Promoting the health of

older people

Setting a research agenda

Christina Victor, St George's Hospital
Medical School
Kenneth Howse, Centre for Policy
on Ageing

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Acknowledgements

The views expressed in this report are those of the authors and not necessarily those of the Health Education Authority.

Preface

The Health Education Authority (HEA) is a special health authority within the National Health Service. It advises government and undertakes research, consultation and policy development in support of national and local health promotion activity. This report is the sixth in a series that has emanated from the HEA's programme of exploratory research investigating the potential for health promotion with vulnerable population groups. (Gillies and McVey, 1996).

In 1999, the Government published its health strategy *Saving Lives: Our Healthier Nation*, which recognised the role of social and environmental influences on health and signalled a commitment to tackling inequalities in health. At a local level it is envisaged that Health Improvement Programmes will play a central role in implementing this strategy. Localities will focus on determining local priorities and targets, addressing the needs of vulnerable groups in particular (Department of Health, 1999).

In October 1996, the HEA set up expert working groups on the following:

Older people
Low income groups
People who are homeless
Refugees
People with mental health problems
Lone parents
Children and young people

These population groups were chosen on the basis of epidemiological and sociological evidence of vulnerability to ill health and poor access to care and service (Benzeval, Judge and Whitehead, 1995; Drever and Whitehead, 1997). There is also evidence that these groups have not been reached by some of the traditional individually based health education approaches.

In addition, the HEA set up three groups to consider the potential of different approaches to promoting the health of vulnerable groups:

Primary health care
Community development
Mass media

Chairs were appointed, and each was asked to convene a group comprising academics, practitioners and an HEA representative, with relevant expertise. The groups were asked to produce a 'state of the art' document using the following questions as a guide:

- Which health promotion interventions, if any, work to promote the health and well-being of individuals, families and communities, and to prevent ill health?

- How well do they work? What impact do they have on health behaviours, access to services etc., in different social or environmental contexts?

- Do they contribute to a reduction in inequalities in health? What and where are the gaps in health promotion knowledge and activities among these groups and among service providers?

- What are the principal health promotion needs of these groups?

- What are the implications for a new research, development and policy agenda?

Each group was asked to work with a definition of health promotion as the process of enabling individuals and communities to increase control over the determinants of their health and thereby to improve their health. Interventions to promote health include: those that strengthen the capacity of individuals and communities for health; those that improve access to services and facilities; and those that encourage micro- and macroeconomic and cultural change. The aim was to examine the wider context within which health is experienced, seeking a better understanding of the relationship between health and its socio-economic, political, environmental and cultural determinants.

The expert groups programme aimed to consider a range of evidence using a variety of study designs and involving qualitative and quantitative methodologies along with evidence based on the programme of systematic reviews of effectiveness.

This report, by Christina Victor of St George's Hospital Medical School and Kenneth Howse of the Centre for Policy on Ageing, presents the results of a review investigating the effectiveness of health promotion interventions with older people. It draws attention to the lack of health promotion activity undertaken by researchers, policy makers and practitioners. Despite this the review highlights a number of effective health promotion interventions: in particular, screening services, interventions associated with changes in lifestyle (such as exercise, healthy eating and smoking cessation), and interventions developed specifically for older people (such as risk assessment, social support and influenza vaccination).

Despite evidence suggesting the potential for effective health promotion with older people, there are many gaps in knowledge that hinder the delivery of wider health benefits to this group. The authors argue that health promotion for older people lacks a clear definition. Ageist perspectives and the diversity of older age groups demand a new framework within which to evaluate the benefits of health promotion for older people. In particular the authors recommend that more health promotion activities be evaluated in terms of outcome measures. More research on the social, cultural, material and environmental factors that influence older people's ability to benefit from health promotion is also needed.

Above all, in order to formulate a research agenda that successfully addresses the issue of reducing inequalities in health, the authors stress the importance of acknowledging the diversity – in terms of age, gender, class and ethnicity – that exists within this population group.

Lorraine Taylor *Research Manager*
Hilary Whent *Senior Research Manager*
Dominic McVey *Head of Research*

Joan Heuston *Senior Research Manager*
Pamela Gillies *Director of Research*

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Executive summary

1 Introduction

This report presents the results of a review of the effectiveness of health promotion with older people. The authors were also asked to identify the major health promotion needs of older people, including any gaps in knowledge, and to recommend future research and development programmes.

The report consists of a review of robustly designed published research studies. This includes research studies that use a randomised controlled trial design, existing reviews, meta-analysis and data from observation studies, especially longitudinal studies of ageing. For the purpose of this review older people were defined as those aged 65 years and over.

This report follows up the recommendations of a recent Health Education Authority/Centre for Policy on Ageing report on the need to review the effectiveness of health promotion among older people and to develop an associated research strategy (Killoran et al., 1997).

2 Health promotion and older people

Health promotion with older people has been neglected by researchers, policy makers and practitioners. Part of this neglect stems from negative and ageist assumptions about the health of older people. If, as is widely assumed, all older people are ill, then there is little point in trying to promote or improve their health.

The range of activities that can be classed as health promotion for older people is very wide. The boundaries between what might be called 'core' health promotion activities – changing health behaviour and improving access to services – and clinical activities such as rehabilitation, or 'social' interventions to reduce isolation, are somewhat blurred. Research and policy makers also need to acknowledge the diversity, in terms of age, gender, class and ethnicity, of the nine million people aged 65 and over in Great Britain. There is a need to develop a clear framework within which to evaluate health promotion activities with this population. In particular the principal health benefits of health promotion activity with older people – 'adding years to life' (i.e. increasing the quantity

of life) and 'adding life to years' (i.e. improving the quality of life) – need to be pursued within an informed context that acknowledges the heterogeneity of this vulnerable group.

There is good evidence to support the extension of existing interventions and services (such as breast cancer screening and smoking cessation) and some of the interventions developed specifically with older people in mind (such as influenza vaccination, risk assessment with frail older people and interventions to increase social support and participation). However, there is a need to acknowledge the context of such activities; what is effective within nursing homes may not work in community settings. There is also good evidence that there are inequalities in health within the older population, mirroring those within the working age population.

3 Effective health promotion

In relation to interventions and strategies for 'adding years to life' there is evidence to suggest benefits under a number of headings.

Lifestyle change and risk reduction:

- the effects of smoking cessation on the risk of cardiovascular mortality are discernible within one or two years of quitting;

- the adoption of a more physically active lifestyle – one that involves participation in fairly vigorous exercise – may add years to life for previously inactive older people;

- behavioural interventions to reduce the risk of cardiovascular disease are effective for high-risk individuals with established heart disease;

- behavioural interventions can also reduce the risk factors for cardiovascular disease in unselected populations of older people. It is not clear, however, whether the kinds of reduction that have been demonstrated would have a significant effect on cardiovascular mortality.

Improving access to services:

- uptake of breast cancer screening and immunisation for influenza can be improved by educational programmes and/or changes to health service organisation;

- regular health checks can identify treatable health problems and may help to preserve independence/add years to life.

In relation to interventions and strategies for 'adding life to years' there is also evidence of a wide range of benefits.

Lifestyle change:

- regular physical exercise, even an 'everyday' exercise like walking, can postpone morbidity and functional decline in older people;

- participation in supervised exercise programmes can effect measurable improvements in the functional status of relatively healthy community-dwelling older people in their sixties, seventies and eighties;

- participation in exercise is associated with improvements in stamina, as well as reduction in mobility problems and the risk of falling.

Improving access to services:

- regular screening of older people in the community improves access to services and reduces admission to long term care. It is not clear, however, whether general health and functional screening has a significant impact on morbidity or functional decline.

Targeted interventions for older people living in the community:

- individualised health promotion programmes for disabled people living in the community can maintain their capacity for independent living by postponing or retarding functional deterioration. However, it is not obvious which part of the programme – lifestyle change, better access to services or improved social support – is beneficial;

- multi-factoral intervention strategies for the prevention of falls may be effective with high-risk community-resident older people;

- educational programmes to develop skills for the self-management of chronic disease seem to have little effect on functional status, though they are associated with symptomatic relief and better coping;

- carefully designed interventions to relieve social isolation among older people in the community may have some health benefits.

4 Future research and development programmes

Despite the evidence suggesting that there is considerable scope for health promotion to improve the quality and quantity of life for older people, there are many gaps in our

knowledge. In particular there is a need to:

- establish how the need for health promotion activity varies within the older population – issues of class and ethnicity in particular require rigorous investigation;

- determine how factors such as class, gender, age and ethnicity influence health beliefs, health related behaviour and attitudes and the ability of older people to benefit from health promotion;

- investigate the socio-structural context of older people's lives, in particular the influence of material and environmental factors (such as access to material resources, transport and housing);

- examine the differences in health needs between community dwellers and the five per cent of over-65s resident in long-stay care;

- investigate the effects of social interventions in order to establish their effects upon survival;

- undertake more research on individualised health promotion programmes;

- examine the methodological approaches to the evaluation of effectiveness of health promotion with older people.

To facilitate future research we need to develop a clear conceptual framework within which to develop health promotion research and interventions with this population. Given the limited conceptual framework and empirical evidence available we can only partially address the questions investigated in this report, and there is an extensive research agenda which requires attention in order to successfully address the issue of reducing inequalities in health among older people.

1 Introduction

This report presents the results of a review investigating the effectiveness of health promotion interventions with older people. As such it forms one piece of work within a suite of reports commissioned by the Health Education Authority (HEA) in Spring 1997 concerned with the effectiveness of health promotion interventions in reducing inequalities in health within specific disadvantaged groups. The report follows up the recommendations in the joint HEA/CPA (Centre for Policy on Ageing) report concerning the need to review the effectiveness of health promotion activities with older people and to develop a coherent research strategy for the study of health promotion and older people (Killoran et al., 1997). This review compliments the health promotion strategy developed by the HEA and CPA, and the report into researching older people's health needs and health promotion issues also commissioned by the HEA (Ginn et al., 1997).

Background to the review

Within Britain there have been several reports describing inequalities in health between different social groups. The World Health Organization's (WHO) Health For All strategy focused upon inequalities in health between social groups and called for a reduction of 25 per cent in the variations in health between different groups within any specific country by the year 2000. This was to be achieved by improving the health of the most vulnerable and disadvantaged. One means of achieving this was via the introduction of effective health promotion intervention projects with a specific focus upon reducing variations in health.

Terms of reference
The terms of reference for this review were:

- to marshal the best available evidence as to the effectiveness of health promotion interventions with vulnerable and disadvantaged social groups (in this case older people);

- to identify the major health promotion needs of the groups and articulate gaps in knowledge;

- to provide guidance on a research and development programme.

Key questions

The key questions to be addressed by each group were:

- which health promotion interventions, if any, work to promote the health and well-being of individuals, families and communities, and to reduce ill-health?

- how well do they work, i.e. what impact do they have on dimensions such as health behaviour or access to services?

- how well do they work in different social and environmental contexts, and across racial, ethnic, gender and class boundaries?

- do they currently contribute to a reduction in inequalities or variations in health?

- what and where are the gaps in health promotion knowledge/activities among vulnerable and disadvantaged groups and service providers?

- what are the principal health promotion needs of these groups?

- what are the implications for a new research, development and policy agenda?

Methodology

This report does not constitute a rigorous systematic review in that we have not attempted to undertake 'classical' meta-analysis. However, the review of health promotion interventions for older people was based upon a set of inclusion criteria. These are described below. Our intention was to be comprehensive rather than complete.

Types of study

This review is concerned with compiling 'the best available evidence' as to the effectiveness of health promotion interventions with older people. There is clearly a debate about which types of study design do (and do not) provide good evidence as to the effectiveness of health promotion (or indeed other health-care related) interventions. In this review we have opted to select studies with the most robust methodologies. Consequently we have concentrated on published studies that have used a randomised controlled trial design. Whilst this decreases the number of studies included it does concentrate upon those with the most scientifically sound methodology. Existing reviews and meta-analysis are included where available. Data from observation studies (especially longitudinal studies of ageing) are included, where

appropriate, in order to provide 'context' for understanding the trials examined and to provide evidence as to what types of outcomes we might attempt to 'improve' by health promotion interventions.

Interventions

We have investigated studies that evaluated many different types of health promotion intervention. These may be most easily divided into those designed to change a single risk factor (e.g. reduce blood pressure by reducing weight or increase bone mass by increasing exercise) and those intended to improve multiple risk factors. This latter category also includes studies of screening and assessing older people. Similarly we have included both individual and group level interventions in the scope of this review. For brevity and the reduction of repetition we have presented our results in terms of outcome measures (adding years to life and life to years) rather than interventions. This helps to focus attention upon identifying the objective of interventions (i.e. a focus upon ends rather than means). This is discussed further in Chapter 3.

Study populations

For the purpose of this review we defined older people as those aged 65 years and over (see Chapter 2). Generally we have excluded studies that included subjects under the age of 65. Other reviews of older people have taken a younger age definition (e.g. aged 55 and over) or have been content to include studies that did not include older people and extrapolate their findings to those aged 65 years and over (Ebrahim and Davey Smith, 1996). We have not adopted this strategy for two reasons. First, there was little point in covering ground already reported (e.g. Ebrahim and Davey Smith, 1996). Second, and perhaps more importantly, we wished to emphasise the evaluative work that has been undertaken specifically with older people. In line with our objectives, the studies were broken down into three age bands (65–74, 75–84, 85 years and over) and by gender, class and ethnicity.

2 Who are 'older' people?

This review aims to identify the best available evidence of the effectiveness of health promotion interventions. Hence we needed to consider how 'older people' are to be defined and identified. There are several competing ways including chronological definitions, notions of 'functional age', stage in the 'life-cycle' and relationship to the labour market (i.e. those retired and receiving their pension). We chose to use the latter indicator. However, all these approaches have their drawbacks (see Victor, 1994 and Bytheway, 1995 for a review of the main approaches towards the definition of old age).

The most commonly used approach to the definition of old age is based upon chronological age (sometimes combined with receipt of pension and formal withdrawal from the labour market). Old age, therefore, is defined by the number of years individuals have lived. With this type of approach we are using chronological age as a surrogate for biological/functional age. It is usual to take the age of 65 years as a broad indicator of entry into the later phases of the life cycle. However, the population aged 65 years and over is large – it is estimated that, in the UK, nine million people (about 18 per cent of the total population) fall within this category. In the results section we consider the key aspects that influence the needs for and use of health promotion interventions for those aged 65 years and over.

Key issues for health promotion

An important element of this review is to summarise the key characteristics of the older population and how these influence their need for (and possible acceptance of) health promotion activities. This provides the context within which to locate the review of studies and also for the development of any future health promotion programmes with this particular group. Furthermore, until we accept that ageing is a natural process and not a pathological state, we are unlikely to be able to develop appropriate models of health promotion activity.

Disaggregating the older population

As already stated, we have defined older people as those aged 65 years and over. This rather arbitrary definition includes an age range of about 40 years. It would be unwise to take this large segment of the population and treat it as if it were a single homogeneous group. It is only fairly recently that the heterogeneous nature of this age group has been widely accepted (see Victor, 1994). However, it is clearly evident that

older people from different social groups will have very real differences in their need for health promotion interventions. Furthermore, it is likely that the delivery of such interventions will need modifying in order to respond to the differing characteristics of different groups of older people.

There are a number of distinct groups into which older people may be sub-divided. It is important to distinguish between the 'young old' (those aged up to about 75 years – sometimes termed 'third agers') and the 'old old' (those aged 85 years and over – sometimes termed 'the fourth agers'). The third age is depicted by protagonists as a time of opportunity and freedom while the fourth age is seen as a time of decline and frailty (see Laslett, 1996 and the third age enquiry of the Carnegie Inquiry (1993)). Additionally there are important gender (see Arber and Ginn, 1991), ethnic (Blakemore and Boneham, 1993) and class (Victor, 1991) differences in the experience of later life, especially with regard to access to material resources and health. Women, minority community members, the very old and those from manual occupations are more likely to experience low income and poverty in later life (see Victor, 1996; Midwinter, 1997). This clearly limits the degree to which they can participate in society, and may be significant barriers to engaging in health promoting activities.

The dimensions of social stratification do not exist in isolation from each other. Thus in order to truly disaggregate the older age groups into their constituent parts we need to take into account at least four factors: age; gender; ethnicity; and social class. The complexity of the sub-divisions that characterise the older age groups has rarely been acknowledged but probably represents a continuation of the inter-relationships between these dimensions of social stratification, which characterise other, younger, age groups. Health promotion, if it is to be effective for older people, needs to recognise and respond to these differences.

Lifestyle

As well as the factors noted above, the social and domestic environments of older people will influence their response to health promotion activities. Many older people experience considerable material disadvantage (Arber and Ginn, 1991; Victor, 1996). This clearly limits their ability to participate in society and may 'exclude' them from adopting well recognised 'healthy' practices and lifestyles (such as diet or exercise). Additionally many older people are disadvantaged by their reliance upon public transport and their often reduced social networks. Widowhood and solo living are almost the norm among older people (especially women) and this again can limit their opportunities to participate in society. Furthermore a significant minority, approximately five per cent, of those aged 65 and over live in long-stay care settings, and health promotion activities need to recognise the potentially differing needs of older people living in the community and those in long-stay care settings.

For those behaviours traditionally thought of as being the 'target' of health promotion (for instance smoking, exercise, alcohol consumption and diet), older people present a varying picture. In terms of smoking and alcohol consumption, older people present a healthier picture than for the general population. There seems to be little variation in diet by age but exercise participation rates are low among older people (especially those aged over 75 years) (see Ginn et al., 1997).

We must be cautious, however, about making inferences from this pattern of behaviours as to what the pattern for future generations of elders will be. The low rate of alcohol and smoking among today's generation of older people is an excellent illustration of a 'cohort' effect and is unrelated to ageing per se. Rather it reflects the negative attitude (especially by women) towards smoking and alcohol consumption held by this group and which is rooted in the different social context and mores operating when today's older people were younger. We cannot assume that future generations of older people will maintain these low smoking and alcohol consumption rates.

Variations in health in later life

Those who reach old age (however it is defined) are the 'survivors'. There are important differences in who survives to experience old age. It is well documented that male–female variations in mortality during midlife mean that men are less likely to reach old age than women are. Expectation of life at birth is about five years greater for females as compared with males (77 years vs. 72 years). The reasons for this remain unclear but are probably partly biological, partly social and partly due to lifestyle (see Victor, 1994). In the UK people from a non-manual occupation group are more likely to reach old age than their contemporaries from unskilled/semi-skilled occupation groups (Fox and Goldblatt, 1982; Ginn et al., 1997). Expectation of life at birth for males in classes I/II is 75 years, compared to 70 years for those in classes IV/V. In the United States there are clear differentials in the likelihood of reaching old age among differing ethnic groups. It is unclear whether such ethnic-based variations in mortality exist in the UK.

Perhaps the most persistent of all stereotypes (or images) of later life is that old age is a time of universal ill health and physical/mental frailty. Put at its most simplistic, to be old is to be unhealthy. From this perspective dementia is perceived as part of 'normal' ageing and not as a pathological state. The persistence of this stereotype among researchers, policy makers and practitioners has meant that health variations in later life have only recently been explored. Indeed it is pertinent to note that the major UK studies of variations in health (Black et al., 1980; Drever and Whitehead, 1987; Acheson, 1998) did not include older people and were primarily concerned with differences in premature male mortality (i.e. deaths before the age of 65).

Age and variations in health

There are important variations in physical and mental health status within the population considered as older. Mortality rates continue to increase in later life and 82 per cent of all deaths that occur each year in England and Wales are in those aged 65 and over (Charlton, 1997). Despite this age-related increase in mortality there have been considerable recent declines in mortality in later life. Over the last thirty years mortality rates for men aged 65–74 fell from 540 per 10,000 (1961–1965) to 373 per 10,000 (1991–1994) – a decline of 69 per cent (Charlton, 1997). For women in the same age group the percentage decrease was even larger at 78 per cent (from 298 per 10,000 to 216 per 10,000). These decreases were not confined to those aged 65–74. Over the same period mortality rates for those aged 85 years and over fell by 78 per cent for men (from 2532 to 1966 per 10,000) and by 73 per cent for women (from 2067 to 1518 per 10,000). The reasons for this decrease remain unclear but probably reflect improved access to treatment by older people and improvement in the interventions. These data suggest that there is still the potential to improve the health status of older people as measured by mortality.

The reduction in late-age mortality is not confined to the UK. Rather it is a feature that has been observed elsewhere, especially in the United States. This observation has led to much theorising about the future pattern of mortality in later life. As a result of decreasing mortality, are there more people experiencing physical and mental disability in the later phases of life? Fries (1980) has argued that mortality in the United States is being 'compressed' into a shorter period at the very end of life. This argument suggests that people will remain active for longer and then experience a short period of disability and dependency. The alternative hypothesis is advanced by Gruenberg (1977), who argues that reductions in mortality are bringing about increased numbers of disabled elders (i.e., we are increasingly allowing the very frail to survive). If this theory is correct then the number of people experiencing physical and mental frailty will increase and they will experience these problems longer by the postponement of death by medical intervention. At the moment such arguments are speculative as there is not enough evidence to refute (or support) either position (Grundy, 1997). However, it does draw attention to the fact that reductions in mortality may have a negative impact upon the quality of life. Reducing one does not inevitably result in an improvement in the other.

Just as mortality increases with age so the prevalence of disability and problems with activities of daily living increase with age. For example, data from the General Household Survey (GHS) show that approximately one-third (38 per cent) of those aged 65–69 report a long-standing illness or disability compared with two-thirds (68 per cent) of those aged 85 years and over (Arber and Ginn, 1991). There has been little evidence to indicate that disability rates are decreasing in the way described for mortality (see Victor, 1994; Ginn et al., 1997; Grundy, 1997).

Gender and health

Within this general pattern of age-related increase in physical and mental ill health there are important variations within the older age groups. For physical health, women experience poorer health than their male counterparts (Arber and Ginn, 1991). Such differences are not trivial. Victor (1991) reports that, for those aged 65 and over, rates of morbidity (as measured by long-standing limiting illness, a good proxy for chronic illness) are 18 per cent higher among women as compared with men of the same age (Victor, 1991). This is a reversal of the pattern for mortality where mortality rates are from 73 per cent (aged 65–74) to 30 per cent (at age 85 and over) higher among men than women (Charlton, 1997). This translates into differences in life expectancy for men and women of four years at age 60 and two years at age 80 (Ginn et al., 1997). This illustrates why mortality rates provide only a limited perspective upon the pattern of health in later life (or indeed at other ages).

Ethnicity and health

Within the UK there has been comparatively little work on ageing and ethnicity. This reflects the predominantly white indigenous nature of the elderly population (although it totally ignores the 'invisible' minorities such as the Irish and Europeans). Approximately 20 per cent of the white population are aged 60 and over compared with less than 10 per cent of black and Asian people. However, this will change in future decades as the population of economic migrants ages. It is unclear as to what this will mean in terms of needs for health care (including health promotion). To date we can only speculate and acknowledge that our assumption of a mainly white elderly population will have to change and that this will have considerable implications for the range and style of services/interventions provided. There is, however, some evidence from the 1991 census that minority community members aged 75 and over have higher rates of chronic illness than the white population. Small-scale local studies appear to confirm the health disadvantage experienced by minority community members.

Socio-economic variations in health

Social class has been a particularly neglected dimension in the study of later life. This is in sharp contrast to the centrality of social class in the study of other age groups. Part of the reticence concerning class in later life derives from the stereotyping of later life as a universal, homogeneous experience and within which previously important dimensions of differentiation are negated. Furthermore, there are conceptual problems in assigning a social class position to many people within older age groups, because the most widely used measure is based upon occupation. Further difficulties arise for other reasons: because many, now elderly, women have never been gainfully employed, and because the status evaluation of jobs may have changed over time. However, despite all these caveats it is possible to assign a broad social class category to most older people, and Arber and Ginn (1993) argue that, for older women, assignment of social class on the basis of their husband's occupation is appropriate.

There remain profound variations in both mortality and morbidity within the older age groups and there is little evidence that socio-economic variations in health diminish in later life. For men aged 65–74 and 75 years and over, mortality rates are 60 per cent higher among those from social class V (the unskilled occupation groups) as compared with those from class I (Victor, 1991).

For disability there are similar differences (Victor, 1991; Arber and Ginn, 1991). In the UK population aged 65 and over there is a 20 per cent difference in the prevalence of age-standardised long-standing limiting illness between the extremes of the class distribution (Victor, 1991). Within the different age groups, the social class differential (class I and class V) may be observed: 9 per cent for those aged 65–69 (35 per cent vs. 44 per cent); and 13 per cent for those aged 80 and over (46 per cent vs. 59 per cent) (Victor, 1991). Class-based variations in health are observed for both men and women. For those aged 65 and over the prevalence of long-standing limiting illness for men in classes I and II was 33 per cent compared with 48 per cent of those in classes IV and V; for women the difference was less strong but still observable (42 per cent vs. 50 per cent) (Victor, 1991). Although class-based differentials are strongest for men they are also evident among women.

As noted earlier each dimension of differentiation does not exist in isolation. When we combine age, gender and class, the importance of social class is emphasised. Hence health in later life may be construed as reflecting (and reinforcing) the accumulated disadvantages illustrated by earlier phases of the life cycle. As such there is considerable scope for acknowledging and addressing (and redressing) the gender, class and ethnic variations in health status, which characterise later life (see Ginn et al., 1997 for a more detailed review of inequalities in later life).

The potential for prevention: types of health problems experienced in later life

Another factor that greatly affects the potential for health promotion in later life are the types of health problems and health issues experienced by older people. We therefore need to identify the key health issues; it is not acceptable to identify the health problems and concerns of younger people and assume that they apply to the older age groups.

There are a number of competing ways in which we can think about the main types of health problems. The most widely used model for older people (or indeed other age groups) is in terms of disease/diagnostic categories. In terms of mortality the three major problems of later life are cardiovascular disease and stroke, respiratory disease and cancers. These represent 75 per cent of all deaths of those aged 65 and over. However, if we look at patterns of morbidity then problems of the musculo-skeletal system, most notably arthritis, are pre-eminent. Additionally we need to combine the prevalence of specific conditions with the impact they have upon the functional ability of individuals.

This can be measured in several ways such as disability-free life expectancy. Whichever indicator we use, there is ample evidence that osteoarthritis, stroke and cardiovascular disease and cognitive impairment are the major causes of reductions in functional ability and the ability for continued independent living among older people. Interventions developed will need to address these specific concerns as well as other indices if they are to have a real benefit for older people.

Older people and health beliefs

Surveys have consistently indicated that health is an important concern of older people and a resource which can promote (or inhibit) 'successful' ageing (Arber and Ginn, 1991). Furthermore, a particular health event, such as a stroke or heart attack, can be an important element in determining when individuals start to define themselves as 'old' (Ward, 1984). Despite the obvious importance attached to health and the preservation of health by older people remarkably little is known either about their health beliefs or their needs for/attitudes towards/perspectives upon health promotion (Sidell, 1995). The study by Finch (1997) of attitudes to physical exercise by older people is an interesting example of the type of work required. Such attitudes will, however, clearly affect the degree to which older people will (or will not) accept health promotion.

3 The scope of this review

In this chapter we set out the scope of our review. After briefly considering the question of definition – what is health promotion for older people? – we comment on the difference between the two major types of health gain (adding years to life and adding life to years) that health promotion interventions may bring for older people. Following this we specify the kinds of intervention included in the review and describe the main outcome measures that have been used to evaluate the effectiveness of health promotion activities with older people.

There is a great deal of scope for conceptual confusion in undertaking a review of health promotion interventions for older people. Some definitions of health promotion would contrast it with preventive medicine (Kennie, 1993); others would use it as a very broad term to include preventive medicine (Kalache, 1995). For this present review, the question of definition has not only theoretical interest but an important practical purpose. How wide should the net be cast in the attempt to determine what works in health promotion for older people? What kinds of intervention are to be included and what excluded? If the aim is to undertake an exhaustive survey of studies that bear on the evaluation of particular interventions, it is essential to have well-defined criteria for including studies in the review.

The implications of different inclusion criteria may be illustrated by two reviews (Paterson and Chambers, 1995; Harris *et al.*, 1996) of 'preventive programs' or 'preventive interventions' for older people. Paterson and Chambers (1995) use the standard typology of disease prevention to select the kinds of intervention for which the evidence is to be assessed. The reviewers are moderately optimistic about preventive interventions for older people, picking out five examples of primary and secondary prevention of disease or injury (Table 3.1) for which there is good evidence of effectiveness.

- Smoking cessation.
- Immunization against influenza and pneumonia for older people in institutional settings.
- Multidisciplinary falls prevention.
- Breast cancer screening (up to 69 years of age).
- Home visit to prevent excessive institutionalization.

Table 3.1. Good evidence for health benefits of primary and secondary preventive interventions (Paterson and Chambers, 1995)

An Australian review of 'preventive programs' for older people (Harris et al., 1996) is much less sanguine about the prospects for prevention on the basis of a somewhat different selection of interventions. A threefold classification is used (health education and skills training; home-based geriatric assessment; clinic-based geriatric assessment) to identify 20 randomised controlled trials (many of which had serious methodological weaknesses). The authors conclude that the overall benefits of preventive programmes are unclear.

Our own approach to the definition of health-promoting interventions for older people differs from both these earlier reviews and has been guided largely by pragmatic considerations. Although it is necessary to acknowledge the importance of pharmacological and technological interventions, which properly belong to preventive medicine and loom large in Paterson and Chambers' (1995) review, it was clearly beyond our brief to attempt an exhaustive survey of the evidence for their effectiveness. It is also arguable that the standard typology of disease prevention is of limited usefulness in discussing health promotion for older people (Davies, 1990). The review of Harris et al. (1996), on the other hand, is somewhat too narrow for our purposes, though it enabled him to survey his chosen field with some claim to exhaustiveness. This present review makes no such claim, mainly because of the uncertainty of the boundaries marking off the interventions likely to be of interest. There is, therefore, no neat and simple definition of 'health promotion for older people' that we have used in order to select a set of interventions for inclusion in this review.

In this chapter we offer a guide to the areas we have attempted to survey. The following sections:

- look at the difference between two different kinds of health gain that may be obtained from health-promoting interventions for older people – adding years to life and adding life to years;

- outline the main types of intervention examined in this review;

- outline the main outcome measures used in trials of health promotion interventions for older people.

Adding years to life and adding life to years

Adding years to life: the primacy of disease prevention

The simplest framework for a preventive strategy that aims at adding years to life is that provided by the threefold typology of disease prevention. Health gain is achieved by the primary and secondary prevention of often fatal disease or injury, and this will include – as different activities – preventive medicine, health education and what has come to be

called 'health protection'. Tertiary prevention is a therapeutic activity and part of clinical medicine.

The starting point for many enquiries into effective preventive strategies for adding years to the lives of people already considered old is a body of evidence about the effective prevention of certain kinds of common and often fatal disease (e.g. coronary heart disease, stroke, some cancers) in the younger/middle-aged population (or the general population). It can then be asked, what works for older people *as well as* younger people? In other words, we are directed to look for evidence about the effectiveness – and comparative effectiveness – of established interventions in specifically older populations. Questions about the effectiveness of anti-hypertensive medication in the 'older old', advice/counselling on the reduction of cardiovascular risk in older people or breast cancer screening for women aged 65 years or more fall into this category. It is also important to consider the effectiveness – in adding years to life – of preventive interventions that are largely tailor-made for older people. Outstanding examples of such interventions are immunisation for influenza and regular health and functional screening.

When comparing the effectiveness, in adding years to life, of interventions for older and younger people, the cards are to some extent stacked against older people, for the simple reason that they have fewer life years to gain than younger people. In addition, change in older people may be harder to effect. Not only are pathological processes usually more advanced and therefore harder to modify, but older people are more set in their ways, which makes it harder to modify behavioural health risks. Although this is not the place to consider in detail the case for 'preventive nihilism', which is implicit in these arguments, it is evident that much of its force depends on the identification of health gain with the adding of years to life.

Adding life to years: what is healthy ageing?
It is a mistake, however, to identify health gain with the adding of years to life. The benefits of health promotion for the older population extend beyond the adding of years to life to include what is often called the 'adding of life to years'. It is arguable indeed that as people get older the emphasis in health promotion should shift away from the extension of life to the improvement of health-related quality of life (Fries et al., 1993; Killoran et al., 1997).

Because the difference between good and poor health is less easily defined than the distinction between life and death, adding life to years is a more complex and elusive goal for health promotion than adding years to life. Health gain is to be achieved by the prevention of that kind of health-related loss of well-being that is so often associated with ageing. Chronic complaints become more common, and pain and distress tend to become ever more closely woven into the fabric of daily life. The prevalence rate of

disability rises with age, and rises very steeply after about 70 years. The ability to live independently, without relying on the assistance of others in the kind of everyday tasks that younger adults take for granted, is increasingly compromised. Whatever lightens the burden of this kind of health-related loss of well-being – functional limitation and persistent ill-health – adds life to years.

To some extent this goal may be encompassed within a framework of disease prevention. Turn attention away from often-fatal disease and on to seldom-fatal but often disabling disease by: preventing its onset; halting or slowing down its progress; and, if these are not possible, minimizing its harmful consequences. By the time people have reached their seventh or eighth decade the emphasis on disease prevention will be on secondary and tertiary prevention. There are, however, reasons for resisting the identification of health promotion in later life with disease prevention. The closeness of the link between the prevention of loss of health and the control of underlying disease processes, which is what makes the identification plausible, appears to be considerably weakened in later life. It is difficult to 'shoehorn' discussion of health promotion for older people into a framework provided by the standard typology of disease prevention (Davies, 1990; Jette, 1996).

The weakening of the link between the loss of health and specific, well-understood disease processes is very apparent, for example, in clinical practice within geriatric medicine and the psychiatry of old age, where the attention of clinicians tends to be directed towards changes in functional ability and symptom severity rather than underlying pathology. There are various reasons for this: the pathological processes underlying many of the chronic degenerative diseases which are common in later life are poorly understood. This means that often it is not possible to describe the progress of disease in terms of the underlying pathological processes; tertiary prevention – the preservation of function and the relief of distressing symptoms rather than cure – often plays the dominant role in the clinical management of these conditions; and, furthermore, multiple pathology is common in later life.

Another factor that weakens the link between loss of health and disease is the occurrence of various kinds of age-associated deterioration and decline which appear to have no clear relation to underlying pathological change, unless we choose to describe ageing itself as pathological. That it is normal for a wide range of age-associated structural and functional changes to occur in humans is amply demonstrated by the evidence from observational studies of ageing. Muscles, for example, become weaker and joints less flexible; individuals tire more easily; memory function tends to decline; and there is a loss of physiological reserve which hampers the process of recovery from illness. Although it is often the case that such changes can be explained by disease processes, this is not always the case. This process of functional decline is very heterogeneous across the population. It starts later and proceeds more slowly in some people than in others.

And what has emerged from a mixture of observational and experimental studies is the hypothesis that a significant portion of age-associated decline in physical functioning, and perhaps also cognitive functioning, is due to 'disuse' or 'deconditioning' rather than disease processes or a biologically conditioned process of senescence (Muir Gray, 1985; Buchner and Wagner, 1992). On this hypothesis it is reasonable to look for health gain, not only from disease prevention strategies, but also from strategies for the prevention of deconditioning.

Adding life to years: the evidence from longitudinal studies

The essential groundwork for the development of a primary prevention strategy for cardiovascular disease and some of the common cancers has been the identification of modifiable risk factors for disease through large-scale long-term longitudinal studies, e.g. the Framingham Heart Study (Sherman et al., 1994) and the UK doctors' study (Doll et al., 1994). This work has its parallel in several important longitudinal studies that have tried to identify potentially modifiable 'predictors' of healthy ageing in large samples of the population. Most of the published research comes from North America and Scandinavia, for example the Alameda County Study (USA), the Longitudinal Study on Aging (USA), the Established Populations for the Epidemiological Study for the Aging (USA), the Manitoba study on Aging (Canada), the Gothenburg study (Sweden) and the Tampere study (Finland).

These studies generally take a fairly wide view of the components of healthy ageing. They are trying to identify factors that predict not only survival but also survival in a healthy and active condition. None of the studies restrict their view of the dimensions of health to the presence or absence of disease, all of them give special attention to the maintenance of physical function, for example mobility and the capacity for personal self-care, and many of them include cognitive functioning. Putting to one side socio-economic status, there is a growing body of evidence from these studies for the importance of three main kinds of modifiable predictive factor: the presence of chronic disease; healthy lifestyle; social networks and social participation.

Presence of disease

Prominent among the conditions that have been associated in longitudinal studies with significantly increased risk of loss of physical functional ability are: circulatory disease (including hypertension); diabetes; and arthritis. Although it is by no means easy to find consistent results across quite a large number of studies with considerable differences in methodology (e.g. different measures of functional ability, length of follow-up, sample populations), circulatory disease in particular emerges as a fairly consistent predictor of loss of physical functional ability (Pinsky, 1985; Lammi et al., 1989; Guralnik and Kaplan, 1989; Harris et al., 1989; Guralnik et al., 1993; Boult et al., 1994; Parker et al., 1996), though it is not always a very strong predictor (e.g. Guralnik et al., 1993).

Further evidence for the impact of circulatory disease on functional status has been accumulated through studies looking at the contribution of vascular disease to cognitive decline. The progressive deterioration with age in various cognitive processes – mental processing speed, selective attention and short-term memory – is well described in the psychological literature (e.g. Kausler, 1982). The inevitability of this decline as a concomitant of the ageing process is by no means universally accepted. There is evidence, for example, from observational studies to suggest: (i) that ageing *per se*, rather than the ill-health associated with ageing, is not responsible for cognitive decline (e.g. Starr, 1997); and (ii) that vascular disease makes a significant contribution to cognitive decline (e.g. Breteler 1994 *et al.*; Gale *et al.*, 1996).

What these results suggest is that effective interventions to change risk factors for often-fatal disease (e.g. smoking, obesity, lack of physical activity) are likely to have wider benefits than the extension of life. The reduction of risk for cardiovascular disease should add life to years as well as adding years to life.

Healthy lifestyle

There is plenty of compelling evidence from observational studies about the contribution of a healthy lifestyle to survival. Regular exercise, for example, as well as not smoking and low to moderate alcohol consumption all have a significant impact on the risk of mortality. There is also evidence from longitudinal studies of healthy ageing that more or less the same factors which add years to life also add life to years. Regular exercise, not smoking and low to moderate alcohol consumption protect against loss of physical function (Guralnik and Kaplan, 1989; Mor *et al.*, 1989; Breslow and Breslow, 1993; LaCroix *et al.*, 1993; Seeman *et al.*, 1995). The evidence is especially strong, and is consistent across several studies, for the benefits of regular exercise or a physically active lifestyle.

Social networks and participation

By the mid-1980s there was a considerable body of evidence, almost entirely from US studies, on the 'health-protective' effects of social support and continuing social activity in later life. It seems clear that, for older people, good 'social support networks' and the maintenance of social activity increase the chances of survival (Blazer, 1982; Zuckerman *et al.*, 1984; Welin *et al.*, 1985: Schoenbach *et al.*, 1986; Seeman *et al.*, 1987). The causal mechanisms by which these social factors operate have yet to be fully clarified, though it is widely agreed that good social support aids recovery and rehabilitation and that it also seems to act as a buffer against some of the stressful events that are common in later life (House *et al.*, 1988).

Results from more recent longitudinal studies of healthy ageing suggest that good social support and/or the maintenance of social activity have an effect not only on survival but also on the preservation of functional ability and independence (Roos and Havens, 1991; Seeman *et al.*, 1995; Kaplan *et al.*, 1993; Steinbach, 1992).

The main interventions

This review is about health-promoting interventions. It is necessary therefore to define the range of interventions that are to be included. We have suggested that there are problems with applying the typology of disease prevention to ill health in later life. The rationale for using this typology as a means of isolating health promotion as a distinct activity is that it provides for a distinction between therapeutic (or clinical) and non-therapeutic (or non-clinical) interventions. There is, however, a tendency for the distinction between primary and secondary (i.e. non-therapeutic/non-clinical) interventions and tertiary (i.e. therapeutic/clinical) interventions to become blurred in the case of chronic disease, which limits the usefulness of the typology for discussions of health promotion for older people. Anti-hypertensive medication, for example, may be classified as both primary and tertiary prevention – primary prevention of stroke and tertiary prevention of hypertensive disease. Nor is this particular problem remedied by adopting a typology of disability prevention in place of a typology of disease prevention (Jette, 1996).

One approach to this difficulty is simply to ignore it: to accept that tertiary prevention has an especially prominent role in the prevention of ill health in later life. This is in effect the strategy adopted by David Kennie (1993) in his very comprehensive book on preventive care for the elderly. As it was never intended that this present review should attempt a comprehensive survey of the effectiveness of any intervention that could be regarded as health-promoting rather than curative, we have been forced to adopt a more restrictive approach. Where possible we have tried to maintain the distinction between therapeutic and non-therapeutic interventions. With this end in mind, we have concentrated attention on:

- educational and behavioural interventions;
- screening and preventive assessments;
- social interventions.

Evidence for the effectiveness of pharmacological or technological interventions that could be classified as primary prevention – i.e. immunisation, anti-hypertensive medication, hip protectors and special dietary supplements – has not been included in the review, even though these are the kinds of preventive intervention that are likely to set the standards for effectiveness. The reason for this is that they are the subject of several existing reviews (e.g. Kennie, 1993; Mulrow et al., 1994a; Gross et al., 1995; Paterson and Chambers, 1995; Ebrahim and Davey Smith, 1996).

Educational and behavioural interventions in later life
Risk reduction for often fatal disease
As already stated, a great deal of evidence has accumulated in recent years about the role of personal lifestyle in the prevention of often-fatal chronic disease and loss of functional ability in later life. Smoking, lack of physical activity, a high fat diet with little fresh fruit or vegetables and excessive alcohol consumption all increase the relative risk of cardiovascular mortality. A healthy lifestyle reduces the risk of cardiovascular disease and increases the chances of a healthy old age. In this report we want to ask more specific questions about the benefits of adopting a healthy lifestyle in later life:

- What are the health benefits of adopting a healthy lifestyle – e.g. smoking cessation or increasing physical activity – late in life?
- Do the benefits of behavioural change diminish with increasing age to such an extent that after, say, 65 years they become negligible and it is no longer worthwhile making the effort?
- Does the adoption of a healthy lifestyle add years to life and life to years even for those who are already old?

Given that there is good evidence for the health benefits of a certain kind of lifestyle, what can be done to bring about lifestyle change in people who have an 'unhealthy' lifestyle? Evidence that modifiable individual risk factors make a significant contribution to the incidence of often-fatal disease has generated a substantial body of research looking at the effectiveness of pharmacological and educational/behavioural interventions intended to reduce risk for cardiovascular disease. Most reviewers (e.g. Ebrahim and Davey Smith, 1996) tend to agree that there is little or no good evidence for the effectiveness, in the general population, of educational or behavioural attempts at individual risk factor modification in reducing cardiac disease or cardiac deaths. Even when the interventions prove to be effective in lowering blood pressure or reducing blood cholesterol, it seems that the effect is not large enough to have a significant impact on mortality or disease events. For high-risk populations – i.e. those people who have already been diagnosed or who have symptomatic heart disease – it is a different matter. Lifestyle change can reverse coronary heart disease (Ornish et al., 1990).

What evidence is there for the effectiveness of interventions to reduce the risk of often fatal disease in people over 65 years of age? Is it possible, for example, to change the behaviour of older people without symptomatic cardiac disease so as to reduce the incidence of disease (Posner et al., 1990)?

Skills and strategies for preserving optimal health
Education for health in later life has a much wider field of application than merely as an instrument for reducing the behavioural risk of often-fatal disease. This is partly a matter of outcomes, as there is a wider range of potential benefits that may be used to evaluate

effectiveness, and partly a matter of strategy, as there are other aspects of health behaviour in respect of which older people may be helped to take better care of their own health.

Prominent among the more age-specific problems for which researchers have sought educational and/or behavioural solutions are:

- falls prevention;

- self-care and the relationship of older people to formal health services;

- self-management of chronic disease.

The common ground in these problems, and in the interventions designed to deal with them, is that the pressures of ageing make it increasingly difficult for older people to exercise control over, and take responsibility for, their own health without some kind of outside help. Health problems and functional deficits tend to become more common, more persistent and more pressing, and these make many and varied adaptive demands on the individuals concerned. There is plenty of scope, therefore, for educational/ behavioural interventions with older people to develop skills and strategies for maintaining optimal health.

What evidence is there that educational/behavioural interventions with older people, besides those that aim at risk reduction for often-fatal disease, can add years to life or life to years?

Falls prevention

One of the commonest health problems of later life is falling. Although only a minority of falls in older people result in serious injury, a bad fall can be a devastating and confidence-destroying event even in the absence of serious injury. In the UK, falls are one of the main reasons for older people transferring from community to institutional care.

Falls are complex multifactorial events and it is only recently that important risk factors have begun to be properly identified (King and Tinetti, 1995). The risk factors that have attracted most research attention are: a deterioration in physical performance, especially balance control, gait control and lower limb strength; modifiable hazards in the environment; risk-taking by older people; and adverse effects from medication.

These different kinds of risk factor have in their turn generated different strategies for the prevention of falling. Some strategies concentrate on the use of exercise to improve physical capacities connected with mobility and stability, others provide a

comprehensive risk assessment with appropriate follow-up and finally, there are those which rely heavily on an educational/behavioural approach to the modification of risk.

The relationship of older people to formal health services

Knowing when and how to make use of formal health services, as well as prescribed and unprescribed medications, is part and parcel of a healthy lifestyle. It is important for older people to have some idea about what they can do for themselves to maintain their own health *and* what can be done for them by formal health services, to avoid both over-reliance on formal services and also their under-use. What makes this especially important for older people is evidence regarding: the character of their relationship with formal health services; and the tendency to use prescribed and unprescribed medications inappropriately. It is sometimes suggested, for example, that older people, or at least those generations born before the Second World War, tend to be more 'passive' in their relationship to the formal health services than younger people. They may be especially prone to fall into, even perhaps directed towards, a kind of behavioural trap characterised by patterns of 'learnt dependence' and/or resigned inactivity. One way of dealing with the problem is to encourage and enable older people to make better use of formal health services, for example, by coaching older patients to increase their involvement in medical decision-making (McCormick et al., 1996), or by trying to improve the uptake of clinical preventive services. It is also possible to devise strategies that deal with the problem of over-reliance on health services rather than on their under-use; by equipping people with the knowledge and skills that will enable them to exercise more and better self-care (Crook, 1995).

Rehabilitation and patient education

There is widespread consensus about the importance of good rehabilitative care for older people, and there is now a large and growing research literature on the most effective strategies for the preservation of functional ability after catastrophic events such as hip fractures or strokes. The improvement of rehabilitation services was one of the proposed key areas in the 1991 government consultation document on the Health of the Nation policy (Department of Health, 1991). In the same year, the Royal College of Physicians highlighted the importance of effective rehabilitation after acute disease in its conclusions and recommendations on preventive medicine for older people (Royal College of Physicians, 1991). The present Labour government has declared the improvement of rehabilitation services to be one of its priorities for the National Health Service (NHS). Whatever its indisputable importance as a form of tertiary prevention, it seems sensible to regard rehabilitative care after acute disease as a therapeutic activity, which falls outside the scope of this review.

Rehabilitation packages are available, however, not only to people suffering from the consequences of acute disease but also for older people with chronic disease. Evidence for the benefits to be obtained from well-planned rehabilitative interventions in chronic

disease is to be found in increasing numbers of trials (e.g. Young, 1991; Sridhar, 1997). Rehabilitation packages for chronic disease often include an educational component. They also usually offer some kind of 'exercise therapy' to improve functional status or afford symptom relief, as well as cognitive therapy or advice and training on strategies for coping with pain or distress. Some of these interventions are described in evaluation studies as therapeutic (or rehabilitative), whereas others place much more emphasis on the educational component in the intervention and describe themselves as patient education programmes. Although there seems little point in attempting to draw too firm a line between rehabilitative care and health promotion interventions, we have included in the review examples only of those interventions that describe themselves as forms of patient education for older people with chronic disease. Although very few studies of this kind restrict their samples to people aged 65 years or more, they are interested in populations defined by the presence of disease rather than by age, and those studies that look at the education of patients with, for example heart disease, Parkinson's Disease or arthritis will be concerned with predominantly older populations.

There is a good reason for *excluding* patient education for chronic disease from the scope of this review – it is part of the clinical management of disease and an adjunct to medical therapy, and like rehabilitative therapy, it is an example of tertiary prevention. There are also, however, good reasons for *including* patient education in the review, and this is what we have done. The kind of chronic disease for which medical therapy may offer some relief but cannot offer a cure is very common in later life. Health problems such as these place huge burdens of adjustment on older people, and some of them adjust and cope better than others. They manage symptoms more successfully, preserve optimal levels of functional capacity, maintain an active social life and succumb less easily to the low spirits, which are so commonly associated with chronic disease and disability in later life. Interventions that help older people to adjust and cope more successfully with health problems that cannot be removed by medical means are interventions that help them to help themselves. In that sense, even when incorporated into the standard clinical management of a condition, they stand in obvious contrast to medical therapies. The aim is to make the patient a more active partner – perhaps even *the* more active partner – in the partnership of care between doctor and patient. In this respect the interventions have obvious and close affinities with educational and/or socio-behavioural interventions for healthy older people.

Screening and preventive assessments

Health and functional assessments for older people are used for various purposes in different settings. What are known in the US literature as 'comprehensive geriatric assessments' help to inform the clinical management of older people admitted to acute care services. There is now considerable consensus about the value of these specialist-led multidisciplinary assessments (Stuck et al., 1993). Older patients after their discharge from acute care services are also an important target group for assessments that have a

preventive aim in view – e.g. the prevention of re-admission to hospital (Hansen, 1995; Rubin et al., 1993).

Combined medical, functional and psycho-social assessments (hence the comprehensiveness) are also used as part of community-wide screening programmes for everyone deemed to be at high risk, because of their age, of serious morbidity and functional decline. In the UK general practitioners are contractually obliged to offer an annual health check to everyone aged 75 years or more, though the value and effectiveness of such a programme remains a matter for dispute. Williams (1994) describes the purpose of these health checks as *tertiary* prevention, 'the early recognition and seeking out of established symptomatic disease and social detriment so that treatment and social support can be instituted to improve quality of life and reduce functional deficit'. There is no consensus about the value of various *secondary* preventive interventions, for example disease-specific screening programmes for older people over 64 years (including breast cancer screening), which have as their aim the early detection of asymptomatic disease.

Programmes involving some kind of regular health surveillance for older people living in the community are by no means new (Williams, 1995). The surveillance can take many different forms besides a medical consultation, including 'postal surveillance' (Pathy, 1992), visits from unskilled volunteers trained to use a simple proforma (Carpenter, 1990), periodic assessments provided by nurses or health visitors to older people in their own homes (Vetter, 1984), or assessments by multi-disciplinary teams in primary care settings (Williams, 1987; Epstein, 1990).

As the Harris (1996) review makes clear, there are good reasons for taking a fairly wide view of what should count as preventive assessments for older people – a view shared by a recent meta-analysis of controlled trials of geriatric assessment (Stuck, 1993), which sets out to evaluate the common component – the geriatric assessment – in trials with varied aims, personnel and settings. For our purposes, however, it is important to try to maintain the distinction, and we have taken a more restricted view than either Harris or Stuck, confining our attention to evaluations of home-based assessments or assessments in primary care settings which are comparing 'proactive' surveillance with 'wait for the patient to consult'.

What evidence is there that general health screening/health checks for older people add years to life or life to years?

Social interventions

There is, as we have already pointed out, a considerable body of evidence to suggest that good social support networks and continuing social activity are associated with longer life and better health. The range of interventions that might be reasonably described as

'social' is wider, however, than those that aim either to stimulate older people to greater social activity or to provide them with a substitute for the kind of emotional support which friends or relations may offer in times of stress or loss. It might include, for example, programmes to provide practical help with domestic chores for older people living in the community (Townsend et al., 1988), or specially augmented domiciliary services for people with dementia (Riordan and Bennett, 1998), or the provision of respite care to take the strain off long-term informal carers of older people with dementia (Homer and Gilliard, 1994). It would certainly include many 'interventions' that could be more usefully described as projects for the promotion of mutual aid among older people – for example, community development projects – galvanising older people in the community into concerted action on health matters or helping to establish self-help groups (Minkler, 1992). It could even be taken to include re-housing – what are the health benefits of moving from poor quality 'high rise' accommodation to purpose-built sheltered housing?

A narrower approach to the idea of a social intervention has been used to guide the selection of evaluation studies for this present review. The intervention trials that have been selected are those which can be tied in with the observational evidence for the benefits of social support or social activity. In other words, the intervention aims either to activate older people socially or to provide them with a substitute for the kind of emotional support which friends or relations may offer in times of stress or loss. By this means it is hoped to counteract the kind of social isolation and inactivity to which older people are thought to be especially vulnerable. Only a handful of intervention trials are included in this review that have as a primary aim the amelioration of isolation or the social activation of older people. They have been chosen as illustrations of some of the different types of intervention that researchers have tried to subject to rigorous evaluation and do not represent an exhaustive list of robustly designed controlled trials of social support/activation interventions. It should be said, however, that the literature contains relatively few published reports of randomised controlled trials of social interventions with older people (just as it contains relatively few published reports of randomised controlled trials of educational/behavioural interventions with older people).

The main outcome measures in evaluations of health promotion interventions with older people

Our aim in this review is to offer a snapshot survey, not a systematic and exhaustive review, of the different kinds of health promotion intervention that have been evaluated with older people, and to see what kinds of health benefit may be expected from these interventions. Ideally we would like to be able to compare different interventions in respect of their effectiveness in producing a given kind of health benefit. In practice this is very difficult to achieve, even with interventions that are intended or expected to add

years. Many trials of interventions that are built on a risk reduction strategy for cardiovascular disease rely on risk factor outcomes rather than survival or mortality. Not all inferences that proceed from successful risk reduction to predictions of reduced mortality are equally secure. When we take account of trials of interventions that are intended to add life to years as well as, or rather than, years to life, the task of comparing interventions becomes even more complex.

A wider range of outcome measures is deployed in evaluating life-enhancing as opposed to life-extending interventions. There are objective measures of health status that indicate the presence or severity of a given condition (e.g. a diagnosis of depression or the occurrence of a hip fracture or symptom severity), and there are multi-dimensional measures of health status such as the Nottingham Health Profile or the SF-36 as well as measures of physical and cognitive functioning. Some studies rely on what are in effect risk factor outcomes – i.e. measures of risk for seldom-fatal disease or loss of functional ability. The occurrence of falls, for example, is a risk factor for hip fracture, impaired balance is a risk factor for falling, and, in more general terms, low levels of physical activity, or social participation, are risk factors for 'unhealthy ageing'. As with the evaluation of risk reduction strategies for cardiovascular disease, it is important to distinguish between the effectiveness of an intervention in reducing risk (for something or other) and its impact on health status. An intervention may for example successfully reduce a measure of risk for hip fractures (the occurrence of falls) without having any discernible effect on the fracture rate. There are also outcomes that measure the utilisation of services rather than health or functional status per se, and finally what might be called 'well-being' outcomes.

Morbidity

A few of the trials cited in this review are disease-specific, and they confine their attempts to detect changes in health status to one or two medical conditions. For example – does the intervention prevent their occurrence in people who are free of the disease?; or does it improve the condition of those who already have the disease (reduce symptom severity, etc.)? Most of the trials, however, want an outcome measure that will capture more or less any significant change in morbidity/health status associated with the interventions. For example – does the intervention prevent morbidity, not just this or that particular kind of morbidity? The most common approaches to this problem are: (i) multi-dimensional measures of global health status; (ii) self-rated health; and (iii) utilisation of medical and social services.

An acute admission to hospital, though not a direct measure of health status, is often taken as a fairly reliable marker of a change for the worse in health status. Although there are other reasons for admitting older people to hospital besides the occurrence of an actual or suspected 'acute episode', the move is usually precipitated by an actual or suspected change for the worse in health. The impact of an intervention on 'bed days' is,

for example, used as a main outcome in several US studies of preventive programmes for older people (e.g. Stuck et al., 1995; Leveille et al., 1998). Institutionalization stands in an analogous relationship to serious decline of functional capacity. Although the move from a home in the community to some form of residential or institutional care may be precipitated by other factors besides a deterioration in functional ability (such as a loss of social support or a growing disinclination to make the effort to cope at home) it is not unreasonable to regard institutionalization as a fairly reliable marker of the transition from independence to dependence, and therefore as an indication of a serious deterioration in functional capacity.

Functional status

Among the most widely used measures of functional ability are those which assess individual capacity to perform selected and meaningful activities of daily life (ADL). It is the normal experience of ageing to find that the performance of some of the activities of daily life becomes more difficult with advancing years. The extent of a person's functional limitation depends on the abilities that are compromised and the degree to which they are compromised. Only a minority of older people, even among those who survive into their eighties and nineties, experience such a decline in functional status that they are no longer capable of performing an essential task like getting in and out of bed without help from someone else. Some of the trials cited in the following chapters look at the transition from independence to dependence in a set of core everyday tasks (ADLs) such as bathing and toileting. Functional decline in this sense is closely related to the need for social care. Others studies use as their yardstick of functional status a wider range of activities (instrumental activities of daily living – IADLs), and register increasing difficulty as well as loss of independence. Measures of functional ability which assess capacity to perform ADLs or IADLs have played an important part in the evaluation of screening interventions. Is it possible to postpone functional decline by screening programmes to identify unmet needs for health and social care among older people living in the community?

Trials of interventions which look for the prevention or postponement of the kind of functional decline associated with loss of independence in ADLs (or IADLs) are looking for relatively large effects on functional status – and generally make use of relatively long follow-up periods. These, however, are not the only kind of beneficial effect on functional status which may be looked for in health promotion trials with older people. Most of the exercise trials cited in the following chapters – those with samples of relatively healthy, non-disabled older people – make use of somewhat different outcome measures to detect improvements in functional (physical or cognitive) capacity as a result of relatively short-term interventions. The immediate focus of interest in many of these trials is the reversal of 'de-conditioning' in non-disabled older people rather than the prevention of the onset of disability in non-disabled people. There is, however, one important outcome measure which does make a connection with the prevention of

disability, and that is the occurrence of falls. In other words, effective falls prevention may contribute to the prevention or postponement of loss of independence in the ability to perform the basic activities of daily life.

Well-being outcomes

Well-being is one of the most important themes in gerontological research. What factors contribute to the well-being of older people and how are they to be measured? There are some components of well-being that are amenable to objective assessment. It is better to be independent in the essential tasks of daily living than not, *and* it is possible to make an objective assessment of this state of affairs. There is, however, another side to well-being, which is sometimes called 'subjective' well-being. Although independence in activities of daily life matters, what also matters is the impact of the loss of independence on someone's *sense* of well-being. There is little doubt that health and functional status are among the most important determinants of older people's subjective sense of well-being.

Some of the intervention studies included in this survey of health promotion research use measures of subjective well-being (e.g. self-perceived health, self-esteem, morale, etc) as well as measures of health and functional status. They can ask therefore whether or not a demonstrable improvement in health or functional status is associated with a sense of greater well-being. They can also ask whether or not subjective well-being may be improved even when health and functional status remain unaffected. Some trials, however, use *only* subjective measures of well-being, which opens up a conceptual quandary. Should we say that an intervention that has an effect on subjective (or psychological) well-being is *ipso facto* productive of health benefits? On the one hand, it may be argued that an improvement in subjective well-being is an improvement in mental health. On the other hand, it is debatable whether an intervention that enhances the sense of well-being in non-depressed older adults should be so described. Has their health status changed? From one point of view the answer is clearly no. Does the intervention diminish the risk of a decline in health status? That is a different question and it is one that few of these studies address.

4 The benefits of lifestyle change late in life

In this chapter we ask whether there are any health benefits – adding either years to life or life to years – to be had from adopting a healthy lifestyle late in life.

Does lifestyle change add years to life even for people who are already old?

Risk factors for cardiovascular disease in later life

Lifestyle change adds years to life by modifying risk factors for disease. It is only in recent years that researchers have begun to clarify some of the uncertainties about the continuing influence in later life of risk factors that are of established importance in middle age and early old age. It now seems clear, for example, that high blood pressure is associated with an increased risk of mortality for people well into their eighties, and that the benefits of hypotensive medication may outweigh the risks for people in advanced old age.

The evidence for the continuing significance of high levels of blood cholesterol and obesity in later life, as risk factors for cardiovascular disease, is less clear. Results from observational studies suggest that the significance of serum cholesterol as an independent risk factor is weaker for people in their seventies than for younger people, and for people in their eighties higher levels of cholesterol are associated with survival rather than mortality (Weverling-Rijnsburger et al., 1997). Although, for people around 65 years of age, heavier weight is associated with a modest increase in the risk of heart disease, it is less clear to what extent it presents a mortality risk in the older old. Recent results from a US study (Harris et al., 1997) suggest that there is an increased risk of mortality for people who become overweight – or more overweight – in later life. There is scope for weight reduction strategies to add years to life. Weight reduction does, of course, confer other health benefits besides the reduction of mortality.

Smoking cessation

Results from US studies of the long-term effects of smoking behaviour provide good evidence that smoking cessation, even for lifetime smokers who are in their sixties, increases the chances of survival. Cardiovascular risk is reduced quite rapidly so that older smokers who quit have a reduced risk of death within one or two years of quitting compared with current smokers. Cancer risk, however, appears to decline more gradually, in line with the view that risk is related to accumulated lifetime exposure. The

evidence from these observational studies suggests that the overall risk of death for quitters approaches that for those who have never smoked, but only after 15 or 20 years of abstinence (LaCroix and Owen, 1992).

Adopting a physically active lifestyle
The evidence from observational studies
Results from long-term observational studies of the effects of changes in levels of physical activity are more or less in line with the evidence for the benefits of smoking cessation. Results from three large US studies – the Harvard Alumni Study, the Alameda County Study and the fitness study of Blair and colleagues – all suggest that previously inactive older people who take up 'moderately vigorous' exercise live longer than those who remain inactive (Kaplan, 1993; Paffenbarger et al., 1991; Blair et al., 1995).

Participation in vigorous exercise is not very common in people aged 65 years or more. For this age group, the most common physical activity in later life is walking. The best evidence for the cardiovascular benefits of walking in older adults is probably to be found in a recent observational study of older people (65+) without severe disability or a history of heart disease (LaCroix, 1996). Walking more than four hours a week was associated with a reduced risk of cardiovascular events; and was not altered by adjustment for various risk factors for cardiovascular disease. The association was present in both sexes and in older (75+) as well as younger (65–74) members of the sample; in older people who did not participate in more vigorous exercise as well as those who did. Walking for more than four hours a week was also associated with a reduced risk of mortality – though in this case the association was substantially diminished when other risk factors for cardiovascular disese and general health status were taken into account.

The evidence from experimental trials of exercise interventions
Results from experimental trials of the benefits of moderately vigorous aerobic exercise for previously inactive older people, screened for cardiovascular disease, demonstrate that: (i) many healthy older people in their sixties and seventies can tolerate vigorous aerobic exercise after an appropriately designed and progressive exercise programme; and (ii) participation in such programmes is associated with improved cardio-respiratory fitness (e.g. Cunningham et al., 1987; Blumenthal et al., 1989; Hopkins et al., 1990; Posner et al., 1992; Hill et al., 1993). Trials of home-based unsupervised exercise programmes are rare, though King et al. (1991) found that a home-based programme was as effective as a group-based programme in improving aerobic capacity in a relatively young sample (50–65 years of age).

Not all older people, however, are willing or able to participate in programmes of fairly vigorous aerobic exercise. It is important therefore to look at the cardiorespiratory benefits of relatively low intensity exercise, especially in groups of older people who

may be unable to tolerate more vigorous exercise as well as those with heart disease or chronic obstructive pulmonary disease. Studies by Panton et al. (1990) and Foster et al. (1989) establish that clear gains in cardiorespiratory fitness can be made with relatively low-intensity exercise in healthy older people (65+ years).

The significance of these results should be assessed in the light of the twin objectives of health promotion for older people – adding years to life and life to years. The research by Blair et al. (1995) suggests that gains in cardiorespiratory fitness late in life may add years to life. The improvement in cardiac function may also have a positive effect on quality of life by increasing the ability to tolerate exercise and decreasing tiredness, even if it falls short of what may be required to have an effect on survival. For many older people this is an important precondition of mobility.

Is lifestyle change an effective way of adding life to years?

There is a large and accumulating body of evidence that the adoption of a healthy lifestyle late in life has other benefits besides that of adding years to life. A great deal of this evidence comes from experimental studies of the health benefits of participation by previously inactive older people in exercise programmes (Buchner et al., 1992; Elward and Larson, 1992).

Three kinds of outcome measure (besides cardiorespiratory fitness, as already discussed) are used to evaluate trials of exercise interventions included in this review, each reflecting a different dimension of health benefit:

● measures of physical functioning broadly related to the improvement or maintenance of mobility, including the risk of falling;

● cognitive function;

● psychological well-being.

One outcome of considerable importance in several recent observational and experimental studies of exercise participation and physical activity in older people, that of bone strength, has been omitted from this present review. This is because the typical age range of the participants invariably falls below our chosen threshold of 65 years (e.g. McMurdo et al., 1997).

Before looking at exercise interventions in more detail, it is appropriate to mention the contribution of good nutrition to healthy ageing. The importance of a healthy diet in the general population has been the subject of extensive research through its association

with cardiovascular disease and cancer. In this respect older people are urged to adopt similar patterns of eating to those advised for younger adults (Department of Health, 1991). There are, however, other kinds of nutritional risk to which older people are especially vulnerable. Obesity, for example, impairs mobility, while a major hazard of being underweight is osteoporosis and a tendency to fracture. Older people also tend to reduce the overall amount of food they consume, which may make it difficult to maintain an adequate supply of essential nutrients. Although there seems to be plenty of scope for health-promoting interventions aimed at nutrition in later life in addition to risk reduction for cardiovascular disease/stroke, there are very few published evaluations of such interventions. Those that are available look at the use of routine dietary supplements in particular high-risk populations of older people such as the housebound and institutionalised (Chapuy et al., 1994; Dawson-Hughes et al., 1997).

Physical function and mobility in relatively healthy older people

Results from trials of aerobic exercise/endurance training with samples of relatively healthy older people have been supplemented, especially in more recent years, by studies that have included a wider range of outcomes, with considerable attention being paid to measures that are closely associated with mobility and stability (e.g. balance control, lower limb strength, joint flexibility and gait speed). These interventions aim, broadly speaking, to improve or maintain mobility and to prevent falls.

Studies of gymnasium-based strength training have shown that such exercise is feasible in relatively healthy community-dwelling older people in their sixties and seventies (e.g. Charette et al., 1991; Pyka, 1994; Nichols, 1993). Results with older samples (i.e. where no-one is younger than 65 years) are mostly in line with this (Topp et al., 1993; Skelton et al., 1995), though Jette et al. (1996) report only modest gains in strength from a home-based intervention. Results from most of these studies, however, plus the meta-analysis of the results from the multi-centre FICSIT (frailty and injuries: cooperative studies and intervention techniques) fall prevention trials (Province et al., 1995) and a direct comparison of strength training and computerised balance training (Wolfson et al., 1996), suggest that strength and/or endurance training has a relatively small impact on the risk of falling, despite positive effects on muscle and bone strength, aerobic capacity and flexibility. The main exception to this generalisation appears to be one of the arms of the FICSIT trials, which compared different kinds of endurance and strength training in a sample of physically unfit adults with mild deficits in balance and found that such exercise had a positive effect on risk of falling (Buchner et al., 1997).

More promising than strength or endurance training are exercise programmes specifically designed to improve balance control or mixed exercise programmes that aim to improve balance, gait and flexibility as well as lower limb strength. Impressive results have been obtained with class-based programmes that have included people up to 85 years of age (McMurdo and Barnett, 1992; Lord et al., 1995, 1996). In a controlled trial

of a class-based t'ai chi training programme, subjects (70+ years) showed a substantial reduction in rate of falling compared to controls who received no training and also compared to subjects who were given computerised balance training (Wolf, 1996). The intervention involved a less intensive practice of t'ai chi than is customary in China, which was thought to explain the absence of any detectable improvements in strength or flexibility.

Most promising of all, however, would seem to be the results reported by Campbell et al. (1997) in a controlled trial of a home-based exercise programme to reduce falls among older women. The mean age in the Campbell sample was high, with an age threshold of 80 years. The study aimed to develop a falls prevention programme that was 'simple, easy to implement and affordable as well as effective', and this is precisely what it seems to have achieved through an exercise programme of strength and balance training led by physiotherapists making home visits.

Physical function and mobility in institutionalised or disabled older people

It has proved somewhat more difficult to secure similar gains in samples of older people who are frail, disabled or institutionalised. Most of the trials cited above manage to secure high levels of compliance from healthy volunteers. With samples of older people who are frail or unwell, difficulties of compliance can be considerable, large enough sometimes to undermine the statistical power of the study (Thompson et al., 1988; Crilly et al., 1989). Furthermore, the intensity of the intervention must be moderated to take account of lower baseline levels of functioning. Results from several studies (all without controls or quasi-experimental in design), however, have shown that such interventions were feasible and might effect improvement in various aspects of physical functioning, including strength, flexibility and cardiovascular fitness, even in very frail and chronically ill elderly people (Anianson et al., 1980; Morey et al., 1989; Cress et al., 1991; Fiatarone et al., 1990; Fisher et al., 1991; Hickey et al., 1995).

More rigorous evaluations of the effects of physical training on measures of physical performance in samples of institutionalised and/or disabled elderly have been reported by Crilly et al. (1989), McMurdo (1993), Mulrow et al. (1994), Fiatarone et al. (1994), and MacRae et al. (1994). We have included these studies in this review, even though it is arguable that they are more concerned with the effectiveness of exercise therapy than with the adoption of a physically active lifestyle or participation in exercise. The most promising results, from the point of view of maintaining or improving mobility, have been obtained by Fiatarone from a programme of 'high intensity resistance training'. At the other extreme of intensity, MacRae (1996), in an evaluation of supervised walking for nursing home residents, reported no positive effect from the intervention on any mobility-related variable except walking endurance. Another study by McMurdo and Johnstone (1995), which evaluated a 'low technology' approach to home exercise

provision for community-dwelling elderly people with poor mobility (dependent in at least one ADL), reported no improvements from either strength training or mobility training.

No impact on the occurrence of falls was reported for any of the 'exercise-only' falls prevention trials with institutionalised and relatively frail populations. Both Rubenstein et al. (1994) and Mulrow et al. (1994b) failed to show any positive effect on falls from exercise-based interventions despite good compliance with the exercise regimen from samples with mean ages of 80+ years, though there was improvement in other mobility-related measures of physical performance. In the US, results from the Boston (heavy resistance training plus nutritional supplementation) and San Antonio (individualised physical therapy) arms of the FICSIT trial are in line with these studies (Province et al., 1995).

Few trials of exercise interventions use the ability to perform ADLs as an outcome. They tend to be concerned more with those aspects of physical functioning that underlie the capacity to perform ADLs than with the activities themselves. The main exceptions to this rule are the studies by McMurdo (1993) and Mulrow et al. (1994b), who used samples of elderly people from institutionalised and frail populations. Both trials looked for improvements in functional status over the short-term as a result of improvements in physical performance in elderly people who at the outset had fairly high levels of disability. It is possible that the different results obtained in these trials – McMurdo, but not Mulrow, reports an improvement in ADLs – may be explained by higher baseline levels of disability in the Mulrow sample (81 per cent dependent in at least three ADLs).

Exercise and cognitive function

Speculation that regular physical activity may slow some of the age-associated changes in the central nervous system has generated a large amount of experimental research on the impact of exercise on neuropsychological function (Emery et al., 1991).

Results from experimental studies of the effects of exercise in previously inactive or sedentary older people provide very limited support for the view that exercise begun late in life can significantly affect cognitive function. Several trials of the chronic effects of exercise in relatively intensive interventions have been made with samples of older people who are relatively young and healthy (Dustman et al., 1984; Madden et al., 1989; Blumenthal et al., 1991; Emery and Gatz, 1990; Hill et al.., 1993), and all but one of these achieved significant improvements in cardiovascular fitness. Despite these cardiovascular changes (an improvement in the supply of oxygen to the nervous system is sometimes argued to be the mechanism by which neuropsychological change is effected), a positive effect on cognitive function was noted only by Dustman with a predominantly male and relatively young sample (mean age 61 years). One trial only had a sample of community-dwelling adults aged 65 years or more (Panton et al., 1990).

Once again clear gains in aerobic capacity were reported but with no discernible effect on his chosen measure of cognitive function.

As it is more difficult to achieve significant improvements in physical fitness in older and frailer samples, especially in institutionalised older people, it is not surprising perhaps that the results from these trials are mostly disappointing. No effects on cognitive function were reported by Molloy et al. (1988), Mulrow et al. (1994b) or McMurdo (1993), though short-term improvements in memory and mood were reported by Molloy (1988) in a trial of the acute effects of aerobic exercise with a similar sample.

Exercise and feeling better

Evidence for the beneficial effects of exercise on older people's psychological well-being or morale was observed when comparing, for example, mood in regular exercisers and non-exercisers. This was also the case in some experimental studies looking at the impact of exercise programmes on mood or effect in people who are already somewhat depressed or anxious (Emery et al., 1991; Singh et al., 1997).

Results from experimental studies of the effects of exercise on psychological well-being are mixed. The findings from studies (Molloy et al., 1988; Mulrow et al., 1994b; McMurdo, 1993) conducted with institutionalized samples of frail older people are not easily harmonised. Mulrow et al. (1994b) failed to detect any decrease in self-rated depression after a four-month intervention. McMurdo (1993) reported an improvement in the same measure after a longer but somewhat less intensive intervention. The intervention evaluated by Jette et al. (1996), a home-based programme for non-disabled older people, used a more diverse set of psychological measures and reported improvements (in males only) in vigour, stress and overall social functioning, but not depression.

To some extent results of trials with the younger old present a more consistent picture. Neither Blumethal et al. (1991) nor Emery and Gatz (1990) found any change in the levels of depressive symptoms after exercise interventions with samples of healthy older people with relatively low levels of psychiatric symptoms at the outset. Emery and Gatz (1990) also found that their intervention had no effect on measures of locus of control or self-efficacy, and increased self-efficacy has been postulated as the mechanism by which exercise might improve a sense of well-being (Coverley Veale, 1987). It seems that exercise may have a positive effect on self-perceptions of well-being even in the absence of any changes in more objective measures of psychological well-being, as for example depressive symptomatology (Emery and Blumenthal, 1990; Hill et al., 1993). It should come as no surprise, therefore, that when an exercise intervention does have an impact on physical fitness (McMurdo and Burnett, 1992) or an objective feature of

quality of life such as back pain (Bravo et al., 1996), subjects also report improvements in their sense of well-being, including self-perceived health status.

One aspect of their quality of life that older people might hope to ameliorate by exercise is sleep disruption. Some studies of exercise among community-dwelling older adults have reported improvements in sleep patterns (Stevenson and Topp, 1990). It is not surprising perhaps that sleep disruption has been shown to be a common problem among nursing home residents (Ancoli-Israel 1989), and equally unsurprising that general recommendations to improve sleep include increasing daytime activity. The evidence for the effectiveness of this strategy in nursing home residents, however, is very thin. Results from a trial of physical activity by Alessi et al. (1995) suggest that increasing daytime activity alone is not adequate to improve sleep in impaired nursing home residents.

Key points

● Good evidence that lifestyle change late in life, especially smoking cessation and participation in fairly vigorous exercise, is effective in adding years to life.

● Good evidence that lifestyle change late in life, especially participation in exercise, is effective in improving physical functioning.

5 Interventions and strategies for adding years to life

Interventions for which there is some evidence of effectiveness in adding years to life

- Geriatric screening and preventive assessments.

- Educational or behavioural interventions to reduce the risk of often-fatal disease.

- Improving uptake of clinical preventive services.

Geriatric screening and preventive assessments

Since Tulloch and Moore's (1979) pioneering study of geriatric surveillance and screening in general practice, researchers in the USA and Europe have evaluated a wide range of health screening programmes for older people living in the community. Despite considerable variation in both programme content (what to screen for?) and method of delivery (e.g. who does the screening and how often?), researchers have used broadly similar outcome measures to detect health benefits. For example, does the intervention have any effect on survival? Does it postpone functional decline (measured by functional capacity or admission to care homes) and prevent serious morbidity (often measured by admission to acute care)? Does it improve psychological well-being (measured by morale or self-perceived health)?

It is difficult to find straightforward answers to these questions in the results from robustly designed trials of screening programmes. Although most of the trials report health benefits of one kind or another, there is sufficient disagreement between them, and sufficient uncertainty about the comparison of like with like, to urge caution in claims for effectiveness (Beales and Tulloch, 1998). This also means that the mechanism by which the reported benefits are obtained is to some extent unclear. Do health checks prevent institutionalisation by identifying the need for practical support in the home? Do they postpone functional decline and prevent mortality by identifying unmanaged medical conditions or preventable causes of death? Or is it that they provide more the isolated older people with an important source of social support?

Studies by Hendriksen et al. (1984), Vetter et al. (1984) and Pathy et al. (1992) report

reductions in mortality for groups of older people whose health was kept under regular surveillance for two to three years. Hendriksen and Pathy take these results in their stride and assume that they can be explained by the early identification and appropriate management of health and social problems. Vetter, on the other hand, confesses himself more puzzled by findings that were frankly unexpected. All the other published trials of geriatric screening (see Appendix Table A.3) report no effect on mortality.

Vetter et al. (1992) and German et al. (1995) also report results that suggest that preventive assessments for older people may have a beneficial effect, as measured by mortality. Both these trials evaluate interventions that are somewhat different from the studies of geriatric screening – i.e. health and functional assessments for older people usually aged 70+ years – cited above.

The UK study (Vetter et al., 1992) was planned as an evaluation of a simple health visitor intervention to reduce fractures in older people aged 70 and over. Although no effect was detected on the incidence of falls or fractures the intervention, which included recommendations on nutrition, smoking, exercise, etc., as well as referral for medical problems and inappropriate medication, was associated with better survival. Links with educational/behavioural interventions to reduce risk for often fatal disease were also present in the US trial (German et al., 1995), which embedded health counselling in a wider preventive assessment undertaken in a clinic (not at home). The assessment emphasised biomedical screening, with a physical examination (e.g. digital rectal exam) and laboratory procedures (e.g. occult blood in stool) that included immunisation for influenza. The sample, however, is somewhat younger (65+ years) than that found in most trials of geriatric screening. The study reported a positive effect at two years follow-up on mortality and a multi-dimensional index of health status, though there were no significant changes in health behaviour associated with the intervention (Burton et al., 1995).

Risk reduction for often-fatal disease

Relatively few evaluations have been published of interventions with older people designed to encourage or promote the kinds of behavioural change that may add years to life. In the absence of long-term follow-up with survival/mortality as an outcome, the effectiveness of these interventions in adding years to life must be inferred from their impact on known behavioural and non-behavioural risk factors for often fatal-disease.

Changes in health behaviour have been reported in quasi-experimental evaluations of various class-based lifestyle interventions with older people that addressed risk factors for cardiovascular disease in the context of a programme with broader health promotion goals (Nelson et al., 1984; Benson et al., 1989; Brice et al., 1996). The findings of the two earlier studies were promising rather than positive. Evaluations of the Stay Healthy After

Fifty (SHAF) programme (Benson et al., 1989) and the Self-Care for Senior Citizens (SCSC) program (Nelson et al., 1984) failed to detect any effect on health status or physician utilisation (the main outcomes), despite the fact that health behaviours, especially levels of physical activity, had improved. The SHAF programme appeared to be effective in promoting attempts at behavioural change rather than change itself, and the improvements noted at the end of the SCSC programme had ceased to be significant after six months. Although more positive results were reported by Brice et al. (1996) in an evaluation of the Staywell Program, the age ranges of the samples in all three of these studies put them below our age threshold.

There is one UK study which straddles the age threshold for our review and reports positive results from a counselling intervention (i.e. not class-based), which singles out one health behaviour, smoking (Vetter and Ford, 1990). What is interesting about the results from this study, which uses a more robust research design, is the suggestion of an age-related difference in behaviour change. Although a higher proportion of the intervention group stopped smoking than controls for all age groups, the proportion fell with increasing age from 18 per cent of those aged 60–64 to 7 per cent of those aged 65 and over.

The best evidence for the effectiveness of health promotion interventions in changing risk behaviours in older people (65+ years) comes from two large randomised controlled trials in the USA (Fries et al., 1993; Mayer et al., 1994). In both these studies behavioural change is the main focus of the intervention. Mayer et al. (1994) report a positive effect on behavioural outcomes after one year from a health promotion package with two components: subjects received feedback from a lifestyle assessment instrument and were then helped to set their own 'risk reduction' goals through face-to-face counselling; and they attended an eight-week group-based health education course. Intervention subjects were more likely than controls to increase their level of physical activity and decrease their intake of dietary fat and caffeine. There were, however, no differences between the two groups in respect of non-behavioural risks, for example body mass index and blood pressure. Positive results were also reported by Fries et al. (1993) in a study of a low-cost health promotion programme administered by post. Although the sample included subjects under 65 years, results for the 65+ age group were analysed separately after one- and two-year follow ups. Improvements favouring the intervention group were noted in health habits (including exercise levels, smoking behaviour and dietary fat intake) and non-behavioural factors (including systolic blood pressure) for both age categories.

Improving uptake of clinical preventive services

In the context of a strategy that aims at adding years to life, it is desirable to ensure that medically-provided preventive services of known effectiveness are not under-used. In both the USA and Australia, researchers have evaluated various different approaches to

improving the uptake of: (i) mammography screening for breast cancer in women aged 65 years or more; (ii) and immunisation against influenza in the older population (65 + years). British researchers have been working in a different policy environment, and have understandably concentrated their attention on the more basic question, namely, the effectiveness of mammography screening for breast cancer and immunisation for influenza in the older (65 + years) UK population.

It is beyond the scope of this review to assess the evidence for the effectiveness of regular screening for breast cancer in women over 65 years of age or for other 'disease-specific' screening interventions that might benefit older people, as for example screening for prostate or colorectal cancers. Paterson and Chambers (1995), however, like the House of Commons Health Committee in 1995, argue that there is good evidence for the effectiveness of breast cancer screening for asymptomatic women up to the age of 69 years. For older ages, response rates to invitations to screening tend to fall below the levels required to make an impact on mortality, though in Sweden uptake was 80 per cent up to 74 years (Tabor et al., 1985). The handful of British studies were all too small for a precise estimate of cancer yield, but they confirm that high rates of uptake may be obtained with women over 64 years (Sutton, 1997). It has been estimated, using decision analysis modelling, that screening may remain beneficial for older women through their eighties (Mandelblatt et al., 1992).

Hermann et al. (1995) and King et al. (1995), in what appear to be the only published trials of interventions to improve compliance with invitations to breast cancer screening among older women (65+ years) found that patient education/counselling and organisational changes in the work of non-medical personnel were effective, especially with women who had had no previous screening.

Different methods of recruiting older people into screening or immunisation programmes have been shown to be effective in several controlled trials. Immunisation rates for the over-65s have been improved by home preventive visits (Fabacher et al., 1994), mailed and telephone reminders to patients (Larson et al., 1982; McDowell et al., 1986), reminders to physicians on case notes (Chambers et al., 1991; McDonald et al., 1992) and the formation of prevention teams (Hermann 1994). Patient education on its own, without organisational change in the providers, has generally not been found to be effective (Herman et al., 1994).

Key points

- Good evidence that focused educational/behavioural interventions incorporating individualised risk appraisal can be effective in reducing risk behaviours for often-fatal disease among older people.

- Not certain whether the behavioural changes, other than smoking cessation, reported in these programmes are sufficient to increase the chances of survival. Are the reported increases in levels of physical activity big enough, and will they be maintained for long enough, to add years to life?

- Good evidence that educational/behavioural interventions are effective in increasing the uptake of life-extending preventive services.

- Some evidence to suggest that regular screening/health checks for older people can add years to life.

6 Interventions and strategies for adding life to years

Strategies for which there is some evidence of effectiveness in adding life to years

- Educational/behavioural interventions for risk reduction of often-fatal disease.

- Developing personal skills and strategies for preserving optimal health.

- Screening and preventive assessments.

- Social interventions.

Educational and/or behavioural interventions for risk reduction of often-fatal disease

Behavioural interventions to modify risk factors for often-fatal disease may add life to years for older people, even if they do not add years to life. Where interventions are effective in changing behaviour, it can be shown that there are other health benefits to be gained from behaviour change besides increased chances of survival. Behavioural interventions in patients with established heart disease can change objective risk factors for cardiovascular disease, and may reduce non-fatal cardiac events as well as cardiac mortality (Ebrahim and Davey Smith, 1996). Even when they fail, however, to change objective risk factors, they may still have a significant impact on everyday life by lessening the restriction of everyday activities associated with the disease (Cupples and McKnight, 1994). Smoking cessation interventions can be effective in reducing the distressing symptoms of impaired respiratory function (Vetter 1990).

Evidence for the effects of this kind of educational/behavioural intervention on health-related quality of life in unselected populations of older people is somewhat harder to find. Fries et al. (1993), in a study of individual health risk appraisal for older members of a health maintenance organisation, did find an effect on 'physician-utilisation'. A reduction in demand for medical services is of course not the same as a reduction in morbidity. Even so, there is enough of a link between them to argue that the results are suggestive of health benefits other than the adding of years to life.

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Developing personal skills and strategies for preserving optimal health
Broad-based health promotion programmes for older people

In the USA, several class-based programmes with broadly-based (i.e. broader than risk reduction for often-fatal disease) health promotion aims have been evaluated with older people. These studies have already been considered in the light of their effects on risk behaviour for cardiovascular disease. The researchers on both the SHAF programme (Nelson et al., 1984) and the SCSC programme (Benson et al., 1989) were more interested in adding life to years and reducing health care costs than adding years to life. Neither programme, however, could detect any effect from the intervention on measures of health status. Similar results were obtained from a controlled evaluation of the Senior Actualisation and Growth Exploration (SAGE) programme in the USA, also with a relatively younger-old sample. Although self-esteem and psycho-social coping improved, and anxiety (about illness) decreased, no effects were detected on health status, health behaviour or medication use (Lieberman and Gourash, 1979).

Much more promising results have been obtained in a Canadian randomised controlled trial (Hall et al., 1992) of a 'personalised health promotion program for frail elders' with an 'emphasis on the development of personal health skills'; and in a US trial of a 'multi-component disability prevention and disease self-management program led by a geriatric nurse practitioner' (Leveille et al., 1998).

The sample in the Hall et al. (1992) study is very different from the relatively healthy community-dwelling older people who have participated in trials based round Seniors' Centers in the USA – they were all 65 years old or more and had all been assessed to receive 'personal care at home' (home helps, meals on wheels, etc). The primary aim of the intervention was to help maintain disabled older people in the community, to prevent or postpone the kind of functional decline which usually leads to institutionalisation. After a three-year intervention delivered against a background of social care provision which enabled attention to be directed away from uptake of social support to other factors, recipients were more likely than controls to be 'alive and still assessed for care at home'. Experimental subjects received home visits that concentrated on the development of 'personalised health plans' across any of 10 health-related topics – health care, substance use, exercise, nutrition, stress management, emotional functioning, social support and participation, housing, finances and transport. Although the intervention evidently has quite a lot in common with home screening visits and health education to reduce risk for often fatal disease, there is enough of an emphasis on the improvement of access to services and a broad-based approach to skills training to treat it separately.

Leveille et al. (1998) studied an older (70 + years) but less functionally impaired sample. Although all the participants were mobile and independent in the activities of daily life, they were all receiving treatment for at least one chronic illness (excluding dementia or

terminal disease). In other words, they were at relatively high risk of disability. The intervention, which aimed to prevent disability by promoting physical and social activity and chronic illness self-management, was (as in the study of Hall *et al.* (1992)) tailored individually to each patient after consultation with the primary care doctor. The intervention group, at 12-month follow-up, showed less decline than the control group in function, as measured by hospitalization and scores on the Health Assessment Questionnaire. The intervention led to significantly higher levels of physical *and* social activity as well as significant reductions in the use of psychoactive medications.

Patient education and the self-management of chronic disease

Chronic diseases associated with both functional limitation and undesirable symptoms are common in later life. On occasions when medical therapy is powerless to halt the progress of disease it can sometimes help preserve function by offering relief of symptoms. Often, however, clinical medicine has relatively little to offer or, to put it another way, what it has to offer leaves a considerable burden of symptoms and functional limitation to be carried by the individual. In such cases there is a clear role for patient education in order to help lighten the burden of symptoms and preserve function.

What is self-management of chronic disease? Clark *et al.* (1991) identified several common self-management tasks from a review of studies of patient education for arthritis, diabetes, heart disease, asthma and chronic obstructive pulmonary disease. The core tasks included: recognising and responding to symptoms; using medicine; managing acute episodes; maintaining activity; smoking cessation; interacting with health care providers; managing emotions; and psychological responses to illness.

Over the last 15 years or so a substantial body of literature has developed on the self-management of chronic disease, and reviewers have generally concluded that educational/behavioural interventions are beneficial. About two-thirds of the studies reviewed by Lorig *et al.* (1987), for example, reported changes in health behaviour and a positive impact on measures of health status. Since so much of the research into this topic, however, is disease-specific, it is relatively unusual for researchers to go out of their way to look for subjects who may be classified as older people, and none of the studies cited in this section have samples that fall within our age limit of 65 years or more. Even so, the topic was one that seemed to demand inclusion in this review.

Lorig's research into arthritis self-management is one of the few programmes (ASMP) to have generated a comparison of the benefits of patient education in the younger old and the older old (Lorig *et al.*, 1984). In line with other studies in this area, the ASMP intervention appeared to have a positive impact on pain and depression, but not on physical function/mobility. The improvement, which was present in both younger (55–74 years) and older old (75+ years) after an eight-month follow-up, persisted in

the younger group only through 20 months. Improvements were associated more with self-efficacy than with behaviour change.

Positive results in controlled trials of patient education programmes have also been reported for older people with heart disease (Clark et al., 1992, 1997) and Parkinson's disease (Montgomery et al., 1994). The studies of Clark and colleagues, like Lorig and colleagues, highlight the psychosocial rather than the physical benefits of intervention. All three studies assign a significant role to enhanced self-efficacy in securing these benefits.

Education for falls prevention

Findings from observational studies have suggested that the presence of hazards in the home (e.g. poor lighting in stairwells) and unnecessary risk-taking in the home may be important risk factors in the occurrence of falls. On the basis of these studies, various educational or behavioural strategies for the prevention of falls have been developed and evaluated by researchers. Results from the more robustly designed trials are disappointing. Only one of the trials (Hornbrook et al., 1994) is of older people aged 65 years or more.

Reinsch et al. (1992) reported negative results from an evaluation of 12-month cognitive–behavioural and exercise interventions with a sample of older people aged 60 years or more. The cognitive–behavioural intervention was a class-based programme to provide health and safety information, teach relaxation techniques and improve reaction times by video games.

The positive effect on the occurrence of falls reported by Hornbrook et al. (1994) from a mixed intervention 'package' was delivered without any attempt at targeting. It relied heavily on group-based education sessions to advise on, for example, home safety and risk taking, identification of home hazards, as well as exercise, and carries an important qualification – the effect was small and of uncertain clinical significance. Hornbrook (1994) carried out a second evaluation of the same intervention with a 'higher risk' (i.e. even older) population as one arm of the FICSIT study, but failed to find any effect on falls (Province et al., 1995).

Screening and preventive assessments

Does geriatric screening postpone functional decline or prevent serious morbidity?

One of the most interesting features of the results from trials of geriatric screening with measures of functional ability as an outcome is that they appear to divide largely along national lines. UK and European studies by Vetter et al. (1984), McEwan et al. (1990), Carpenter and Demopoulos (1990) and van Rossum et al. (1993) all report no effect on measures of functional ability and independence. Fabacher et al. (1994) and Stuck et al. (1995), however, both report positive results from studies carried out in the USA –

subjects receiving the intervention were less likely to experience a decline in functional ability.

The explanation for this difference in results may have something to do with the content of the interventions – are they more intensive in the USA (more frequent visits) or do they place more emphasis on biomedical screening? – or it may be that the US interventions are filling gaps in primary provision that are much smaller in the UK and Western Europe. In other words the USA visits may be picking up medical problems that would otherwise be overlooked, whereas in the UK and Holland the same problems tend to be picked up anyway.

Results from the US studies looking at admissions to institutional care are in line with the results for measures of functional ability. Stuck et al. (1993) report reductions in permanent nursing home stays. Findings from the European trials are more mixed. Hendriksen et al. (1984) and Carpenter and Demopoulos (1990) both report reductions in admissions to institutional care, whereas Pathy et al. (1992) and van Rossum et al. (1993) report negative findings. Despite a positive impact on mortality, no effect on admission to institutional care was found in a trial of a fairly 'diluted' intervention – postal screening with selective follow-up (Pathy et al., 1992). Van Rossum et al. (1993) also found no difference in admissions to long-term institutional care, along with most of the other measures of health status used in the trial. The distinction between preserving independence (living longer at home) and delaying disability is important for understanding the significance of these trials. The intervention evaluated by Carpenter and Demopoulos (1990) would appear to preserve independence by ensuring better access to practical social support services in response to functional deterioration. The intervention evaluated by Stuck et al. (1993) would seem to preserve independence by delaying the onset of disability.

There is not really any consistent evidence to suggest that regular geriatric screening/health checks are effective in preventing morbidity. Tulloch and Moore (1979) found that their screening programme made no impact on the prevalence of selected medical disorders, whereas German et al. (1995) reported positive effects on a multidimensional health index in a trial of preventive health checks. A positive effect on self-perceived health was found by Pathy (1992) but not van Rossum et al. (1993). Just as admission to institutional care is sometimes used as a marker for the transition to dependence, so is acute admission to hospital sometimes used as a marker for serious morbidity. The only trial to report a clear positive on acute hospitalisations is the Danish study by Hendriksen et al. (1984). Pathy (1992) reports a positive effect for a younger age group (65–74 years) only.

Does geriatric screening improve the sense of well-being?
Various measures of psychological well-being appear as outcome measures in several of

the trials of home surveillance or home preventive visits. Positive effects were reported by McEwan et al. (1990) on morale, by Pathy et al. (1992) on self-perceived health status and by Vetter et al. (1984) on 'subjective feelings of quality of life'. The presence of these effects, in the absence of more objective measures of health or functional status, is consistent with results from earlier research on social supports, which suggests that emotional well-being is strongly correlated with the perception or belief that one's environment is supportive (Rabins, 1992).

Preventive assessments and the prevention of falls

Although all the prevention trials with community-dwelling older people include some form of exercise, many of them place the exercise programme (or recommendations) in the context of a more complex multi-component intervention. We have already suggested that there is little evidence for the effectiveness of educational or socio-behavioural interventions in dealing with this problem. Results from trials that assign a central role to individual domiciliary assessments for risk factors for falls are more promising.

A modest but significant reduction in falls (trend level only difference for injurious falls) was reported by Tinetti et al. (1994), who screened a sample of community dwellers to identify high-risk individuals (i.e. 'likely fallers') as a target group for a relatively intensive intervention. Tinetti is unable to say anything about the effectiveness of the individual components of the intervention. It seems clear, however, that the targeting of the intervention to high-risk individuals played an important role in the success of the trial. The negative results, for both hip fractures and the occurrence of falls, reported by Vetter et al. (1992) from a similar intervention (though of 'lower intensity') may perhaps be explained by the fact that the intervention was population-based – assessment formed part of the intervention rather than part of the selection process for inclusion in the study. A similar conclusion would seem to be warranted by the negative results reported from a Canadian trial (with a slightly younger sample of 60-year-olds and older) of comprehensive risk assessment with individualised feedback (Gallagher and Brunt, 1996). The positive effects noted by Wagner (1994), also with a population-based intervention, are reported with important qualifications – the effect was small and appeared only in the first year of the study. It had disappeared by the second year of follow-up.

As the results from the exercise trials summarised earlier show, there are differences between community-dwelling older people and those who live in institutions, which are reflected both in the character of the interventions used with these different populations and in the health gains that may be achieved from the interventions. Further confirmation of the difficulty of preventing falls in frail and institutionalised older people is found in the results from an evaluation study of post-fall assessment by Rubenstein et al. (1990). The findings do, however, highlight the importance of falls as a

marker for underlying medical problems, which in this study were detected and appropriately managed as a result of the post-fall assessment. The intervention reduced hospitalisations, even though it had no effect on falls.

Social interventions

Many of the techniques that are used to ameliorate social isolation or stimulate social activity in older people are well known. Social clubs, day centres and befriending visits are among the most obvious examples of well established facilities often provided by voluntary groups. In recent years there has also been a great deal of effort to make the social environment in care homes more agreeable and stimulating. Attempts to assess the effectiveness of these programmes are more recent still, and reviews have emphasised the difficulties of evaluating programmes to ameliorate social isolation and the dearth of hard data on the most effective and efficient methods for decreasing isolation and increasing positive social supports (Institute of Medicine, 1990; Rubinstein, R.L., 1994).

It is not surprising perhaps, given the nature and declared aim of social interventions such as these, that it is rare to find a study that includes what we have called objective measures of health status among its outcomes. They tend to be more concerned with what have been described as 'intermediate' outcomes, which evaluate success or failure by asking whether people have been galvanised into shared activity or whether they have changed their behaviour, and outcomes that try to gauge 'psychological well-being'. Did the programme succeed in building new social networks or increasing social interaction? Did it have any effect on the participants' sense of isolation or their morale?

A randomised controlled trial of an 'activation programme' for older residents (52–91 years) in sheltered housing in Sweden found that the experimental group receiving the intervention became more active, that is more socially participative (Arnetz et al., 1982), as well as more protesting, that is less passive (Arnetz and Theorell, 1983). There was, however, no discernible effect on most of the other 'behavioural parameters' that had been selected as outcomes for the study, for example alertness, talkativeness, interestedness and happiness.

One kind of 'activating' intervention with older people that has become common in residential and day care settings is group discussion. Reminiscence is perhaps the most favoured form of group discussion, and is widely used as therapy with older people who are cognitively impaired, with the aim of improving cognitive function. It is also used, however, with older people who not cognitively impaired, where other benefits besides improved cognitive function are being looked for. Rattenbury and Stone (1989), for example, in a controlled evaluation of reminiscence and a 'current topics' discussion group for nursing home residents without cognitive impairment, found that both intervention groups were happier than controls (though there were no functional

benefits). They also found that benefit increased in line with participation. Not dissimilar from group discussion is the kind of intervention evaluated by Rünnberg (1998), again with nursing home residents without cognitive impairment. The aim was to see if the quality of life of residents could be improved by breaking down social isolation through the use of story-telling. The group receiving the intervention (story-telling + discussion group) showed improvements in energy, pain and social isolation when compared with controls.

If we look outside residential and day care settings, which provide care for the frailer and more disabled portion of the older population, to relatively healthy older people living in the community, it appears to become more difficult to demonstrate any effect on well-being from these kinds of 'activating' or 'supportive' interventions. Scates et al. (1986), in a study that compared different kinds of group intervention, including reminiscence and an activity group, found no significant changes (in life satisfaction or anxiety) in a group of older volunteers (65 + years) all of whom had good existing social support networks. Grimby and Svanborg (1996), looking at a Swedish sample of older people aged 70 years and older, found that a complex medico-social intervention, including home preventive assessments, lifestyle advice and exercise programmes as well as attempts to increase levels of social interaction, had no effect on psychological well-being. Of those sampled 61 per cent were married. An evaluation of a three-year intervention programme by Hedelin et al. (1997), again with a Swedish sample (65 + years) living in the community, also failed to detect any positive effect on well-being. The aim of the programme was 'to prevent, detect at an early stage and alleviate depression and depressive conditions in older people by developing social networks, social support and visiting activities'.

Are targeted social interventions (i.e. those that pick out groups of especially vulnerable community-dwelling older people) more effective? Bogat and Jason (1983), in a quasi-experimental study of 'network-building' programmes for older people on a waiting list to enter sheltered accommodation, found no significant effect on well-being. More promising results were obtained by Andersson (1985) in a randomised controlled trial of an intervention against loneliness in a sample of older women (60–80 years) who lived alone and rated themselves as lonely at an initial screening interview. The aims of the intervention were to alleviate 'emotional estrangement' (i.e. those who experienced a lack of intimacy) and 'social estrangement' (i.e. those who experienced a lack of relatedness to the social environment) by the use of 'group work'. At a follow-up interview six months after the completion of the intervention, experimental subjects had an increased range of social contacts, more self-esteem and were less lonely; they also had lower blood pressure. One of the few trials to evaluate a social intervention with a wide range health and functional outcomes as well as measures of psychological well-being (Clarke et al., 1992) found that the only difference between the intervention and non-intervention groups was in self-perceived health-status. No effect was observed, for

example, on functional ability, morale or life satisfaction. The intervention package was aimed specifically at enhancing social contacts in elderly people who were aged 75 years or more and lived alone.

Observational studies suggest that, while older people tend to suffer less extreme anguish upon the death of a spouse than younger widows or widowers, there is a substantial minority in whom bereavement can precipitate severe depression. When this is added to the effects of the other losses that commonly occur in old age, it contributes to a substantial proportion of the psychiatric problems of this age group (Parkes, 1992). Both Rabins (1992) and Parkes (1980), whose reviews of evaluation studies coincided with our age threshold, concluded that counselling interventions are more likely to be effective with high-risk groups than with unselected populations, as for example older widowers and widowers who are vulnerable to mental health problems for other reasons besides bereavement. This conclusion is supported by the findings of a study that compared the relative impact of 'intrapersonal resources' and participation in self-help groups in determining the response of older adults to bereavement (Caserta and Lund, 1993). Intrapersonal resources (stable characteristics that are assumed to pre-exist the death of a spouse) had a greater influence on outcome than the intervention.

Key points

- Good evidence that educational/behavioural interventions, targeted towards older people with chronic health problems or disability, can add life to years.

- Some evidence that geriatric screening/health checks for older people can add life to years.

- Limited evidence that targeted social interventions are productive of health benefits. No evidence from trials of social intervention that they might add life to years.

7 Discussion and conclusions

In order to achieve the HEA's objective of marshalling the best available evidence as to the effectiveness of health promotion interventions with vulnerable and disadvantaged social groups (in this case older people) we have undertaken, within certain limits, a literature review (but not a systematic review or meta-analysis) concentrating upon studies that have used the most robust scientific design. These have been mainly randomised controlled trials, supplemented by relevant evidence from observational studies.

Definitional and contextual issues

What is health promotion for older people?
The range of activities which can fall within the remit of health promotion activity for older people is very wide, and it is possible to draw the boundaries between health promotion interventions and other kinds of interventions in different ways. The uncertain boundaries between what might be thought of as 'core' health promotion activities – changing health behaviour and improving access to services – and clinical activities such as rehabilitation or social interventions to reduce isolation make it very difficult for a single study to survey the area comprehensively.

What outcomes measures should be used in evaluating health promotion interventions for older people?
There are two main health benefits from health promotion activity with older people: adding years to life; and adding life to years. The best outcome measure for evaluating health promotion interventions for older people in respect of adding years to life, is survival. Inferences based on the incidence of often-fatal disease (rather than fatalities) or on risk factor outcomes are less secure.

The evaluation of health promotion interventions in respect of their effectiveness in adding life to years, by enhancing health-related quality of life, calls for a different though overlapping set of outcomes. Outcomes should be able to register significant changes in functional status as well as the presence or absence of disease. They should also be able to register other kinds of change in health and/or functional status besides the transition from absence to presence of disease or disability. To prevent or postpone the onset of chronic illness and functional decline is a goal that concerns only healthy and/or functionally intact older people. It is necessary also to consider ways in which

the loss of health-related quality of life may be retarded or reversed in older people who already suffer from some kind of chronic illness or functional limitation.

The range of possible outcome measures for the evaluation of health promotion interventions with older people is not exhausted, however, by what are in effect 'objective' measures of health status. There are also: outcomes that measure the risk of seldom-fatal disease or loss of functional ability such as the occurrence of falls (though from another point of view the avoidance of falls reflects an improvement in physical functioning); what might be called well-being outcomes; and social-behavioural outcomes such as levels of social participation.

There is no simple answer to the question, 'What outcomes measures should be used in evaluating health promotion interventions in respect of their effectiveness in adding life to years?' Much of the current research in the field is devoted to the validation and refinement of different outcome measures. Some outcomes are geared to the detection of what one might call 'large' effects. There would be little doubt, for example, about the effectiveness, for adding life to years, of interventions that postponed the onset of symptomatic heart disease or prevented/postponed the transition from independence to dependence in activities of daily life. Outcomes such as these are able to register health gains which have a clear and demonstrable relationship to the experienced quality of life of older people. Sometimes, however, the health gain associated with a particular outcome may be uncertain, or have an uncertain relationship with experienced quality of life.

The clarification of the relationship between particular *objective* measures of health status and the *experienced* quality of life is a fundamental problem for anyone interested in this field. An objective measure of health status may detect change which is rather weakly related to change in the experienced quality of life. Conversely, changes in experienced quality of life may be rather weakly related to objective measures of health status. What kind of real gains in muscle strength make a difference in daily life? What is to be made of interventions that have an effect on some aspect of the *experienced* quality of life – e.g. morale or self-perceived health or loneliness – but have no discernible effect on any objective measures of health status?

Who are older people?
For both pragmatic reasons, and to follow custom and practice, we have chosen to concentrate on studies that have included only those people who are aged 65 years and over. Although this is a rather arbitrary definition of what constitutes old age or 'later life', it has the merit of being widely used. We identified comparatively few methodologically robust studies (when compared with studies of young people or those in mid-life) concerned exclusively with evaluating health promoting interventions for older people.

The range of interventions that have been evaluated with older people varies for: community-dwelling and institutionalised older people; and the older old and the younger old. Some studies are conducted with individuals who are already 'frail', others with people who are on the threshold of frailty or are at risk of accumulating chronic health and functional problems, and others again with individuals who are active and healthy. Hence the definition of which age groups define 'older people' will influence the range of interventions and health problem addressed.

What works in adding years to life for older people?

Lifestyle change and risk reduction for often-fatal disease
The effects of smoking cessation on risk of cardiovascular mortality are discernible within one or two years of quitting. This is true for older lifetime smokers as well as for middle-aged lifetime smokers. There is also evidence to suggest that the adoption of a more physically active lifestyle – i.e. one that involves participation in fairly vigorous exercise – may add years to life for previously inactive older people.

Behavioural interventions to reduce the risk of cardiovascular disease are effective in adding years to life for high-risk individuals with established heart disease. There is also good evidence that behavioural interventions can reduce risk factors for cardiovascular disease in unselected populations of older people. It is not clear, however, whether the kind of risk factor reduction that has been demonstrated in such intervention trials would have a significant effect on cardiovascular mortality.

Improving access to services
Improving access to preventive services of known effectiveness in adding years to life is a strategy which should yield clear gains. There is good evidence that the uptake of breast cancer screening and immunisation for influenza, both 'life-saving' preventive interventions, can be improved by educational programmes and/or changes in health service organisation.

Regular health checks for older people in the community are of uncertain effectiveness in adding years to life.

What works in adding life to years for older people?

Lifestyle change
There is plenty of evidence from observational studies to support the claim that regular physical exercise, even an 'everyday' exercise like walking, can postpone morbidity and functional decline in older people. There is also good evidence from experimental studies that participation in supervised exercise programmes can effect measurable improvements in the functional status of relatively healthy community-dwelling older

people in their sixties, seventies and eighties. Participation in exercise is associated with improvements in stamina, as well as a reduction in mobility problems and the risk of falling. It may also have a positive effect on perceived quality of life independently of any impact on more objective measures of health status.

Improving access to services

There is good evidence that regular screening of older people in the community improves access to services and reduces admission to long-term care. It is not clear, however, whether general health and functional screening (in European as opposed to US studies) has a significant impact on morbidity or functional decline. There is quite a lot of evidence to suggest that improving access to services may have a positive effect on perceived quality of life independently of any impact on more objective measures of health status.

Targeted interventions for older people living in the community

Individualised health promotion programmes for disabled older people living in the community can maintain their capacity for independent living by postponing or retarding functional deterioration. However, it is not obvious which part of the programme is beneficial. Is it lifestyle change, better access to services or improved social support?

Multi-factorial intervention strategies for the prevention of falls may be effective with high-risk community-resident older people. The experimental evidence does not, so far, seem to warrant the conclusion that effective falls prevention might have a sizeable impact on health or functional status.

Educational programmes to develop skills for the self-management of chronic disease appear to have little effect on physical functional status, though they are associated with symptomatic relief and better 'coping'. The current evidence, which is not much, suggests that these effects weaken with age.

There is some evidence to suggest that carefully targeted interventions to relieve social isolation among older people in the community may have health benefits, though robustly-designed studies with objective health outcomes, rather than subjective well-being outcomes, are fairly thin on the ground.

How well do they work: what level of impact do they have on, for example, health behaviour or access to services?

Several different kinds of outcome measure are commonly used in estimating the impact of interventions on the health and well-being of older people. These include measures

of functional status and psychological well-being, the occurrence of 'high risk' events for functional decline (e.g. falls/fractures), the presence of behavioural risk factors for coronary heart disease, and the uptake of preventive services. The comparison of results from different trials looking at the same dimension of impact is made difficult by the variety of measures used by researchers. This is especially true for measures of functional status and psychological well-being.

Although there is evidence that effective interventions are available for each of these various dimensions, the evidential support is strongest (least contestable) for :

● Efforts to improve the uptake of preventive services.

   Most of the trials have been conducted in the USA and their results should be interpreted in the light of differences in health care between the UK and the USA. They show that it is possible to persuade older people who are relatively healthy and mobile to attend clinics for screening interventions (e.g. blood pressure testing and cancer screening) and influenza immunisation.

● The impact of exercise participation on functional status.

   This has been the subject of many trials, only a handful of which fail to show some benefits from participation in the programme. Such failure is usually associated with the selection of frailer and more disabled participants. The main problem for many of the successful trials is the uncertain significance of the measured benefit for ability to perform the activities of daily life.

● The impact of health promotion programmes on health behaviours including physical activity.

Clinical trial methodology was used in the evaluation of senior health promotion programmes only in the USA.

How well do interventions work in different social or environmental contexts and across racial, ethnic, gender and class boundaries?

Part of the rationale for this review (and the others undertaken within the same research brief) was to determine the degree to which health promotion interventions work differentially within vulnerable groups. Older people (like other sub-groups within the population) are not a homogeneous social category; key social variables such as age, gender, class and ethnicity influence the experience of old age and probably influence the need for, and effectiveness of, health promotion in later life.

The importance of age/functional status

The age-related heterogeneity of the group 'older people' is perhaps most clearly reflected in the differential impact of exercise interventions on different age groups. It is also reflected in the effect that present functional status has on exercise participation.

The reviewed trials lend some support to the view that with older (e.g. 80 + years) or more disabled populations more input is required to achieve health gains, and smaller gains are achieved. It must be emphasised, however, that this question has rarely been the subject of explicit and systematic enquiry. The other interventions for which there is *some* evidence for age- or functional status-related differences in impact are smoking cessation and falls prevention.

Institutionalised and community-resident older people

There is some evidence for the differential impact of exercise and falls prevention interventions on older people living in the community and those living in communal establishments such as residential and nursing homes.

The environmental context for delivery of interventions

Evidence for the differential impact of interventions in various environmental contexts (apart from institutionalised versus community-resident older people) is surprisingly sparse. We found no studies for the 65 years and over age group evaluating, for example, the relative merits of class-based and home-based exercise programmes, or 'individualised' and group-based health promotion programmes.

The comprehensive geriatric assessment is perhaps the one intervention for which there is fairly good evidence for the differential effect of the environmental context (home-based versus hospital or clinic-based assessments). In this case the difference in context indicates an important difference in function.

The impact of interventions across racial, ethnic, gender and class boundaries

It is apparent that few health promotion interventions acknowledge the importance (or even existence) of social differentiation, including socio-economic variations, in later life. Hence we have few insights into how health promotion interventions may work differentially across different social categories. Most studies, if they collect data on background variables, are not usually of sufficient size to undertake such detailed analyses.

Do health promotion interventions currently contribute to a reduction in inequalities in health in later life?

Most health promotion interventions designed for older people do not acknowledge the existence of socio-economic variations in health in later life. There is little, if any, research that has specifically evaluated health promotion programmes which have explicitly sought to reduce inequalities in health status or access to health care among older people.

This conclusion is supported by a recent international review of interventions to reduce socio-economic health differences (Gepkens and Gunning-Schepers, 1996). Studies were classified into those aimed at specific age groups, those aimed at specific diseases and those aimed at the determinants of health. No studies were identified that were concerned with older adults as a specific client group. In the studies aimed at reducing variations in smoking or cardiovascular disease/cancer, older people were not analysed as a specific group. Those studies aimed at structural determinants of health have largely concentrated upon unemployment, ethnicity or income variables and have paid scant attention to the problems of inequality in later life.

What and where are the gaps in health promotion knowledge and activities among groups and service providers?

A major gap in the area of service provision is the failure to acknowledge and respond to the social diversity of older people. Similarly we need to tackle the 'ageist' view that health promotion is an activity which is undertaken with the young or middle-aged.

What are the principal health promotion needs of older people?

From what we have already said about the diversity of older people, it should be clear that it is very difficult to make any generalisations that will apply to all older people – younger and older, mobile and disabled, male and female, from Hampstead or Hackney. This is perhaps especially apparent when we consider the differences between older people who are relatively young, healthy and mobile, and those who are relatively old, frail and disabled. To apply the same interventions to such different groups would be to ignore the significance of diminished life expectancy and diminished functional status on priorities for health promotion. It is not unreasonable to suppose that 'lifestyle' focused interventions will be more appropriate for people in their fifties and sixties than for those in their eighties, for whom the prevention of cognitive decline, falls prevention, mobility and general health screening might be more appropriate. Is it more

appropriate to offer 'empowering' interventions to the older old than to the younger old?

It must be emphasised that the determination of this issue waits on: the clarification of the policy framework for health promotion for older people; and research on the differential impact on health promotion interventions at different stages in the course of life.

Conclusion: issues for a research agenda

There are a number of important issues that have to be addressed in order to develop a health promotion research agenda for older people:

- *A clear conceptual framework.* What activities/interventions with older people should count as health promotion? What are the intended benefits of such activities? Who are older people?

- *The methodologies of evaluation.* We need to examine the methodological approaches to the evaluation of the effectiveness of health promotion with older people. There is little standardisation of outcome measures between studies, which makes comparisons between studies problematic. We need to undertake some 'basic' research examining the utility of commonly used outcome measures for use with older people and, perhaps, adapting or developing new instruments.

  We recommend that more health promotion research is evaluated in terms of outcome measures which relate directly to the ability of older people to cope independently at home. Indeed there is a clear research agenda concerned with the development and application of health outcome measures with older people. This would include basic research to establish how older people see the benefits of health promotion and how such factors could be measured.

- *The social context.* Health promotion research should acknowledge and address the diversity of older people. Typically, studies have treated older people as if they were a single group. There is a need for evidence on the differential impact of interventions on different groups of older people (e.g. in terms of age, class and gender as well as ethnicity).

  The interpretation of the results of this experimental research will require a better understanding not only of the health beliefs and health-related behaviour of different groups of older people but also of the socio-structural context of their lives (e.g. access to material resources, transport and housing).

- *Participation in health promotion activities.* There is ample evidence for the benefits of exercise participation for older people. It is a useful example of an effective intervention for older people, and it raises many application/delivery type questions. Much more is known about the benefits of participation in exercise than about the most effective strategies for promoting participation by older people in exercise programmes (or other health promotion activities). Furthermore, nearly all the intervention studies on this topic have been done in the USA, and it should not be assumed that strategies which work in the USA will also work in the UK.

- *Individualised health promotion programmes.* The promising results obtained from the Canadian trial of individualised health promotion programmes delivered to frail older people at home as well as its relationship to what we have described as 'core' health promotion activities strongly suggest that this kind of intervention merits further investigation in a UK setting.

Appendix: Randomised controlled trials of selected health-promoting interventions with older people

Table A.1 Exercise interventions with community dwelling older people (65 years and older)

Author/date/country	Duration	Sample	Intervention	Results
Panton et al. (1990) USA	6 months	70–79 years (healthy) n = 49	Aerobic and resistance training	Improvement in aerobic capacity but not in psychomotor performance
McMurdo and Johnstone (1995) UK	6 months	n = 69	Home-based exercise intervention: impaired mobility	No effect on physical functional status strength or mobility exercise
Jette (1996) USA	12–15 weeks	66–87 years (healthy) n = 102	One home-based training session with regular telephone follow-up	Improvements in physical functioning for younger subjects (<73); and in psychological well-being for older males (73+)
Topp et al. (1996) USA	12 weeks	n = 55	Dynamic resistance training	No improvement in gait velocity or balance
Wolf et al. (1996) USA	8 months	70 + years n = 200	T'ai chi vs. computerized balance training	Reduced risk of falling in t'ai chi group
Skelton (1995) USA	12 weeks	n = 40 (healthy)	Resistance training	Increases in muscle strength not matched by improvements in mobility
Wolfson et al. (1996) USA	3 months	75 + years n = 110	Resistance training vs. computerised balance training	Improvement in balance measures for group receiving balance training
Buchner et al. (1997) USA	18 months	68–85 n = 105	Strength and endurance training	Protective effect on risk of falling, though no effect on measures of gait or balance
Campbell et al. (1997) New Zealand	1 year	80 + years n = 233	Home-based programme of strength and balance training	Reduction in falls

Table A.2 Educational/behavioural/social interventions with community-dwelling older people (65 years and older)

Author/date/country	Duration	Sample	Intervention	Results
Lorig et al. (1984) USA	20 months	75 + years	Arthritis self-management programme	Early improvement in pain/depression not sustained at 20 months; no improvement in physical function
Scates et al. (1986) USA		65 + years n = 50	Effects of reminiscence/social activation on well-being	No positive effects
Hall et al. (1992) Canada	3 years	65 + years (disabled) n = 167	Home preventive visit: personalised health promotion plan	Intervention group more likely to be 'alive and living at home' at end of study
Clarke (1992) UK	3 years	75 + years n = 523	Individual packages of support to enhance social contacts	No effect on any measure of health status except self-perceived health
Fries et al. (1993) USA	2 years	55 +/65+ years n = 4712	Health risk appraisal and feedback by post	Changes in health behaviours and non-behavioural risk factors for cardiovascular disease
Mayer et al. (1994) USA	1 year	65 + years n = 1800	Health risk appraisal, feedback and health education classes	Changes in levels of physical activity and selected nutrition behaviours
Hornbrook et al. (1994) USA	24 months	65 + years n = 3186	Improve safety habits, remove home hazards, exercise programme	Small effect on non-injurious falls
Burton et al. (1995) USA	2 years	65 + years n = 3097	Single session risk reduction advice as part of health check	No change in risk behaviour
Leveille et al. (1998) USA	1 year	70 + years n = 201	Targeted, multi-component disability prevention & disease self-management programme	Positive effect on functional status measured by 'bed days' and HAQ

Table A.3 Health screening and community-based preventive assessments

Author/date/country	Duration (years)	Sample	Intervention	Results
Tulloch and Moore (1979) UK	2	70 + years n = 289	Single assessment at beginning of study	No impact on mortality; little impact on health status
Hendriksen et al. (1984) Denmark	3	75 + years n = 572	Quarterly visit by nurse practitioner	Reduction in mortality and admissions to nursing homes
Vetter et al. (1984) UK	3	70 + years n = 555; n = 590	Surveillance by health visitors in urban and rural practices	Reduction in mortality and slight improvement in quality of life in urban study area; no effect on disability in either area
McEwan et al. (1990) UK	3	70 + years n = 296	Regular surveillance by nurse	No effect on mortality, health status or use of health or social services; improvement in morale
Carpenter and Demopoulos (1990) UK	3	75 + years n = 539	Surveillance by three- or six-monthly visit from unskilled volunteers	No effect on mortality or disability; reduction in admissions to long-term care
Pathy et al. (1992) UK	3	65 + years n = 725	Regular screening by postal questionnaire with follow up visit as appropriate	Reduction in mortality and use of services; no effect on disability or general health status
Vetter et al. (1992) UK	4	70 + years n = 674	Home-based assessment for falls by health visitor + intervention for at-risk subjects	No effect on fracture rate
van Rossum et al. (1993) Netherlands	3	75–84 years n = 580	Surveillance by quarterly visit from nurse	No effect on mortality, health status or admissions to institutional care; reduced rate of hospital admissions

Table A.3 Health screening and community-based preventive assessments (continued)

Author/date/country	Duration (years)	Sample	Intervention	Results
Tinetti et al. (1994) USA	12 months	70 + years n = 301	Multi-component falls prevention intervention	Reduction in falls; improvements in balance and gait
Wagner et al. (1994) USA	2	n = 952	Falls prevention assessment and intervention	Effect on falls at one year; fades after two years
Fabacher et al. (1994) USA	1	70 + years n = 254	Geriatric assessment with quarterly follow up by trained volunteers	Postponed onset of disability and improved uptake of preventive services
Stuck et al. (1995) USA	3	75 +years n = 414	Regular assessments by nurse practitioners	Postponed onset of disability and admissions to nursing homes

Table A.4 Interventions with institutional populations of older people

Author/date/ country	Duration	Sample	Intervention	Results
Molloy (1988) Canada	3 months	70+ years (women) n = 25:25	Non-aerobic exercise class	No improvement in cognitive function
Crilly et al. (1989) Canada	12 weeks	72 + years (mean age 82 years) n = 50	Exercise class	No improvement in postural sway
Rattenbury and Stone (1989) USA	9 weeks	mean age = 85 years n = 24	Reminiscence and discussion groups	Improvement in psychological well-being
Rubenstein et al. (1990) USA	2 years	mean age 87 years n = 321	Comprehensive post-fall assessment + recommendations for treatment/care	No effect on falls; but reduction in hospitalizations
McMurdo (1993) UK	7 months	64–91 years n = 49	Seated exercise session to music	Positive effect on physical functioning and self-rated depression; no effect on cognitive function
Mulrow et al. (1994a) USA	4 months	mean age 82 years n = 194	One-to-one physical training	Positive effects on mobility; no effects on falls, ADLs or depressive symptoms
Rubenstein et al. (1994a) USA	3 months	70+ years n = 44	Balance and strength training	Improvements in knee and hip strength, gait velocity, back flexibility, walking distance
Fiatarone et al. (1994) USA	10 weeks	72–98 + years n = 100	Progressive resistance training and nutrient supplementation	Improvements in muscle strength and gait velocity for exercisers
Alessi et al. (1995) USA	9 weeks	65 + years n = 65	Physical activity programme	No improvement in sleep disturbance

Table A.4 Interventions with institutional populations of older people (continued)

Author/date/country	Duration	Sample	Intervention	Results
MacRae et al. (1996)	12 weeks	80 + years n = 41	Supervised walking programme	Improvement in walking endurance; but no other effect on mobility or quality of life
Rünnberg (1998) Sweden	4 months	n = 27	Mental stimulation programmes	Improvement in Nottingham Health Profile scores: more energy, less pain and sense of isolation

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