung!'*

*'Horse-riding, marvellous, met lots of new people, joined ILDRA and Lacale riding club, now on committee, endless fun and leisure.'*

*'Companionship and great fun - horse-riding. As I have fibromyalgia if I don't ride I have extreme pain in my back, neck and hips. Hence the twelve prescriptions for daily drugs which don't work if I don't ride.'*

*'When out riding either in company or on my own with my horse, I lose myself for the duration! As a young mother with two young children, life is hectic and sometimes unpredictable.'*

*'Horse-riding - riding club. New activities, challenges, meeting other people with similar interests, bonding with my horse, having fun.'*

*'Horse-riding helps maintain my fitness and most of all my sanity.'*

Some of the comments that riders gave are shown in Box 4.6. These clearly demonstrate that it is the combination of the exhilaration of the ride, the fitness aspect and the meeting up with other people that means so much to the group. Several people also mentioned the therapeutic properties of horse-riding. Horse-riding clearly gives physical and mental health benefits to participants.

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Photos courtesy of Heather Hoffman

#### 4.7 Case Study 7 - Afan Forest Park, Port Talbot, West Glamorgan, Wales



##### Project information

Afan Forest Park is situated close to Port Talbot in South Wales and is owned and maintained by the Forestry Commission, with the visitor centre jointly run by Neath and Port Talbot Council and the Forestry Commission. The forest has clearly marked walks, mountain bike trails and calorie counted routes, and the visitor centre boasts toilets, a café, gift shop, education rooms and bike cleaning facilities.

Calorie counted maps for walks and mountain bike routes have been developed for six Forestry Commission woodlands<sup>9</sup> in Wales in partnership with the University of Wales, Aberystwyth. Professor Jo Doust has calculated the calorie cost of walking or cycling particular routes and has generated a map showing these calorie costs along with exercise advice and information. These calorie counted walks are a new approach to healthy lifestyle promotion, with the aim of increasing participation in physical activity.

Many people come to the forest independently for family days out, mountain biking, walking, horse trekking and bird watching. Visitors arrange to meet groups of friends at Afan to go cycling, walking and horse-riding. Free leaflets with maps showing the mountain biking routes and walks and the difficulty grades for them are available at the visitor centre. Forest education days (Forest Schools) are arranged with local schools in conjunction with the Forestry Commission as a great way for children to interact with wildlife and the forest.

Activities in Afan vary from being intense, physically and skilfully demanding mountain biking for several hours, to gentle forest strolls and leisurely rides. A range of different people use Afan Forest, varying in age, ability, physical fitness, educational level, background and culture. Some visit in groups, and others go on their own. On the two fieldwork days in November, people (especially mountain bikers) were coming to the forest at all times of day, whatever the weather.

##### Population data

Key information on visitors to Afan Forest Park is shown in Table 4.13. Forty-one visitors to the forest

<sup>9</sup>Calorie Counted Walks at: Moel Famau near Mold, Nant yr Arian near Aberystwyth, Penpych in the Rhondda Valley, Afan Forest Park and Fforest Fawr near Cardiff. Cycle Trails at: Afan Forest Park and Coed y Brenin near Dolgellau.

Table 4.13 - Afan Forest key basic data

Activity/ Initiative	Calories used per hour (kcal)	Calories used per session (kcal)	No. of subjects	Male: Female Ratio	Age Range (yrs)	Average age (yrs)	Main occupation categories of participants	General health state score (out of 100)
Mountain biking (66%) and walking	654	2,616	41	33:8	18 - 64	35	73% employed or self-employed 15% seeking work	86.81



completed the questionnaires, the majority in their late twenties/early thirties and male. Although ages ranged from 18 to 64, the average age of volunteers was 35. Over 65% of people participated in mountain biking and the remainder were walking or on Enterprise Forest Training. The average calories (kcal) used per visit was 2,616, and at 654 calories per hour this represented the most vigorous physical activity of the case studies.

Over 70% of visitors were employed or self-employed and 15% were seeking work. The majority of participants (65%) continued their education after the minimum school leaving age and a quarter had a degree or equivalent professional qualification.

### Health status

**Table 4.14** - Average number of times participants received medical treatment in the last year compared to average scores for the study population

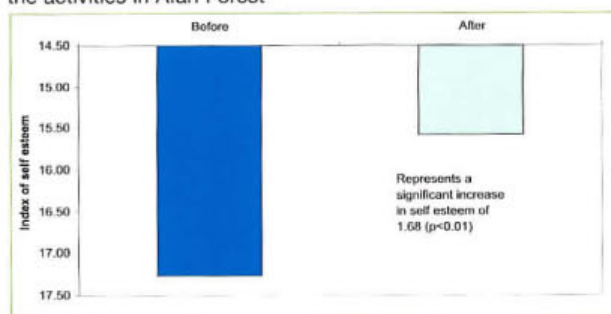
	Afan Forest Park	Whole study population	Comparison
No. of visits to the doctor in the last year	1.78	2.2	fewer
No. of times referred to a specialist	0.27	0.32	fewer
No. of times been prescribed drugs	0.97	1.53	fewer
No. of times referred for treatment	0.41	0.33	more
No. of times admitted to hospital	0.19	0.16	more

The general health state of the visitors to Afan was 86.81 (out of a possible 100), which represents a score just below (-0.27) the UK population average but higher than the average for all 263 respondents. Half of visitors had experienced serious illness in their family; some had experienced it in caring for others (10%) and only 8% had experienced it themselves. These proportions of those experiencing serious illness were lower than the averages for the whole of the survey population (except for experiencing serious illness in their family which was about the same as for the study population), implying less illness in this group of

people. The measures show that the Afan participants received medical treatment a similar number of times in the last year compared to the rest of the study population (see Table 4.14). The people visiting Afan Forest Park can therefore be said to be in average health.

All of the visitors to Afan said that they encountered no problems at all with mobility, self-care or their usual daily activities. 92% said they experienced no problems with anxiety or depression, and 79% did not suffer from pain or discomfort.

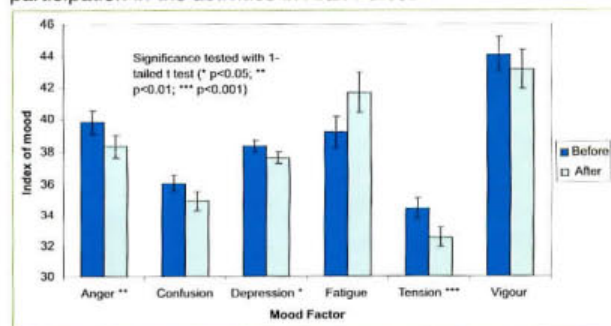
**Figure 4.19** - The change in self-esteem following participation in the activities in Afan Forest



Smoking habits of the people using Afan Forest Park were above our average for the study population, with 29% current smokers, 24% ex-smokers and 46% never smokers compared to 12%, 26% and 62% respectively.

Elements of the questionnaire that examined the psychological health of those visiting Afan showed that, as a group, the self-esteem of visitors improved as a result of the activity (see Figure 4.19). This was similar to the story in the majority of other cases studied.

**Figure 4.20** - The changes in all mood factors following participation in the activities in Afan Forest



Changes in mood after the forest activities is shown in Figure 4.20. Anger, confusion, depression and

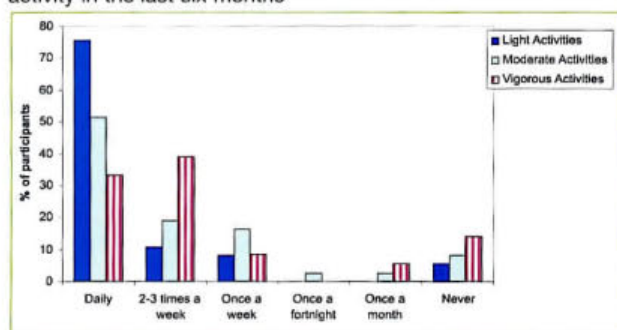
tension all decreased after the activity, suggesting an overall improvement in mood. Levels of fatigue increased and vigour levels decreased slightly, probably due to the strenuous physical activity of the mountain biking at Afan. This picture was similar to that shown by mountain bikers at Glentress Forest in Scotland.

The average General Health Questionnaire score (GHQ) for visitors to Afan was 8.33, lower than the average score when compared to the rest of the population (8.73) (which represents a better level of psychological health).

### Physical activity

The level of physical fitness of volunteers was examined by including questions relating to the amount of physical activity of differing levels undertaken daily, every week, every month, every six months or not at all. Light activities included using the stairs or walking for pleasure; moderate activity examples included gardening, housework and bowls; and vigorous activities included playing sports, running and swimming. Results can be seen in Figure 4.21.

Figure 4.21 - How often participants took part in various levels of activity in the last six months



Visitors to Afan are reasonably active people. Over half of those studied took part in light and moderate activities every day, and over 75% took part in vigorous activities at least once a week. This frequency of vigorous activities is slightly higher than that of our average survey population which suggests that most visitors to Afan are fitter than average.

### Qualitative responses

Some of the comments that visitors to Afan have given are shown in Box 4.7. Visitors not only drew attention to the benefits of exercise and the fun element to mountain biking but also to the social aspect of getting together with friends. Many people mentioned how relaxing it is to be in beautiful countryside and highlighted the stress-relieving properties of getting back to nature. The results show that mountain biking and walking in Afan Forest Park produced both physical and mental health benefits, as well as adding to social capital.

Box 4.7 - Afan Forest: What is Special? comments from participants

*'Fresh air, good for myself, baby and dog, plenty of exercise.'*

*'Good fun and keeps you fit.'*

*'Relieved some built up tension.'*

*'Sense of achievement at completing route.'*

*'Team work, fresh air, fitness, feeling good about self.'*

*'Getting to bond with lads I haven't spent much time with, having some freedom.'*

*'Different way to see the countryside, awesome rush.'*

*'I walk the dog most days as it helps me to relax and enjoy the countryside. The forest is especially beautiful during autumn as the colours change so fast and I get pleasure out of watching it.'*

*'The scenic forest and the exercise is rewarding.'*

*'I walked about 7.5 miles and did a new activity called geocaching.'*

*'Fresh air, good exercise and a real thrill from the ride, as well as camaraderie and team spirit!'*

*'Gets you outside - makes you feel more alive and in touch - puts things in perspective, makes you feel better too! Muddy!'*

*'Gives me a buzz, releases all my tensions, keeps me fit, keeps me sane!'*

*'Fresh air and exercise help me to lose weight and feel better about myself.'*

*'Good energetic day out with minimal cost to all!'*



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Photos courtesy of Afan Forest Park/Neath and Port Talbot Council

#### 4.8 Case Study 8 - Torfaen Green Gym, Pontypool, Gwent, Wales



##### Project information

Torfaen is in an ex-coal mining area near to Pontypool in south east Wales. Torfaen Green Gym is one of a national network of Green Gyms. Green Gyms co-ordinated and supervised by the British Trust for Conservation Volunteers (BTCV) offer people an opportunity to improve their fitness by involvement in practical conservation activities such as planting hedges, creating and maintaining community gardens or improving footpaths (for more details of Green Gyms see Section 2.6).

Green Gyms offer regular sessions of conservation activities in accordance with health and safety guidelines, and people can join for an hour or more on a weekly or twice-weekly basis. Torfaen Green Gym has been running for two years and works at various locations around Pontypool, depending on the task. On the fieldwork day the Green Gym group went to Cwmbran City Farm. Each session always starts with some warm-up exercises and then the intensity of exercise depends on the particular conservation task for that day. At any one session of Torfaen Green Gym there are typically four/five people with a mix of ages, fitness, abilities and education and they are usually outside working for two-and-a-half hours.

Unfortunately, on the day of the fieldwork it was very cold with torrential rain so only two of the group arrived and activities had to be abandoned at the site because of the weather. The two participants agreed to take their questionnaires home and complete them before and after the next Green Gym session and then return them. The results for this case study are therefore based on a very small survey population.

##### Population data

Key information on the volunteers for Torfaen Green Gym is shown in Table 4.15. Two volunteers completed the questionnaires, both male, one 27 and the other 72. Both participated in conservation activities. The average calories (kcal) used per session is 825, and at 330 calories per hour this represents moderate physical activity.

One of the volunteers was retired and the other was a student. One participant had continued his education after the minimum school leaving age but neither had a degree or equivalent professional qualification.

Table 4.15 - Torfaen Green Gym key basic data

Activity/ Initiative	Calories used per hour (kcal)	Calories used per session (kcal)	No. of subjects	Male: Female Ratio	Age Range (yrs)	Average age (yrs)	Main occupation categories of participants	General health state score (out of 100)
Conservation work	330	825	2	2:0	27 - 72	50	50% retired 50% student	50.00



## Health status

The general health state of the volunteers was 50.00 (out of a possible 100) which represents a score well below (-2.01) the UK population average and much lower than the average for all 263 respondents. One volunteer had experienced serious illness in his family and in caring for others, himself and one had experienced it. These proportions of those experiencing serious illness were lower than those averages for the whole of the survey population, implying more illness in this group of people. However, the small sample size is likely to be a key factor. The measures show that the Torfaen participants received medical treatment much fewer times in the last year compared to the rest of the study population (see Table 4.16).

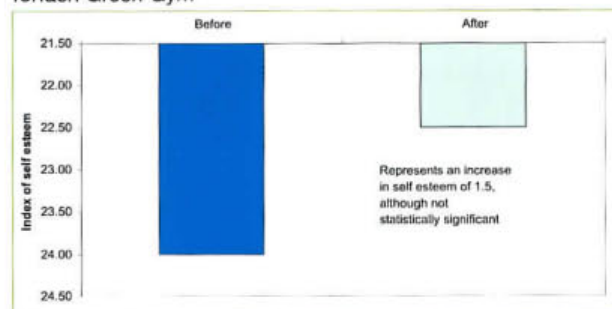
**Table 4.16** - Average number of times participants received medical treatment in the last year compared to average scores for the study population

	<b>Torfaen Green Gym</b>	<b>Whole study population</b>	<b>Comparison</b>
No. of visits to the doctor in the last year	1.5	2.2	fewer
No. of times referred to a specialist	1	0.32	fewer
No. of times been prescribed drugs	1	1.53	fewer
No. of times referred for treatment	0	0.33	fewer
No. of times admitted to hospital	0	0.16	fewer

Smoking habits of the participants from Torfaen Green Gym cannot really be compared to the averages for the rest of the study population due to the small sample size, but one person was a current smoker and the other had given up.

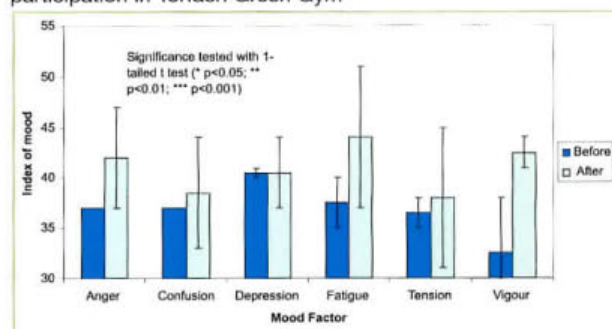
Elements of the questionnaire that examined the psychological health of volunteers showed that, as a group, the self-esteem of visitors improved as a result of the activity (see Figure 4.22). This was similar to the story in the majority of other cases studied. Self-esteem scores in this group were, however, the lowest to start with compared to other groups.

**Figure 4.22** - The change in self-esteem following participation in Torfaen Green Gym



Changes in mood after the conservation activities are shown in Figure 4.23. Anger, confusion, depression and tension all increased after the activity, suggesting an overall deterioration in mood. Although levels of fatigue increased, so too did vigour levels. This picture is completely different to that shown by results from all of the other case studies. Again, this is likely to be due to the small population size and possible confusion with the questionnaire in the absence of researchers. It may also have been affected by weather conditions.

**Figure 4.23** - The changes in all mood factors following participation in Torfaen Green Gym



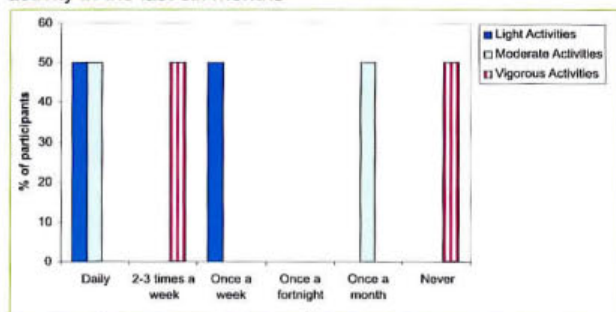
The average General Health Questionnaire score (GHQ) for volunteers was 9, slightly higher than the average score when compared to the rest of the population (8.73) (which represents a slightly lower level of psychological health).

## Physical activity

The level of physical fitness of volunteers was examined by including questions relating to the amount of physical activity of differing levels undertaken daily, every week, every month, every six months or not at all. Light activities included using the stairs or walking for pleasure; moderate activity examples included gardening, housework

and bowls; and vigorous activities included playing sports, running and swimming. Results can be seen in Figure 4.24.

Figure 4.24 - How often participants took part in various levels of activity in the last six months



Torfaen Green Gym participants are reasonably active people. They both took part in light activities at least once a week; one participated in moderate activities daily and the other once a month.

#### Qualitative responses

Both participants liked the physical aspects of the conservation work and appreciated being outside. They said:

*'It stimulated my body and I enjoyed the fresh air.'*

*'Keeps me active - takes my mind off things.'*

The results from this one example of a BTCV Green Gym cannot be taken as an accurate reflection of the success or otherwise of Green Gyms as a whole. It was unfortunate that the numbers of participants were so small and the weather was atrocious because these factors have undoubtedly adversely affected the results.

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Photos courtesy of BTCV

<http://www.btcv.org/greengym/>



#### 4.9 Case Study 9 - Walking Out Project, Lincolnshire, England



##### Project information

Walking Out is a project from the Ramblers' Association funded by the Countryside Agency to promote walking and its associated benefits to people who have not had the opportunity to enjoy walking before. The Walking Out project is currently running in three areas - Lincoln, Stoke and Sheffield - and aims to develop partnerships with local community groups and organisations. The project has already made links with many different groups, including groups for older people, refugees and disabled people, and delivers accessible, short walks led by a walk leader. The Walking Out project in Sheffield has been running since April 2004 and

has a regular group of approximately 25 people who go out walking every week (up to three times a week during the summer). The Walking Out group studied in this research is the one in Lincolnshire which is a slightly smaller sized group of people.

##### Population data

Key information on walkers is shown in Table 4.17. Five walkers on the Walking Out project in Lincoln completed the questionnaires and all were older people. The main activity was walking. The average calories (kcal) used per visit was 648, and at 324 calories per hour this represented gentle physical activity.

All of the walkers were retired. The majority of participants (60%) continued their education after the minimum school leaving age and 40% had a degree or equivalent professional qualification.

##### Health status

The general health state of the walkers was 81.00 (out of a possible 100) which represents a score just above (0.069) the UK population average for that age group but lower than the average for all 263 respondents (81.35). Three-quarters of visitors had experienced serious illness in their family, all had experienced it in caring for others and a third had experienced it themselves. These proportions of those experiencing serious illness were markedly higher than the averages for the whole of the survey population, implying more exposure to illness in this group of people. The higher than average age for this group may have influenced this result.

The measures designed to show how healthy a person is revealed that the walkers received medical treatment slightly more times in the last year compared to the rest of the study population (see Table 4.18). The group of walkers can therefore be said to be slightly less healthy than our average.

Table 4.17 - Walking Out Project key basic data

Activity/ Initiative	Calories used per hour (kcal)	Calories used per session (kcal)	No. of subjects	Male: Female Ratio	Age Range (yrs)	Average age (yrs)	Main occupation categories of participants	General health state score (out of 100)
Walking	324	648	5	2:3	60 - 67	65	100% retired	81.00

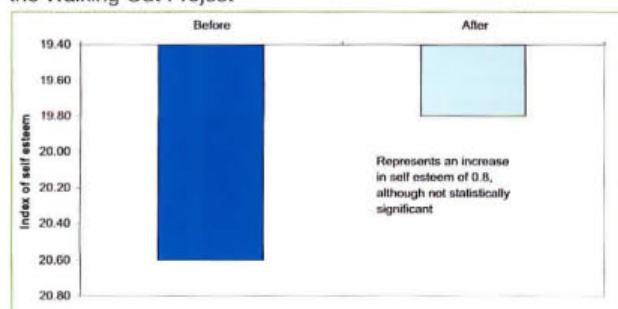
**Table 4.18** - Average number of times participants received medical treatment in the last year compared to average scores for the study population

	<b>Walking Out Project</b>	<b>Whole study population</b>	<b>Comparison</b>
No. of visits to the doctor in the last year	1.60	2.2	fewer
No. of times referred to a specialist	0.40	0.32	more
No. of times been prescribed drugs	2.60	1.53	more
No. of times referred for treatment	0.60	0.33	more
No. of times admitted to hospital	0.20	0.16	more

All of the walkers said that they encountered no problems at all with mobility, self-care or their usual daily activities. 60% said they experienced no problems with anxiety or depression, and 100% did not suffer from pain or discomfort. Smoking habits of the walkers were markedly below our average for the study population, with no current smokers at all, 40% ex-smokers and 60% never smokers compared to 12%, 26% and 62% respectively.

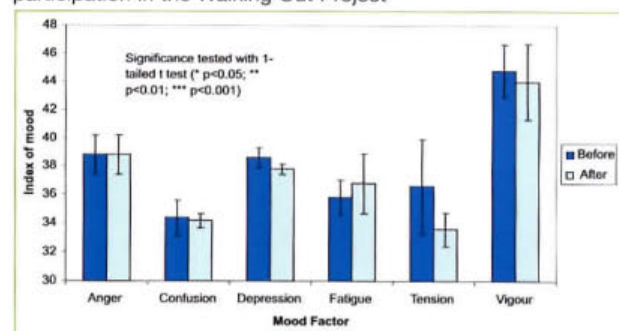
Elements of the questionnaire that examined the psychological health of the walkers showed that, as a group, the self-esteem of visitors improved as a result of the activity (see Figure 4.25). This was similar to the story in the majority of other cases studied.

**Figure 4.25** - The change in self-esteem following participation in the Walking Out Project



Changes in mood after the conservation activities is shown in Figure 4.26. Anger levels remained the same and confusion, depression and tension all decreased after the activity, suggesting an overall improvement in mood. As levels of fatigue increased and vigour decreased, this suggests that participants were physically tired after the exercise.

**Figure 4.26** - The changes in all mood factors following participation in the Walking Out Project

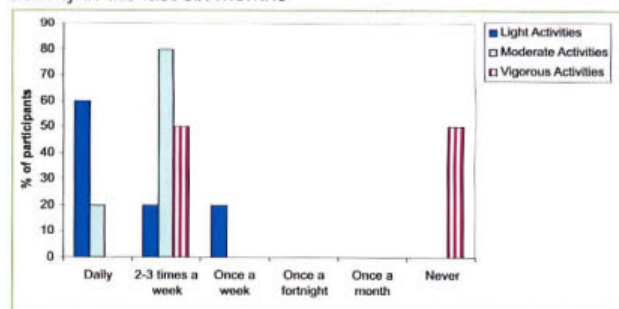


The average General Health Questionnaire score (GHQ), which measures overall psychological health, was 7.60 for walkers, which is a lower than average score when compared to the rest of the population (8.73) but which actually represents a better than average level of psychological health.

### Physical activity

The level of physical fitness of walkers was examined by including questions relating to the amount of physical activity of differing levels undertaken daily, every week, every month, every six months or not at all. Light activities included using the stairs or walking for pleasure; moderate activity examples included gardening, housework and bowls; and vigorous activities included playing sports, running and swimming. Results can be seen in Figure 4.27.

**Figure 4.27** - How often participants took part in various levels of activity in the last six months





Participants in the Walking Out Project in Lincoln are reasonably active people. Over half of those studied took part in light activities every day and in moderate activities two to three times a week. Half of the walkers participated in vigorous activity two to three times a week and the other half did not take part in vigorous activity at all.

#### Qualitative responses

All of the participants said that they felt better after walking in the countryside. The social element of meeting up with other people also meant a lot to participants:

*'To be able to escape from the noise and pollution of traffic and get out into the countryside for a walk.'*

*'Walking in a group of people.'*

*'Meeting people, generally feeling better afterwards.'*

*'Being out in the fresh air, meeting other people, visiting a new place.'*

For more information about the Walking Out Project please contact

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Photos courtesy of Simon Bolton

#### 4.10 Case Study 10 - Fishing, Layer Pit, Essex, England.



##### Project information

The Colchester Angling Preservation Society (CAPS) manages Layer Pit Fishing Lake, near Colchester in Essex, for its members. Layer Pit is a very picturesque lake, rich in wildlife, and is said to be one of the most popular fishing spots in the county. Anglers fish the various swims around the lake, and although fishing can be quite sedentary until fish bite, the fishermen here are usually outside in all weathers for long periods of time, frequently in excess of ten hours. Most of the anglers know each other, and even though they usually fish individually, many meet up for a chat over a cup of tea on the lakeside so there is quite a sense of camaraderie.

Fishermen at Layer Pit are predominantly male, with an average age of 43.

##### Population data

Key information on the Layer Pit fishermen is shown in Table 4.19. Eight people completed the questionnaires most in their forties and male. Although ages ranged from 21 to 66, the average age of volunteers was 43. The main activity was fishing. The average calories (kcal) used per visit was 3,528, and at 294 calories per hour this represented gentle physical activity but for long periods of time.

Half of the anglers were employed or self-employed and the other half were retired. Some of the participants (38%) continued their education after the minimum school leaving age and 13% had a degree or equivalent professional qualification.

##### Health status

The general health state of the fishermen was 67.88 (out of a possible 100) which represents a score just below (-0.77) the UK population average for that age group and is also below the average for all 263 respondents. Less than a third of anglers (29%) had experienced serious illness in their family; some had experienced it in caring for others (17%) and a quarter had experienced it themselves. These proportions of those experiencing serious illness in others were lower than those averages for the whole of the survey population, but experiencing serious illness themselves was a higher than average proportion, implying slightly more illness in this group of people.

The measures designed to show how healthy a person is, revealed that the anglers received medical treatment slightly more times in the last year compared to the rest of the study population (with the exception of admission to hospital and

Table 4.19 - Fishing key basic data

Activity/ Initiative	Calories used per hour (kcal)	Calories used per session (kcal)	No. of subjects	Male: Female Ratio	Age Range (yrs)	Average age (yrs)	Main occupation categories of participants	General health state score (out of 100)
Fishing	294	3528	8	8:0	21 - 66	43	50% employed and self- employed 50% retired	67.88



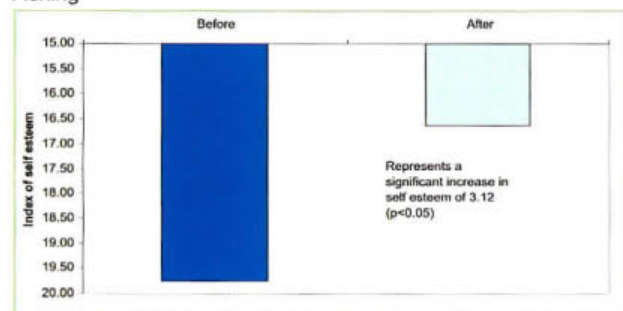
referral for treatment which were slightly fewer) (see Table 4.20). The fishermen can therefore be said to be slightly less healthy than our average.

**Table 4.20** - Average number of times participants received medical treatment in the last year compared to average scores for the study population

	Fishing	Whole study population	Comparison
No. of visits to the doctor in the last year	2.88	2.2	more
No. of times referred to a specialist	0.38	0.32	more
No. of times been prescribed drugs	2.57	1.53	more
No. of times referred for treatment	0.25	0.33	fewer
No. of times admitted to hospital	0.13	0.16	fewer

Three-quarters of the fishermen said that they encountered no problems at all with mobility, pain or discomfort or their usual daily activities. All said they had no problems with self-care and 88% said they experienced no problems with anxiety or depression. Smoking habits of the anglers were worse than our average for the study population, with 38% current smokers, 50% ex-smokers and 12% never smokers compared to 12%, 26% and 62% respectively.

**Figure 4.28** - The change in self-esteem following participation in Fishing

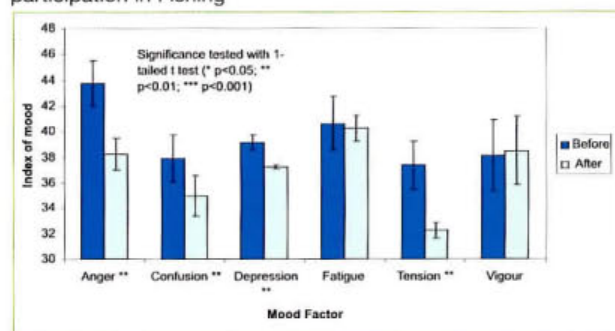


Elements of the questionnaire that examined the psychological health of those fishing at Layer Pit showed that, as a group, the self-esteem of visitors improved as a result of the activity (see Figure 4.28). This was slightly better than the story in the majority of other cases studied. Self-esteem scores

in this group may well be influenced, by the degree of success of the fishing trip i.e. the number or size of fish caught.

Changes in mood after the conservation activities is shown in Figure 4.29. Anger, confusion, depression and tension all decreased markedly after the activity, suggesting an overall improvement in mood. Levels of fatigue also decreased and vigour levels increased, implying that the participants felt rested and re-energised. This picture was slightly better than that shown by results from the majority of case studies.

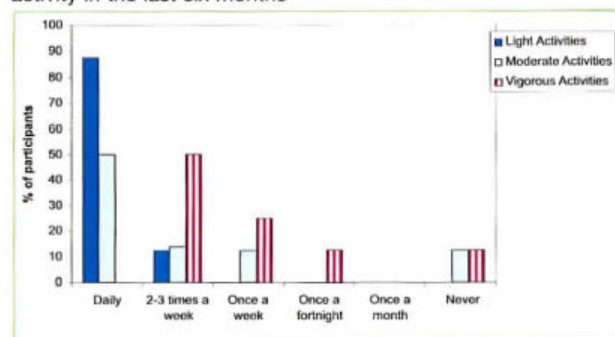
**Figure 4.26** - The changes in all mood factors following participation in Fishing



The average General Health Questionnaire score (GHQ) for fishermen was 9.00 which is a higher than average score when compared to the rest of the population (8.73) (which represents a lower level of psychological health).

### Physical activity

**Figure 4.30** - How often participants took part in various levels of activity in the last six months



The level of physical fitness of anglers was examined by including questions relating to the amount of physical activity of differing levels undertaken daily, every week, every month, every six months or not at all. Light activities included

using the stairs or walking for pleasure; moderate activity examples included gardening, housework and bowls; and vigorous activities included playing sports, running and swimming. Results can be seen in Figure 4.30. The fishermen at Layer Pit are reasonably active. All participants took part in light activities at least two to three times a week (most of them daily) and the majority took part in moderate activities at least once a week. Only a minority never did any vigorous activities, and the remainder took part in vigorous activity at least once a fortnight.

### Qualitative responses

Box 4.8 - Fishing at Layer Pits: What is Special? comments from participants

*'I think it is, in part, due to fishing having so many aspects to it. A lot of these aspects are a kind of by-product of going fishing. For some people it's all about relaxation and getting away from their day-to-day lives. For me the chance to relax when fishing is an added bonus but not the reason I go.'*

*'As we go on we can't help but develop a love of the countryside and the environment we fish in and the things we see when we are out there. We are very lucky to have a hobby that places us in some of the best bits of the country. All anglers can list a series of unforgettable wildlife encounters they've had, or envisage the perfect sunset or sunrise, which is always somehow better when looked upon with water in view.'*

*'The thrill of silently creeping around to see the big fish lurking in the water.'*

*The relaxation of sitting amongst nature, watching the world go by, accompanied by the background orchestra of the dawn chorus.*

*The wonder of watching a kingfisher land on the end of your fishing rod and being able to admire its beauty while too scared to move for fear of making it fly away.'*

*'The tranquillity of being on your own, or the comradeship when fishing with your friends'.*

*'Getting up to find the frost has frozen everything or the wonderful dew is covering everything really helps you realise that you are away from it all and that there is no pressure.'*

Some of the comments given by the fishermen of CAPS are shown in Box 4.8. These clearly indicate that it is the combination of the beautiful surroundings, the fishing and the meeting up with others that makes fishing so enjoyable. Many mentioned the value of getting back to nature and away from the stresses of day-to-day life. Fishing thus produces both physical and mental health benefits.

For more information about Fishing at Layer Pits contact

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Photos courtesy of Steve Barton and CAPS - [www.caps.org.uk/frames.htm](http://www.caps.org.uk/frames.htm)



## Chapter 5: Policy implications of green exercise

### 5.1 Implications of green exercise research

We conclude that green exercise has important implications for public and environmental health. A fitter and emotionally more content population would clearly cost the economy less as well as reducing individual human suffering. Obesity and related conditions already cost more in public health terms than smoking (Kenkel and Manning, 1999; Lang and Heasman, 2004), and will overtake smoking as industrialised countries' largest source of mortality in ten to fifteen years if current trends persist. Thus increasing support for and access to a wide range of green exercise activities for all sectors of society should produce substantial economic and public health benefits. Such support could include the provision and promotion of healthy walks projects, exercise on prescription, healthy school environments, healthy travel to school projects, green views in hospitals, city farms and community gardens, urban greenspace, and outdoor leisure activities in the countryside.

However, there is a distinct tension between these conclusions and existing drivers of economic development in both rural and urban regions. In urban areas, greenspaces are often removed to keep down maintenance costs, and there is often a perception that well-vegetated places offer more opportunities for criminals and drug-dealers to hide. In rural areas, modern agricultural development continues to put pressure on spaces where people can enjoy green exercise opportunities.

In this chapter, we first review the current participation rates for green exercise, and then analyse the economic benefits, the barriers to participation, and best practice for countryside projects. We then conclude with sectoral policy recommendations, addressing

- 1 access to the countryside
- 2 agricultural reform
- 3 schools
- 4 health sector

- 5 sustainable communities and regeneration
- 6 social aspects
- 7 biodiversity
- 8 sports and leisure industry
- 9 partnerships

### 5.2 Current participation rates for activities in greenspaces

As indicated earlier in this report, there has been a dramatic fall in physical activity over the past fifty years in the UK, though leisure-time physical activity may have increased. The behaviour of many groups of people seems to suggest that they already appreciate the benefits of protecting the environment, undertaking physical activity, and combining the two. Despite the increased daily disconnections between a predominantly urban population and nature, and the increase in sedentary lifestyles imposed or adopted by the majority of the population, people still express their values in a variety of direct and indirect ways, through membership of environmental and wildlife organisations; visits to the countryside; and membership of gymnasiums and of sports and outdoor organisations.

Each year, some 1.5 billion day visits are made to the UK countryside and seaside, and these visitors spend more than the gross income earned by farms for the food produced in the landscape. A substantial proportion of these day visits involves significant physical exercise (see Table 5.1). In addition, urban people make 2.5 billion day visits to urban parks, each of which again contributes to the physical and mental wellbeing of participants, mainly through walking and formal sports. Country parks are generally located on the urban fringe, and thus readily available to many people (CRN, 2003). There are 270 country parks in the UK (covering 39,000 ha), 64% of which have a nature conservation designation. Some 73 million visits are made each year, with an average of 270,000 per park. The clientele is mostly 25-44 years old from social groups A and B. Country parks should be seen as an important part of the national health system.

Table 5.1 - Green Exercise in British countryside and days spent on each activity (2002-03)

	Countryside		Seaside/Coast		Wood/Forest		Water with boats		Water without boats	
Volume (millions)	1,262		267		252		119		134	
Value (£bn)	10.9		3.1		1.2		1.4		1.1	
Main Activity	(%)	Trips per yr (million)	(%)	Trips per yr (million)	(%)	Trips per yr (million)	(%)	Trips per yr (million)	(%)	Trips per yr (million)
Walk, hill-walk, ramble	32	404	20	53	62	156	34	40	54	72
Cycling, mountain biking	4	50	1	3	8	20	7	8	2	3
Swimming	1	13	3	8	1	3	3	4	0	0
Visit beach	0	0	21	56	0	0	1	1	0	0
Sports, active pursuits, indoor, outdoor, field, water	11	139	7	19	4	10	8	10	9	12
Hobby or special interest	8	101	6	16	4	10	5	6	4	5
Visit leisure attraction	5	63	4	11	3	8	6	7	5	7
Visit park or garden	3	38	1	3	7	18	4	5	9	12
Informal sports, games, relaxation and well-being	3	38	2	5	1	3	0	0	1	1
Other	33	416	36	96	9	23	31	37	16	21

Source: GB Leisure Visits (2004)

Membership of environmental and heritage organisations also increases access to outdoor facilities and greenspace. Whether this would have happened without the organisations is not clear, but it is true that such membership has been growing steadily in recent years. Some now have very substantial numbers of members (such as National Trust with 3 million members; RSPB with 1 million; The Wildlife Trusts with 500,000; and the Ramblers Association with 170,000). Some of these activities and memberships already have a 'green exercise' component, such as walking in the countryside, fell-running and orienteering, mountaineering, and work days on nature reserves. These activities are classed as informal recreation. However, there is a contradictory trend in some sectors with people less likely to take up membership of formal organisations, such as angling clubs, preferring to fish alone.

Greater participation by the public in green exercise has increased due to new schemes such as the Walking the way to Health Initiative, which has encouraged 900,000 people to walk more. Participants in local Walking the way to Health

Initiatives go for organised, led walks and make use of the walk leaflets produced by the scheme. Walkers are also motivated by articles in the press, by wearing step-o-meters and using the website. The number of local Walking for Health schemes is currently 350, with 205 schemes being grant-aided in areas of high health need and the remainder self-funded. In addition, all schemes cater for the independent walker by offering places to walk, free led walks and information.

At the same time, there is also evidence that membership of private and public gyms and health clubs has increased in recent years, as urban people look to local opportunities to engage in physical activity. In 2001, there were 4,059 public and private health and fitness clubs, up from about 2,200 in 1980. Some 5.4 million people are members of these clubs (though many do not take regular advantage of their membership).

The UK also has a network of some 110,000 community amateur sports clubs run by 1.5 million volunteers. Large numbers of people regularly engage in physical activity in their communities - for example, 400,000 people play football each



weekend in 33,000 registered amateur football clubs. There are, however, concerns that some organised local sports are under threat from loss of playing fields for development, and the number of sports clubs has declined by 40,000 since 1996.

### 5.3 Economic benefits of green exercise

Our research has shown that exposure to both nature and physical activity improves mental health and physical wellbeing over a short period. Although we do not know whether this alone will lead to long-term improvements, we have provided some evidence to suggest that behavioural and lifestyle changes can be provoked by such activities, leading to continuing re-exposure which would result in a healthier population.

It is already clear that there are substantial economic benefits of a healthier population (Wanless, 2002; DoH, 2004). If life expectancy in the UK rose by five years (to current Japanese levels), then GDP in the UK would rise by £3-5 billion per year. Workplace absences alone cost the UK some £11 billion per year, and some of these would be reduced if the population were healthier. As indicated in Chapter 1, CHD kills 110,000 people per year, yet this is largely preventable with appropriate diets and regular physical activity. Mental health problems affect a large number of people in the UK, yet exposure to greenspace has a clear positive effect on both self-esteem and mood.

The cost to the NHS per sedentary person has been estimated to be £130 per year, putting the total cost to the NHS of inactivity at some 6% of its £70 billion budget per year (Ashcroft, pers. comm.). It has been further estimated that 60 retired people walking can save one life per year, and reduce falls by nine cases per year, and twenty-one overweight people walking can save one case of diabetes per year.

The Department of Health (2004) has estimated that a 10% increase in adult physical activity would benefit the UK by £500 million per year, saving 6,000 lives. The potential economic impact of emotional benefits and improved mental wellbeing has not been quantified but would be additional to these physical health benefits, and might indeed

outweigh them. If these benefits are achieved through 'green' activities that might also provoke long-term changes in attitudes to nature and the environment in both rural and urban contexts, then wider support for pro-sustainability policies is more likely to arise.

Green exercise has important public and environmental health consequences. At one level, a fitter and emotionally more content population costs the economy less. Obesity already costs more in public health terms, and will overtake smoking as Britain's biggest killer in ten to fifteen years if current trends persist. If trends continue, other diet- and physical inactivity-related diseases will also become more prevalent. Increasing the support for and access to a wide range of green exercise activities for all sectors of society will therefore produce substantial public health benefits and avoided costs.

Can green exercise therefore be considered a good buy for public health, providing physical, social and mental health benefits? Could some of the annual £10 billion of costs of obesity, coronary heart disease and physical inactivity be avoided? Getting the policies right will help, and section 5.6 contains sectoral policy recommendations in nine distinct areas.

One of the central needs now is to ensure that the assessment of the value of greenspace and the countryside includes the potential mental and physical health benefits to both those working and visiting these areas. The farmed countryside is already being recognised as a multifunctional space, with its economic value being more than just agricultural production (RSPB, 2000; Rayment and Dickie, 2000; Loomis and Richardson, 2001; Pretty, 2002; National Trust, 2003; GHK, 2004). Agricultural production shapes the countryside, but two visitors staying in the countryside for two weeks now bring in the same amount of money as 5 tonnes of wheat.

The same argument can also be made for the multifunctional value of urban greenspace. These spaces are valuable not just to local people for contemplation, dog walking, sports and species



conservation, but also because they contribute directly to the nation's health.

The NHS budget is several hundred times more than current spending on conservation and access to greenspaces, yet spending on these will help to prevent illness and so save the UK money.

#### 5.4 Barriers and accessibility

If green exercise can have such a positive effect on health, why then do more people not regularly take exercise and visit green-space? First, it is clear from participation rates (section 5.2) that a large proportion of the UK population already does engage in forms of green exercise. Thus, there is already a health dividend being experienced. On the other hand, health data indicate that another substantial proportion of the population is in danger of becoming obese and too sedentary. It is clear that there are barriers to participation affecting different groups of people in different ways. How, then, can environmental and health policy reach the sedentary 'sofa' dwellers'?

A variety of factors are important barriers to participation in activities in both local neighbourhoods and in the countryside (Brownson *et al.*, 2001; CRN, 2001). These include lack of time, feeling too tired from work, no motivation to take exercise, absence of safe pavements and walking and cycling paths, lack of transport options, heavy traffic on roads, and lack of nearby enjoyable scenery.

The availability of accessible green-space close to home is a well-known factor in levels of exercise participation, and particularly if these areas are located within a few hundred metres or a five minute walk from home. However, two main barriers are shown to affect the accessibility of such areas (Harrison *et al.*, 1995)

**physical constraints** - these include the distance of the green-space from the home, the presence of obstacles (such as roads to cross) and the extent to which particular groups of adults and children are independently mobile.

**social and cultural factors** - public spaces are sometimes seen as 'risky' and associated with crime, and this fear of crime may affect

people's willingness and ability to make the most of these natural places.

The amount of usage of green-spaces also varies from site to site and, according to visitor surveys, some groups of people are more likely to use these places than others. For example, the numbers of teenagers and young adults using parks and open spaces generally outweigh the numbers of children under five, older people and those from black and ethnic minorities. In its study in 2001, CRN also identified four groups with low participation rates in countryside recreation as a whole: i) young people, ii) low-income groups, iii) ethnic minorities and iv) disabled people.

Faber Maunsell (2003) also identifies seven further key issues regarding barriers to participation in the countryside

**Location of rights of way** - many people do not know where footpaths start, finish or how to get to them.

**Personal safety** - as in the Harrison study, Faber Maunsell highlights the fear from personal attack, angry farmers, farm animals or fear of having a medical emergency as factors that can prevent people from accessing green-space in the countryside.

**Terrain** - lack of knowledge about the terrain of an area can also act as a barrier to participation. If there is no information available on type of surface, severity of hills, maintenance standards of paths and hedges and obstacles, for example, many people may be put off. This is doubly worrying for those people suffering from joint and balance problems or those with generally low levels of fitness.

**Facilities** - lack of information about facilities, such as toilets, that may be available en route may also act as a deterrent.

**Time available** - many people assume that in order to have any benefit to health, walks need to be for at least an hour, and because of this many people feel that they then cannot spare this much time to walk.

**Motivation** - many people find it difficult to get the motivation to do any type of exercise.

**Purpose** - some people need a reason to go for a walk. These reasons include: walking with a



pushchair, walking the dog, or social reasons such as meeting people or family time.

The challenge facing all agencies is therefore to find ways to remove these barriers to participation.

### 5.5 Good practice for projects

Best practices in the provision of countryside recreation in England, Wales, Scotland and Northern Ireland were analysed by CRN in 2001. This found that the more successful initiatives generally had the following attributes

- ▶ being community driven
- ▶ having empowerment as an objective
- ▶ having social cohesion as an objective
- ▶ promoting partnerships
- ▶ having 'outreach' as opposed to just 'countryside staff'
- ▶ being assessed by both 'quantitative' and 'qualitative' indicators
- ▶ using effective marketing

Driving up participation in sport and recreation in the countryside has been acknowledged by a recent report (Elson, 2004). There may, however, be some conflicts between sport and recreation in the countryside and conservation interests (CRN, 1995). Further conflicts can arise if too many people visit particular sites, and so increase traffic congestion (CRN, 1994).

From the review of current literature and examination of the case studies highlighted in this research, some other examples of good practice clearly emerge. Many of these certainly address several of the barrier and accessibility issues raised in the previous section. The success of a project or initiative can be increased by considering some of these examples of good practice from the outset. Good practices may translate to all types of 'green exercise' initiative and so are largely generic while others may relate to projects where the focus is primarily i) land or access-based or ii) group-based.

#### Generic

**Partnerships** - whether the project is of a land or group focus, successful partnership working is important. To have many partners involved with an initiative does not necessarily mean that the

initiative will be successful, as unless there is good communication and partnership working there is the danger that the project appears piecemeal. Cases where several organisations, funding bodies and experts have a good relationship seem to be more successful than ones that do not. For example, at Glentress Forest the working relationship between the Forestry Commission Scotland, the private enterprise The Hub (mountain bike shop and café) and the local community has meant that this initiative is going from strength to strength. This is also the case for group-based initiatives, such as the Walking the way to Health Initiative in Ballymena. This is one of the most successful WHI groups around, and one of the reasons given for this by organisers is the strong partnership with the local Borough Council which fully supports the initiative.

**Opportunities for feedback** - comments boards, suggestion boxes and other opportunities for participants to suggest improvements or to highlight problems can be invaluable in increasing the success of an initiative and can create a sense of ownership for the initiative. Feedback can also be encouraged further if it is carried out in an anonymous way.

#### Land- or access-based

**Clearly marked routes** - safety, added confidence, conflict reduction. Clearly marked routes can dramatically increase the popularity of an area as people know that they will not get lost (both in the countryside and in urban green-space), therefore eliminating some safety concerns and adding confidence to participate. Where an area is used by several groups of people doing different activities, such as a forest clearly marked routes, can prevent accidents and promote harmony between these users. If a family is out walking with young children when a mountain bike comes around the corner in the middle of a speedy descent, an accident and/or conflict may occur. Thus, in some circumstances, separating mountain bike, horseriding and walking routes could help to solve this issue, though good management can result in appropriate co-provision.



Public rights of way are crucial for increasing access and maintaining adherence rates in physical activities such as walking (Faber Maunsell, 2003). The value of local access is also shown by the Towpath Monitoring Survey conducted by British Waterways (2003) on twelve canal side sites. This found that 62% of the 1,026 respondents indicated that the presence of the canal towpath had increased the amount of physical activity they regularly took. Of this total, 42% indicated that it had increased by a large amount.

#### Information -

- i) on the time taken to complete route,
- ii) on the relative ease/difficulty of the route or activity,
- iii) on the length of route

Points i), ii) and iii) add confidence, promote safety and enhance enjoyment in an area. If participants know that a walk is relatively easy, possible to do in normal shoes or while pushing a pushchair and will only take half an hour, they are more likely to have a go. Alternatively, those walkers or bikers who want more of a challenge can avoid the easy routes and plan their departure/arrival back around accurate estimates of time.

- iv) on any interesting or historical features en route,
- v) on the calorific count of a route

Points iv) and v) can add motivation for people to participate. If a route passes by some historical remains (e.g. an old coal mine, a panoramic view, a hill fort or a round house) some people are more likely to go for a walk fuelled by interest rather than for a desire to walk. In the same way, calorie-counted routes highlight the physical health benefits of a particular walk.

- vi) a programme of when any specific groups (organised or other) regularly use the area.

This can add a social element to a purely land-based initiative. Although many people will visit a particular recreational area, park or forest in informal groups of family or friends or on their own, rather than as part of an organised group,

a programme of any groups/events that take place in the area can create an opportunity for participants to meet other like-minded people. This can therefore increase the social capital of a community.

**Facilities** - safety, confidence and accessibility. The presence of facilities such as car parking, toilets, changing rooms, bike washers, information point, and cafés can make a big difference to the use of an area for outdoor recreation. Visitors will feel happier leaving their cars unattended for long periods of time if the car park is often busy, and people are more likely to visit an area if there are toilet facilities available. If there is a base from where people can start or finish their activity, such as a central car park or information point, it can also act as a meeting place and increase the likelihood of building up the social capital of the local community.

#### Successful market research/identification of users and a targeted approach to facilities -

where facilities in an area have arisen from the direct needs of users, they are targeted and more heavily used. In Glentress, for example, mountain bikers used the forest anyway, but when a private enterprise responded (in partnership with the Forestry Commission) to the desirability of bike hire and repairs, changing facilities and refreshments after an exhausting day out, the facilities were widely used and have vastly increased the numbers of all visitors, not just mountain bikers.

**Staff** - safety, security, motivation, confidence. Many land-focused initiatives are suitably funded in order to provide members of staff at visitor centres or information points. Trained members of staff can also make the difference between a person opting to take part in green exercise or not. The opportunity for members of the public to ask questions about the land and activities in the area or about facilities available is likely to raise motivation and confidence and ultimately increase the usage of an area. At places where potentially dangerous activities take place (mountain biking, climbing or canoeing), the availability of a staff member (forest or park ranger for example) to administer



first aid or call for an ambulance may make the difference in choice of venue.

### **Group-based**

Whether the group is designed to access a specific group of people or to promote a particular type of activity, there are many factors leading to success.

#### **Regularity of meeting** - this promotes confidence.

If participants and potential participants know that, for example, the group meets every Tuesday and Thursday at 10am, without fail whatever the weather and all year round, there is little room for confusion and doubt. This means that participants have the security of knowing they won't be on their own if they turn up and won't have to make decisions based on other factors - Is the weather 'good' enough? Is it still on during half term? I didn't go last week so have I missed an announcement? These factors can all make a difference to whether people engage with the initiative, especially for those who are perhaps on their own, unsure or lacking in confidence.

**A programme of events/dates/locations** - this promotes confidence, security and motivation and increases communication. If a project produces a programme of forthcoming walks, with location, times and meeting information, then potential participants feel secure in knowing where they are going and what time they will return, helping them to plan their day. This also eliminates any possible confusion and security worries for participants who are on their own or nervous and who might worry about their safety.

**Personality of group leader** - confidence, motivation and increased adherence rates. The personality of a project leader can have a huge effect on the success of an initiative. Where the organiser of a group is welcoming, exudes enthusiasm, promotes harmony and gives encouragement to members of all abilities, then they can really make the difference to whether a participant returns to the group regularly. As potential participants in a group or activity often feel shy about being 'new', or worry whether they will fit in or not, it is therefore up to the group leader in the first instance to give

encouragement and make them feel like they belong. Several of the cases in this research had dynamic leaders or organisers, and some participants in their groups would even ring to apologise in advance if they knew that they were going to miss a session.

**Advertising** - advertising the existence of a group or initiative in several places increases the likelihood of attracting new participants. When the group is advertised both in locations where anyone can see it (such as local papers, village halls and community centres) and also in places relating to health (GP surgeries, hospital waiting areas) then the numbers of participants were higher. However, word of mouth was one of the best advertising methods that the more successful case studies had used. In Ballymena, for example, many people had joined the WHI group because of the recommendation of a friend or relative.

Another key issue pertinent to good practice is evaluating the potential of a project or initiative from the outset (see Appendices D and E). Where baseline data of participants has been collected, quantitative or qualitative or both (physical ability, weight, body mass index, visitor rates, number of participants etc.), a comparison can then be made in future which will help to determine the success of the project in providing various health benefits. This is crucial for many community projects in particular to secure future funding or to justify scaling-up.

Practical guidelines and questions for the effective evaluation of green exercise projects can be found in Appendix E.

### **5.6 Sectoral policy recommendations**

Our review and research on the effects of green exercise has important policy implications for a wide range of rural and urban sectors. It is clear that a large number of people already use the countryside and urban/urban fringe greenspace for leisure activities, from which they derive a health benefit. However, physical and mental health problems are on the increase. Two challenges, therefore, remain



- ▶ to increase the number of people taking part in green exercise, especially those social groups suffering the most ill-health through sedentary lifestyles and those currently not accessing the countryside for recreation and leisure;
- ▶ to increase the rate of use by those people already participating in green exercise.

These can be addressed through improved provision and access, and by wider recognition that exposure both to nature and greenspace and to physical activity should be a central part of the policies and strategies of a large number of organisations. Some of these environmental determinants of physical activity and sedentary behaviour have been assessed (e.g. Owen *et al.*, 2000; Brownson *et al.*, 2004) as well as key environmental and policy interventions (e.g. Blamey *et al.*, 1995; Sallis *et al.*, 1998).

#### **Access and recreation providers**

Access and recreation providers (including local authorities) need to address maintenance of paths, sustainable transport, promotion of facilities and provision of information.

The greenspace already available to the public in national parks, areas of outstanding national beauty (AONBs), nature reserves, country parks, urban parks and heritage sites (e.g. held by the National Trust) constitutes a very significant resource for the country. All this accessible land is therefore an important health resource. However, at present too few people make use of these opportunities, and those that do tend to be from only certain social groups.

#### **Key recommendations**

- ▶ Government should ensure that the public are aware of these increasing opportunities through the Countryside and Rights of Way Act (CRoW), and that they know their rights and responsibilities when in the countryside in all areas.
- ▶ As part of local transport plans, agencies and authorities should identify the needs and demands of the public for greenspace access through rights of way improvement plans.
- ▶ Local authorities should place a higher emphasis on rights of way signage and

maintenance to encourage access and perceptions of safety, and should engage with local communities and non-government organisations to increase understanding of the value of nearby nature and greenspace, and to increase provision of walking and biking trails.

- ▶ As Local authorities should ensure there is access to countryside recreation activities close to the rural-urban fringe, together with developing healthy walks projects.
- ▶ As Access should be improved by better provision of sustainable transport systems to connect people in urban areas with both nearby and remote countryside areas. Bus companies should be encouraged to provide bike carriers.
- ▶ As Countryside agencies should provide more recreation and information centres to encourage access to specific areas currently under-provisioned.
- ▶ As Countryside agencies should ensure their provision of services at recreation and leisure locations is focused on encouraging socially-excluded groups to access the countryside.
- ▶ As Countryside and land agencies should consider and advertise the health implications of their resources, and health agencies should advertise the mental health benefits of physical activities in rural and urban greenspace.

#### **Agricultural managers and policy makers**

Agricultural managers and policy makers need to increase countryside access and encourage the farming industry to promote the opportunity to indicate that land management can involve opportunities for public health provision.

The Common Agricultural Policy is already undergoing reform, with farmers to receive public financial support only if they can provide environmental goods and services.

#### **Key recommendations**

- ▶ Government should ensure that access ways provided by farmers are well-maintained and connected up on a landscape scale.
- ▶ The farming industry should take note of the opportunity to emphasise that land management as a positive side-effect of farming is a health provision for the public.



## Schools

Schools should ensure that all primary age children experience visits to a range of types of countryside, and where possible establish their own on-site gardens; they should also emphasise the public health value of physical activity for all children.

### Key recommendations

- ▶ Schools should ensure that all primary age children have opportunities to visit woodlands and farmland, and where possible establish their own on-site gardens and develop appropriate local sourcing for food for school meals.
- ▶ Schools should emphasise the public health value of physical activity for all children, through informal walking and cycling as well as formal sports.

## Health sector

The health sector needs to consider the contribution green exercise makes to public wellbeing and so saving money for the NHS. The forthcoming Physical Activity Plan should emphasise the value of nature and greenspace for formal and informal use, and also stress the therapeutic value of the outdoors (both rural and urban) for delivering mental wellbeing.

### Key recommendations

- ▶ The NHS should place emphasis in the forthcoming Physical Activity Plan on the value of nature and greenspace for formal and informal use.
- ▶ The NHS should stress the therapeutic value of the outdoors (both rural and urban) for delivering mental wellbeing.
- ▶ Health professionals at PCT level, including GPs, should work closely with environmental, countryside, sports and planning professionals to link health and the environment more closely. Exercise prescription should be increased to encourage those with sedentary lifestyles and weight problems to become aware of the personal health benefits. A recommendation to take part in existing local walking for health schemes is potentially a cheap and effective way for primary health care practitioners to encourage people to become more active.

- ▶ Those involved in hospital design and planning should consider the value to patients and visitors of pleasant views from windows, of landscape artwork in wards, and of hospital gardens.
- ▶ Increase provision of pedometers to encourage self-monitoring of walking (target 10,000 steps per day for health; 20,000 steps for weight-loss).

## Planners and developers

Planners and developers should take account of the vital role that local greenspace (or nearby nature) plays for all people, and regard outdoor recreational activities as part of economic regeneration strategies in both rural and urban economically-depressed areas.

Local greenspace (or nearby nature) is vital for all people. There is evidence that use of such space is directly correlated with closeness of provision to homes.

### Key recommendations

- ▶ Planners and local authorities should ensure that all communities, especially new ones on both green- and brown-field sites, have both accessible local greenspaces (including urban parks, country parks, allotments, urban farms, community gardens), and accessible services (e.g. shops, surgeries) within walking distance.
- ▶ Outdoor recreational activities should be incorporated into economic regeneration strategies in both rural and urban economically-depressed areas.

## Social services

Social services should acknowledge that green exercise has clear mental health benefits for those people who engage collectively with existing groups (e.g. families) or new groups (e.g. WHI, adventure therapy). Therefore countryside and local authority agencies should ensure their provision of services at recreation and leisure locations is focused on encouraging families and other groups. Crime/social services agencies should also consider the therapeutic value of green exercise.

### Key recommendations

- ▶ Government and local authorities should provide support for best-practice projects to

increase awareness and access to green exercise activities.

- Crime and social service agencies of all types should consider the therapeutic value of green exercise as part of strategies to address anti-social behaviour amongst adolescents.

#### **Environmental managers**

Environmental managers should ensure that local and national Biodiversity Action Plans are rewritten to include a component on biodiversity activities that contribute to public health.

A good quality countryside or greenspace increases the value of the green exercise experience. Biodiversity is an important component of this quality, and should be seen as a community service.

#### **Key recommendations**

- Local and national Biodiversity Action Plans should be rewritten to include a component on biodiversity activities that contribute to public health.

#### **Sports and leisure industry**

The sports and leisure industry (especially gyms and fitness centres) should improve the green aspects of their facilities, and the formal sports sector should emphasise the health value of participation, as some sports (e.g. football, cricket) draw from a wider range of social groups than most countryside recreation. Public and private gyms and fitness centres are clearly oriented towards improving health, but the sports sector has only recently adopted health messages in its work.

#### **Key recommendations**

- Gyms and fitness centres should improve the green aspects of their facilities (e.g. windows with views, landscape pictures, television programmes).
- The formal sports sector, from local to national level, should emphasise the health value of involvement in sports, as participation in some sports (e.g. football, cricket) is from a wider range of social groups than is countryside recreation.
- Ensure strategic planning for promotion of a wide range of informal recreation activities.

#### **Partnerships**

Green exercise has implications for many sectors, suggesting the need for cross-disciplinary and sectoral strategies and action. Therefore countryside agencies should market the countryside as a health resource, and the private sector, particularly the food manufacture and retail industry, should be engaged in partnerships for provision of both healthy food and healthy places where the food is raised and grown.

It is clear that green exercise has implications for many sectors, suggesting the need for cross-disciplinary and sectoral strategies and action. A number of government and non-government organisations have recognised the importance of greenspaces for public health, including the DTLR (2002), National Urban Forestry Unit (2002), Countryside Agency (2003), Scottish Wildlife Trust (2003), DoH (2004), Groundwork (2004), RSPB (2004).

#### **Key recommendations**

- The majority of countryside visits are informal, and so countryside agencies should consider how better to market the countryside as a health resource to a wide range of social groups.
- The private sector, particularly the food manufacture and retail industry, should be engaged in partnerships for provision of both healthy food and healthy places where the food is raised and grown.
- All public and private agencies should consider the value to their employees and customers of a pleasant outdoor landscape, water, indoor vegetation, nature posters and paintings, fresh flowers, daylight, fish tanks and bird feeders, which can all be readily incorporated into the local physical environment with minimal expense.



## Policy implications from the research

The research shows that outdoor activity - 'Green Exercise' - has benefits for social and mental wellbeing in addition to the benefits of exercise. It is one of just a few studies that explore these benefits. Do we, therefore, need more studies to support policy development?

The case linking green exercise and health seems to be strong enough to move on from addressing the fundamental question of whether there are any benefits to looking now at how we maximise them. There are two dimensions to this. Firstly, we want to manage greenspaces - the physical resource - to deliver health benefits as effectively as possible. Secondly, we want to make these benefits as widely available as possible. The two are closely linked.

Managing the resource, whether it is open countryside or an urban park, will require us to understand the subjectively determined needs of our intended beneficiaries. We will require an expertise in design and in qualitative research and, as there are many parties who are interested in this area and able to make a positive contribution, we must be willing to work in partnerships.

Who should benefit? Len Almond, Director of the BHF National Centre for Physical Activity and Health speaking at the conference where the research was presented was quite clear on this. He suggested that the immediate target for our attention should be people who live a sedentary lifestyle but are, or have been, infrequent participants in green exercise. People who do not get outdoors at all should not be overlooked, but encouraging them is a long-term project.

We know that poor health and disadvantage go hand in hand. Recent research in Scotland indicates that childhood experience is important, that people who participated in green exercise as children are more likely to do so as adults. Also, we do not want to lose the opportunity of maintaining or increasing the levels of participation by those who are already engaged.

The case studies on which the research was centred illustrated the benefits and practical aspects of delivering them. They represent a sample of the projects and activities that are being developed throughout the UK. To learn from projects these we need effective evaluative frameworks, and evaluation that is built into the projects rather than added retrospectively.

Resources are scarce so we will need to be strategic in our approach. This implies a shared vision across all the organisations involved and perhaps some kind of co-ordinating function so that we can learn from each other and avoid duplication and unnecessary competition. We will want to tailor our approach to suit the social mix in any location, implying a pragmatic and flexible approach that reflects local circumstances.

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# Appendix A: Materials and methods: study of effects of rural and urban views on health

## Subjects

The effects of exercise whilst exposed to different rural and urban photographic scenes were studied on 100 adult subjects (55 female, 45 male). Their age range was 18-60, with a mean of  $24.6 \pm 0.99$  (SE). Subjects were undergraduates and employees at the University of Essex or drawn from the local community in Colchester, UK.

## Prior-assessment of photographs

Photographs were categorized as rural pleasant, rural unpleasant, urban pleasant or urban unpleasant by an independent panel of 50 people. A library of 309 photographs was viewed by each panel member as a powerpoint presentation and each scene was scored on a five point scale according to how well it represented a particular category (vaguely, slightly, typically, strongly or very strongly representative). Only where 95% of the panel assessed a scene as strongly representing the definition was the photograph selected for use in the experiment. In all, 30 photographs were selected for each category (see Photos 1a-1d for samples). These were entered into a powerpoint presentation and shown in random order for a period of 15 seconds each before rotation to the next picture.

## Materials and design

The following materials were used in the experiment: a) Powerjog Treadmill, JX200; b) Gateway laptop computer, Solo 9300, Viglen Genie 2 computer with Powerjog Coach software package, Epson EMP 52 projector and screen; c) Cardiosport heart rate belt, with Polar Accurex Plus heart rate monitor and belt; d) Massage table; e) Omron Digital Blood pressure monitor, HEM 704C; f) Stadiometer, Seca 220; g) Weighing Scales, Seca 770 Digital. Mean arterial blood pressure (MAP) was calculated as diastolic pressure  $+0.33$  (systolic - diastolic).

The survey instruments for assessing psychological states were as follows: a) Profile of Mood States Questionnaire (POMS) (McNair *et al.* 1984); b) Rosenberg Self-Esteem Questionnaire (Rosenberg 1989); c) Profile of Subject Questionnaire (designed for this study); d) Par-Q General Health Questionnaire (Chisholm *et al.* 1975); and e) Informed Consent form.

Subjects were randomly allocated to one of the five conditions (four with pictures, one control) and a multivariate data set of dependent variables was collated. A number of measures were used to assess the combined synergistic impact of the exercise and the photographic view. Physiological measures included blood pressure readings and continuous heart rate monitoring. Psychological tools incorporated the Profile of Mood States (POMS), which comprises 5 questions for each of the 6 mood states (McNair *et al.* 1984), and the Rosenberg Self-esteem questionnaire, which comprises ten questions (Rosenberg 1989) and in which a decrease in the score represents an improvement in self-esteem

## Experimental procedure

Initially subjects completed and signed an informed consent and the PAR-Q General Health Questionnaire. A Polar heart rate monitor and Cardiosport transmitter belt were used to record heart rate at five second heart intervals. Weight (kg) and height (m) were recorded and then a series of profile building questions were asked about the subject's exercise habits and their perspectives on the natural environment. On completion (5 minutes), subjects relaxed in a supine position, with eyes closed on the massage table for a further three minutes. Heart rate was monitored throughout this period and the lowest value attained was considered to represent the resting heart rate. Resting systolic and diastolic blood pressure was measured at the end of this period using an Omron Digital blood pressure monitor. Subjects then completed the POMS and self-esteem questionnaires, which were rotated at random.

Subjects were familiarized with a printed version of Borg's 20 point rating of perceived exertion (RPE) scale (Borg 1961) while stationary on the treadmill.



Subjects were advised to exercise at level 12 (fairly light'). The speed of the treadmill was controlled remotely by the tester via the software package according to oral feedback from the subject.

Subjects warmed up by walking at a moderate pace for 3 minutes. The speed of the treadmill was then steadily increased until the subject informed the tester that it had reached the specified 'fairly light' intensity that was relative to their level of fitness. For most of the subjects this intensity was achieved at a jogging pace, but for others it was a fast walk. Subjects could instruct the tester to alter the speed of the treadmill at any point during the exercise to ensure that the intensity remained consistent. During the 20 minute period of exercise, the randomly allocated set of pictures appeared sequentially, in randomized order, on the projector screen and heart rate data were continuously recorded. Subjects were instructed to concentrate on absorbing and assimilating as much about the individual pictures as they could. One set of participants acted as the control group, as they exercised with a blank white screen. Twenty subjects were tested for each of the five categories of photographs.

Following the 20 minutes of exercise, the treadmill speed was reduced to a standstill within twenty seconds. Subjects then completed both the POMS and self-esteem questionnaires immediately (randomly rotated), so that any effect of the pictures combined with the exercise would not be lost. Five minutes after the exercise, blood pressure was measured.

## Appendix B: Additional statistical analysis of health status of green exercise subjects

### General health status

Additional detailed statistical analysis involving independent t tests and ANOVA's exposed a number of significant findings are as follows

#### General health state score

- Subjects with no problems with mobility possessed significantly higher general health state scores ( $83.54 \pm 13.563$ ) than those with some problems ( $58.05 \pm 23.018$ ;  $p < 0.000$ )
- Individuals who suffered from no problems with their usual activities also revealed a significantly higher general health score ( $82.73 \pm 14.941$ ) in comparison to those with some problems ( $62.81 \pm 18.613$ ;  $p < 0.000$ ).
- Subjects with no problems with pain/discomfort perceived their general health state score to be significantly better ( $84.29$ ) than those with some problems ( $73.67$ ;  $p < 0.000$ ) and those with extreme problems ( $46.67$ ;  $p < 0.000$ ).
- Participants who suffered from no problems with anxiety / depression also scored significantly more highly on their general health state ( $82.64$ ) than those with some problems ( $74.63$ ;  $p = 0.0175$ ). In comparison, those who suffered with extreme problems ( $53.33$ ) were significantly poorer in their perceived general health state than those with no problems ( $p = 0.002$ ) and those with some problems ( $p = 0.034$ ).

Number of visits to the doctor, drugs, specialist, treatment and hospital

- Participants with no problems with mobility visited the doctor significantly fewer times ( $1.92 \pm 2.381$ ) than those with some problems ( $5.19 \pm 3.410$ ;  $p = 0.001$ ), received significantly less drug prescriptions ( $1.27 \pm 2.299$  compared to  $4.71 \pm 4.428$ ;  $p = 0.006$ ) and were referred to a specialist on significantly less occasions ( $0.27 \pm 0.773$ ) compared to ( $0.94 \pm 0.966$ ;  $p = 0.006$ ).

- The same applied for those suffering from no problems with their usual activities. They visited the doctor significantly fewer times ( $2.00 \pm 2.514$ ) in comparison to some problems ( $4.67 \pm 2.717$ ;  $p < 0.000$ ), received significantly less drug prescriptions ( $1.40 \pm 2.601$ ) compared to ( $4.00 \pm 3.136$ ;  $p = 0.0005$ ), referred to a specialist on significantly less occasions ( $0.27 \pm 0.765$ ) compared to ( $1.20 \pm 1.014$ ;  $p = 0.0015$ ) and received significantly less treatment ( $0.28 \pm 0.881$ ) compared to ( $1.20 \pm 1.612$ ;  $p = 0.023$ ).
- Subjects with no problems with pain/discomfort visited the doctor significantly fewer times ( $1.80$ ) than those with some problems ( $3.06$ ;  $p = 0.0015$ ) and those with extreme problems ( $9.67$ ;  $p < 0.000$ ). They were also administered with significantly less drug prescriptions ( $1.16$ ) than those with some problems ( $2.58$ ;  $p = 0.001$ ) and those with extreme problems ( $8.50$ ;  $p < 0.000$ ) and referred to a specialist on significantly fewer occasions ( $0.24$ ) compared to those with some problems ( $0.54$ ;  $p = 0.023$ ) and those with extreme problems ( $2.00$ ;  $p = 0.003$ ).
- Participants with no problems with anxiety/depression visited the doctor significantly fewer times ( $1.90$ ) compared to those with some problems ( $3.81$ ;  $p = 0.0005$ ), were referred to a specialist on significantly fewer occasions ( $0.25$ ) compared to ( $0.96$ ;  $p < 0.000$ ), received significantly less treatment ( $0.27$ ) compared to ( $0.96$ ;  $p = 0.001$ ) and were admitted to hospital on significantly fewer occasions ( $0.11$ ) compared to ( $0.58$ ;  $p = 0.003$ ).

All of these findings confirm how interrelated and reliable the various components of the questionnaires are and therefore how confident we can be about the findings of the research.

### Mood Measures and Health Status

Correlations and findings between mood and EuroQol questionnaires

- Anger was significantly correlated with age ( $-0.164$ ;  $p = 0.009$ ) implying that the older the participant was, the less angry they were.
- Fatigue prior to the activity significantly correlated with age ( $-0.221$ ;  $p < 0.000$ ). Surprisingly it was evident that the younger the



participant was, the more fatigued they felt in general before participating in the activity.

- ▶ The level of vigour measured prior to the activity was significantly higher in males ( $44.45 \pm 7.203$ ) compared to females ( $41.89 \pm 7.344$ ;  $p = 0.0025$ ).
- ▶ The link between education and health was again apparent in a selection of the mood factor measurements recorded before the activity commenced. Levels of anger ( $39.49 \pm 3.194$ ), confusion ( $36.12 \pm 4.390$ ) and depression ( $38.31 \pm 1.963$ ) were all significantly lower if participant's education had continued after the minimum school leaving age. Those whose education had ceased at this stage were ( $40.72 \pm 5.095$ ;  $p = 0.023$ ,  $37.16 \pm 5.052$ ;  $p = 0.0048$ ,  $39.20 \pm 3.087$ ;  $p = 0.009$ ) respectively. Participants whose education had continued were also significantly more vigorous ( $44.19 \pm 7.180$ ) than those who hadn't ( $41.29 \pm 7.613$ ;  $p = 0.0015$ ).
- ▶ A similar pattern emerged when comparing participant's further education status. Anger ( $38.68 \pm 2.352$ ), confusion ( $35.15 \pm 4.250$ ), depression ( $37.96 \pm 1.613$ ) and tension ( $33.41 \pm 3.685$ ) prior to the activity were all significantly lower if the participant had a degree or equivalent professional qualification. Participants without these qualifications reported scores of ( $40.68 \pm 4.543$ ;  $p < 0.000$ ,  $37.31 \pm 4.691$ ;  $p < 0.000$ ,  $39.01 \pm 2.753$ ;  $p < 0.000$  and  $35.16 \pm 4.499$ ;  $p = 0.0005$ ) respectively. Again, these individuals were also significantly more vigorous ( $45.10 \pm 6.821$ ) than those without qualifications ( $42.06 \pm 7.590$ ;  $p = 0.0005$ ). Following the activity, all participants mood recordings reduced, however, there was still a significant difference between the levels in these 2 groups.
- ▶ Ex smokers were significantly more angry ( $40.92$ ) than never smokers ( $39.44$ ;  $p = 0.015$ ) when mood measurements were taken prior to the activity.
- ▶ Depression ( $39.10 \pm 2.746$ ), fatigue ( $39.64 \pm 5.217$ ), and tension ( $35.06 \pm 4.710$ ) measurements at the start were significantly higher if individuals had experienced illness in their family, compared to those who hadn't. ( $38.13 \pm 1.929$ ;  $p = 0.0025$ ,  $37.97 \pm 5.104$ ;  $p = 0.0125$  and  $33.60 \pm 3.287$ ;  $p = 0.006$  respectively). Vigour was once again significantly lower in those participants who had experienced illness in their families ( $42.45 \pm 7.139$ ) in comparison to those who hadn't ( $44.45 \pm 7.112$ ;  $p = 0.0255$ )
- ▶ Those participants suffering from no problems with mobility, initially scored significantly higher on their vigour measurement ( $44.00 \pm 7.105$ ) in comparison to those with some problems with mobility ( $36.50 \pm 7.366$ ;  $p < 0.000$ ).
- ▶ Confusion ( $36.16 \pm 4.396$ ), fatigue ( $38.49 \pm 5.100$ ) and tension ( $34.15 \pm 3.927$ ) measurements taken prior to the activity were all significantly lower if participants had no problems with their usual activities, compared to those with some problems. ( $39.24 \pm 5.869$ ;  $p = 0.0035$ ,  $42.59 \pm 6.285$ ;  $p = 0.0085$  and  $38.59 \pm 6.355$ ;  $p = 0.0055$  respectively). Again, these participants were also significantly more vigorous ( $43.96 \pm 7.164$ ) compared to ( $36.00 \pm 6.114$ ;  $p < 0.000$ )
- ▶ Initially, anger ( $39.53$ ), depression ( $38.34$ ), and tension ( $34.09$ ) mood factors were significantly lower if participants reported having no problems with pain / discomfort, in comparison to those with some or extreme problems. ( $45.00$ ;  $p = 0.0195$ ,  $39.21$ ;  $p = 0.023$  and  $43.00$ ;  $p = 0.0005$  respectively). This group were also significantly more vigorous ( $44.23$ ) in comparison to those with some problems ( $40.78$ ;  $p = 0.0025$ ).
- ▶ All mood factors measured prior to activity, using the POMS, were significantly different when comparing individuals who had no problems with anxiety / depression on the EuroQol questionnaire to those reporting some problems. Anger ( $39.37$ ), confusion ( $35.91$ ), depression ( $38.14$ ), fatigue ( $38.15$ ) and tension ( $33.74$ ) were all significantly lower in those with no problems, compared to those with some problems ( $42.67$ ;  $p < 0.000$ ,  $39.33$ ;  $p < 0.000$ ,  $41.61$ ;  $p < 0.000$ ,  $43.57$ ;  $p < 0.000$  and  $39.71$ ;  $p < 0.000$  respectively). Vigour was significantly higher ( $44.25$ ) in those with no problems, compared to those with some problems ( $38.04$ ;



$p < 0.000$ ) and those with extreme problems (34.67;  $p = 0.028$ )

- ▶ All mood factors significantly correlated with the general health state score reported. Anger (-0.262;  $p < 0.000$ ), confusion (-0.244;  $p < 0.000$ ), depression (-0.287;  $p < 0.000$ ), fatigue (-0.219;  $p = 0.001$ ) and tension (-0.303;  $p < 0.000$ ) were higher if participants had a poor general health score, and vigour (-0.289;  $p < 0.000$ ) was higher if they reported a better general health score.
- ▶ Many of the mood factors correlated with the i) number of times participants had been referred to a specialist, ii) referred for treatment, iii) been admitted to hospital and iv) visited their doctor. Anger (i) 0.283;  $p < 0.000$ , ii) 0.254;  $p < 0.000$  iii) 0.352;  $p < 0.000$ , iv) 0.241;  $p < 0.000$ ) confusion (i) 0.188;  $p < 0.000$ , ii) 0.215;  $p = 0.001$ , iii) 0.225;  $p < 0.000$ , iv) 0.137;  $p = 0.035$ ), depression (i) 0.200;  $p = 0.002$ , ii) 0.210;  $p = 0.001$ , iii) 0.287;  $p < 0.000$ , iv) 0.297;  $p < 0.000$ ) fatigue (i) 0.215;  $p = 0.001$ , ii) 0.209;  $p = 0.001$ , iii) 0.214;  $p = 0.001$ , iv) 0.245;  $p < 0.000$ ) and tension (i) 0.252;  $p < 0.000$ , ii) 0.280;  $p < 0.000$ , iii) 0.237;  $p < 0.000$ , iv) 0.312;  $p < 0.000$ ) all significantly increased as the number of occasions listed above increased. Vigour (i) -0.163;  $p = 0.12$ , iv) -0.170;  $p = 0.009$ ) significantly increased as the number of times participants did the above decreased.
- ▶ All mood factors significantly correlated with self-esteem measurements both before and after the activity. Anger (0.281;  $p < 0.000$ ), confusion (0.384;  $p < 0.000$ ), depression (0.376;  $p < 0.000$ ), fatigue (0.294;  $p < 0.000$ ) and tension (0.400;  $p < 0.000$ ) increased as self esteem decreased. Vigour (-0.434;  $p < 0.000$ ) significantly increased as self esteem values improved.
- ▶ Tension ( $\beta = 0.359$ ;  $p < 0.000$ ) and vigour ( $\beta = -0.303$ ;  $p = 0.003$ ) were the strongest predictors of individual's initial self esteem score using regression analysis techniques. I.e. the more tense an individual was, the poorer their self esteem, and the more vigorous they were the better their self esteem.
- ▶ Participant's body weight ( $\beta = 0.234$ ;  $p = 0.027$ ) and their self esteem scores ( $\beta = 0.229$ ;

$p = 0.031$ ) recorded prior to the activity were the strongest predictors of their initial anger score, using regression analysis. I.e. the heavier they were, the more angry they were, and the better their self esteem score the less angry they were

- ▶ The strongest predictor of confusion was participant's initial self esteem score ( $\beta = 0.446$ ;  $p < 0.000$ ), using the same regression analysis technique. I.e. the poorer their self esteem the more confused and bewildered they were.

The general health questionnaire provides an indication of the overall psychological state and is therefore clearly different to the general health state score. The final score derived can range from a minimum of 0, which represents excellent mental health to a maximum of 36, which implies a poor mental health state. The average score incorporating all participants was calculated as  $8.73 \pm 0.270$  ( $n = 234$ ). The values collected ranged from 0 to 29 and the most common score was 6. Various statistical tests revealed the following significant findings

- ▶ Men ( $8.18 \pm 3.525$ ) reported a significantly better GHQ score than women ( $9.35 \pm 4.654$ ;  $p = 0.0145$ )
- ▶ The GHQ score significantly correlated with the general health state score (-0.256;  $p < 0.000$ ), implying that the better a participants general health state was, the better their mental health.
- ▶ The GHQ value was also the strongest predictor of the general health state score ( $\beta = -0.096$ ;  $p = 0.019$ ), using regression analysis techniques. This re-emphasised the positive linear relationship between participants general and mental health.
- ▶ Participants reporting no problems with pain/discomfort had a significantly better GHQ score (8.36) than those with extreme problems (13.67;  $p = 0.035$ ).
- ▶ Participants reporting no problems with anxiety/depression (8.11) also possessed a significantly better GHQ score than those with some (13.23;  $p < 0.000$ ) or extreme problems (13.00;  $p = 0.0375$ ).
- ▶ The GHQ score significantly correlated with the number of visits to the doctor recorded (0.157;



$p = 0.018$ ) and additionally the number of times an individual had been referred to a specialist (0.224;  $p = 0.001$ ). Therefore, the fewer times a participant visited the doctor, the better their GHQ score and if they had been referred to a specialist on less occasions, their GHQ score was enhanced.

spent doing moderate activities reduced feelings of fatigue.

- ▶ The GHQ score significantly correlated with both self esteem values collected before (0.308;  $p < 0.000$ ) and after (0.465;  $p < 0.000$ ) the activity. This implied that an individual with a poor self esteem also reported a poor mental health score, emphasising the consistency of the 2 separate questionnaires.
- ▶ The GHQ score significantly correlated with most of the mood factors - confusion (0.237;  $p < 0.000$ ), depression (0.392;  $p < 0.000$ ), fatigue (0.311;  $p < 0.000$ ) and tension (0.309;  $p < 0.000$ ) were all higher when an individual had a poor mental health score. Vigour (-0.287;  $p < 0.000$ ) was enhanced when a good mental health score was reported.
- ▶ Using regression analysis techniques it was established that the strongest predictors of the GHQ score were initial depression scores ( $\beta = 0.390$ ;  $p < 0.000$ ), initial vigour values ( $\beta = -0.262$ ;  $p = 0.006$ ) and the duration spent each week doing vigorous activities ( $\beta = -0.207$ ;  $p = 0.026$ ). Therefore, the more depressed a participant was the poorer their mental health, the more vigorous they felt the better their mental health, and the more time they spent doing vigorous activities each week the better their mental health.
- ▶ The GHQ score was the strongest predictor of initial depression scores ( $\beta = 0.474$ ;  $p < 0.000$ ) recorded before the activity commenced, implying that if an individual was depressed, this would predict a poor overall mental health assessed using the GHQ.
- ▶ The GHQ score was also the strongest predictor of levels of fatigue ( $\beta = 0.344$ ;  $p = 0.001$ ) experienced prior to the activity. Therefore, the more fatigued a person felt the poorer their mental health. The duration of moderate activities also predicted fatigue ( $\beta = -0.230$ ;  $p = 0.028$ ), implying that more time

## Appendix C: List of UK-based initiatives and projects

Initiative/Project	Comments
"Walking the way to Health Initiative"	Over 350 registered walking schemes
Healthy Walking Schemes	Hundreds of varying walks countrywide
"Step it Up Highland"	Campaign to get more people taking regular exercise
Two recent government initiatives:	Provide opportunities for health and leisure professionals to get "health walks" onto local agendas
▶ Healthy Living Centres	Centres in disadvantaged areas
▶ Health Action Zones	
"Paths to Health"	Scottish based initiative with over 25 walking schemes registered
Ramblers Association - major campaigns include:	Thousands of led walks around the country occur weekly
▶ Footpaths	
▶ Freedom to roam	
▶ Take 30 - Walk for health	
▶ Britain on the Move	
"Steps to Health", Dudley, West Midlands	Aims to encourage public use in 5 parks, works alongside a cardiac rehabilitation unit
Walking Out Project- "Rambling and refugees"	Led walks aimed at socially excluded groups
Wyre Forest Health Walks	Regular health walks, with a heart monitor in the visitor centre
Yorkshire Dales Volunteers	Walks for mental health, WHI walks, etc.
Peak Park Leisure Walks	Walks aimed at people with health problems
Women's Walking Network	Encourage and build the confidence of women to enjoy the countryside
Britain on the Move	ITV National Campaign which aims to encourage the nation to become more active through walking
"Route to Health"	1 mile walk aimed to encourage those at risk of health problems to enjoy gentle exercise. Route is adorned with temporary and permanent art works
West Midlands Woodland and Health Pilot	Included 7 projects during the pilot
▶ Burntwood Walk and Talk	Utilises local woodlands and public rights of way network to encourage people to take up walking as a regular activity
▶ Black Country Urban Forest "Walking for Health Calender's"	Produced and distributed 10,000 calenders containing walks and woodland information
▶ Westport Lakes	Aims to improve the regeneration prospects of Stoke on Trent - 3 new walks created
▶ Newton Coppice	Created an additional walk to compliment a WHI which already exists in the area
▶ Roughwood Chase, Walsall	Compliments a WHI project
▶ South Telford Woodlands	Silvicultural works, path surfacing etc.



Initiative/Project	Comments
▶ Bradwell Woods, Newcastle-under-Lyme	Healthy walks site for "Fit for Living" aimed at over 55's who are at risk of CHD
Forest Fitness Campaign	Encouraged general public to take part in independent activities including walking, cycling and horse-riding
Scotland Health At Work (SHAW)	Family event, including hill walking, children's games, wayfaring, canoeing, rock-climbing etc.
Calorie counted woodland walks and cycle trails through Wales	Supported by the Forestry Commission and University of Wales, Aberystwyth
Forest of Dean Project	Concentrates on getting deprived people out of Bristol and supporting them to go cycling in the woodland
Seven steps to Biking Heaven	Mountain biking trails in 7 scottish forests including Mabie and Glentress
Sustrans	Charity which works on practical projects to encourage people to walk and cycle more
Easington Cycle Project	Encouraging cycling for health
National White Water Canoe Centre	White water rafting, canoeing, kayaking
Mariners of Bewl	Encourages the integration of disabled people with the able bodied through the medium and enjoyment of sailing
Canals for commuting	Creates a sustainable multi-user route on the Shropshire Union canal to promote healthy activity
Re-Union Canal Boats	Social enterprise which aims to help community organisations access the water of the canal
Alton Water	Sailing club encouraging people to benefit from water based physical activity
Fresh Air...Fitness and Fun	Various case studies conducted in Yorkshire and the Humbar looking at removing barriers, walking projects etc.
▶ Access for all in the North York Moors National Park	Improving access for all users - e.g. disabled, elderly, also involved in "Reach out" project
▶ Easy Going Trails	Sells a book of 20 walks, recently re-printed 2000 copies due to demand
▶ The Kirklees PALS Project	Patients are not active or suffer from health conditions - referred by GP
▶ Sheffield Health Walks	23 city wide walks per week, 2 leaders per walk, 6-36 participants of all ages and abilities
▶ Walking for all in Keighley (WALK)	Community wide approach to the promotion of walking, area is socially and economically deprived, culturally diverse
▶ Bradford Mental Health Rehabilitation Walks	A programme of walks designed to meet the needs of people with mental health problems
▶ Linking Local Paths and Trails into Networks	4 projects that aim to provide accessible routes for people close to where they live and work
▶ Ponderosa Park	Created an artificial climbing boulder in an urban parkland to give the park a "wilderness" feel
▶ Netherwood Country Park	Restoration of derelict brownfield land to create a nature reserve and separate fishing pond
▶ Opening up new areas of countryside	2 projects where open access has already been successfully applied under the countryside agreement
▶ Negotiating access to water	3 projects demonstrating how opportunities can be extended through careful negotiation

Initiative/Project	Comments
Therapi - (Tackling Health Through Environmental Regeneration And Public Involvement)	11 projects exploring different aspects of this connection
▶ Stress reduction outdoors activity programmes and eco-therapy	
▶ Green Gym sessions	Exercise and conservation for cardiac patients
▶ GP health centre grounds enhancement	
▶ Grounds for health	Therapeutic garden for St Georges Hospital
▶ Health and Arts Activities	The Plot Harold Hill Allotments, Romford
▶ Health, environment and the community	Community park involving local people
▶ Environmental activities outreach	Young families and environmental activities
▶ Just walk pack	Urban walks in Barking and Dagenham
▶ East London Walking Festival	
▶ "Out and About"	Map pack and guide covering all Thames Chase Sites
"Green Gyms"	Conservation project combining outdoor physical exercise with enhancing the environment - over 50 established
Arnside and Silverdale Area of Outstanding Natural Beauty	Voluntary group that perform conservation activities - similar to a "Green Gym"
Grantown Community Woodland	Promotes the conservation, restoration, and improvement of the local native woodlands for the public benefit
Conservation holidays	People work as a paid volunteer on a particular project
Parish Paths Partnership (P3)	Cambridgeshire focused on individuals suffering from heart disease problems and involved them in building stiles, repairing paths etc.
Natural Growth Project	Through gardening in allotments it helps refugee torture survivors rebuild confidence and adapt to living in London
Grow well project - Forest of Mercia	Involves therapeutic horticulture and is targeted at mental health patients
Homeopathic Hospital Garden, Glasgow	Aims to "create a place of beauty and healing" by providing the hospital with an inviting outdoor extension to the indoor healing environment
Cannock Chase "Arts for Health" project	Walk through an area filled with sculptures and artwork
Eastern Region Public Health Observatory	Database which contains approximately 250 examples of projects to encourage physical activity in the East of England
LEAP (Local Exercise Action Pilots)	10 PCT's in neighbourhood renewal areas across England running pilot schemes to encourage people to take up more physical activity
BODS - Based in Hereford	Working primarily with youths with special needs and getting them involved in woodland activities
Hampshire Trailblazers	New award scheme promoting outdoor learning and environmental education for young people in Hampshire



Initiative/Project	Comments
Chopwell Wood Health Pilot Project	A GP woodland based activity referral scheme and a programme of school visits
Summer camps	Activities include sailing, gorgewalking, abseiling, high and low ropes, archery, kayaking and problem solving
The Country Trust Educational Visits	Organise and conduct day and week long educational visits, especially children from inner cities
Forest Schools	Provides hands on learning in a woodland environment for all ages
Lesson's in nature's classrooms	Worcs, Somerset, Devon, Yorks, East Anglia and Wales take children down to the woods for hands-on learning
Kent Rural Disability Sportslink Project	Aims to increase access to the outdoor, rural environment by opening up opportunities for disabled people
Miles without stiles	Project identifies paths which can be improved for wheelchair users, visually impaired, people with pushchairs etc.
British Horse Society	Benefits of outdoor exercise, does a lot of work with disabled children
Inverness Forest District: ▶ Glenmore Forest Park	Less-abled people use self-propelled electric buggies to allow access
▶ Learnie Forest	Upgrading informally built mountain bike trails to attract excluded youths
Moray Forest District: ▶ Culbin Forest	Ran trailer rides during summer holidays - targeted elderly and less-abled people
▶ Mountain bike trails in Fochabers area	Encouraging local youngsters and community/social groups to develop these trails
Forth (Local man leads a mobility scooter outing every week to take people into the forest)	Leading brashing parties to open up old routes for local people to use
Callender Woods Education Project	Programme for local schools - half the time concerns environmental games and half mountain biking in woods
Fort Augustus Forest District: ▶ Glen Brittle Forest	Allows access for the Highland Disabled Rambler's group to use their mobility vehicles
▶ Outdoor Education and First Response Units	Provides facilities for disadvantaged youths and socially excluded groups - supervised expeditions on foot or cycle
Local routes for a multi-cultural countryside	Engages with groups from a variety of cultural backgrounds, improves opportunities for access and encourages groups to enjoy and participate in countryside activities

## Appendix D: Challenges in the evaluation of countryside and nature-based health projects<sup>10</sup>

The evaluation of public health and environmental projects aimed at increasing participation in nature-based exercise and access to the countryside presents many interesting challenges. Here the scientific and practical issues are explored under three headings

- the variety of projects and initiatives
- the complexity of relationships with different dimensions of health
- the production of evidence of the effectiveness of health-related activities

Finally a 'Guidelines for Evaluation' section has been included (Annex E), based on the discussion in this annex, from practical experiences in the field and Good Practice for Projects section 5.5.

### The variety of projects and initiatives

One of the obvious challenges in designing appropriate evaluation methodologies for programmes and initiatives involving people's interaction with the "countryside" or the "natural environment" is that they are difficult to define. The conceptual area, although plainly understandable in a common-sense way, has no readily available classification scheme or even a consensus-based set of definitions and meanings. At best we could say that all of such projects involve a **place** (defining it as a "countryside" or "nature" related initiative), an **activity** (which usually, but not always, has a health-related exercise component) and a number of **participants** (who may arrive purely in their capacity as 'ordinary citizens', may participate through an organised therapeutic programme or possibly via the mechanism of a formal medical referral or prescription).

Traditional and popular culture is, of course, replete with ideas and categories relating to common sense distinctions between different types of place. Foremost amongst these would be the distinction between "town and country" or "built up areas and open spaces".

There is a similarly loose, or a least un-standardised, situation surrounding the understanding and categorisation of the kinds of activities that might make up organised programmes and initiatives in the countryside. For example, it would be difficult to find a generalised consensus of what constitutes "exercise" - as this would depend on the context, the social situation, and the professional identity of the person doing the defining. Yet in the field of researching the benefits of countryside and environmental programmes, a simple and clear understanding of the nature of an activity (for example its therapeutic or a least potentially therapeutic nature) is a basic pre-requisite for structured evaluation work. The principle reason for this is that structured approaches to evaluation require, as part of their methodology, the use of validated and standardised outcome measures. Without a clear idea of the therapeutic effects being attempted, this aspect of evaluation design would be at best difficult, and at worst a frankly hit-and-miss affair.

The existence of such a wide variety of settings, activities and ways of participating is not simply of passing or 'academic' interest. The nature of projects and initiatives and the 'recruitment' of participants have direct implications for the design of evaluative work. Exactly how and why this is may best be seen in some hypothetical examples.

The evaluation of, for example, a new cycle track linking a residential area to a commercial centre will need to involve the methodology and concepts of traffic and transport engineering, as well as those stemming from sciences associated with physical or mental health. In a practical sense, this will mean that some evaluative fields will involve an analysis of journeys made, time taken and the flow of people as well as environmental health dimensions such as potential impact on pollution or air quality. Other public health interests would also need to be involved and there may, for example, need to be measures of population improvements in cardiovascular risk factors such as Body Mass Index. Local community and primary

<sup>10</sup> This annex was prepared by Dr. Charlie Davison, Fellow in the Dept. of Health and Human Sciences, University of Essex



health care workers (or indeed users) on the other hand, may well focus on therapeutic effects at the individual level - such as changes in weight, strength, emotional wellbeing etc. Some of this evaluation strategy stems directly from the nature of the project (it is a transport engineering initiative), and some from the fact that there is no readily identifiable 'client group' (the cycle track is simply a public utility - you don't need to be a 'patient', have a referral or be in possession of a prescription in order to use it). Structured evaluative approaches such as Randomised Control Trials, therefore, are clearly inappropriate. The use of formalised health measuring instruments may also be difficult to implement. These issues will be discussed further in the evaluation guidelines section.

The challenge presented by variety becomes clearer when we turn to the example of a very different type of project. Some of the conceptual areas involved in planning the evaluation of the cycle track may also inform the evaluation of a programme that, for example, organises boating trips for clients of a community mental health service. In this example, the activity is much more 'bounded' than the cycle track. There is not only a pre-defined body of participants, but also a conceptual outcome field (mental health improvement) that is already populated by a wide array of measurement instruments. At least in theory, then, the way is clear for a highly structured approach to evaluation - a design involving comparison groups, repeated measurement and possibly even randomness and control.

In planning and designing evaluations, then, it will not simply be important to understand the nature of the programmes in question as far as place and activity are concerned, but also to explore their expected impact on several different dimensions of health. Once these aspects of an initiative are clarified, it will be possible to include or exclude particular evaluation strategies from a strictly scientific point of view.

### **The complexity of relationships between countryside recreation and health - the crucial question of 'outcomes'**

There are several different ways that the relationship between countryside recreation and health can be theorised. Pretty (2004), for example, puts forward a three part typology of recreational interaction with the countryside - through i) observation/viewing, ii) incidental exposure or being 'in the presence of' the natural environment and iii) active participation. This approach represents an important step in the development of evaluation strategy, as the nature of the engagement process will have both theoretical and practical implications for the design of evaluation work. In terms of the methodological details of how we should plan and organise evaluation, however, it will be necessary to take a slightly closer look at the salutogenic processes that particular projects are aspiring to activate or trigger. This is because, at its heart, evaluation involves the measurement (or at least the assessment) of health-related outcomes. Unless the health effects of engagement with nature and the countryside are clarified, the development of meaningful evaluation methodologies will be difficult.

For the practical purposes of evaluation, then, we now briefly explore a relatively simple list of the different ways that countryside projects can aim to interact with health.

#### **Exercise improves the physical health of the individuals who participate**

If an interaction of this type was to take place, it should be possible to use assessments of individuals' physical health to measure the effects of engagement with the countryside by way of exercise. We could take as an example here the case of a person referred to a walking programme for reasons of obesity. In such a case, the impact of the referral should logically be open to assessment by measuring the participant's Body Mass Index before and after the programme. There are, of course, a multitude of biometric and functional measurements that could be employed in such work (joint flexion, blood pressure, lung function etc.). In terms of Pretty's typology, these types of



effect/interaction would only be looked for in 'type 3' activities ("direct participation").

#### **Engagement with nature improves the mental health of the individuals who participate**

As in the previous paragraph, the proposed relationship here is relatively direct. If an individual's depression (for example) was the hoped for 'target' of the countryside activity, we would look towards the variety of measuring tools for depression to include in the methodological planning of the evaluation. Psychological sciences and psychiatric medicine (like their physical health counterparts) have not been backward in the development and validation of measurement instruments, and the choice for evaluators will be wide. This will, of course, depend on the specific areas of mental health that a project is hoping to have an impact upon. In terms of Pretty's typology, this approach to evaluation could be followed in any of the three engagement types (viewing, incidental exposure and direct participation).

#### **Engagement with nature improves the general wellbeing and quality of life of the individuals who participate**

As with sections a) and b) above, the theoretical relationship here is relatively simple. Ideas of 'quality of life' have long been included in evaluative approaches to health, social and community initiatives. The general idea is that the somewhat theoretically vexed relationship between physical and mental health is dissolved into a wider category involving both. One result of this is that the focus of measurement and assessment becomes the perception that participants themselves have of how positively or negatively certain aspects of their life are going. While this switch from objective to subjective assessments could be said also to lie at the heart of many mental health measurement instruments (the Beck Depression Inventory, for example), it is even more marked in the fields of general wellbeing and quality of life (for example the SF36 or EuroQuol5).

Given that there is much interest in countryside schemes from the point of view of improving the overall health of whole communities, there is plainly a great potential in quality of life/general wellbeing approaches. This is particularly true in settings

where no specific original pathology is being addressed at an individual level, and where the focus of initiatives is open community access, rather than one-by-one medical referral.

#### **Engagement with nature and access to 'green space' improves the health and wellbeing of the entire community**

So far we have looked at the evaluation of projects from the point of view of assessing influences on health and wellbeing at the individual level - whether their participation is through referral/recommendation or through purely voluntary action. It is important to note, however, that the 'raison d'être' of many countryside access initiatives and, indeed, their underpinning philosophy, is centred on the idea of community. This is not to say that, if, in the end, enough individuals in a community engage with the natural environment, then the community itself becomes healthy simply on a 'majority' basis. Rather it is the idea that the provision of an infrastructure that allows engagement with nature and countryside recreation will represent an augmentation in the 'social capital' of the community. The central notion is, then, that it is possible to envisage both 'unhealthy communities' and 'healthy' ones - and that a particular approach to a modern type of Public Health engineering can enable a community to cease being the first type, and become the second.

There are several different strands to this argument. In the 'physical' dimension these might include the general population health effects of a reduction in atmospheric pollution, a rise in journeys made on foot and bicycle and an increase in opportunities for sport and exercise. In terms of mental health and quality of life, there are similar environmental arguments. Quiet green spaces, for example, become more common and closer to homes and workplaces - thus increasing the viewing and passive consumption of nature. In a less concrete way, there is an idea that the community effects of the provision of 'green' recreational facilities will bring about a generalised improvement in human relationships. This may be theorised in terms of an increase in both the quality and quantity of contact between neighbours and citizens, which in turn



brings about a reduction in the isolation and social conflict that underlies many mental health problems (see section 1.6).

From the evaluative point of view, these kinds of impacts and effects represent a more serious challenge than the (already complex) fields of assessing health and wellbeing with the individual as the principle unit of analysis. Community level and social capital approaches to evaluation can be pursued in a variety of ways, but each poses its own methodological and scientific problems. Aggregate representative groups within a population, for example, could be repeatedly measured using physical, mental and quality of life instruments, so charting changes over time. Although without a strictly controlled comparative dimension to such work, a causal relationship between the provision of any recreational infrastructure and any changes in health and wellbeing could not even be suggested – let alone ‘proved’. The same would be true of epidemiological data analysis such as rates of illness, health service use, length of life etc. (even though such an approach would probably be more feasible and practical than the first).

The only other strategy available (aside from simply counting and listing infrastructural improvements and the numbers of users) would be to attempt a more qualitative or participatory approach to evaluation. In such a scheme, the objective would be to try and assess the experiential and perceptual aspects of recreational opportunities in the accounts of members of local communities. Influences or effects on health and quality of life would be made as analytical inferences about community wellbeing and social capital, as part of an interpretative sociological approach.

Whether evaluation approaches are essentially quantitative, qualitative or both, the full involvement of the wider community is an important issue. For this reason, the evaluation of green exercise projects should seek the broadest possible inclusion and in this, the use of Participatory Appraisal (PA) methods can be ideal. Participatory and rapid rural appraisal techniques were originally developed within the context of international development but recent years have seen a rapid

expansion in new participatory methods and approaches to learning in many different contexts including health needs assessment, environmental management, urban regeneration, agriculture, conservation, national parks, and local economic development (see Pretty and Hine 1999). Participatory Appraisal methods can be used to evaluate green exercise initiatives and by design they will encourage close interaction between organisers, users and researchers. This will, in addition, provide valuable qualitative data, promote community ownership and build on local social capital. Increasingly, participatory methods are also being adapted to generate semi-quantitative data, which can be analysed statistically.

### The production of evidence of the effectiveness of health-related activities

In the field of healthcare evaluation, the robustness and effectiveness of evidence is traditionally assessed using an idea of a ‘hierarchy of evidence’. While the details of different versions of a hierarchy will differ, the main elements are similar throughout the world of public health. In the traditional hierarchy, particular elements of evaluation design are seen as indispensable if the ‘scientific’ nature of evidence is to be preserved. Foremost among these are

- ▶ the application of a comparative method including a ‘control’ sample
- ▶ the use of randomness as a principle in the construction of samples
- ▶ the use of ‘blinding’ (research participants and researchers are uncertain of which individuals have received an intervention and which a dummy or placebo)
- ▶ the use of replicable methodology and standardised, validated instruments for the measurement of health gain and other outcomes

Because of the above, the ‘double-blind randomised control trial’ (RCT) is seen as the ‘gold standard’ in effectiveness methodology. However, there are many fields of activity within healthcare and health promotion that cannot live up to this standard, as, by their very nature, they preclude the



use of one (or several) desirable methodological elements. The main reasons for this are

- ▶ the intervention does not involve the application of a discrete 'treatment' such as a medicine
- ▶ the intervention is not applied to an identifiable population of 'patients' (therefore randomised samples of 'treated' and 'untreated' patients are not identifiable)
- ▶ the intervention is not amenable to placebo (e.g. it is difficult or impossible to design placebo or 'dummy' health promotion activities such as education or exercise)
- ▶ the outcomes being looked for are not discrete or easily measurable (eg. feelings of improved general wellbeing, augmented social capital, "healthy communities")

Given that schemes promoting access to the countryside and/or 'green exercise' are characterised by all of the above, we can see that the 'gold standard' of a blinded and randomised control trial is not an appropriate (or even possible) choice. It is possible, however, for evaluation methodologies to retain several attributes of the blinded RCT, and thus score relatively highly in terms of the traditional evidence hierarchy. An example of this would be a programme in which patients in a Primary Care setting are specifically recommended (prescribed) a programme of green exercise such as an organised set of country walks. This may happen, for example, in cases where patients have high blood pressure which the health service would like to be lower, so as to reduce cardio-vascular risk.

In such a case we now have several of the crucial elements needed for an RCT. First, it would be possible to identify patients who could be potential beneficiaries and randomise them into an 'intervention group' (who would be prescribed the country walks) and a 'control group' (who would not). Second, a standardised method of measuring blood pressure (eg. by sphygmomanometer at a surgery once a week) could be proposed. However, the intervention could not be blinded as it would not be possible for a patient to be honestly unsure whether they had been on a country walk or not. Neither could it be 'placebo-ed' as it is not possible to design an activity that is just like a country walk,

but isn't a country walk at all. Even with these limitations, though, it would be possible to produce evidence at the top end of the traditional hierarchy, because it would be possible to report on the differences in mean blood pressure changes between the two groups and subject these calculations to statistical analyses giving, for example, significance and confidence figures.

As we have seen in the previous paragraphs, however, very few 'access to the countryside' or 'green exercise' schemes are as amenable to RCT methodology as this example. The principle reasons for this belong to the essentially 'holistic' and 'social' nature of the activities being evaluated and include

- ▶ the open access nature of schemes (there are no 'patients', just 'the public')
- ▶ the relatively amorphous nature of desired outcomes
- ▶ the lack of standardised measures to use with generalised social outcomes
- ▶ the importance of perception and personal context in the experience of being a 'user' of 'access to the countryside' or 'green exercise' schemes

As far as the development of best practice is concerned, we can draw two principle conclusions from this discussion.

Firstly, evaluators can try and use as many elements of classic randomised trials as they can. For example, in the absence of a discrete patient group, a randomised sample of people with access to a scheme could be identified and then matched with a similar sample from a similar geographical area without access to a similar scheme. Standardised measurement of physical health or general wellbeing could then be applied to both groups at the same time intervals. Such a descriptive comparison of groups is clearly "lower down" the traditional hierarchy of evidence than the gold-standard RCT because there is no guarantee that the two groups are genuinely comparable.

Secondly, evaluators could 'take the bull by the horns' as far as the amorphous nature of sort-for benefits and the experiential/holistic aspects of social participation are concerned. Evaluation



research methodologies, therefore, could be specifically designed to include *qualitative* elements, such as asking participants and users to reflect on their experiences of involvement with schemes, in their own words and following their own 'agendas'. This type of work (using such methods as one-to-one interviews, focus group discussions, personal diaries and a myriad of different PA methods) does not figure at all in traditional approaches to proving effectiveness. Indeed in classical Public Health circles such data is often classed as "unscientific", "anecdotal" and "subjective". On the other hand, in terms of attempting to illustrate and describe the kinds of impacts that 'access to the countryside' or 'green exercise' schemes can have on the lives of participants, the use of qualitative methods is clearly one appropriate path to follow.

## Appendix E: Guidelines and questions for the evaluation of countryside and nature-based health projects<sup>11</sup>

Every existing or planned green exercise initiative will be set in its own context and will have slightly different aims and objectives. In order to carry out effective evaluation it is important then to tailor the evaluation to the specific circumstances and decide on the most appropriate evaluation techniques needed for each initiative. The process of deciding on which evaluation methods to use can be made easier by considering key characteristics that apply to all projects. For this reason a 'checklist of questions to consider' is provided in this section, showing a hypothetical example from both a 'land based' initiative perspective and from a 'group based' perspective, to make it easier to plan an evaluation process for any prospective initiative.

Regardless of whether a project is a 'land' or 'group' focused one (i.e. project set up to increase access to a particular area of land or to target a specific group of people) however, there are several generic issues that should be considered for the successful evaluation of any project.

### Generic issues

#### Planning and budgeting for evaluation

If green exercise projects are to be effectively evaluated, then ideally the evaluation process should be considered and built in to the 'planning and design' stage of setting up an initiative, rather than as an afterthought. Whether the assessment methods produce qualitative or quantitative data they need to be in place at the outset<sup>12</sup>.

In addition the costs for evaluation need to be taken into account in the budget for the project. The assessment methods recommended require adequate resources both in terms of finance and time.

#### Baseline data collection

The collection of baseline data is very important if a dimension of comparison is to be achieved. In order to assess whether an initiative has provided the health benefits or the increase in visitors that

had been hoped for, for example, it is necessary to have baseline data to enable comparison. For this reason it is never too early to collect formalised and structured data about the development and use of recreational facilities. Comparisons with baseline data (e.g. "before and after", or "population x with population y") are vital in determining if a project has been successful in achieving its goals. In addition, this comparison can be invaluable in applying for or justifying continued funding or support.

#### Community inclusion and stakeholder involvement

Countryside and 'green' recreation projects should always aim to be embedded in the needs and social contexts of local communities. Community and stakeholder involvement can make a huge difference to the success of an initiative in terms of support and usage. Fostering a sense of community ownership to both the initiative and any evaluation that takes place is preferable.

#### Identification of the aims and participants of a project

A green exercise project may aim to address physical health, mental health, environmental improvement or social development targets (or indeed a mixture of all of them) and the identification of these aims will influence the choice of evaluation and sampling strategy. In addition, a project that involves particular organised groups of people, perhaps with specific health problems or objectives (e.g. GP referred patients with cardiovascular needs) may call for a different evaluation structure than a project which involves open access to an area by any member of the public (e.g. visitors to a country park).

In addition it is also important to include all groups that are representative of the particular local community, including Black and Ethnic Minority (BME) groups, people living in deprivation, the vulnerable and socially excluded. When planning an evaluation, care should therefore be taken that the

<sup>11</sup> This annex is written by Rachel Hine and Charlie Davison

<sup>12</sup> This is not to say that successful evaluation cannot be carried out if a project is already up and running, but that it is preferable to have considered it from the outset.



process does not exclude particular people by its design, i.e. should be sensitive to culture and religion.

### **Ethical issues**

Most evaluation work is considered as a type of research and in many settings this brings up the issue of ethics. Therefore ethical dimensions should be considered when interviewing or surveying both members of the public and professionals, in terms of the right to privacy and protection from physical or emotional harm. For example, when dealing with children, the issue of parental consent should be considered, informed consent is also necessary for adults and involvement with GP referred patients may produce confidentiality issues.

In healthcare settings in the UK, research is likely to be within the remit of NHS Research Ethics Committees, and possibly NHS Trust Research and Development committees. Even if there are no formal healthcare links with the project, the evaluators or the participants in an evaluation, evaluation work may still fall under the remit of Local Authority or University ethical regulations.

It is also necessary to consider the health and safety of the researchers carrying out the evaluation. Standing in an isolated car park for example, surveying visitors to a remote forest or country park could be potentially dangerous and safety aspects must be taken into account. Evaluation researchers should therefore be expected to exercise general common sense and moral responsibility to the both the subjects and to themselves.

Advice on ethical dimensions and governance questions will be one of the aspects of evaluation that a university department, local health authority, local authority or a local research network will be able to provide. A wealth of information about ethics in healthcare research is available at the website of the Central Office for Research Committees ([www.corec.org.uk](http://www.corec.org.uk)).

### **Evaluation guidelines - checklist questions to consider**

This section is designed to be a guide to help in the planning of an evaluation process for a 'land/

access' or 'group' focus initiative. The questions in the left hand 'questions' column can be used whatever the context but the examples used are hypothetical and are just to illustrate the kinds of questions and issues that should be considered for a successful and efficient evaluation. For this reason comments in the 'answers' columns should not be considered as comprehensive.

Questions		Answers	
		'Land focus' project	'Group focus' project
<b>Project Name</b>		Any district Country Park	Any town walking group
<b>Nature of project</b>		Creation of a network of graded and way-marked paths and trails in the Country Park	Creation of a group that will have weekly walks in the local area
<b>Participants</b>		Open access - so participants are members of the public, either as individual or as formal or informal groups	Anybody can join the group, so participants are members of the public interested in walking with other people and also possibility of participants by GP recommendation (to increase exercise levels in patients)
<b>Aims</b>	<i>Increased access/numbers of visitors</i>	To increase usage of the park, increase visitor numbers for all activities, especially walkers, runners, cyclists and horse riders	No remit to increase access or visitors to a specific area, although groups may do this anyway
	<i>Setting up a group</i>	No specific remit to create a group although it is hoped that local groups will use the park	To create an opportunity for people to go on walks with others, to get fitter, be sociable and feel better
	<i>Other</i>	To encourage local people to use the park more, i.e. increase its appeal to people in the immediate vicinity	To increase social capital of local community and to promote a healthier, more active lifestyle
<b>Potential benefits for participants, local community or land</b>	<i>Health improvements</i>	Improvements to physical and mental health from participating in activities (walking, running, cycling etc.)	Improvements to physical and mental health from walking
	<i>Social capital improvements</i>	Nothing specific except that park will be a place for people to meet up with others, a venue for groups to meet and a resource for the local community	Increased social capital in local community and participants can feel part of a group, get to know people and be more sociable
	<i>Environmental improvements</i>	Encouraging people to keep to marked trails will help to preserve the areas in between for wildlife biodiversity	No specific environmental benefits
<b>What to evaluate and how</b>		Evaluate what difference activities in the park have made to people's lives. Physical, mental and social health etc.	Evaluate what difference being part of a walking group has made to members lives. Physical, mental and social health etc.
		Questionnaire, Participatory Appraisal methods and Narratives	Questionnaire, Participatory Appraisal methods and Narratives. As the same group of people meet every week there is a possibility of longitudinal health improvement analysis for members (including those who have been GP referred)
		Self-completion by participants	Self-completion by participants or evaluation by researchers/GPs



Questions		Answers	
Measures to be used	Basic data	For example questions on age, gender, occupation, education	For example questions on age, gender, occupation, education
	Physical health	<p>For example questions on height, weight, smoking habits, fitness and activity etc.</p> <p>Height and weight data enables the calculation of Body Mass Index (BMI)</p> <p>Physical measures such as blood pressure, respiratory function etc. before and after activity for example may be desirable but may have practical limitations for collection in the field</p> <p>Standardised instruments such as Euroqol (EQ-5D) and SF 36 may be used to provide physical and wellbeing data</p>	<p>For example questions on height, weight, smoking habits, fitness and activity etc.</p> <p>Height and weight data enables the calculation of Body Mass Index (BMI)</p> <p>Physical measures such as blood pressure, respiratory function etc. before and after activity or as a longitudinal survey for example may be possible and more practical in this case</p> <p>Standardised instruments such as Euroqol (EQ-5D) and SF 36 may be used to provide physical and wellbeing data</p>
	Mental health	<p>For example changes in mood and self esteem post activity</p> <p>Standardised instruments such as RSE (self esteem), POMS (mood) and GHQ (general psychological health) may be used</p>	<p>For example changes in mood and self esteem post activity or on a longitudinal basis</p> <p>Standardised instruments such as RSE (self esteem), POMS (mood) and GHQ (general psychological health) may be used</p>
	Social benefits	Narrative data, interviews, focus groups, PA methods	Narrative data, interviews, group activities, PA methods
	Benefits to environment	For example biodiversity changes, impacts on wildlife	Not relevant
	Other	May change from context to context	May change from context to context
Baseline data/ comparison possibilities		<p>Possibility of analysing changes in visitor numbers over time ie before the development of marked and graded trails and then again after development of trails</p> <p>Pre and post activity comparisons</p>	<p>Possibility of analysing changes in 'health' pre and post activity and also on a longer term longitudinal basis</p>
Sampling		<p>As this is an 'open access' project there is no specific group of people to sample, but a mixture of individuals and groups</p> <p>Sampling of the population will then be more opportunity based and comparisons are likely to be</p> <p>i) before and after participating in an activity in the country park on that day, or</p>	<p>This is a specific group of people which should make it easier to access and to estimate size of sample population</p> <p>Sampling could be before and after walk, i.e. at meeting and finishing points.</p>

Questions		Answers	
		ii) a larger sample (twice the size of i) of participants now and another sample of different participants in (for example) a years time to see what the changes have been	Information could also be gathered on joining the group and then again after 6 months (for example) of regular participation in walks
<b>Ethics</b>		Unlikely to fall under NHS Ethics Committee but may fall under local authority or country park ethical guidelines	GP recommended members are likely to fall under NHS Ethics committee and others may fall under local authority or university ethics committees depending on context
<b>Practicalities and sensitivities</b>	<i>Location</i>	As open access project, best location to access visitors for evaluation pre and post activity would be a central car park, café or visitor centre etc. or somewhere where people begin and end their visit	At meeting and finishing point of walks
	<i>Safety</i>	The safety of both the visitors and researchers should be considered (e.g. safe for children and dogs while adults complete a questionnaire?, researchers standing alone in remote places etc.)	Safety aspects should have been covered by the walking group anyway, evaluation is unlikely to create new risks
	<i>Sensitivities</i>	Is the design, timing or nature of evaluation likely to cause offence or problems for anyone? Or does evaluation time coincide with a local event etc.	Is the design, timing or nature of evaluation likely to cause offence or problems for anyone in the group?
<b>Costs</b>		Account for researchers time for design and implementation of evaluation; materials; possible incentives; analysis of results; report; feedback etc.	Account for researchers time for design and implementation of evaluation; materials; possible incentives; analysis of results; report; feedback etc.
<b>Feedback</b>		For example: Country Park Newsletter; local paper, radio or TV, notice/poster at visitor centre, park café, local community centre, village hall etc.  When asking people to take part in an evaluation, it is better to have clear ideas on how the results will be fed back to the community, before it starts. Feedback promotes community ownership and stimulates further interest in the project	For example: Walking group newsletter, local paper, radio or TV., notice/poster at GP surgery, community centre or village hall.  When asking people to take part in an evaluation, it is better to have clear ideas on how the results will be fed back to the community, before it starts. Feedback promotes community ownership and stimulates further interest in the project



Questions		Answers	
<b>Partnerships</b>	<i>Other organisations</i>	The research may be relevant to other Country Parks, local or national organisations, local authorities and the health sector. Links could be made with such groups to promote best practice, share results and information and possibly funding.	The research may be relevant to other walking groups, PCTs and other health groups, local or national organisations and local authorities. Links could be made with such groups to promote best practice, share results and information and possibly funding.
	<i>Community Groups</i>	Involvement of key community groups in the project and in the evaluation will foster ownership and promote support	Other community groups in the area may be interested to hear about the walking groups and this could lead to social capital improvements