

Scottish Needs Assessment Programme



Health Related Physical Activity

SCOTTISH FORUM FOR PUBLIC HEALTH MEDICINE

69 Oakfield Avenue
Glasgow G12 8QQ
Tel - 0141 330 5607
Fax - 0141 330 3687

ACKNOWLEDGEMENTS

The editorial team undertook extensive consultation in putting this document together. The team would like to acknowledge the considerable assistance given by a large number of individuals in this exercise. Unfortunately, they are too many to detail by name but it is hoped that they will recognise their input in this report. We acknowledge the Area Managers of the Health Promotion Departments in Scotland and their respective health promotion officers who replied to our request for further information. Individual members of the working group deserve special mention for their time and effort as the request to join the editorial team meant an addition to already heavy work schedules. In particular, Dr Jill Murie carried out extensive consultation with individuals both within and beyond the boundaries of Lanarkshire Health Board. Last but not least, Jackie Gregan, SNAP secretariat, had the unenviable task of co-ordinating the meetings and pulling together reports of the group.

CONTENTS

Executive Summary

Recommendations for commissioners

- 1 Introduction**
- 2 Recommended levels of physical activity**
- 3 Prevalence of physical inactivity in Scotland**
- 4 Framework for commissioning and consultation**
- 5 Economic costs and benefits**
- 6 Effective interventions**
- 7 Monitoring**
- 8 Priority action areas and recommendations**
- 9 References**

Appendix

- 1 Terminology**
- 2 Organisational framework**
- 3 Monitoring indicators**
- 4 Current practice**
- 5 Checklist for priority work (Health Board)**
- 6 Checklist for priority work (General Practitioner)**

EXECUTIVE SUMMARY

- **Physical activity and health**

Evidence suggests that higher levels of physical activity are strongly associated with lower all-cause mortality in populations. A low level of physical activity is one of the causes of coronary heart disease (CHD). In addition, physical activity programmes can reduce the risk of mortality after a heart attack by 20%. There is evidence to suggest that regular physical activity can exert a positive effect on the management of obesity, the deferment or prevention of non-insulin diabetes mellitus, the lowering of both systolic and diastolic blood pressure, and in the increase of bone density.

It has been estimated that around one third of all CHD and one quarter of stroke incidence could be avoided if regular physical activity became the norm. In adults of 45 years and over, just under one quarter of non-insulin dependent diabetes and just over half the hip fractures could be avoided.

Regular participation in physical activity confers a wide range of benefits especially to older adults: improvement in co-ordination, balance, mobility, functional capacity, grip and leg strength are all developed or maintained through physical activity.

Regular participation in physical activity is associated with raised self esteem in children and adults. There is also an association between exercise and a decreased level of mild to moderate depression. Though some risks are associated with participation in physical activity, there is agreement that the risks of physical inactivity far outweigh both the direct and indirect risks of being more active.

- **Recommended levels of physical activity**

Two complementary sets of recommendations exist regarding the amount of physical activity required for health gain. These recommendations can be seen as a two step approach and are concerned with getting the population more active on a regular basis. The first recommendation proposes that sedentary individuals seek to accumulate at least 30 minutes of moderate intensity activity on at least five days of the week. The second recommendation is aimed at those who wish to improve health related physical fitness and proposes participation of at least 20 minutes of vigorous intensity activity on three or more days a week. To attain the greatest public health benefit it is important that the first step i.e., *sedentary individuals increase daily physical activity of a moderate intensity*, is given high priority.

- **Prevalence of physical inactivity**

It is estimated that around one third of adults are sedentary with very few women taking part in regular vigorous intensity activity. The proportion of sedentary people in the population increases with increasing age irrespective of gender. Fitness and activity levels of children and young adults have declined. It is estimated that only half of children aged 11-15 years undertake the recommended levels of physical activity and in girls of this age group there is a marked decrease in the proportion who are physically active on a regular basis.

- **Framework for commissioning and consultation**

A shared vision which embodies a clear understanding of the active living concept must lie at the heart of the consultation and commissioning process. There should also be a clear understanding that health promotion entails more than health education (e.g., information giving). It involves and requires interventions which aim to tackle both social and environmental determinants.

- Purchasing is involved with the assessment of need, the provision and development of service capability and the evaluation of service provision.
- It is clear that consultation must take place at a number of levels: from national strategic level between appropriate agencies through to local implementation where the opportunity for physical activity participation becomes a reality.
- By agreement on common aims and strategic objectives both commitment and co-operation can be realised.

- **Cost benefit**

In relation to the United Kingdom there is little data on cost benefit analysis. One estimate predicted a saving of £20 per person on medical costs alone if the adult population over 45 years were physically active. A report on the economic impact of hillwalking in Scotland showed that £110 million was generated by 500,000 people who took to the Scottish hills in the year 1995-96. Other analysis relating to increased use of cycling has estimated the substantial costs savings to the environment in terms of reduced pollution, fewer accidents and reduced maintenance costs to roads.

- **Effective interventions**

A number of randomised controlled trials in the United Kingdom are underway but little data is available. Interventions may be more effective if alternatives to formal structured, supervised, exercise classes are provided. Additionally, interventions should provide on-going support to help ensure that individuals move from initial adoption and progress to maintenance.

Involvement of general practitioners in referral projects has increased but data available on outcomes is qualitative and descriptive. Interventions should be targeted at individuals who are more likely to consider and undertake change in behaviour; the 'stages of change' model promises utility in this context. Individualised interventions such as giving information can be effective as a first step. Thereafter, interactive interventions are likely to be more effective.

- **Monitoring**

There is a wide list of indicators available to judge the evaluation of health education and health promotion interventions. Although change in physical activity is an acceptable outcome of an intervention, debate surrounds the validity and reliability of self assessment of individual change. The self-report seven day recall measure is adequate for lifestyle interventions.

RECOMMENDATIONS FOR COMMISSIONERS

Leadership role

- There should be better consultation and formation of health alliances between lead agencies, notably health, sport, education and leisure. Joint action plans should be agreed here.
- Directors of Public Health should take a lead role in advocating the promotion of physical activity.
- Health Boards should audit their progress in reference to an action checklist.

Research

- Health Boards should commission research on effective interventions (e.g., General Practitioner exercise referrals and exercise consultation).
- There should be better provision of information on activity and fitness levels of the Scottish population. A national lead agency should coordinate this activity.
- Innovative research programmes which evaluate environmental changes to promote an active living approach should be encouraged.

Training

- Training for health professionals both in short courses and also in more advanced formats (e.g., at certificate, diploma and master level) is undeveloped and would benefit greatly from a nationally recognised training infrastructure. Information on existing courses is not systematically disseminated.

1 INTRODUCTION

The contribution of physical activity to health and well-being

The health of the people in Scotland is poor in comparison with the rest of Europe. Compared with other West European and developed countries, Scottish men have the shortest life expectancy and Scottish women are almost as badly off. Mortality rates for lung cancer in Scottish women are the highest with rates for Scottish men almost at the same level¹. Scotland's mortality rates from coronary heart disease (CHD) have for many years been among the highest in the world for both men and women². There is world-wide consensus that physical activity is protective against CHD and over forty years of research from different countries has shown that physical inactivity is an independent risk factor for CHD among men and that regular physical activity can reduce that risk^{3,4,5,6,7,8}. An international conference brought together the research evidence from clinical, epidemiological and experimental studies on physical activity and health⁹. Both conferences produced consensus statements in support of the positive relationship between physical activity and disease prevention and The Royal College of Physicians¹⁰ and a British Heart Foundation working group¹¹ concluded, following comprehensive reviews, that there is substantive evidence that regular physical activity contributes to physical health.

In *Exercise and the prevention of coronary heart disease: today's best buy in public health*, J N Morris stated that:

'It (exercise) is personally and ecologically positive, the costs in injuries or resources need not be prohibitive and the anti-health forces are feeble in comparison with those... in the areas of tobacco, alcohol and diet. Nothing less is required in developed countries than an epochal shift of behaviour to a more active style of living'¹².

Risk to health from physical inactivity

A physically inactive lifestyle is a powerful independent risk factor for CHD and stroke and is the most prevalent CHD risk factor among Scotland's adult population. Table 1 overleaf outlines both the prevalence and relative risk of physical inactivity in comparison to other risk factors.

Table 1 Prevalence and relative risk of CHD risk factors¹³

CHD risk factor	Estimated prevalence in Scotland	Relative Risk *
Smoking ^a	33% (women), 35% (men)	2.5
High serum cholesterol ^b	26%	2.4
Hypertension ^c	15%	2.1
Physical inactivity ^d	81% (women), 76% (men)	1.9
Obesity ^e	16% (women), 13% (men)	1.5 ¹⁴

*Estimated relative risk of disease for individuals who are at risk compared with those who are not

a > 20 cigarettes a day v not smoking

b plasma cholesterol > 6.9mmol/l v 5.6 mmol/l

c systolic blood pressure >150mm mercury v 130mm mercury

d 3x20 mins vigorous physical activity v no physical activity

e BMI >25 v BMI < 25

There is now convincing evidence that the historical trend towards increasingly inactive lifestyles is the main factor explaining the rise in obesity levels in Britain¹⁵. It is argued that future programmes which tackle the prevalence of obesity give equal attention to diet *and* physical activity^{16,17}.

Physical Activity and Mental Health

Regular exercise can positively influence mental illness, in particular helping to reduce anxiety and depression¹⁸. From epidemiological studies in the USA¹⁹ and Canada²⁰, symptoms of depression and lack of psychological well-being have been correlated with lack of recreational activity. Although there is little evidence to suggest that exercise promotion among the general population will result in widespread and substantial mental health benefits, exercise does have benefits for depressed, anxious and stressed individuals and a protective effect for those disposed to psychological distress. From the viewpoint of public mental health, population approaches to exercise promotion are considered to be 'sound public policy' and an important means of reaching needy individuals who are not in therapy, as long as expectations of the extent and depth of psychological benefits are not exaggerated²¹.

Physical Activity and the Quality of Life

The natural loss in functional capacity due to ageing from middle to later years is exacerbated by physical inactivity. It has been reported that 50% of what we currently note as ageing is now considered to be hypokinesia, more commonly termed a disease of "disuse"²². When lower thresholds of functional capacity are reached, quality of life can become affected. The potential benefits to persons with chronic conditions should not be overlooked. There is now mounting evidence to suggest that while chronic conditions cannot be cured by being physically active on a regular basis, they can be coped with more effectively²³. There seems to be a potential for exercise to play a positive role in rehabilitation from a medical condition, coping with a chronic illness, dealing with reproductive events (menstruation, pregnancy, menopause) or dealing with the consequences of ageing²⁴.

National Policy

The importance of physical activity to health and the risk of physical inactivity to ill-health is reflected in policy statements set out by Health Boards. Since the early 1990s physical activity promotion has been identified as a priority area for action, primarily because of its role in the prevention of CHD, stroke and vascular disease through modifying some of the risk factors for these diseases, including obesity, hypertension and raised blood cholesterol. The key policy documents include:

- Health Education in Scotland (1991)
- Scotland's Health (1992)
- Coronary Heart Disease in Scotland: report of a policy review (1996)

The priorities for action by purchasers over the next two to three years were outlined by the NHS Management Executive in a letter to Health Boards, NHS Trusts and GP fundholders (MEL 1995/51). The identification of the prevention of mental illness, CHD and cancer as priorities means that the promotion of physical activity remains firmly on the NHS policy agenda and is a high priority for health promotion efforts in Scotland. Of the nine current research priorities outlined by the Chief Scientist Office for Scotland, physical activity can make a major positive contribution to five of them. The economic and social costs of obesity are closely related to the health burden and are substantial. In The Scottish Diet report²⁵, leisure time physical activity is noted as an important means of weight management and has therefore a contribution to make in lessening the health burden of obesity.

The government underlined the importance of physical activity by setting up a national physical activity task force in September 1993 with the specific remit of developing a national strategy for physical activity in England. This task force is part of the overall national health strategy expounded in the Health of the Nation. No similar task force or strategy exists for Scotland.

While there have been a number of reports which have focused on the theme of health related physical activity, no single text has gathered together at Health Board level the various strands relating to benefit, cost, prevalence, provision, programmes and recommendations.

The purpose of this report is, therefore, to:

- underline the importance of physical activity as a public health issue in Scotland
- bring together research, policy statements and strategies under one cover
- review the evidence of effectiveness in physical activity interventions
- provide a reference handbook for Health Boards and other purchasers
- suggest *approaches* to bringing about required changes in physical activity in the Scottish population
- provide recommendations for the *commissioning* of services.

2 RECOMMENDED PHYSICAL ACTIVITY LEVELS

Adults

Traditionally, health education and exercise professionals have adopted the exercise guidelines issued by the American College of Sports Medicine in 1978 (revised 1990). These recommended a weekly minimum of at least three 20 minute sessions of vigorous intensity exercise (i.e., to at least 60% of maximum heart rate) to improve cardiorespiratory and muscular fitness²⁶. Following a review of the research evidence²⁷, a new 'active living' approach to the promotion of health-related physical activity has been advocated^{28 29}. See Appendix 1 for clarification of terms.

This 'active living' approach is founded upon the recent guidelines on physical activity issued by the Centres for Disease Control and American College of Sports Medicine in July 1993 which emphasised the health benefits accruing from more frequent bouts of moderate intensity exercise. Moderate, as well as vigorous, intensity physical activity on a regular basis has been shown to bring health benefits to the sedentary population and is regarded as offering considerable health gain to the least active. Regular vigorous intensity physical activity offers protection against coronary heart disease; the risks associated with physical activity are lessened if it is part of a regular routine and of a more moderate intensity.

The new recommendation is:

Aim to accumulate 30 minutes or more of moderate intensity physical activity over the course of most days of the week²².

The new recommendation (see Box 1 overleaf) is intended to encourage the majority of the population who are not physically active on a regular basis to build physical activity of a moderate intensity into their daily routines. It is intended to be complementary to the former '3 x 20 mins' exercise message, rather than to replace it. The 3 x 20 min message for vigorous intensity exercise (see Box 1) remains appropriate for those who are already regularly active and concerned with improving or maintaining aerobic fitness. In view of the new evidence of health benefits from moderate intensity physical activity, and the desirability of promoting physical activity in small steps, a new approach to physical activity promotion is warranted³⁰.

Children and young people

The main guidelines for children and young people in relation to the recommended amount of physical activity which emerged from an International Conference on Physical Activity are similar to those for adults³².

Box 1 Active living and regular exercise recommendations³¹

Recommendation	Messages	Target Group
<p>Stage 1: <i>Active Living</i> Aim to accumulate 30 minutes of moderate intensity physical activity on most days</p>	<p>Feel better in yourself and about yourself. Help your body to work better. Lessen your chances of heart disease. Keep yourself mobile, stronger and more supple. Improve your circulation.</p> <p>Add a bit of physical activity to your present routines so that being physically active becomes a way of life:</p> <ul style="list-style-type: none"> • find more active ways of doing the things that you usually do • gradually build up the length of each period of activity 	<p>Adults who are currently inactive or irregularly active</p>
<p>Stage 2: <i>Regular Exercise</i> Every week aim to include 3 periods of vigorous intensity activity which last for at least 20 minutes</p>	<p>Health benefits as above, but more so. Feel even better etc. Improve your fitness.</p> <p>Take part in exercise activities on a regular basis:</p> <ul style="list-style-type: none"> • make the periods of physical activity longer • be more active more often • make your exercise activities more energetic 	<p>Adults who are already regularly active at a moderate level</p>

3 PREVALENCE OF PHYSICAL ACTIVITY IN SCOTLAND

Data Sources

Data on adult physical activity levels in Scotland are still very poor compared to England³³ and Northern Ireland³⁴ where national surveys have been undertaken. Other monitoring data are available through the Health Survey for England in 1993 and HEA's National Survey on Activity & Health (HEANSAH) in 1991. Participation data for Britain is available from the Health and Lifestyle Surveys (HALS) conducted in 1986 and 1993 and the General Household Survey (GHS) and Health in England 1995.

In Scotland, monitoring data is provided by individual Health Boards by carrying out routine health surveillance and by SNAP core topic surveys. The Health Education Board for Scotland commissioned a panel study conducted by System 3 Scotland in 1993 - tables 4-6 below refer to this study. Data on exercise that general practitioners recorded for Band 3 health promotion funding have not been published and collection has now been abandoned. Population physical activity levels will be reported by the Scottish Health Survey in 1997, while data on behaviour, knowledge, beliefs, motivations and skills will be available through HEBS's new Health Education Population Survey as from summer 1996.

Physical Activity Levels

In Scotland, it is estimated that around one third of adults are sedentary. The definition of sedentary is Activity Level 0, taken from the levels (see below) used in the Allied Dunbar National Fitness Survey²⁶ i.e., no physical activity of a moderate or vigorous intensity in last 4 weeks.

Table 2

Level	Activity of 20 minutes duration in the previous 4 weeks
0	none
1	1 - 4 occasions of a mix of moderate and vigorous activity
2	4 - 11 occasions of a mix of moderate and vigorous activity
3	12 or more occasions of a mix of moderate and vigorous activity
4	12 or more occasions of moderate activity
5	12 or more occasions of vigorous activity

Table 3
Proportions of sedentary (Activity Level 0) men and women in England, N. Ireland and Scotland

	England	N. Ireland	Scotland
Men	17%	21%	28%
Women	16%	20%	37%

Social variations in physical activity levels

Table 4 shows that older people are more likely to have a sedentary lifestyle than younger people (i.e., activity levels decline with age). Two in ten people aged 16-24 are sedentary, compared to six out of ten people aged 65+.

Table 4
Proportions of sedentary adults (Activity Level 0) by age group in Scotland

16-24	25-34	35-44	45-54	55-64	65+	All ages
18%	23%	31%	39%	43%	60%	33%

There are clear gender differences in physical activity levels and in men's and women's participation rates for different types of sport and exercise (see Table 5). Very few women of any age take part in regular vigorous intensity activity and are less likely than men to take part in regular moderate intensity physical activity.

Table 5
Proportion of sedentary (Activity Level 0) men and women by age group in Scotland

	16-24	25-34	35-44	45-54	55-64	65+	All
Women	20%	25%	35%	40%	48%	66%	37%
Men	15%	22%	26%	39%	38%	51%	28%

Differences in physical activity levels between social classes can be seen in table 6. There are major differences in participation at discrete activity levels, namely 0, 3 and 5 respectively.

Table 6
Adult physical activity levels men and women by social class in Scotland, 1993

Social class	0	1	2	3	4	5	All
ABC1	31%	45%	49%	32%	51%	38%	40%
C2DE	69%	55%	51%	68%	49%	62%	60%

This contrasts with surveys of leisure-time physical activity where lower participation rates with lower social class have been consistently found (HALS, 1985 & 1992; GHS; SHHS 1986). Differences here however may be due to change in methodologies and measurement tools. More striking social differentials in physical activity levels are found using housing tenure and education as social indicators. 28% of men and 23% of women living in rented council accommodation had sedentary lifestyles compared to 15% of male and 15% of female owner-occupiers (ADNFS, HEANSAH).

Trends in leisure-time participation

The CSM Tracking Study has shown that there has been a slight increase in moderate intensity physical activity levels in Scotland. Data from the General Household Survey (GHS) also indicates a small increase in the rates of adult participation in certain leisure-time physical activities over the past 10 years (GHS 1993). In 1993, 72% of men and 57% of women had taken part in at least one activity in the past 4 weeks, compared with 70% of men and 52% of women in 1987. The main increases (1987-1993) have been in walking (38%-41%), swimming (13-15%), keep-fit/yoga (9%-12%) and cycling (8%-10%). This data, together with a consideration of the health potential of different modes of physical activity, suggest that walking, cycling and swimming are the activities that offer the greatest potential for regular participation and therefore health gain³⁵.

- **Brisk Walking** - the only sustained, dynamic, aerobic activity which is common and popular (41%) and increasing as a recreational activity. As a weight-bearing activity, it also offers protection against osteoporosis.
- **Cycling** - a form of activity with substantial health benefits. The BMA concluded that the benefits of cycling outweigh the risks by 20:1. Cycling is suitable for most ages, but has greater appeal to the young. There is a large latent demand for cycling - 90% men and 67% women know how to cycle; and cycle sales have doubled in the last ten years. Individual safety however is still frequently cited as a major barrier to increased use.
- **Swimming** - a form of sustained, dynamic movement and a popular, sociable recreation which can appeal to all ages. Participation increased overall by 90% between 1977-1986, but most among semi-skilled manual groups and the over-60s.

Knowledge

Most people are already aware of the health benefits of regular exercise. For example, a 1991 MORI survey for Sunday Times Scotland found that being more active (together with eating more fresh fruit and vegetables) are the main ways that Scottish adults have been trying to improve their health over the last few years.

However, there is a **large discrepancy between perceived fitness and reported activity behaviour. Eighty per cent of sedentary adults in Scotland regarded themselves as very or fairly fit.** People tend to overestimate how fit they are and so may be unreceptive to promotional messages (see table 7). Important aims of physical activity promotion are to challenge these misperceptions of fitness among the least active groups and to increase activity awareness. It is important to communicate clearly what amount of physical activity is recommended for health benefit.

Table 7 Perceived fitness of Scottish adults by activity level, 1993

Activity Level	Very/Fairly Fit *	Very/Fairly Unfit *
5	93	7
4	96	4
3	95	5
2	86	14
1	84	16
0	80	20
N=	1464	230

* figures in percentages

Barriers and motivations

The main motivations associated with leisure-time physical activity are: wanting to feel in good shape physically, to improve and maintain health, to feel a sense of achievement, to meet friends/other people and to get outdoors. Research has shown that among those who do not take physical activity on a regularly basis a range of negative views were expressed - it was considered time-consuming, difficult, unpleasant (sweaty, hard work), pointless doing in just a small amount and too late to start. Bad experiences at school (especially for women and girls) contribute to these negative attitudes³⁶. Box 2 summarises the main barriers and motivations to both leisure time exercise and active living.

Box 2

Summary of barriers and motivations associated with participation in leisure time exercise and an *active living* approach²⁸

	Leisure-time exercise participation	Active Living (Everyday walking, cycling)
Barriers	Lack of time Not the sporty type Need time to rest and relax Domestic responsibilities, childcare Body image, feel too fat Not healthy enough	Personal Safety Fear of accidents on the road Unpleasant environment (cities) Traffic fumes and pollution Physical effort (changing etc) Bad weather Risk of bike theft Public attitudes to cycling
Motivations	To feel in good shape physically To keep/improve health and fitness To feel a sense of achievement To get outdoors To look good, control weight To have fun, sociable	cheapness health speed convenience

The **declining fitness and physical activity levels of children** have become the focus of increasing interest and concern among researchers, professionals and social commentators. A study of the energy intake of 14-15 year olds over a 50 year period demonstrated no change in the young people's body mass despite reduced energy intake, which suggests that energy expenditure has diminished³⁷. Cross-national studies of school-aged children indicate that in Scotland almost half the children aged 11-15 did not undertake vigorous leisure-time exercise on most days (4-7 times a week), although around one-quarter exercised outside of school once a week or less. Boys are more likely than girls to engage in physically active pursuits outside of school time. Between the ages of 11-15 there is a marked decrease in the proportion of girls who do daily physical exercise, while among boys there is less change³⁸.

Sedentary leisure pursuits were found to be more popular than physically active ones among Scottish schoolchildren. At 15 years old, Scottish schoolchildren have high rates of TV and video watching. While the restricted daylight hours of Scottish winters reduce outdoor opportunities, school children in Norway, where similar conditions occur, have one of the lowest rates of TV and video watching and the most physically active girls.

Children's scope for independent mobility and travel outside the home were found to have declined dramatically between 1971 and 1990, with girls experiencing substantially less independence than boys³⁹. The profile of free time activities illustrated the predominantly sedentary nature of young people's lifestyles, with watching TV, homework, listening to music, using a computer and reading being among the most popular activities⁴⁰. Gender differences were clearly apparent with 17% of the girls compared to 7% of boys who did not participate in any of the physical activities listed. Few children and young people achieve the levels of physical activity recommended for health benefit. Since a sedentary lifestyle is associated with all-cause mortality and it appears that the patterns of physical activity developed in childhood and adolescence continue into adult life⁴¹, promoting the habit and enjoyment of being physically active during childhood and adolescence is therefore an important aspect of young people's health. Schools should be fully aware of this important public health consideration.

Priority population groups

As noted earlier, those who are currently sedentary or only irregularly active at a moderate level comprise the priority group in the population for health-related physical activity promotion strategies. While this priority group will cut across all ages and life stages, females and the older age groups will be over-represented because of their generally lower levels of physical activity.

To assist the formation of physical activity strategies it is necessary to view the population as broken down by age groups. Box 3 outlines four broad population groups, objectives and key settings.

Box 3 Population groupings, objectives and key settings

Population Group	Objectives	Key Settings
<i>Children</i>	<ul style="list-style-type: none"> • to increase motivation to remain physically active • to enhance skills in physically active forms of play, recreation and travel • to engender positive attitudes to regular exercise among children and their families • to recognise the value of physical education in the curriculum 	<ul style="list-style-type: none"> • Schools • Voluntary sector
<i>Young Adults</i>	<ul style="list-style-type: none"> • to encourage links between school leavers and local opportunities • to promote desirability of active forms of recreation and travel • to encourage diversity of modes and non-competitive forms of physical activity within and outwith physical education 	<ul style="list-style-type: none"> • schools • further and higher education • local authorities • voluntary sector • local media
<i>Middle-aged Adults</i>	<ul style="list-style-type: none"> • to promote 'activity awareness' in individual lifestyles and everyday settings • to increase awareness of where active choices can be made • to enhance motivation and skills necessary to develop and maintain an active life • to encourage more active forms of travel (focus on walking, stair-use and cycling) • to increase desirability of active forms of recreation and travel • to develop safe environments for active living 	<ul style="list-style-type: none"> • mass media • workplace • primary health care • voluntary sector • local authority
<i>Older people</i>	<ul style="list-style-type: none"> • to maintain functional mobility and independence • to increase physically active recreational opportunities that provide regular social contacts and mental stimulation • to improve balance and strength to prevent initial/further falls 	<ul style="list-style-type: none"> • primary health care • voluntary sector • local authority

Within these population groups, interventions would need to be tailored more precisely to the needs of particular sub-groups, taking into account:

- 'stage of change'⁴² - with the emphasis on pre-contemplators in the media; contemplators and preparers in more individualised programmes (see Box 4 of *effective interventions* section on page 19 for expansion of these stages)
- health status - with the emphasis on sedentary children, young people and in the general public programmes; on weight control and CHD among middle-aged adults; on osteoporosis among pre-menopausal women; and on maintaining functional capacity and independence and preventing falls among older people.

4 FRAMEWORK FOR CONSULTATION AND COMMISSIONING

The context and practice of purchasing health services is complex. The degree of complexity is no different when we consider the purchase of services to bring about required changes in physical activity levels in the target populations. No concise definition of purchaser exists yet it is clear that Health Boards as purchasers of health services have and exercise functions well beyond that of simply contracting a range of health services. It has been suggested that a purchaser may operate on a number of levels:

- by developing the capability (structures, processes, skills) for assessing needs
- by purchasing services through a contracting process
- by stimulating and developing a range of providers, and
- by analysing and regulating service providers through contract specifications, monitoring and review⁴³.

Working relationships have evolved rapidly in the evolving internal market NHS. Although Boards and NHS Trusts have discrete roles and functions, the contracting process in physical activity promotion will inevitably involve the Board entering into consultation with a number of agencies which can provide the required services. Consultation and decision making within intersectoral health alliances have been described as worthwhile, but time-consuming and difficult to set measures for evaluation.

Joint commissioning is developed from a shared vision, which overcomes partner differences in aims, objectives, value systems, language and power structure. Health, education and leisure professionals have different cultures, resources, priorities and attitudes to physical activity promotion. This diversity of background and approach must be both fully recognised and viewed positively by all agencies within the alliance. By agreement on common aims and strategic objectives both commitment and co-operation can be realised.

Adopting a consultative approach can help to:

- improve clinical and cost effectiveness
- prevent duplication of effort
- maximise use of available resources
- ensure good practice is shared and information about effectiveness is put into practice
- define respective roles and relationships
- co-ordinate and procure required change in physical activity provision

Organisational structure

The need for a cultural and organisational shift involving more innovative pathways of collaboration is evident. It is clear that consultation must take place at a number of levels: from national strategic level between appropriate agencies through to local implementation where the opportunity for physical activity participation becomes a reality. Four principal purchaser-provider levels have been identified (see appendix 2). At each level, action should be focused on the skills and functions of each agency, and how their skills and resources could best be combined.

5 ECONOMIC COSTS AND BENEFITS

In simple terms of wealth generation a recent report has calculated that hillwalking and mountaineering in Scotland generated £400 million last year and nearly 4000 jobs both direct and indirect were created. Around 500,000 people (1% of the adult population of the United Kingdom) made use of this leisure pursuit⁴⁴.

The cost-effectiveness of promoting physical activity can be judged by firstly deciding on how to measure effectiveness and secondly by estimating the cost of changes in this measure which can be brought about by increased physical activity. There are a variety of measures of effectiveness. For example, effectiveness could be judged by decreased coronary risk factors, increased quality adjusted life years (QALY), decreased all-cause mortality, reduced medical costs, decreased use of private car transportation or reduced absenteeism from the workplace. The task of calculating the cost of creating changes in these measures which can be attributed to increased physical activity is complex. Three immediate issues for the cost-effectiveness calculation are the time lag between engaging in physical activity and achieving a health benefit, the percentage of the target population who maintain physical activity and estimating the indirect costs such as time spent being active.

There is apparently little Scottish data available on this topic but Nicholl, Coleman & Brazier⁴⁵ have provided an analysis for England and Wales. According to their calculations savings in health care costs occurred for older adults when adequate physical activity was undertaken. For people aged 45 and over, the average annual medical care cost per person incurred as a result of increased activity was less than £10 while the cost avoided by the disease prevention effects of physical activity was more than £30.

Hatziandrea et al⁴⁶ used a cost-effectiveness analysis on two (one exercising by jogging and one sedentary) hypothetical cohorts (n=1,000) of 35 year old men. Exercise costs were estimated for equipment, counselling, time spent exercising and injury (a 5% injury rate was assumed). The CHD costs included estimates of emergency assistance, hospitalisation, follow-up care and loss of earnings. When time spent exercising was given a value (half the average wage per hour) then exercise did not produce savings. However, if this time was considered as "no cost" then exercise was cost saving. It was further estimated that over 30 years the exercising group would have 78.1 fewer CHD events and would have 1,138 more QALYs than the sedentary group. Furthermore, these calculations suggested that the cost per QALY was favourable when compared to other CHD interventions.

Further cost-effectiveness analyses have been undertaken in the workplace setting where measures of effectiveness include reduced absenteeism, increased productivity and reduced health care costs for the employer. This kind of analysis has mostly been undertaken in the USA. Shephard⁴⁷ has suggested that companies can save approximately £350 per worker per annum by introducing a workplace fitness programme.

Finally, there is a cost-effectiveness analysis which focuses on environmental benefits. If the public reduces dependence on car travel and can be persuaded to walk and cycle instead, there is a saving to the environment and to energy consumption⁴⁸. There is a large potential for change in this area as currently 1 in 4 car journeys is less than 2 miles long. Sustrans (a charity dedicated to provision of cycle paths) has costed cycle path provision at £10,000 per 100 yards. Cost-effectiveness here could be measured not only by health benefits, but by reduced pollution from cars, reduced fuel consumption, decreased pressure on parking and reduced accidents to cyclists and walkers.

6 EFFECTIVE INTERVENTIONS

To date there have been few randomised controlled interventions. Cost, numbers of subjects to be recruited, ethical considerations and adherence problems all have a strong bearing on the reason for the lack of such evidence in this field. There have been two major reviews of international research evidence concerning the effectiveness of physical activity interventions among the general public^{49, 50}.

According to Hillsdon's review of six randomised controlled trials⁵¹, exercise programmes that were effective in attracting and sustaining high levels of participation had certain features in common:

- a focus on moderate intensity exercise, most notably walking
- informal, unsupervised exercise, based in and around the home, rather than professionally supervised, structured exercise programmes based in a special facility or centre
- frequent professional contact for advice, encouragement and support, either by telephone or home visit.

Although the practice of GP exercise referrals has increased greatly, there is still little sound data on the effectiveness of such programmes. If more GPs are to be encouraged to participate then the need for evidence of effectiveness must be viewed as a high research priority. A randomised controlled trial of this form of intervention has been funded by West London Health Promotion Agency⁵². Additionally, primary health care teams can play a major role in supporting and encouraging sedentary patients to become more active.

Programmes which seek to increase regular exercise behaviour among sedentary groups are more likely to be effective if members of the target group are matched to the stages involved in individual behaviour change (see Box 4). Individuals at different stages require a different type of intervention to support the behaviour change process. Non-targeted, non-specific programmes that are not tailored to individual characteristics and do not allow for personal contact with individuals (eg fitness centres, aerobics classes) are more appropriate for those who are already exercising.

Box 4 Range of interventions by stage of change⁵³

Stage of behavioural change	Characteristics	Needs	Appropriate initiatives	Appropriate agencies
<i>Stage 1: Pre-contemplation</i>	Unaware that inactivity and its consequences are a health problem	Information about the benefits/problems of inactivity	National/local media; leaflets; posters; opportunistic advice from GPs	Primary health care, HEBS, local health promotion schools further/higher education
<i>Stage 2: Contemplation</i>	Personalises the problem Balances the potential benefits of taking exercise against the costs (time, money, effect on others)	Opportunities to personalise issues Opportunities for discussion	Promotional events and campaigns; phone lines	Local authority leisure services; local health promotion
<i>Stage 3: Preparation</i>	Does a little physical activity/reasonable amount but irregularly	Knowledge of facilities or opportunities; cues to action	Discussions with exercise or health professional; exercise consultation	Local authority leisure services; local health promotion
<i>Stage 4: Action</i>	Become regularly active (within the last 6 months)	Support to continue new actions	Provision of a variety of opportunities and events	Local authority leisure services, voluntary sector; health promotion; further/higher education
<i>Stage 5: Maintenance</i>	Has been regularly active (for at least 6 months)	Continue support Relapse prevention strategies	Clubs, support groups, co-participants	Local authority leisure services, voluntary sector

Individual interventions

Fitness testing

Health related fitness testing in the general community has been very popular^{54, 55, 56}. This form of intervention has little if any evidence to support its effectiveness in changing behaviour. Current practice is methodologically unsound. The practice may be off-putting as a test implies a pass/fail result. In addition there are major difficulties in carrying out re-tests with the general public due to the considerable change in individual circumstances e.g., employment status, family commitments, illness. Even if re-tests were feasible on an administrative basis, individuals who are relatively active may record comparatively low aerobic fitness levels. In contrast, because of the large hereditary component in aerobic fitness some people can be sedentary yet record relatively high levels of aerobic fitness⁵⁷. Furthermore, the degree of sensitivity and error in both skinfold measurement and estimated aerobic power may mask small changes in physical activity. Only one third of reviewed studies on fitness promotion programmes to modify exercise behaviour evaluated long term cost-effectiveness and cost benefit. Two thirds evaluated only the immediate effects of the promotion⁵⁸.

Exercise Consultation

Exercise consultation is a fairly recent development. Harris and colleagues⁵⁹ found little data but noted that a positive effect could be achieved and that this form of counselling should be routine in the setting of clinical practice. King and colleagues⁶⁰ have called for 'a standardised ... counselling protocol for physical activity promotion in the clinical setting'. More recently, The American College of Sports Medicine and the North American Centres for Disease Control⁶¹ issued a joint statement which advised doctors and other health professionals to 'routinely counsel all patients to adopt and maintain regular physical activity' and for educators of physicians and other health professionals to 'develop effective ways to teach physical activity counselling and incorporate them into the curricula for health professionals'. Guidelines for health professionals to carry out exercise consultation have been published⁶².

There has been one randomised controlled trial of exercise consultation in the context of the Scottish workplace. This study showed that sedentary subjects increased their levels of physical activity and maintained this change over a six month period⁶³. Another randomised controlled trial has been funded by Northamptonshire Health Authority⁶⁴.

Information

Simple but well planned interventions can be effective. One study showed that where the general public were encouraged by a poster to use the stairs rather than the escalator, there was a marked increase in stair use over time⁶⁵.

Workplace Interventions

Shephard⁶⁶ carried out a comprehensive economic analysis of North American programmes on the efficacy of workplace exercise interventions. The main findings related to increased productivity, decreased absenteeism, improved staff morale and increased health gain. He concluded however that activities which could be built in and around the workplace (e.g., walking or cycling to and from work) would be more cost-effective than formal workplace exercise classes. The main drawbacks to workplace interventions remain - low uptake, those who do take part are already active, drop-out rates are high and only large sized companies consider health promotion as valuable. The implementation of physical activity interventions in the Scottish workplace context has been recently appraised⁶⁷. It was concluded that there was limited scope for interventions and the major constraints of time, space and money were most frequently documented.

Policy

A few employers (including NHS Trusts) have taken innovative policy decisions to actively encourage cycling to work by making provision for mileage allowance comparable to car use, interest free loans to buy a bicycle and helmet, improved showering facilities, dedicated cycle routes between hospital sites and in the provision of safe lock-up facilities within hospital grounds. One hospital trust in England encouraged walking to work by providing those employees who lived within one mile of the hospital grounds a one-off payment of £50 with the corresponding loss of any parking facility⁶⁸. Preliminary findings of the outcomes of these policy decisions have been positive.

In terms of effective strategies, all the reviews emphasise the need for a co-ordinated, sustained approach applied at three different levels:

- individual (encouragement)
- group (education, empowerment)
- community (social/environmental change)

7 MONITORING

There is a lack of consensus as to which criteria are suitable for measuring outcome of physical activity interventions. Appendix 3 sets out in fuller detail a range of indicators for evaluating health education and health promotion programmes. If behaviour change in physical activity interventions is an acceptable criterion then the choice of a valid and reliable measurement tool still remains as an area of debate.

Measurement of physical activity

Methods of assessment can be divided into objective and subjective forms. The objective forms of measurement include heart rate monitoring and electrical/mechanical means, for example by pedometer. Objective methods are more costly, rely on greater subject co-operation and are acceptable only for studies involving small numbers over a limited time frame^{69,70}.

Subjective methods are made up of a variety of surveys: diaries, logs, recall questionnaires, job classifications and quantitative histories. Leisure time physical activity surveys have been utilised due to the increasing sedentary nature of occupational tasks⁷¹, the increasing availability of leisure time and for large sections of the population (older people and the unemployed), it is the only opportunity for physical activity⁷². Physical activity measurement by recall procedures are among the most pragmatic in free living adult populations⁷³ though there have been few attempts to examine the validity and reliability of these measures⁷⁴.

Sallis and colleagues⁷⁵ have suggested that the seven day recall may be sensitive to changes in physical activity patterns and thus be suitable for lifestyle intervention studies. Though there is a high degree of variability as to the known validity and reliability of recall questionnaires⁷⁶, Jacobs and colleagues⁷⁷ concluded: "We know of no existing questionnaire that covers all these dimensions. The seven day recall approximates full coverage of recent, not usual physical activity".

A lifestyle questionnaire with a core of standard questions has been developed by the Scottish Needs Assessment Programme (SNAP) for use by Health Boards in Scotland. A variation of the seven day recall of physical activity is part of the core group of questions.

8 PRIORITY AREAS AND RECOMMENDATIONS

See appendix 2 for an outline of the four levels of strategic operation.

Level one

Level 1 operation is concerned with national agencies.

It is apparent that there is a lack of a shared vision between the major partners (health, sport, education and leisure) with little national co-ordination on development of the 'active living' concept. Whilst there are examples of good academic/professional training opportunities in Scotland there is a distinct lack of visible infrastructure particularly with the provision of short courses and in the rationalisation of modular structured courses.

An active living strategy will encompass a transport policy which encourages walking and cycling as a means of daily travel for a growing part of the population. Placing physical activity on the agendas of a number of diverse national agencies (e.g., Environment, Roads, Tourism) presents a major challenge. Realisation of such barriers provides a more realistic framework for evaluating the effectiveness of health promotion programmes.

There is still need for more comprehensive databases on the population. Information is needed on fitness and activity levels, knowledge and motivations across the age spectrum. There is little data on schoolchildren, especially primary age schoolchildren.

Level 2

Level 2 operation is concerned with regional purchasing bodies.

Health boards are in a unique position to be innovative and creative in the planning of effective interventions. Directors of Public Health are in a position to influence the allocation of resources on the basis of this evidence. Furthermore it is claimed that such individuals as 'champions of knowledge'⁷⁸ should act as advocates of physical activity promotion. Health Boards could consider taking stock of their progress by reference to an action checklist (see Appendix 5).

There is already good practice of Health Boards undertaking joint strategic programmes; such practice should be developed and further encouraged. Development and implementation of programmes should be a natural progression from local needs assessment. Health Boards should consider raising the profile of physical activity in their work with health alliances. There is progress to be made at promoting physical activity across primary health care at Board level, employing effective marketing strategies attractive to the wider public. Health Boards should utilise audit resources to check on progress towards outcomes in physical activity contracts and/or interventions.

Health Boards should encourage providers to utilise more fully the services of specialists who could act as local co-ordinators and/or lead officers for physical activity programmes in the locality. At present Health Boards have a tendency to place greater resources to programmes related to other risk factors such as smoking and diet.

Level 3

Level 3 operation is concerned with local purchasers/providers.

There is a need for phasing of health promotion programmes so that national initiatives can be fully harnessed at a local level and that the general public are prevented from becoming overloaded with well intentioned encouragement for lifestyle change.

At Board primary health care level, GP locality commissioning groups should purchase physical activity services and resources in such a way as to target more effectively priority groups in the community (see Appendix 6 for a reference checklist to inform and guide action).

This document has highlighted the need for information on the effectiveness of interventions. There are however a wide range of programmes which have been planned, implemented and

evaluated. Appendix 4 highlights a number of such programmes with a contact name for further information.

Emphasis here is on locally planned programmes which are jointly co-ordinated with other service providers, notably leisure services, community education and voluntary agencies. Health Boards should carry out needs assessment of access to such programmes in rural areas.

Level 4

Level four is concerned with individual promoter/exercise instructor/teacher level.

There is a need for easier access to resources, materials and information on the active living concept.

Individuals need better information on accountability and medico-legal protection.

General Practitioners in particular need specific information on costed programmes, funding, manpower and training.

There is widespread need for the provision of local databases on opportunities for physical activity. Such a database would include contributions from local health promotion departments, leisure centres, voluntary bodies, clubs and so on.

Research

Prevalence data

There is a need for data to be systematically collected on physical activity and fitness levels across the Scottish population; a high priority is the need for data on young people especially at primary one and seven and secondary one and four levels.

Monitoring tools

There is a need for a simple yet valid mechanism or tool to identify individuals' activity status and their readiness to change. Variations of a 'stages of change' questionnaire may provide a practical tool for targeting sedentary populations. It is important that researchers adopt a common format - the emergence of the SNAP core lifestyle questionnaire might provide a measure of uniformity in this context.

The development of a brief, valid and reliable monitoring tool to assess physical activity behaviour change remains a major challenge currently facing those in health promotion evaluation research. The seven day recall of leisure time physical activity questionnaire is a useful tool in lifestyle physical activity interventions but requires further work on validity and reliability.

Effective Individual Interventions

Advice and Information

Appropriate information offered within a supportive framework to contemplators and preparers is a cost effective intervention.

The use of posters encouraging stair use rather than lifts/escalators can be a cost effective intervention. Further studies are required to find out which groups are better motivated.

Fitness Assessment

The current forms of provision and practice have questionable benefit. The practice could form part of a broad range of provision where it has merit in helping some individuals maintain behaviour change.

Exercise Consultation

There is evidence to suggest exercise consultation may be useful in helping sedentary people adopt and maintain active lifestyles. Given the considerable resource of health professionals with knowledge of and generic skills in counselling, there is a large potential for application of this intervention.

General Practitioner Referrals

Evidence on the effectiveness of General Practitioner exercise referrals remains a high research priority.

Training

Training for health professionals both in short courses and also in more advanced formats (e.g. certificate, diploma and masters) is undeveloped and would benefit greatly from a nationally recognised training infrastructure.

9 REFERENCES

- 1 Scotland's Health - A challenge to us all. HMSO, Edinburgh 1992.
- 2 Pisa S, Uemura K. World Health Statistics Quarterly. 1982;35:11-47.
- 3 Paffenbarger RS, Hyde RT, Wing AL, Hsieh C. Physical activity. All-cause mortality, and longevity of college alumni. *New England Journal of Medicine*. 1986;314:605-613.
- 4 Morris JN, Clayton DG, Everitt MG, Semmence AM, Burgess EH. Exercise in leisure time: coronary attack and death rates. *British Heart Journal*. 1990;63:325-334.
- 5 Haskell WL. Health consequences of physical activity: understanding and challenges regarding dose response. *Medicine and Science in Sport and Exercise*. 1994;26:649-660.
- 6 Leon AS, Cornett J, Jacobs DR, Rauramaa R. Leisure time physical activity and risks of coronary artery disease and death: The Multiple Risk Factor Intervention Trial. *Journal of the American Medical Association*. 1987;258:2388-2395.
- 7 Ekelund LG, Haskell WL, Hohnson JL, Wholety FS, Cirqui MH, Sheps DS. Physical fitness as a prevention of cardiovascular mortality in asymptomatic North American men. *New England Journal of Medicine*. 1988;319:1379.
- 8 Shaper AG, Wannamethee G. Physical activity and ischaemic heart disease in middle-aged British men. *British Heart Journal*. 1991;66:384-394.
- 9 Bouchard C, Stephens T. Physical Activity, Fitness and Health. International Proceedings and Consensus Statement In: Bouchard C, Shephard RJ, Stephens T (Eds). *Human Kinetics*. Illinois, 1994.
- 10 The Royal College of Physicians of London. Medical aspects of exercise - Benefits and risks. 1991.
- 11 Hardman A. Exercise and the Heart - Report of a British Heart Foundation Working Group. British Heart Foundation, 1991.
- 12 Morris JN. Exercise in the prevention of coronary heart disease: today's best buy in public health. *Medicine and Science in Sports and Exercise*. 1995;26(7):807-814.
- 13 Adapted from Pooling Project Research Group. Relationship of blood pressure, serum cholesterol, smoking habit, relative weight and ECG abnormalities to incidence of major coronary events: final report of the Pooling Project. *Journal of Chronic Diseases*. 1978;31:202-306.
- 14 See Obesity and the Heart In: Obesity Bjorntorp P, Brodoff JB (eds). J B Lipincott Company 1990. "In an American Cancer Society study of approximately 750,000 men and women in the general population, mortality due to coronary artery disease among those persons 30% to 40% heavier than average was nearly 50% higher than among those of average weight" p523.
- 15 Prentice AM, Judd SA. Obesity in Britain: gluttony or sloth? *British Medical Journal*. 1995;311:437-9.
- 16 Kendell R. From the Chief Medical Officer, *Health Bulletin*, 54(4), July 1996.
- 17 MacNair A. Physical activity, not diet, should be the focus of measures for the primary prevention of cardiovascular disease. *Nutrition Research Review*. 1994;7:43-65.
- 18 Crews DJ, Lander DM. A meta - analytic review of aerobic fitness and reactivity to psychosocial stressors. *Medicine and Science in Sport and Exercise*. 1987;19 (Supplement 5):S114-120.

- 19 Farmer ME, Locke BZ, Moscicki EK, Dannenberg AL, Larson DB, Radlof LS. Physical activity and depressive symptoms: the NHANES 1 epidemiological follow-up study. *American Journal of Epidemiology*. 1985;69:1340-1351.
- 20 Stephens T. Physical activity and mental health in the USA and Canada: Evidence from population surveys. *Preventive Medicine*. 1988;17:35-47.
- 21 Martinsen EW, Stephens T. Exercise in mental health in clinical and free-living populations. In: Dishman RK (Ed) Advances in exercise adherence pp55-72, *Human Kinetics*. Illinois, 1994.
- 22 O'Brien SJ, Vertinsky PA. Unfit survivors: Exercise as a resource for ageing women. *The Gerontologist*. 1991;31(3):347-357.
- 23 Sharratt MT, Sharratt JK. Potential health benefits of active living for persons with chronic conditions. In: Quinney HA, Gauvin L, Wall T (Eds). *Toward Active Living. Human Kinetics*. Illinois, 1994.
- 24 Mutrie N. Promoting rehabilitation and recovery through exercise: psychological outcomes and adherence issues. In: Fox K (ed) *The physical self: from motivation to well-being. Human Kinetics*. 1996.
- 25 Scotland's Health - A challenge to us all. The Scottish Diet Report of a Working Party to the Chief Medical Officer. HMSO, 1995.
- 26 American College of Sports Medicine. The recommended quality and quantity of exercise for developing cardiorespiratory and muscular fitness in adults. *Medicine and Science in Sport and Exercise*. 1990;22:265-274.
- 27 Blair SN, Connolly JC. How much physical activity should we do? - the case for moderate amounts and intensities of physical activity. In: *Moving On, Proceedings of a Conference organised and published by the Health Education Authority*, 1994.
- 28 Pate R, Pratt M, Blair SN, et al. Physical activity and public health. *Journal of the American Medical Association*. 1995;273:402-407.
- 29 Powell KE, Pratt M. Physical activity and health. *Journal of the American Medical Association*. 1996;313:126-127.
- 30 Wimbush E. A moderate approach to promoting physical activity. *Health Education Journal*. 1994;53:327-336.
- 31 Health Education Board for Scotland. *Promoting Physical Activity in Scotland: a policy statement*. HEBS, Edinburgh 1995.
- 32 Sallis J, Patrick K. Physical activity guidelines for adolescents: consensus statement. *Paediatric Exercise Science*. 1994;6:302-314.
- 33 Allied Dunbar, Health Education Authority, Sports Council. 1992 Allied Dunbar National Fitness Survey: a report on activity patterns and fitness levels. Main findings and summary document, London:Sports Council, Health Education Authority.
- 34 MacAuley D, et al. Northern Ireland Health and Activity Survey. HMSO, Belfast 1994.
- 35 Physical activity in daily life: potential for change. In: *Physical activity: an agenda for action*. National Forum for Coronary Heart Disease Prevention. August 1995.
- 36 Health Education Board for Scotland. Qualitative Research for the 1995 walking campaign. Report to HEBS from Scott Porter Research and Marketing (unpublished). Also Health Education Authority Physical Activity Strategic Research Paper (unpublished). Health Education Authority 1993.

- 37 Durnin JVGA. Physical activity levels past and present. In: Physical activity and health. Norgan N (Ed). Cambridge University Press' 1993.
- 38 See reports from the Research Unit in Health and Behavioural Change (RUHBC), Edinburgh. The WHO: Cross national health behaviour in school aged children(HBSC) survey was conducted in 1994.
- 39 Hillman M, Adams J, Whitelegg J. One false move: a study of children's independent mobility. Policy Studies Institute. London' 1994.
- 40 Commissioned survey by Greater Glasgow Health Board of 2629 young people (12-16 years) from a random selection of 15 secondary schools.
- 41 The Allied Dunbar National Fitness Survey and other research evidence has shown that people who exercise regularly in their youth were more likely to continue or resume exercise in later years.
- 42 Prochaska JO, Marcus B. The Transtheoretical Model: Applications to Exercise In: Dishman R (Ed). Advances in Exercise Adherence. *Human Kinetics*. Illinois, 1995.
- 43 Cropper S (ed). Promoting physical activity - Guidance for purchasers and providers. Health Education Authority, 1995.
- 44 Highlands walking creates £110 million and 4000 Jobs. The Daily Telegraph, 10/4/96.
- 45 Nicholl J, Coleman P, Brazier J. Health and Health care costs and benefits of exercise. *PharmoEconomics*. 1994;5:109-122.
- 46 Hatziandreu E, Koplan J, Weinstein M, Carspersen C, Warner K. A cost effectiveness analysis of exercise as a health promotion activity. *American Journal of Public Health*. 1988;78:1417-1421.
- 47 Shephard RJ. Considerations in the cost benefit evaluation of exercise programmes. *Sport Training, Medicine and Rehabilitation*. 1991;3:65-77.
- 48 Cycling into the Future - The Scottish Office Policy on Cycling. The Scottish Office' 1996.
- 49 Vuori IM. Exercise promotion: a review of the effectiveness of health education and health promotion. Commission of the European Communities, 1994.
- 50 Killoran A, Fentem P, Caspersen C (Eds). Moving On: International perspectives on promoting physical activity: a report of the HEA symposium on physical activity. HEA, London 1995.
- 51 Hillsdon M, et al. Randomised controlled trials of physical activity promotion in free-living populations: a review. *Journal of Epidemiology and Community Health*. 1995;49:448-53.
- 52 Health Gain News. Health Education Authority. Issue I, Spring 1996.
- 53 Adapted from Tables VIII & IX in Promoting physical activity: Guidance for purchasers and providers pp 48 and 49. Cropper S (ed). Health Education Authority, 1995.
- 54 Ashton J, Seymour H. The New Public Health. Milton Keynes: Open University Press, 1992.
- 55 Faculty of Public Health Medicine Guidelines for Health Promotion Coronary Heart Disease: Putting it into practice. Action in the Workplace. Royal College of Physicians, 1990.

- 56 Health Education Authority. Fitness Testing for Health Promotion, 1992.
- 57 Boutcher S. Conceptualisation and quantification of aerobic fitness and physical activity. Exercise Psychology- the influence of physical exercise on psychological processes. Wiley, New York, 1994.
- 58 Biddle S, Mutrie N. Psychology of Physical Activity and Exercise. Springer, Verlag, 1993.
- 59 Harris SS, Carspersen CJ. et al. Physical activity counselling for healthy adults as a primary preventive intervention in the clinical setting. *The Journal of the American Medical Association*. 1989;261:3590-3598.
- 60 King AC, Blair SN, et al. The determinants of physical activity interventions in adults. *Medicine and Science in Sport and Exercise*. 1992;24(6):S221-236.
- 61 Joint press statement issued by the American College of Sports Medicine and the Centres for Disease Control and Prevention, Atlanta GA, USA.
- 62 Loughlan C, Mutrie N. Conducting an exercise consultation: Guidelines for health professionals. *Journal of the Institute of Health Education*. 1995;33(3):79-82.
- 63 Loughlan C, Mutrie N. A randomised controlled study of the effectiveness of three interventions in promoting physical activity in a sedentary population- fitness testing v exercise consultation v information. *Health Education Journal*. In press.
- 64 Health Gain News. Issue Number 1, 1996.
- 65 Blamey A, Mutrie N, Aitchison T. Health promotion by encouraged use of stairwalking. *British Medical Journal*. 1995;311:2890-290.
- 66 Shephard RJ. A critical analysis of work site fitness programs and their postulated benefits. *Medicine and Science in Sport and Exercise*. 1992;24(3):354-371.
- 67 Jones L, Ross A. Health Promotion in the workplace: needs assessment. Health Education Board for Scotland, 1994.
- 68 Owen L, Davis A. Life Cycle. *Health Service Journal*. 24 August, 1995.
- 69 Sallis JF, Haskell WL, Wood P. Physical activity assessment methodology in the five city project. *American Journal of Epidemiology*. 1985;121(1):91-105.
- 70 Ainsworth BE, Jacobs JR, Leon AS. Validity and reliability of self reported physical activity status: the Lipid Research Clinics questionnaire. *Medicine and Science in Sport and Exercise*. 1993;25(1):92-98.
- 71 See reference 37
- 72 Lamb KL, Brodie DA. Leisure time physical activity as an estimate of physical fitness - a validity study. *Journal of Clinical Epidemiology*. 1991;44(1):41-45.
- 73 LaPorte RE, Montoye HL, Caspersen CJ. Assessment of physical activity in epidemiological research: problems and prospects. *Public Health Reports*. 1985;100:131-146.
- 74 Jacobs DR, Ainsworth BE, Hartman TJ, Leon AS. A simultaneous evaluation of ten commonly used physical activity questionnaires. *Medicine and Science in Sport and Exercise*. 1992;25(1):81-91.
- 75 Sallis JF, Haskell WL, Wood P. Physical activity assessment methodology in the five city project. *American Journal of Epidemiology*. 1985;121(1): 91-105.

- 76 Ainsworth BE, Jacobs JR, Leon AS. Validity and reliability of self reported physical activity status: the Lipids Research Clinics Questionnaire. *Medicine and Science in Sport and Exercise*. 1993;25(1):92-98.
- 77 Jacobs JR, Ainsworth BE, Hartman TJ, Leon AS. A simultaneous evaluation of ten commonly used physical activity questionnaires. *Medicine and Science in Sport and Exercise*. 1992;25(1):81-91.
- 78 Stocking B. Why research findings are not used by commissions - and what can be done about it. *Journal of Public Health Medicine*. 1995;17(4):380-382.

Appendix 1

TERMINOLOGY

Physical Activity

The term physical activity encompasses any body movement which results in a substantial increase in resting energy expenditure¹. Walking with a dog or to the shops, activity in and around the house e.g., DIY and working in the garden would fall into this category. In some instances the physical activity element is 'hidden' e.g., walking to and from work, or in the physical demands of any occupational task. For some individuals however, this component of habitual physical activity can be perceived as exercise.

Exercise and Sport

A distinct category of physical activity is exercise. Exercise is planned, structured and involves repetitive bodily movement done to improve or maintain one or more components of physical fitness. It has a specific function e.g., losing/gaining weight, improving body image, meeting friends, improving a skill/fitness. In general terms the public perceive exercise as a leisure time physical activity. Examples of this are weight training, swimming, jogging and so on. The term sport in the report applies to any physical activity which involves a competitive element, bound by rules or laws.

Physical Fitness

In relation to health promotion and disease prevention, fitness has been defined by Pate² as: i) a state characterised by an ability to perform daily activities with vigour and ii) demonstration of traits and capacities that are associated with low risk of premature development of hypokinetic diseases (i.e. those associated with physical inactivity).

Aerobic fitness

Aerobic fitness is the ability to breathe in, transport and utilise oxygen; also known as endurance fitness, stamina or cardiorespiratory fitness³. Aerobic activity relates to the ability of the heart and lungs to supply fuel (using oxygen) during sustained physical activity and eliminate waste products.

Intensity levels⁴

Low/light

Low intensity activities are those with an energy expenditure of <4 kcal/minute (eg walking slowly at 1-2 mph, bowling, light stretching exercises).

Moderate

Moderate intensity physical activities are those with an energy expenditure of 4 - 7 kcal/minute (eg walking briskly at 3-4 mph, table tennis, ballroom dancing).

Vigorous/hard

Vigorous intensity activities are those with an energy expenditure of >7 kcal/minute (eg walking uphill/rucksack, cycling >10mph, weight training, Scottish country dance).

References

- 1 Carspersen CJ, Powell KE, Christenson GM. Physical activity, exercise and physical fitness: Definitions and distinctions for health related research. *Public Health Reports*. 1985;100(2):126-131.
- 2 Pate RR. The evolving definition of physical fitness. *Quest*. 1988;40(3):174-179.
- 3 Sharkey BJ. Physiology of fitness. Third edition - Human Kinetics Books. Illinois, 1990.
- 4 Pate RR et al. Physical activity and Public Health. *Journal of the American Medical Association*. 1995;273:402-407.

Appendix 2

Organisational Structure

Level 1 - National

Scottish Office Health Department	Scottish Office Agriculture, Environment & Fisheries Department	Scottish Office Development Department	Scottish Office Education, Industry Department	Voluntary Organisations	Professional Associations
NHS Management Executive	Environmental Affairs	Local Government	School	Fitness Scotland Age concern	Institute of Leisure & Amenity Management Association of Directors of Recreation, Leisure & Tourism
Public Health Policy Unit	Group	Division; Economic	Education Groups	Chest, Heart & Stroke	Convention of Scottish Local Authorities Royal College of General Practitioners Royal College of Physicians National Union of Teachers
CMO		Infrastructure Group; Roads	School sport Further & Higher Education Enterprise & Tourism	National Council of YMCAs Youth Club Scotland	
Health Education Board for Scotland	Scottish National Heritage		Scottish Sports Council Scottish Tourist Board		

Level 2 - Regional Purchasing Bodies

15 Health Boards	32 Unitary Authorities	Universities & Colleges	Industry Branches	Regional Branches	Regional
General Managers	Countryside Ranger Service	Schools			
Area Health Promotion Managers	Roads, Planning, Housing Leisure & Recreation Community Education	Advisory Service			

Level 3 - Local Purchaser/Provider agencies

GP Locality Groups	Health Education	Country Parks	Recreation & Sports facilities	Further Education & Higher Education facilities	local businesses private clubs	clubs local groups
Hospital Trusts	Health Promotion		Community centres			YMCA/Y WCA community initiatives
Community Trusts						
Fundholding GPs						

Level 4 - Practitioners

GPs	Health Promotion	Countryside	Sport	Teachers	Fitness trainers	Fitness instructors
Practice Nurses	LAY tutors	Rangers & planners	development officers & Community Education officers	Head Teachers Lecturers	Exercise Teachers Voluntary group leaders	
Health Visitors				Researchers		
Physiotherapists						
Cardiac Rehabilitation Nurses						

Appendix 3 MONITORING - USE OF CERTAIN INDICATORS

For monitoring purposes, indicators can measure progress towards two goals, namely i) to reduce the proportion of those with inactive lifestyles and ii) to increase the proportion of those participating in moderate or vigorous intensity forms of physical activity. It has been proposed that the following four groups are used to categorise a population on the basis of their physical activity behaviour¹.

Categories for physical activity behaviour	
Inactive (sedentary)	No 30 minute sessions of moderate intensity physical activity per week. No 20 minute sessions of vigorous intensity exercise per week
Irregular moderate	1-4 × 30 minute sessions of moderate intensity physical activity per week < 3 × 20 minute sessions of vigorous intensity exercise per week
Regular moderate	5+ × 30 minute sessions of moderate intensity physical activity per week < 3 × 20 minute sessions of vigorous intensity exercise per week
Regular vigorous	3+ × 20 minute sessions of vigorous intensity exercise per week

The sedentary, irregular moderate and regular moderate groups are mutually exclusive. Those in the regular vigorous category may also be active at a moderate level.

In a monitoring survey on health-related behaviour, two core questions on physical activity are needed to develop these categories:

Core questions on physical activity behaviour

- 1 In the last 4 weeks, how many times have you spent at least 30 minutes doing something that is moderately active, that is active enough to make you breathe faster than usual?
- 2 In the last 4 weeks, how many times have you spent at least 20 minutes doing some form of vigorous exercise that makes you sweaty and out of breath?

For school age children, core questions on physical activity behaviour are also needed. For example,

- percentage of school age children who get daily exercise of at least a moderate intensity
- percentage of school age children who participate in physically active recreations after school
- percentage of school age children who actively commute to school

Programme evaluation - measurement of other areas of health education

To achieve changes in physical activity behaviour, health education programmes engage in a range of interventions that seek to change people's knowledge, attitudes, beliefs, motivations and skills related to physical activity. The key objectives here are:

- 1 to reduce the proportion of the inactive group who believe themselves to be fit or very fit

- 2 to increase the proportion of the population who are aware that daily physical activity of a moderate intensity (in particular, walking) will benefit their health
- 3 to increase the proportion of the inactive, irregular moderate and regular moderate sections of the population who would like to be more active/get more regular exercise
- 4 to increase the proportion of the inactive group who have been advised by their GP to take more exercise in the last year

To assess progress towards achieving these objectives, some further questions are needed which, at analysis stage, can be cross-tabulated with the four categories for physical activity behaviour.

Questions on physical activity knowledge, attitudes & beliefs

- Thinking of other men/women your age, would you say you are:
 - 1 Very fit
 - 2 Quite fit
 - 3 Quite unfit
 - 4 Very unfit

- Include the following statements about exercise within a series of other health-related knowledge/attitude statements, using likert scales for responses (Agree/Disagree)
 - "Walking at a brisk pace is a good form of exercise".
 - "Walking for 30 minutes a day will benefit your health"
 - "Exercise does you good only if it makes you sweaty and out of breath"

- Which of the following statements best describes your feelings about exercise:
 - 1 "I hate exercise and have no intention of being more active"
 - 2 "I would like to get more exercise, but I'm not sure how"
 - 3 "I am trying to increase the amount of exercise I get"
 - 4 "I have managed to increase the amount of exercise I get over the last 6 months"
 - 5 "I exercise regularly and do not intend to do any more"

(All those who have visited their GP in the last year)

- Over the last year when you visited your GP, did s/he advise you:

1	to take more exercise	Yes/No
2	to eat more fruit and veg	Yes/No
3	to stop smoking	Yes/No
4	to drink less	Yes/No

Programme evaluation - health promotion

The aim of increasing physical activity levels is unlikely to be fulfilled through health education programmes alone, but requires the orchestration of a range of health promoting policies. Many agencies have a role to play in promoting physical activity for health. The aim is to maximise inter-agency networking and communication to enhance partnerships for physical activity promotion at national and local levels. A series of indicators can be

identified whereby policy contributions to physical activity promotion may be gauged. Examples include:

Indicators for monitoring the development of physical activity promotion policies

Environment

- number of cycle paths (miles per 1000 population)
- pedestrianised areas (sq metres per 1000 population)
- number of sport and active leisure facilities (per 1000 population)
- number of children's playgrounds (per 1000 population under 15)
- area of public open space (using 6 acre standard)

Training

- number of trained activity leaders (per 1000 population)
- number of professionals who are involved in the promotion of physical activity
- number of primary schools with at least one member of teaching staff trained in health-related exercise
- number of primary care teams with staff trained to advise people in physical activity

Opportunities

- number of organised exercise groups (per 1000 population)
- use of sport and active leisure facilities
- use of swimming pools
- use of parks and open spaces
- sale of bicycles

Settings

Workplace (including NHS)/schools

- number of workplaces providing exercise opportunities for employees
- number of workplaces providing showers and changing facilities for exercising employees
- number of workplaces offering exercise consultation
- number of organisations providing incentives for active transport use
- number of primary care teams operating exercise referral or counselling
- number of exercise-based rehabilitation programmes (cardiac, alcohol)
- number of schools offering extracurricular physical activity programme

Policy level

- existence of policies on exercise/physical activity promotion in Health Boards, local authorities, educational institutions
- existence of mechanisms for co-ordination of physical activity initiatives

The Physical Activity Task Force's consultation paper ***More People More Active More Often*** suggests the following indicators for England:

- awareness of benefits of regular moderate activity
- short journeys (under 2 miles) walked by adults and school age children
- short journeys (under 2 miles) cycled by adults and school age children
- improved provision for pedestrians and cyclists in local plans
- use of local authority leisure services
- journeys to and from school undertaken by bicycle
- opportunities for physical activity in the workplace.

Appendix 4

CURRENT PRACTICE

A pro-forma was sent out to the Health Promotion Departments of the fifteen Health Boards in Scotland. The departments were at liberty to duplicate and distribute as appropriate. The list below provides merely a range of the current practice which exists in Scotland. Whilst only a snapshot of provision, information on the evaluation of the projects can be obtained from the contact name listed. Additional information can be obtained by contacting the Departments of Public Health Medicine in each local Health Board area.

Programme	Outcomes	Contact
Strategy/planning	Guidelines for multi-agency approach	Avril Blamey, Health Promotion Department, Greater Glasgow HB
Skills/knowledge	Training Course End target audience: adults	Brian Green, Jordanhill Campus, Strathclyde University
	L.A.Y. Training Course End target audience: women in APTs, young offenders	Anne Cossar, Health Promotion Department, Ayrshire & Arran Community Trust
	Training Course End target audience: frail older adults	R Brickley, Fife Institute of Physical Recreation, Glenrothes
Opportunity provision	Opportunities for the over 50s in the general community	Tish Hoole HFA project, Community Clinic, Fort William
	Opportunities for adults in the community <i>Step Forward</i>	Zandra Shearer, 1a Station House, Carston, Stromness, Orkney
	NHS employees: fitness & lifestyle evaluation	Ms J E Allison, Health Promotion Department, 60 Rose Street, Thurso
	Opportunities for the over 50s	Celia Gardiner, Health Promotion Department, Highland Health Board
	Over 60s exercise class	Dr M McMurdo/ D Dobson, The Medical School, Ninewells, Dundee
Increase awareness	Increase motivation in general population: Stairwalking promotion	Avril Blamey, Health Promotion Department, GGHB

Programme	Outcome	Contact
GP Referrals	Increase opportunities for patients - Scottish Office funded	Bill Smith, Health Promotion Department, Dumfries & Galloway Health Board
	Increase opportunities for patients: <i>Macfit</i>	Dr Colin Fettes, Health Centre, Munloch
	Increase opportunities for patients	Irene Ferguson, Health Promotion Department, Forth Valley Health Board
	Increase opportunities for patients	Liz Holms, Health Promotion Department, Ross House, Paisley PA2 7BN
	Increase opportunities for patients	Jane Burns, 25 Hillview, Fort William PH33 7LS
	Increase opportunities for patients	Martin Russell, Health Promotion Department, RNI, Inverness IV3 5SF
	Increase participation amongst sedentary adults	Imelda Corry, GPERs, Newstead TD6 9DB
	Increase opportunities for patients	Dr Kirsty Foster, Lothian Health, Deaconess House, Pleasance, Edinburgh

Appendix 5

CURRENT PRACTICE

A pro-forma was sent out to the Health Promotion Departments of the fifteen Health Boards in Scotland. The departments were at liberty to duplicate and distribute as appropriate. The list below provides merely a range of the current practice which exists in Scotland. Whilst only a snapshot of provision, information on the evaluation of the projects can be obtained from the contact name listed. Additional information can be obtained by contacting the Departments of Public Health Medicine in each local Health Board area.

Programme	Outcomes	Contact
Strategy/planning	Guidelines for multi-agency approach	Avril Blamey, Health Promotion Department, Greater Glasgow HB
Skills/knowledge	Training Course End target audience: adults	Brian Green, Jordanhill Campus, Strathclyde University
	L.A.Y. Training Course End target audience: women in APTs, young offenders	Anne Cossar, Health Promotion Department, Ayrshire & Arran Community Trust
	Training Course End target audience: frail older adults	R Brickley, Fife Institute of Physical Recreation, Glenrothes
Opportunity provision	Opportunities for the over 50s in the general community	Tish Hoole HFA project, Community Clinic, Fort William
	Opportunities for adults in the community <i>Step Forward</i>	Zandra Shearer, 1a Station House, Carston, Stromness, Orkney
	NHS employees: fitness & lifestyle evaluation	Ms J E Allison, Health Promotion Department, 60 Rose Street, Thurso
	Opportunities for the over 50s	Celia Gardiner, Health Promotion Department, Highland Health Board
	Over 60s exercise class	Dr M McMurdo/ D Dobson, The Medical School, Ninewells, Dundee
Increase awareness	Increase motivation in general population: Stairwalking promotion	Avril Blamey, Health Promotion Department, GGHB

Programme	Outcome	Contact
GP Referrals	Increase opportunities for patients - Scottish Office funded	Bill Smith, Health Promotion Department, Dumfries & Galloway Health Board
	Increase opportunities for patients: <i>Macfit</i>	Dr Colin Fettes, Health Centre, Munloch
	Increase opportunities for patients	Irene Ferguson, Health Promotion Department, Forth Valley Health Board
	Increase opportunities for patients	Liz Holms, Health Promotion Department, Ross House, Paisley PA2 7BN
	Increase opportunities for patients	Jane Burns, 25 Hillview, Fort William PH33 7LS
	Increase opportunities for patients	Martin Russell, Health Promotion Department, RNI, Inverness IV3 5SF
	Increase participation amongst sedentary adults	Imelda Corry, GPERs, Newstead TD6 9DB
	Increase opportunities for patients	Dr Kirsty Foster, Lothian Health, Deaconess House, Pleasance, Edinburgh

Appendix 6

GP CHECKLIST

- **ADVOCACY** GP purchasers realise their full potential by lobbying local government for improvement in locality services and environment.
- **EDUCATION** All regional postgraduate courses to include PGEA approved health related physical activity sessions. Training extended to practice nurses and health visitors.
- **COMMUNICATION** Networks to be strengthened through recognisable channels, health alliances and named individuals within health promotion, trusts, leisure services and voluntary sector.
- **ORGANISATION** Referral processes e.g. exercise prescription schemes to be developed with medico-legal protection for participating health professionals.
- **CONCESSIONS** Realistic charges set according to ability to pay with subsidies for elderly and unwaged to attract the highest risk groups.
- **CONTRACTS** Service specification to fulfil criteria of accepted protocols and guidelines e.g. hospital based cardiac rehabilitation.
- **EVALUATION** Terms to be defined with clarity and data collection to be simplified and scientifically robust (cf. current READ codes) in order that clinical audit and research might evaluate outcomes of health care interventions.