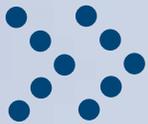


getting australia active



Towards better practice for the promotion of physical activity

getting australia active



Towards better practice for the promotion of physical activity

••• Adrian Bauman

••• Bill Bellew

••• Philip Vita

••• Wendy Brown

••• Neville Owen



Suggested citation:

Bauman A, Bellew B, Vita P, Brown W, Owen N. Getting Australia active: towards better practice for the promotion of physical activity. National Public Health Partnership. Melbourne, Australia, March, 2002

© National Public Health Partnership 2002

ISBN: 0-9580326-2-9

Publication Approval number: 3015

This work is copyright. This work may be produced in whole or in part for research or training purposes subject to the inclusion of an acknowledgement of the source and provided no commercial usage or sale is to be made. Reproduction for purposes other than those indicated above requires prior written permission of the National Public Health Partnership, GPO Box 4057, Melbourne Victoria 3001, Australia.

Further copies

Contact the National Public Health Partnership, GPO Box 4057, Melbourne Victoria 3001, Australia. Telephone: (03) 9616 1515 Facsimile (03) 9616 1500 Email: NPHP@dhs.vic.gov.au

Full copies can be downloaded from Website: www.nphp.gov.au/sigpah

Acknowledgements

The development of this document was jointly funded by the Commonwealth Department of Health and Ageing and the NSW Health Department. SIGPAH members provided material for the jurisdictional updates and critical review of earlier versions of the manuscript. Others who have contributed significantly include Fiona Bull, Trevor Shilton, Michael Booth, Cheryl Wright, Jo Salmon, Cathie Kiernan, Sean Tweedy, Michael Fotheringham, Billie Giles-Corti, Tim Armstrong, Evie Leslie, Ben Smith, Alison Marshall, Catharina van Moort and Kylie Ball. Mr Greg Heard (Nullegai Communications) provided editorial consultation for the preparation of the final draft. The design and layout was done by Brooke Ely, Department of Health and Ageing.



FOREWORD

Over the last decade there has been an increasing body of evidence supporting active lifestyles as one of the best investments for individual and community health. This has led to a global movement to promote more active communities and was highlighted on 7 April 2002 by World Health Day with the theme of "Move for Health".

Engaging in regular physical activity, even of moderate intensity, reduces the risk of diseases such as cardiovascular disease, type II diabetes, osteoporosis, colon cancer, and obesity and injury. The benefits, however, go well beyond those of disease prevention. Regular physical activity has also been shown to facilitate better stress management, alleviate depression and anxiety, strengthen self-esteem, enhance mood and boost mental alertness. Additionally, it provides social benefits through increased social interaction and integration. Among children and adolescents, regular physical activity and exercise has been associated with improved school performance, a greater sense of personal responsibility and group cooperation, and less drug and alcohol consumption.

Although the health benefits of physical activity are well established, nearly one-half of the Australian population does not meet the recommended level of at least 30 minutes of moderate intensity physical activity on most days of the week. Physical inactivity is a serious public health problem that results in adverse health outcomes and greater health care costs. In addition to the need for lifestyle modification, it is now well recognised that there is an urgent need for environmental, social and policy changes to increase physical activity in the population.

In Australia, we have seen several initiatives in the past few years, including programs and networks developed under the Active Australia umbrella, and also the formation of National and State-based coalitions or task forces. Under the auspices of the National Public Health Partnership, the Strategic Inter-Governmental forum on Physical Activity and Health (SIGPAH) has led to a more coordinated health sector response to addressing physical inactivity. These efforts, along with those in general practice, schools, local government and the transport sectors, marks the beginning of the work required to stem the decreasing prevalence of physical activity. Population surveys have shown that, despite greater knowledge and good intentions, adult participation rates in physical activity have declined and remain relatively low, and overweight and obesity rates are increasing at an alarming rate. The challenge in addressing this trend is to keep building the evidence base for effective practice and ensure that these best-practice interventions are implemented.

There is still much advocacy work to be done if physical inactivity is to have a similar profile and emphasis received by other public health issues. It will require a concerted and sustained effort from all parts of the health sector and their partners, to advocate for more funding, implement the best available programs and integrate physical activity promotion into other public health initiatives.

The valuable information provided in this document will enable physical activity stakeholders to guide better practice, engage potential partners and advance the physical activity agenda. I recommend it to everyone involved in getting Australia more active.

A handwritten signature in black ink, appearing to read 'M Herriot', is centered on the page.

Michele Herriot

Chair, Strategic Inter-Governmental forum on Physical Activity and Health (SIGPAH)

SYNOPSIS

Physical inactivity is now recognised as a key health issue, and is the second most important risk factor, after tobacco use, that contributes to the burden of disease, morbidity and mortality in Australia. In addition, increasing participation in physical activity has substantial economic and social benefits for the nation.

Getting Australia Active is a comprehensive update on the state-of-the-art of physical activity promotion. It is divided into four parts and aims to:

- provide an update of the evidence for the health benefits and public health importance of physical activity;
- review the settings for effective programs, which might be considered ‘best practice’ approaches to increasing physical activity in Australia;
- present perspectives on special population groups, including a lifespan approach to promoting physical activity; and
- suggest the next steps in terms of recommendations for research and policy implications.

In addition, a detailed appendix highlights physical activity programs and initiatives in each jurisdiction, including current National initiatives.

The valuable information provided in this document will enable physical activity stakeholders to guide better practice, engage potential partners and advance the physical activity agenda.

This document has been designed primarily for health professionals, health promotion and exercise science professionals. It will also be read with interest by others who have an important role in promoting ‘active living’. Key references and reviews are cited for further reading in each chapter. The report encourages critical thinking in developing programs in this area, and the development and use of best-practice approaches to physical activity promotion in Australia.

EXECUTIVE SUMMARY

This report is a comprehensive update on the state of the art of promoting physical activity in Australia. It describes the health benefits to Australia of an active population, the rationale for interventions to increase participation, and specific settings in which interventions should occur. This report is designed as a resource for the diverse practitioners and professionals interested in increasing physical activity participation levels in Australia. It provides a framework for advocacy as well as for action in this area. A central and recurring theme is that, as a nation, we have not taken community-wide participation in physical activity seriously enough. This work provides a framework for addressing that need, and creating a more active Australia.

The report defines best practice, and indicates the current state of knowledge around efforts to increase physical activity, with examples and some evidence coming from Australia, and the remainder from research conducted across the world. The report is divided into four parts, (i) evidence for the importance of physical activity, (ii) evidence for intervention effectiveness in different settings, (iii) physical activity in special populations, and (iv) recommendations and frameworks for further action.

There is now compelling evidence that physical activity is associated with a range of health outcomes, including reduced risk of cardiovascular disease, diabetes, some cancers, and falls in the elderly, and improved mental health. It is likely that an active society will also benefit economically, and show social and community health benefits.

Physical inactivity is also associated with high direct health costs, with a conservative estimate of around \$400 million each year. There are about 8,000 preventable deaths each year in Australia associated with physical inactivity, and it makes a large contribution to the overall burden of disease in Australia, ranking second only to tobacco use as the most important issue in prevention. These important benefits provide a rationale for sustained and focused efforts to increase activity levels amongst all Australians.

There is evidence that rates of participation in physical activity in Australia are declining. Serial surveys in 1997, 1999 and 2000 showed increased awareness of the health benefits of being active but some evidence for a decline in regular participation. These population surveys also identified groups at higher risk of inactivity, including women with children, people in middle age, people who were socially disadvantaged, people from a non-English-speaking background, and Indigenous adults. These population groups are at particular risk of inactivity, and are discussed in part three of this report.

The definitions of best practice used in this report relate to a balance between scientific evidence and pragmatic decisions about program effects. Best practice is defined as programmatic activity that is likely to achieve an increase in physical activity in a specific setting. Physical activity interventions need to be evidence-based, before investment in programs is made by decision makers; programs need to make a substantially greater impact upon physical activity levels than evidenced by efforts in Australia to date.

The document describes the evidence from a range of settings. The first setting described is general practice and primary care. There is evidence that these programs can produce modest increases in physical activity, especially when supplemented by other advice or reinforcement, or in the context of community-wide programs. The evidence is better for the setting of general practice than for primary care, for which few systematic evaluation data exist.

Schools are important settings for accessing children and adolescents. There is limited evidence on best practice but there are important recommendations on equity issues and on school policies regarding curricula, school-based programs and school environments. An important equity issue is the need to focus on older adolescent girls, among whom a decline in physical activity occurs.

Worksite physical activity programs are often described but recent quantitative reviews suggest that these programs may not be effective in reaching and influencing most employees. There is a need to develop innovative interventions in this area, as there is much potential for increasing physical activity in the workplace setting, or through active commuting to and from work.

Media campaigns are reviewed, and the evidence suggests that their main function is in agenda setting and raising community awareness, best delivered as part of a comprehensive approach to promoting physical activity, and supported by multi-strategic initiatives. The framework provided by Active Australia is useful for the development and delivery of public education programs about activity, sport and recreation to the general population.

A new area of work is the field of environmental and policy interventions to increase physical activity. There is emerging evidence but a clear suggestion that much of the physical activity encouragement and facilitation occurs at the environmental change level.

Part three deals with the needs of defined population groups. These include the special needs of children and adolescents, for whom a recommendation of at least an hour of physical activity per day is made. There are special needs in promoting activity amongst young adults, including time barriers, reduced access to facilities, and for particular populations such as women with young children who may find it difficult to be active in their leisure time. The evidence suggests that older adults belong to an important group, as there are substantial benefits from even small increments in physical activity, with a particular emphasis on quality of life and well-being, and on the prevention of injurious falls and fractures prevention. Other challenging population groups include people with disabilities or chronic illnesses, who may benefit from being active, and who require specific, tailored interventions. There are also population groups, such as those from a non-English-speaking background population, those from Indigenous communities, and those at substantial social disadvantage who are less active than the general community, but there are limited population data and few examples of best practice. Working with local communities, agencies or stakeholders in the design and implementation of programs is a common theme across the more effective programs.

Finally, recommendations and suggestions for future work in the areas of research and practice are discussed. There are needs for standardised approaches to measuring physical activity, and for evidence from evaluation of well-designed interventions in a range of settings and with special populations. This evidence is needed to further formulate best practice, so that better returns on investments in physical activity can be achieved. In particular, community and environmental change interventions are needed, as they appear to have the greatest potential for improving population rates of physical activity although the evidence base is least clear in this area. Implications for consideration by policy makers at National and State levels are elucidated. It is important to get programmatic consistency across States and Territories, particularly in the coordination and implementation of regional initiatives to promote physical activity in Australia. Implementing multi-strategy comprehensive initiatives, using resources and personnel from many sectors, may be the best way forward, to reverse the worrying recent trends in sedentariness in Australia.

CONTENTS

FOREWORD	iii
SYNOPSIS	iv
EXECUTIVE SUMMARY	vi
PART 1. THE IMPORTANCE OF PHYSICAL ACTIVITY IN AUSTRALIA.....	3
1.1 RECENT EVIDENCE FOR HEALTH BENEFITS OF PHYSICAL ACTIVITY.....	3
1.1.1. Introduction	3
1.1.2. Quality of scientific evidence	3
1.1.3. Reducing the risk of all-cause mortality	5
1.1.4. Cardiovascular disease prevention	5
1.1.5. Prevention of some cancers	6
1.1.6. Diabetes: primary prevention and control	6
1.1.7. Physical activity and prevention of injurious falls.....	7
1.1.8. Mental health benefits of being active	7
1.1.9. Risks of physical activity	8
1.1.10. Other health benefits	8
1.2 THE 'BURDEN OF DISEASE' AND THE COSTS OF PHYSICAL INACTIVITY IN AUSTRALIA.....	13
1.2.1. Health costs of inactivity	13
1.2.2. The 'burden of disease' in Australia	15
1.2.3. Conclusions	16
1.3 RECENT PHYSICAL ACTIVITY PARTICIPATION DATA FOR AUSTRALIAN ADULTS.....	19
1.3.1. Population surveys of physical activity in Australia	19
1.3.2. Recent trends in physical activity in Australia	21
1.3.3. Conclusions	32

1.4.	TOWARDS BEST PRACTICE: EVIDENCE AND POLICY IMPLICATIONS	35
1.4.1.	Definitions of 'best practice'	35
1.4.2.	Policy implications	36
PART 2.	INTERVENTIONS TO INCREASE PARTICIPATION IN PHYSICAL ACTIVITY IN SPECIFIC SETTINGS.....	43
2.1	LINKING RESEARCH, PRACTICE AND POLICY IN THE PROMOTION OF PHYSICAL ACTIVITY	43
2.1.1.	Comprehensive approaches to physical activity	43
2.1.2.	A health promotion framework	44
2.2	PROMOTING PHYSICAL ACTIVITY THROUGH GENERAL PRACTICE	49
2.2.1.	Why general practice?	49
2.2.2.	Strengths of the general practice setting	49
2.2.3.	Barriers to the promotion of physical activity in general practice	50
2.2.4.	Summary of the research evidence on interventions in general practice	51
2.2.5.	Encouraging GPs to promote physical activity.....	52
2.2.6.	Common intervention strategies used in general practice	52
2.2.7.	What is happening in Australia now?	55
2.2.8.	Conclusions	56
2.3	SCHOOLS AS SETTINGS FOR INTERVENTION	59
2.3.1.	Schools as settings for intervention	59
2.3.2.	The rationale for a settings approach.....	59
2.3.3.	Limitations of schools as settings	61
2.3.4.	Barriers in the community environment	63
2.3.5.	International recommendations for best practice in interventions.....	63
2.3.6.	Intervention menu for Australia	65

2.4	PROMOTING PHYSICAL ACTIVITY IN WORKSITES	69
2.4.1.	Background	69
2.4.2.	Relevance to the Australian context	70
2.4.3.	Strengths of the worksite setting	70
2.4.4.	Barriers to the promotion of physical activity at worksites	71
2.4.5.	Types of intervention on physical activity at worksites	72
2.4.6.	Promoting physical activity and links with occupational health and safety	73
2.4.7.	Research evidence on interventions at worksites	74
2.4.8.	Examples of recent Australian initiatives	74
2.4.9.	The future	76
2.5	MEDIA- AND COMMUNITY-WIDE INTERVENTIONS TO PROMOTE PHYSICAL ACTIVITY	79
2.5.1.	Principles of media campaigns applied to physical activity	79
2.5.2.	Media campaigns around physical activity in Australia	80
2.5.3.	Evidence for the effectiveness of media campaigns	81
2.5.4.	Conclusions	83
2.6	ENVIRONMENTAL, POLICY AND INTERSECTORAL APPROACHES TO PHYSICAL ACTIVITY	87
2.6.1.	Rationale for a focus on environment and policy approaches to promoting activity	87
2.6.2.	Environments where people are physically active	88
2.6.3.	The relationship between physical environments and physical activity	89
2.6.4.	Environmental interventions to promote physical activity	90
2.6.5.	Policy approaches to increasing physical activity	91
2.6.6.	Conclusions	92
2.7	TRANSPORT AND PHYSICAL ACTIVITY	95
2.7.1.	Introduction	95
2.7.2.	Research and intervention challenges	97

PART 3. PROMOTING PHYSICAL ACTIVITY WITH DEFINED POPULATION GROUPS.....	103
3.1 INTRODUCTION TO SPECIAL POPULATION GROUPS	103
3.1.1. Introduction and data needs for special populations	103
3.2 CHILDREN AND ADOLESCENTS	107
3.2.1 Physical activity improves health in children	107
3.2.2 Prevalence: how active are Australian children and adolescents?	107
3.2.3 Evidence supports the commencement of primary prevention at an early age	108
3.2.4 How much physical activity is enough for children and adolescents?	109
3.2.5 Recommendations for action	109
3.3 YOUNG ADULTS	111
3.3.1. Determinants of physical activity in young adults	111
3.3.2 Physical activity interventions with young adults	112
3.3.3. Conclusions	113
3.4 OLDER PEOPLE	115
3.4.1. Introduction	115
3.4.2. Levels and types of activity in older people.....	115
3.4.3 Benefits of physical activity for older people	116
3.4.4 Effective interventions for older people.....	117
3.4.5 Frail and very old people	118
3.4.6 Safety considerations	119
3.4.7 Conclusions	119
3.5 PEOPLE WITH SPECIAL NEEDS	123
3.5.1 People with chronic illness	123
3.5.2. People with disabilities	124
3.5.3. People from non-English-speaking backgrounds	126
3.5.4. Indigenous communities	126
3.5.5. Conclusions	127

3.6	SOCIAL DISADVANTAGE AND INACTIVITY	129
3.6.1.	Introduction	129
3.6.2.	Australian data on SES differentials in physical activity	129
PART 4. NEXT STEPS: RECOMMENDATIONS FOR RESEARCH AND IMPLICATIONS FOR POLICY		135
4.1	RECOMMENDATIONS FOR RESEARCH	135
4.1.1.	Answering questions about the quantum of physical activity for health	135
4.1.2.	Understanding the mental health and psychosocial effects of physical activity	136
4.1.3.	Refining and developing the measurement of physical activity for population monitoring and for interventions	136
4.1.4.	Understanding the factors that cause people to become more physically active	136
4.1.5.	Developing and evaluating community intervention strategies	136
4.1.6.	Understanding and Influencing the societal barriers to physical activity	137
4.2	IMPLICATIONS FOR POLICY AND ACTION	139
4.2.1.	Summary of best practice for the promotion of physical activity	139
APPENDIX 1.		
	ACTIVE AUSTRALIA—A NATIONAL APPROACH TO SPORT AND PHYSICAL ACTIVITY.....	145
APPENDIX 2.		
	STRATEGIC INTER-GOVERNMENTAL FORUM ON PHYSICAL ACTIVITY AND HEALTH (SIGPAH)	147
APPENDIX 3.		
	SAMPLE OF NATIONAL, STATE- AND TERRITORY-BASED ACTIVITIES: BY JURISDICTION AND AGENCY	149
APPENDIX 4.		
	MEASUREMENT OF PHYSICAL ACTIVITY	177
APPENDIX 5.		
	USEFUL LINKS, BOOKS AND RESOURCES	183

LIST OF TABLES

Table 1.	Agreement (per cent combined strongly agree and agree) with knowledge statements, 1997, 1999 and 2000 surveys	24
Table 2.	Any intention to be more active (per cent agree)	26
Table 3.	Trends in ‘sufficient’ levels of physical activity 1997, 1999 and 2000 National samples (Australian estimates)	27
Table 4.	People reporting no physical activity (sedentary), 1997, 1999 and 2000	28
Table 5.	Total time for physical activity during previous week, trends over the two time periods 1999 and 2000 (showing mean minutes, 75th and 95th percentiles)	29
Table 6.	National Physical Activity Guidelines for Australians	37
Table 7.	Physical activity promotion options commonly used in worksite settings	72
Table 8.	Summary of physical activity campaigns	84
Table 9.	Examples of measurement and research needs—linking health and transport agendas	98
Table 10.	Examples of transport- and roads-related interventions that promote physical activity	98
Table 11.	Sociodemographic differences in walking and in participation in vigorous sporting and fitness activities in Australian adults	130
Table 12.	Reported reasons for inactivity, by gender, age, education and income	131
Table A4.1.	Domains of physical activity for questionnaires	179

LIST OF FIGURES

Figure 1.	Proportion of total burden of disease in Australia, genders combined, attributable to preventable risk factors.	16
Figure 2.	Awareness of any physical activity message and Active Australia	23
Figure 3.	Intention to be more active (per cent agree) 1997–2000	25
Figure 4.	A hierarchy of effects in a mass-media campaign for physical activity	82

Part 1.

The importance of physical activity



PART 1

THE IMPORTANCE OF PHYSICAL ACTIVITY IN AUSTRALIA

1.1 Recent evidence for health benefits of physical activity

Summary

Several references and reviews have summarised and updated the health benefits of being active rather than sedentary. The most important recent reference is the 1996 US Surgeon General's report on physical activity, and reviews that were published recently in Australia include the results of new population studies. This chapter further updates the literature on the health benefits for people who are at least moderately active. The Australian policy implications of this evidence are discussed.

1.1.1. Introduction

The health benefits of physical activity (PA) are slowly being accepted in terms of their importance for public health and primary prevention. The publication in 1996 of the US Surgeon General's (USSG) report on physical activity and health (USDHHS 1996) contributed substantially to this growing acceptance. The public health rationale for promoting physical activity is now strong, and is related to a range of health outcomes. There is enough evidence to indicate that physical activity is of clear benefit in five of the six current Australian National health

priorities. If the population were more physically active, health benefits would accrue particularly in:

- cardiovascular disease prevention;
- diabetes prevention and control;
- the primary prevention of some cancers;
- injury prevention and control; and
- the promotion of mental health.

Note that asthma, the sixth health priority is not ameliorated by physical activity directly, nor is lung function improved. There is good evidence that people with well-managed asthma can carry out any physical activity, up to elite standards, but this is due to improved asthma management, not physical activity. Optimal asthma medication, management and written action plans, are suggested for all adults and children with persistent asthma.

1.1.2. Quality of scientific evidence

The initial studies examined the health effects of endurance types of physical activity, which involve large muscle groups for longer periods of time, such as walking, jogging and cycling. Less is known about the broader health effects of resistance types of physical activity such as weight and strength training. More recent studies have suggested that moderate forms of activity are beneficial, and that there is some evidence to suggest that physical activity may be accumulated in short bouts throughout the day, to sum to half an hour, of at least moderate intensity, on most days of the week (National Physical Activity Guidelines DHAC 1999).

The study populations used in the early epidemiological research were predominantly male, often socially and economically particularly advantaged groups. In the past decade, very similar evidence for health benefit has accrued for women, disadvantaged groups, minority and migrant populations and for older people.

The measures used in these studies have ranged from self-reported physical activity recall, usually measured with questionnaires or by interview, through to objectively-assessed movement, cardiorespiratory fitness, or direct measures of energy expenditure. In spite of these diverse measures, the relationships with health outcomes have been remarkably consistent—the better the measurements were, in terms of objective biological assessments or reliable and valid self-reported scores, the stronger the associations were with health outcomes (Powell et al. 1987).

Most of these relationships were established from observational studies. As with the health evidence for tobacco exposure, there are few population-wide randomised controlled trials, and the best evidence comes from well-designed cohort studies, supported by a few well designed case-control studies. Thus, there is little Level 1 or Level 2 evidence (meta-analytic or randomised trial; NHMRC), but this is the same quality of evidence as for active smoking, where the established risks are well accepted. As with exposure to smoking, it would now be impossible to conduct a controlled trial at the population level. The North American National Exercise and Heart

Disease project (Dorn et al. 1999)—an attempt at tertiary prevention in this area that was tried in the 1980s—was a trial of exercise for people with established chronic heart disease. The trial failed to find any effects of exercise, probably due to contamination between groups—one-third of subjects ‘crossed over’, with many subjects in the exercise group becoming sedentary, and many control subjects adopting some physical activity. This crossover substantially reduced the power of the study, and an unrealistically high sample size would have been required to demonstrate a significant effect of exercise.

The strength of the evidence is enhanced by consistent associations across studies, irrespective of exposure measurement, and increasingly studies explain the biological plausibility for these effects. Furthermore, there is considerable evidence of a dose response relationship—more activity is being associated with additional benefit; for some health outcomes, higher levels or intensity of participation are still required to achieve any health gain. Dose-response issues were a specific focus of the June 2001 issue of *Medicine and Science in Sports and Exercise* (Vol. 33, No. 3). Finally, statistical techniques are now used that adjust for the effects of other variables, so that the observed effects of physical activity are likely to be independent of other risk factors. In summary, the evidence is now good enough for policy makers and decision makers to take physical activity much more seriously, and to integrate it into a range of public health policy initiatives as an explicit or implicit element.

1.1.3 Reducing the risk of all-cause mortality

The effects of physical activity on overall mortality are reasonably consistent and strong (Lee and Paffenberger 1997). Associations are generally stronger when cardiorespiratory fitness is measured, than when physical activity is reported, particularly for women. The inverse relationship between physical activity and all-cause mortality holds for all age groups and for diverse populations in different countries (Villeneuve et al. 1999, Andersen et al. 2000). There is strong evidence for women, at most stages of life, that even moderate levels of activity, such as regular walking, are protective (Kushi et al. 1997, Manson et al. 1999). There is a lower risk of all-cause mortality amongst adults who adopt physical activity even if adopted later in life (Sherman et al. 1999, Blair et al. 1995). Furthermore, an increase in physical activity for middle-aged men and women appears to confer a health benefit in terms of subsequent risk of death (Paffenbarger et al. 1993, Blair et al. 1995). Even moderate and incidental forms of activity, such as using the stairs (Paffenbarger et al. 1993) and active cycling to and from work (Andersen et al. 2000), are associated with reduced risk of mortality.

1.1.4. Cardiovascular disease prevention

Numerous population studies since the 1950s have shown that people who are sedentary have between a 1.5-fold and a twofold higher risk of incident or fatal cardiovascular events, compared with those who

are at least moderately physically active (Berlin and Colditz 1990; USDHHS 1996, Bauman and Campbell 2001). The maximum cardiovascular benefit occurred when people moved from sedentary or low fitness groups in the population to moderate activity or moderate fitness levels (Blair et al. 1995, Kushi et al. 1997). The need to accumulate around 800 Kcal per week in leisure-time, physical-activity-related energy expenditure is suggested for cardiac protection (USDHHS 1996, Haapanen et al. 1996). This equates to around two-and-one-half hours (150 minutes) per week of moderate intensity activity for a 70-kilogram person.

Although moderate levels of activity reduce risk, there is evidence of a dose–response relationship— increasing intensity and more sustained activity may confer a greater reduction in the risk of fatal and nonfatal coronary events. There are biologically plausible mechanisms for this observation (Haskell 1994), including one study providing evidence of some reversal of coronary atherosclerosis following prolonged exercise (Hambrecht et al. 1993). It appears that recent physical activity, rather than being active earlier in the lifespan confers the physical activity benefit, suggesting some more acute physiological influences of being active (Sherman 1999).

In addition to the benefits of life-long physical activity amongst adults, there are benefits from starting physical activity during childhood and adolescence. Moreover, there is some evidence that physical activity amongst young people and adolescents can impact favourably upon other cardiovascular risk factors that also contribute to the later

risk of coronary artery disease. This is one component of the benefits of activity in childhood, as physical activity may improve blood lipid profiles amongst children and adolescents (Bar Or 1994), and may also have a favourable impact upon blood pressure. Physical activity improves lipid profiles and blood pressure among adults, and more sustained activity has a role in obesity prevention (Koplan and Dietz 1999).

For older adults, physical activity reduces the risks of cerebrovascular disease, especially ischaemic stroke. A consistent observation in recent studies has been reduced stroke rates across diverse populations (Wannemethee and Shaper 1999). Part of this risk reduction may occur through the beneficial role of moderate physical activity upon systolic and diastolic blood pressure (Kelley and McClellan 1998).

1.1.5. Prevention of some cancers

The best evidence for a cancer prevention role for physical activity relates to colon cancer. There is a clear and consistent dose–response relationship between different forms of physical activity and colon cancer (Colditz et al. 1997). Plausible biological mechanisms have been proposed, including effects on prostaglandins and antioxidants, reduced intestinal transit time, and a contribution to overall energy balance (Slattery et al. 1997). It is thought that physical inactivity causes around one-fifth of all colon cancers in the population, indicating a strong role for primary prevention.

The next best evidence relates to breast cancer but the quantum of physical activity required, and the groups for which activity is

most effective, are still not determined. The effects of physical activity on breast cancer risk seem to be confounded by obesity and possibly by menopausal status, so that clear preventive recommendations are not yet possible. Nonetheless, the evidence is consistent enough, with three-quarters of studies finding a positive relationship, although the biological mechanisms have not been elucidated. Well designed case–control and cohort studies typically show a 20–30 per cent lower risk (Thune et al. 1997, Verloop et al. 2000). Sophisticated methods for assessing attributable risk now estimate that around 12 per cent of breast cancer may be caused by inactivity, a fraction similar to nutritional risk factors (Mezzetti et al. 1998).

Other cancers are being examined in relation to physical activity patterns. Inconsistent relationships are seen for prostate cancer risk, and require further studies (Giovannicci et al. 1998, Liv et al. 2000). Two studies have observed relationships between vigorous and prolonged activity and reduced risk of adenomas, which are not the usual smoking-related types of lung cancer (Thune and Lund 1997), but a biological mechanism to explain this finding is not clear.

1.1.6. Diabetes: primary prevention and control

The increasing rate of non-insulin dependent diabetes mellitus (NIDDM) is a cause for public health concern. There is excellent evidence that physical activity has a role in the primary prevention and also in the treatment of NIDDM.

Longitudinal studies show that the risks of developing diabetes in populations are lower in people who are physically active than those who are sedentary, even after adjustment for body mass index (Folsom et al. 2000, Helmrich et al. 1994). This is true even for moderate levels of activity, such as regular, brisk walking (Hu et al. 2000). Physical activity is an important dimension of the management of diabetes. Exercise may improve glucose metabolism, increase insulin sensitivity, and prevent the increase in heart disease among people with diabetes. Thus, physical activity is of central importance to the primary and secondary prevention of NIDDM. Unfortunately, among people with diabetes, rates of participation in physical activity are very low—up to one-half report engaging in no leisure-time physical activity.

1.1.7. Physical activity and prevention of injurious falls

Physical activity is a beneficial component of the prevention of injurious falls, partly through effects on muscle strengthening and balance, and possibly through maintaining bone density. Reviews have shown that physical activity reduced the risk of falling, although some of the programs were supplemented by education and other interventions (Gillespie et al. 1998, Province et al. 1995, Lord et al. 1995). Physical activity is seen commonly as a means of maintaining strength and vigour, and preventing the functional declines of ageing. Both regular movement and strength training may assist in maintaining balance and flexibility, and, thereby, reduce the risk of falls in the elderly.

The American College of Sports Medicine (ACSM) position statement concluded that functional loading through physical activity exerts a positive influence on bones mass, but that the types of program that may be most effective in producing beneficial results are still uncertain (ACSM 1998). Although physical activity among adults may maintain bone mineral density (prevent osteoporosis), the greatest primary prevention role for physical activity may be in childhood and adolescence, during which period lifelong bone deposition occurs. Thus, being active in adolescence is important for the prevention of osteoporosis and the risk of hip fractures decades later.

1.1.8. Mental health benefits of being active

The mental health benefits of physical activity have been recognised for many decades. Recent reviews have shown that aerobic exercise or strength training programs can reduce the symptoms of depression (Paluska and Schwenk 2000). Physical activity is as effective as meditation or relaxation in the treatment of anxiety. A recent controlled trial found that exercise training among older adults was as effective as antidepressant medication, although the onset of benefit was slower (Blumenthal 1999).

In cross-sectional surveys, associations are often seen between physical activity and feelings of wellness, lowered levels of stress and anxiety and positive mental health in populations (Stephens 1988, Simonsick 1991). In Australia, the baseline surveys of the Australian Longitudinal Study on Womens Health (ALWHS) demonstrated a

clear relationship between mental health (as measured by the SF-36) and physical activity in large population samples of young, middle aged and older women. The nature of the relationship between physical activity and mental health problems remains to be further clarified—the dose, frequency and intensity of activity required for positive mental health are not known.

1.1.9. Risks of physical activity

There is a small risk of injury during physical activity. The most frequent settings for musculoskeletal injuries are in competitive sports (overuse injuries) or in untrained sedentary individuals who embark upon sudden vigorous activity (Powell et al. 1998). Injury rates are very low for moderate intensity activities such as walking, gardening or recreational swimming and cycling.

Another area of risk is that of an acute cardiovascular event during participation in physical activity. Although the risk of cardiac events is higher among people who are vigorously active, this increase in risk is outweighed by the net benefit of being active for that individual (Thompson 1994, Siscovick et al. 1984). There are also recent data that acute cardiac arrests are less likely for those who are active regularly (USDHHS 1996).

1.1.10. Other health benefits

There are some benefits of activity beyond the priority health areas mentioned above. For people with osteo-arthritis or rheumatoid arthritis, there is some evidence that moderate physical activity relieves symptoms, possibly reduces joint swelling, and is associated with improved psychosocial and functional status (Minor 1991). Physical activity may positively influence the immune system, and may be of assistance in a range of other chronic disease states. The ALWHS also showed an inverse relationship between a range of chronic symptoms, including incontinence and menstrual symptoms, and levels of physical activity. Through the ageing process, physically active individuals may experience fewer years of disability; people who are active may have up to five years more of disability-free life and, hence, improvements in quality of life (Vita et al. 1998, NSW Health 1999).

One important health benefit of physical activity is to contribute to obesity prevention. This was discussed earlier (as part of risk factor reduction) but deserves special mention, given the strategic public health importance of obesity (Acting on Australia's Weight 1997).

Population monitoring data suggest increases in rates of obesity in many countries, including Australia (Flegal 1998, AIHW 2000).

This has occurred in spite of reasonably consistent dietary intakes, for example in the UK over five decades (Prentice and Jebb 1995). The difference is attributed to decreased energy expenditure. This implies decreases in overall activity or sports participation (WHO 1997).

Approaches to addressing the role of physical activity in obesity prevention is a complex issue, partly because the amount of activity required for weight loss may be greater than for other health benefits. It may be necessary to accumulate 60–100 minutes of daily, moderate activity for weight loss (WHO 1997), which is more than twice the duration recommended for general health benefits. This requires new ways of developing and implementing programs that decrease sedentary time and increase incidental daily physical activity (see Chapter 2.6, which discusses environmental and policy interventions). Specific examples include decreased car use for short journeys (Koplan and Dietz 1999) and decreased television watching time (Robinson 1999)



References

- Acting on Australia's Weight (1997). A strategic plan for the prevention of overweight and obesity. NHMRC, Canberra.
- AIHW (2000). Australia's Health 2000. Australian Institute of Health and Welfare, AIHW Cat.19, Canberra.
- American College of Sports Medicine (ACSM) 1998. ACSM position stand on osteoporosis and exercise. *Medicine and Science in Sports and Exercise* 27: i-vii.
- Andersen LB, Schnohr P, Schroll M, Hein HO (2000). All cause mortality associated with physical activity during leisure time, work, sports, and cycling to work. *Archives of Internal Medicine* 160:1621-8.
- Bauman A, Owen N (1999). Physical activity of adult Australians: epidemiological evidence and potential strategies for health gain. *Journal of Science, Medicine and Sport* 2(1): 30-41.
- Bauman AE, Campbell TJ. (2001). Heart week 2001: Get active ! A call to action. *Medical Journal of Australia* 174:381-2.
- Bar-Or O. (1994). Childhood and adolescent physical activity and fitness and adult risk profile. Chapter 63, in Bouchard C (Ed) *Physical activity, fitness and health*. Springfield, Illinois: Human Kinetics.
- Blumenthal JA. (1999). The association between physical activity and depression in older depressed adults. *Journal of Aging & Physical Activity* 7(1):55-61.
- Berlin J, Colditz GA. (1990). A meta analysis of physical activity in the prevention of coronary heart disease. *American Journal of Epidemiology* 132:612-28.
- Blair SN, Kohl HW.III, Barlow CE, et al. (1995). Changes in physical fitness and all cause mortality: a prospective study of healthy and unhealthy men. *Journal of the American Medical Association* 273:1093-8.
- Cerhan JR, Torner JC, Lynch CF, et al. (1997). Association of smoking, body mass index and physical activity with risk of prostate cancer in the Iowa rural health study. *Cancer Causes and Control* 8:229-38.
- Colditz G, Cannuscio C, Frazier A. (1997). Physical activity and reduced risk of colon cancer: implications for prevention. *Cancer Causes and Control* 8:649-67.
- Department of Health and Aged Care (DHAC) (1999). National physical activity guidelines for Australians. Canberra.
- Dorn J, Naughton J, Dai I, et al. (1999). Results of a multicenter clinical trial of exercise and long term survival in myocardial infarction patients: the NEHDP. *Circulation* 100:1764-9.
- Flegal KM. (1998). Overweight and obesity in the United States: prevalence and trends 1960-1994. *Int J Obesity and Related Metabolic Disorders* 22:1579-80.
- Fagard RH, Tipton CM. (1994). Physical activity, fitness and hypertension. In Bouchard C (Ed), *Physical Activity and Health*, Champaign, Illinois: Human Kinetics. pp 633-55.
- Folsom A, Kushi LH, Hong CP. (2000). Physical activity and incident diabetes in postmenopausal women. *American Journal of Public Health* 90:134-8.
- Gillespie L, Gillespie W, Cumming R, et al.(1998). Interventions to reduce the incidence of falling in the elderly. *Cochrane Database Systematic Reviews* 3.
- Giovannucci E, Leitzmann M, Spiegelman D, et al. (1998). A prospective study of physical activity and prostate cancer in male health professionals. *Cancer Research* 58(22):5117-22.

- Haapanen N, Millunpalo S, Vuori I, et al. (1996). Characteristics of leisure time physical activity associated with decreased risk of premature all cause mortality and cardiovascular mortality in middle aged men. *American Journal of Epidemiology* 143:870-80.
- Hambrecht R, Niebauer J, Marburger C. (1993). Various intensities of leisure time physical activity in patients with coronary artery disease—effects of cardiorespiratory fitness and progression of coronary atherosclerotic lesions. *Journal of the American College of Cardiology* 22:468-77.
- Haskell W. (1994). Health consequence of physical activity: understanding and challenges regarding dose-response. *Medicine and Science in Sports and Exercise* 26:649-60.
- Helmrich S, Ragland DR, Leung RW, et al. (1991). Physical activity and reduced occurrence of non insulin dependent diabetes mellitus. *New England Journal of Medicine* 325:147-52.
- Hu FB, Sigal RJ, Rich-Edwards JW, et al. (1999). Walking compared with vigorous physical activity and risk of type 2 diabetes in women. *Journal of the American Medical Association* 282(15):1433-9.
- Kelley G, McClellan P. (1994). Antihypertensive effects of aerobic exercise—a brief meta analytic review. *American Journal of Hypertension* 7:115-9.
- Koplan JP, Dietz WH. (1999). Caloric imbalance and public health policy. *Journal of the American Medical Association* 282:1579-80.
- Kushi LH, Fee RM, Folsom AR, et al. (1997). Physical activity and mortality in post-menopausal women. *Journal of the American Medical Association* 277:1287-92.
- Lee IM, Paffenbarger RS. (2000). Associations of light, moderate and vigorous intensity physical activity with longevity—The Harvard Alumni Study. *American Journal of Epidemiology* 151:293-9.
- Liv SM, Lee IM, Linson P, et al. (2000). A prospective study of physical activity and the risk of prostate cancer in US physicians. *International Journal of Epidemiology* 29:29-35.
- Lord S, Ward J, Williams P, et al. (1995). The effect of a 12-month exercise trial on balance, strength, and falls in older women: a randomised controlled trial 1995. *Journal of the American Geriatric Society* 43:1198-206.
- Manson JE, Hu F, Rich-Edwards JW, et al. (1999). A prospective study of walking as compared with vigorous exercise in the prevention of coronary heart disease in women. *New England Journal of Medicine* 341:650-8.
- Mezzetti M, La Vecchia C, Decarli A, et al. (1998). Population attributable risk for breast cancer; diet, nutrition, and physical exercise. *Journal of the National Cancer Institute* 90:389-94.
- Minor M. (1991). Physical activity and the management of arthritis. *Annals of Behavioral Medicine* 13:117-24.
- NSW Health. (1999). *Healthy ageing and physical activity*. Sydney: NSW Health.
- Paffenbarger R, Hyde R, Wing A. (1993). The association of changes in physical activity level and other lifestyle characteristics with mortality among men. *New England Journal of Medicine* 328:538-45.
- Paluska SA, Schwenk T. (2000). Physical activity and mental health—current concepts. *Sports Medicine* 29:167-79.
- Powell K, Health G, Kresnow MJ, et al. (1998). Injury rates from walking, gardening, weightlifting, outdoor bicycling and aerobics. *Medicine and Science in Sports and Exercise* 30:1246-9.
- Powell KE, Thompson PD, Caspersen CJ, et al. (1987). Physical activity and the incidence of coronary heart disease. *Annual Review of Public Health* 8:253-87.

- Province M, Hadley E, Hornbrook M, et al. (1995). The effects of exercise on falls in elderly patients: a preplanned meta-analysis of the FICSIT trials. *Journal of the American Medical Association* 273:1341-7.
- Robinson TN. (1999). Reducing television viewing to prevent obesity—a randomised trial. *Journal of the American Medical Association* 282:1561-7.
- Sherman SE, D'Agostino RB, Silbershatz H, et al. (1999). Comparison of past versus recent physical activity in the prevention of premature death and coronary artery disease. *American Heart Journal* 138:900-7
- Simonsick E. (1991). Personal mental health habits and mental health in a national probability sample. *American Journal of Preventative Medicine* 7(6):425-37.
- Siscovick DS, Weiss NS, Fletcher RH. (1984). The incidence of primary cardiac arrest during vigorous exercise. *New England Journal of Medicine* 311:874-7.
- Slattery M, Potter J, Caan B, et al. (1997). Energy balance and colon cancer—beyond physical activity. *Cancer Research* 57:75-80.
- Smith J, Owen N, Leslie E, et al. (1999). *Active for life physical activity patterns in Victoria 1998*. Melbourne: Victorian Department of Human Services.
- Stephens T. (1988). Physical activity and mental health in the United States and Canada: evidence from four population surveys. *Preventive Medicine* 17(1):35-47.
- Thompson P. (1994). Risks of exercising—cardiovascular including sudden cardiac death. In Bouchard C (Ed), *Physical Activity and Health*, chapter 70, (pp 1019-28).
- Thune I, Brenn T, Lund E, et al. (1997). Physical activity and the risk of breast cancer. *New England Medical Journal* 336(18):1269-75.
- Thune I, Lund E. (1997). The influence of physical activity on lung cancer risk. *International Journal of Cancer* 70:57-62.
- United States Department of Health and Human Services (USDHHS). (1996). *Physical activity and health: a report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion.
- Verloop J, Rookus M, van der Kooy D, et al. (2000). Physical activity and breast cancer risk in women aged 20-54 years. *Journal of the National Cancer Institute* 92(2):128-35.
- Villeneuve PJ, Morrison HI, Craig CL, et al. (1998). Physical activity, physical fitness and risk of dying. *Epidemiology* 9:626-31.
- Vita PJ, Terry RB, Hubert HB, et al. (1998). Aging, health risks, and cumulative disability. *New England Journal of Medicine* 338:1035-41.
- Wannamethea G, Shaper AG. (1992). Physical activity and stroke in British middle aged men. *British Medical Journal* 304:597-601.
- Wannamethee SG, Shaper AG. (1999). Physical activity and the prevention of stroke. *Journal of Cardiovascular Risk* 6:213-16.
- World Health Organization. (1997). *Obesity—preventing and managing the global epidemic*. Geneva: WHO.

1.2 The ‘burden of disease’ and the costs of physical inactivity in Australia

Summary

Physical inactivity is responsible for an estimated 8,000 deaths per year in Australia, and costs the health system at least \$400m in direct health care costs. In addition, the burden of disease study, conducted by AIHW, indicated that physical activity ranked second, only to tobacco control, among the most important factors in disease prevention in Australia. These data, point to an under-recognition of physical activity among risk factors, in terms of resources and attention.

1.2.1. Health costs of inactivity

A report examining the costs of physical inactivity was recently published by the Commonwealth Department of Health and the Australian Sports Commission. This report estimated the direct costs of physical inactivity in Australia (Stephenson et al. 2000). The findings are summarised in this chapter; the full report describes the methods used, and the conservative nature of assumptions made, compared with many other recent health costing studies.

The study identified that about one-half of the adult Australian population was insufficiently active for health gain, and that substantial morbidity could be attributed to this level of inactivity. The modeling strategies used were conservative, but estimated that the preventable fractions [amount of disease that could be prevented if the population were at least moderately

active] were 18 per cent for coronary heart disease, up to 16 per cent for stroke, 13 per cent for non-insulin dependent diabetes mellitus (NIDDM), 19 per cent for colon cancer, between 9–12 per cent for breast cancer and up to 10 per cent for depression symptoms. Physical inactivity was found to contribute to more than 8,000 deaths in Australia each year, of which, 1,531 would occur in people under the age of 70 years and would represent an estimated 77,000 premature potential years of life lost because of inactivity. These deaths were considered avoidable if sedentary and insufficiently-active people adopted at least moderate, regular physical activity.

The annual, direct healthcare costs attributable to physical inactivity were about \$400m each year. Indirect costs, including time off work and the social costs of inactivity would more than double this amount. The estimation of social and economic sector costs is very difficult, and would be based on a range of complex assumptions. Substantial further work may be needed to quantify these dimensions. Nonetheless, this direct costs analysis was conservative, as overseas studies have reported direct costing estimates about twice those reported in the Australian study, as a proportion of overall health expenditure.

The report presented an analysis of potential savings in direct health care costs if public health interventions were able to increase the proportion of the population that was physically active. The analysis indicated that gross savings of up to \$8m in healthcare costs might be achieved for every one per cent gain in the proportion of the population

that is sufficiently active. It was further estimated that more than \$30m per year might be saved by increasing the proportion of adults active in the whole population by five per cent would be an achievable target in public health terms if sufficient resources were directed to physical activity (Bauman et al. 1996). Moreover, it was estimated that about 122 deaths per year from heart disease, diabetes and colon cancer could be avoided for every one per cent increase in the proportion of the population that achieved a level of sufficient and regular physical activity. These estimates indicated that one quarter of these deaths occurred in people under 70 years and that 1,764 life years could be gained for every one per cent increase in moderate activity levels.

The cost estimates in the Stephenson study were compared with earlier 'health costing of risk factor' studies in Australia and elsewhere. An Australian study estimated that total saving of around \$274m may occur if the population became active (Roberts 1987). The recent Stephenson study proposed a saving of about \$400m, or about \$8.6m per one per cent increase in moderate physical activity participation (in mid-1990s dollars). A recent New Zealand study reported a direct and indirect cost saving of around \$162m, if the whole population became active. This would equate to a saving of \$972m if applied to the Australian population, but included indirect costs. A detailed costs-of-illness (COI) study of physical inactivity was produced in Canada (CFLRI 1996). This study focused on chronic heart disease, non-insulin dependent diabetes and colon cancer in 1993. This estimate of about \$12m saved per one per

cent increase in activity was greater than the current Australian estimate. A recent US study estimated that about 2.4 per cent of the direct costs of health expenditure was attributable to physical inactivity—twice the proportion estimated in Stephenson's study.

Studies using simulation modelling have examined the economics of physical activity in a number of countries. In Britain, Munro et al. (1997) suggested that the costs of a physical activity intervention would be £332 per life-year saved—less expensive than antismoking advice from a doctor (£700/life year saved), cholesterol screening (£3,700/life year saved) or treating hypertension (£8,500). A US study reported that exercise was cost-effective (\$11,313 per QALY saved), compared to treating hypertension (>\$25,000 per QALY) or treating ischaemic heart disease (Hatzianandreu et al. 1988). A more recent US study suggested that promoting walking was a useful strategy, with savings of up to \$4.3 billion if the entire sedentary population became active (Jones and Eaton 1994). Another US study proposed that the 'lifetime health system added costs of \$1,900 per sedentary person might be invested in community strategies to increase physical activity participation' (Keller et al. 1989)—several hundred times greater than current Australian expenditures on physical activity.

The Stephenson study of health costs suggests that physical activity costs are similar to the costs associated with other major risk factors, such as the direct costs of diet- and nutrition-related disease (\$771m, according to Crowley et al. 1992). The costs of obesity have been assessed as

contributing to between two and seven per cent of total healthcare costs (WHO 1997). The healthcare costs of tobacco in Australia have been estimated at \$671m (AIHW 1996).

1.2.2. The 'burden of disease' in Australia

In November 1999, the AIHW published the 'burden of disease' study for Australia. This was based on the World Health Organization's 'Global burden of disease study' (Murray and Lopez 1996), in which an assessment of overall health problems is based on both mortality and disability components. The central measure is the disability-adjusted life year (DALY) which provides a more expanded framework for assessing health than the traditional epidemiological use of mortality alone.

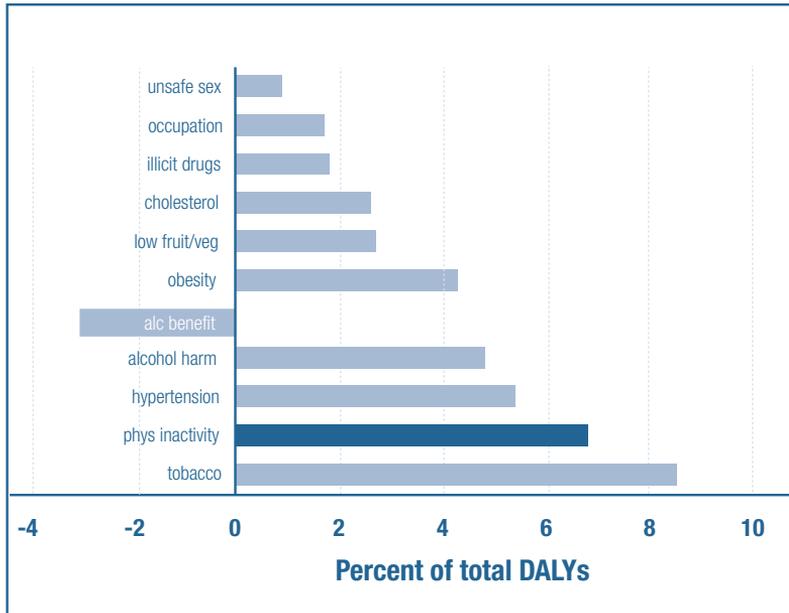
The AIHW report (Mathers et al. 1999) identified preventable risk factors that contribute to the overall disease burden for Australia. Together, prevention-oriented risk factors account for at least one-third of all mortality and disability. The leading risk factors are shown in Figure 1, which has been adapted from the AIHW report. The first ranked contributor to population ill health is tobacco use, then physical activity. This study was not the first to identify physical inactivity as the second ranked hazard to population health—previous estimates from US studies were very similar (McGinnis and Foege 1993). In these Australian data, physical inactivity ranks first as the leading contributor to preventable illness and morbidity among women, given their lower tobacco usage rates than men. Looking at genders combined (Figure 1), after physical

inactivity, in order, come the risk factors hypertension, obesity, nutritional intakes and cholesterol, alcohol (benefits minus risks), illicit drug use, occupational hazards and unsafe sex (including HIV infection). Thus, physical inactivity is very important from the preventive health and health economic perspectives, and far more important than would be suggested by the current allocation of funds across all sectors concerned with active participation and lifestyles at the population level.

The recent 'Burden of disease' (BOD) study enabled a comparison of physical inactivity with other risk factors. For example, physical inactivity was associated with twice as many deaths and nearly three times as many DALYs as high cholesterol levels (which contributed to 6,550 deaths and 64,000 DALYs). Among younger adults, inactivity was associated with more disability and, in older age groups, with higher risk of mortality (Mathers et al. 1999).

According to the BOD study, the loss of an estimated 13,000 lives each year in Australia was attributable to physical inactivity. This estimate was higher than that derived in the costings study above (Stephenson et al 2000) but was probably due to the conservative assumptions underpinning the health economics paper. Nonetheless, inactivity contributes between one-half and two-thirds of the number of deaths usually attributed to tobacco use.

Figure 1. Proportion of total burden of disease in Australia, genders combined, attributable to preventable risk factors. Adapted from Mathers et al. 1999.



1.2.3. Conclusions

In conclusion, the estimates in the health costings study and the Burden of Disease (BOD) study reinforce the importance of physical activity, and are similar to estimates from overseas research (Colditz 1999, Hahn et al. 1990, McGinnis and Foege 1993). Nonetheless, physical activity appears to be under-recognised in terms of public health importance for priority-based resource allocation. Health sector and non-health sector investment in physical activity interventions (as distinct from elite sport investment) is rather smaller than for other risk factors. Compared to the tens of millions of dollars spent in campaigns and National

strategies for illicit drug use, or tobacco control, audits of State and National resource allocation will confirm that the investment in physical activity may be as low as 10 per cent of what it should be, given these data on the preventive role of physical activity.

The challenge is to turn these data into policy and programs, across sectors interested in physical activity, and to develop interventions, funded at and above the investment thresholds for effectiveness, to increase levels of activity among all Australians. Some of the strategies and evidence for interventions of this sort are discussed in part 2 of this report.

References

Bauman A, Bellew B, Booth M, et al. (1996). Towards best practice for the promotion of physical activity in the Areas of New South Wales. NSW Health Department, Centre for Disease Prevention & Health Promotion.

Canadian Fitness and Lifestyle Research Institute. (1996) The economics of participation. Progress in Prevention Bulletin No 10.

Hatziandreu E, Koplan J, Weinstein M, et al. (1988). A cost-effectiveness analysis of exercise as a health promotion activity. American Journal of Public Health 78:1417-21.

Jones TF, Eaton CB. (1994). Cost benefit analysis of walking to prevent coronary heart disease. Archives of Family Medicine 3:703-10.

Keller EB, Manning W, Newhouse JP, et al. (1989). The external costs of a sedentary lifestyle. American Journal of Public Health 79:975-81.

Mathers C, Vos T, Stevenson C. (1999). Burden of disease and injury in Australia, AIHW Catalogue PHE 17, Canberra: Australian Institute of Health and Welfare.

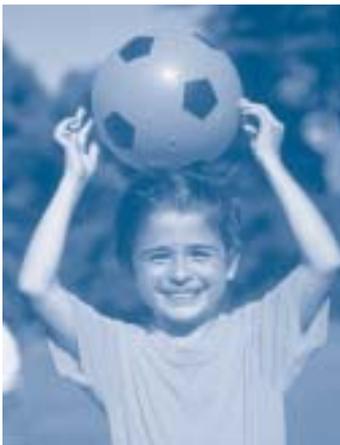
McGinnis JM, Foege WH. (1993). Actual causes of death in the United States. Journal of the American Medical Association 270:2207-12.

Murray CJL, Lopez AD. (1996). The global burden of disease. Geneva: Harvard School of Public Health and World Health Organization.

Roberts A. (1987). The economic benefits of participation in regular physical activity. Canberra: Recreation Minister's Council of Australia.

Stephenson J, Bauman A, Armstrong T, et al. (2000). The costs of illness attributable to physical inactivity. Canberra: Commonwealth Department of Health and Aged Care.

World Health Organization (WHO) (1998). Consultation on Obesity. The economic costs of overweight and obesity. In Obesity: prevention and managing the global epidemic. Geneva: WHO.



1.3 Recent physical activity participation data for Australian adults

Summary

There is an urgent need for standardised approaches to measuring and monitoring physical activity participation at the State and National level in Australia. Some States have already conducted physical activity surveys, including New South Wales, South Australia and Western Australia. At the National level, representative population samples of Australian adults were surveyed about their physical activity patterns in November 1997, 1999 and 2000. Specific sub-groups that are more likely to be inactive can be identified in such data; these include women, older adults, people at some social disadvantage, and those from a non-English-speaking background. Trend analyses showed that there were increases in awareness of the Active Australia media campaign, and in understanding some aspects of the moderate physical activity message, however, the rates of participation appeared to fall between 1997 and 1999, and between 1999 and 2000. Further monitoring is needed to confirm these trends but it is likely that substantial efforts will be required to reverse the trend.

1.3.1. Population surveys of physical activity in Australia

There have been several attempts to measure physical activity in Australia since the late 1970s. Early efforts included physical activity questions in the National Heart Foundation Risk Factor Prevalence surveys in 1980, 1983 and 1989 (NHF 1989). There were also efforts to characterise physical activity participation comprehensively in a sport and recreation context between 1984 and 1987 (Bauman et al. 1990). The National Health Survey, collected by Australian Bureau of Statistics (ABS) also asked identical physical activity questions in 1989, 1995 and 2001. These data systems were not comparable, as the questions they asked were different, the sampling and survey methods were different, and the estimates of the proportion of the (adult) population that was 'active' varied widely. More recent surveys were conducted, particularly at the State level, during 1990s. Detailed analyses of NSW Health Survey questions have been reported from the 1994 State Health Survey (Bauman et al. 1996), and from the 1997 and 1998 NSW surveys (NSW Health, Public Health Division 2000). In addition, a specific NSW physical activity survey was conducted in 1996 (Bauman et al. 1999).

Other States have conducted specific physical activity surveys in more recent years. Data from Victoria were published in 1999 in the Active for Life Reports (Smith et al. 1999). Specific surveys to identify physical activity levels have been conducted in South Australia and Western Australia (summaries are provided in the text boxes), which provide local detailed information on

physical activity levels, as well as information of specific determinants and factors associated with activity and inactivity. Several NSW surveys have been conducted, including State health surveys with a focus on physical activity, as well as several specific surveys in 1996, 1998 and 1999.

Nonetheless, despite the recent interest in monitoring physical activity, there is no standardised approach to measurement and, therefore, making comparisons among States or assessing trends over time is more difficult.

Example of some State physical activity surveys

South Australian Physical Activity Survey

This 1998 State-based initiative was a telephone based population survey of 3,000 adults organised through the Department of Human Services (DHS 1999). Overall, one-half of the SA adult population achieved a level of activity sufficient for health benefit, with rates higher among males than females, and rates declining with increasing age. There were socio-economic and educational gradients, with the more advantaged also likely to be more active.

The State-wide survey was compared with other surveys of older adults (44% sufficiently active) and regional surveys in Onkaparinga and the Eyre Peninsula (45–48% active).

Important barriers to activity were perceived health, no time and no social supports. The responders thought that better environments and the support of family and friends would help them to be more active.

West Australian (WA) Physical Activity Survey 1999

This telephone-based survey sampled 3,178 WA adults in November 1999 (Bull et al. 2000), with a response rate of 46 per cent of eligible respondents. About 58 per cent of WA adults reported a sufficient level of physical activity for health benefit, more often among males than females, and the highest rates were among young adults. Physical activity levels, were related to education and employment, language spoken and body mass index. Sedentary behaviour was assessed, with most adults watching two hours of television per day. The main barrier to activity was a lack of time, and the main reasons for being active were for improved fitness and for enjoyment. Encouraging social supports for exercise, and better facilities and environments were also identified in the survey as important community issues.

1.3.2. Recent trends in physical activity in Australia

This section describes three recent National surveys of physical activity, which were carried out in November 1997, 1999 and 2000, using identical survey methods and questions. Analyses of the trends of these National data have been reported elsewhere, by the Australian Institute of Health and Welfare for the first two surveys (Armstrong et al. 2000). State-level comparisons are shown briefly, only for the 1997 and 1999 surveys.

Methods

The data are from three National telephone surveys of participation in physical activity. The surveys were conducted by the Hunter Valley Research Foundation, and were jointly funded by the Australian Institute of Health and Welfare, the Department of Health and Aged Care, the Australian Sports Commission. Oversampling was carried out for some regions, and was funded by specific State and Territory health departments.

Each of the two surveys was conducted in November, the first in 1997 and the second survey in 1999. The sample size of the 1997 survey was 4,824, but was increased through oversampling from several States. Thus, the total sample for the 1997 survey was 6,803. The actual sample sizes were 3,841 adults for the 1999 survey and 3,590 for the 2000 survey.

The data for all three surveys were based on a simple random sample of telephone numbers, and a randomly sampled adult was selected within each eligible household. The

data were entered into a computer-assisted telephone interview (CATI) system and analysed using SPSS and SAS software.

The response rates were defined as the proportion of people who completed an interview divided by the total eligible to do so. The household response rates were 61 per cent in the 1997 survey, 65 per cent in 1999, and 76 per cent in 2000. Of the individuals eligible to be surveyed, the individual-level response rates were over 80 per cent for all three surveys. Response rates were similar among States and Territories, although rates in the ACT, South Australia and Tasmania were slightly higher than in other regions.

Measurements

The surveys used a questionnaire, which sought information about responders' participation in physical activity in the previous week, as well as questions about knowledge and understanding of the moderate intensity physical activity message, intention to be more active, and also recall of Active Australia messages and campaign themes (Armstrong et al. 2000).

The primary measures of physical activity were derived from questions that asked about participation in walking, vigorous activity and moderate activity in the previous week, and incorporated information on the total number of sessions during the week, and the total time in minutes. A definition of sufficient physical activity for health was developed, and was based on the accrual of at least 150 minutes of physical activity during the previous week. Minutes spent in vigorous activity were 'weighted' to count for

twice those spent in moderate activity, as described in Armstrong et al. (2000). This is consistent with the National Physical Activity Guidelines for Australians (DHAC, 1999), and also with the United States Surgeon Generals Report on physical activity (USDHHS 1996).

Questions were asked about recall of any general messages about exercise or physical activity in the media, and specific message recall about two Active Australia campaigns. These were the 1998 campaign, 'Exercise. You only have to take it regularly, not seriously', and the 1999 International Year of Older People 'Rusty' campaign, which portrayed a tin man who shed his armour and became more active. Recall of these messages was asked in both unprompted and prompted ways, but the prompted recall is described in more detail in this chapter. The same questions were asked in 1997, 1999 and 2000, so trends in these perceptions and beliefs and behaviors were the focus of this analysis.

Weighting of the data

The data were weighted by age and sex, in proportion to the National population (Armstrong et al. 2000). For these analyses, weighted sample data were used, to provide National estimates. The data were down-weighted to an effective sample size of 2,500 or 3,000 for each survey. Although some over-sampling occurred in some States, this was not consistent across all surveys and, hence, State-level comparisons were not possible using these data. The limited State-level data reported are based

on unweighted data. For the smaller States, such as ACT, South Australia, Tasmania and NT, the sample sizes were too small to provide reliable State-level or trend data, and caution should be used in interpreting State-level comparisons (State-level trends are summarised in the text box). For these reasons, primarily National weighted data are described.

Research questions

Five research questions are asked of these three National physical activity surveys.

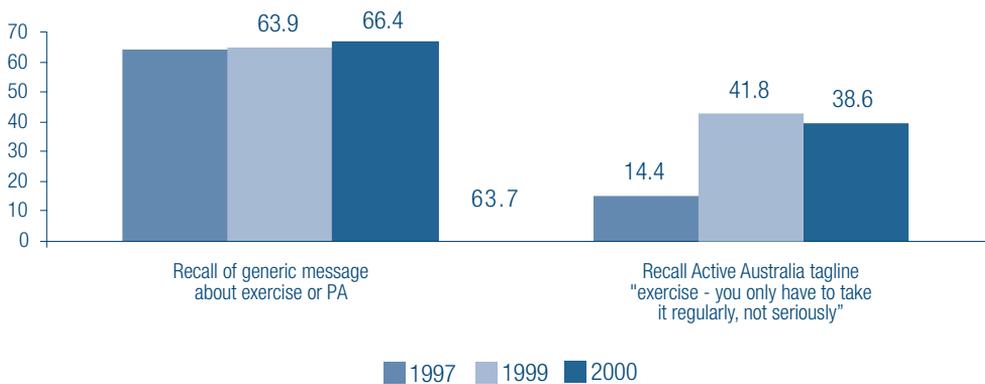
1. Was there an increase in overall awareness of physical activity messages among adult Australians, and, specifically, greater awareness of physical activity campaign message 'Exercise. You only have to take it regularly, not seriously'?
2. Did people increase or change their understanding of the moderate activity message? (Responses to four knowledge statements about activity)
3. Did people change their intention to be more active?
4. Did physical activity change in terms of:
 - a. reported minutes of activity in the previous week?
 - b. reported proportion of the population 'sufficiently' active for health benefit?
 - c. proportion inactive (completely sedentary)?
5. From a range of data sources, (including these surveys) what sub-groups of the population are least active?

Results

Message recall and understanding of the moderate physical activity message

Reported recall of any message about physical activity in the previous month was quite high—reported by nearly 64 per cent of adults in 1997 and 1999 and 66 per cent in 2000 (see Figure 2). Specific recall of the Active Australia tagline increased markedly from 14.4 per cent in 1997 to 42 per cent in 1999, and remained high in 2000.

Figure 2. Awareness of any physical activity message and Active Australia



Understanding of the moderate physical activity message

Understanding of the moderate physical activity message was assessed by responses to four statements asked at each survey. The questions were coded on a five-point Likert scale from ‘strongly agree’ to ‘strongly disagree’. The proportions agreeing with the four statements are shown in Table 1.

Table 1. Agreement (per cent combined strongly agree and agree) with knowledge statements, 1997, 1999 and 2000 surveys

Statement	1. Taking the stairs at work or generally being more active for at least 30 min each day is enough to improve your health	2. Half an hour of brisk walking on most days is enough to improve your health	3. To improve your health it is essential for you to do vigorous exercise for at least 20 min each time, three times a week	4. Exercise doesn't have to be done all at one time—blocks of 10 min are okay
Total 1997 % agree	84.6	90.3	62.2	74.1
Total 1999 % agree	88.1	92.1	60.8	79.2
Total 2000 % agree	87.7	91.2	59.6	78.2

There was an increase in agreement with the first and fourth statement between 1997 and 1999, with no subsequent change to 2000. This suggests agreement with the notions of generally being more active and with 'accumulating activity in bouts of at least ten minutes' having a positive effect on health. The 'half an hour per day' question was generally well understood at all three surveys—over 90 per cent agreed with the statement. There was a slight favourable decline in the proportion agreeing with the 'vigorous activity 3 x 20 essential' statement—this decreased from 62 per cent in 1997 to 59.6 per cent in 2000.

Intention to be more active

Figure 3 shows the trends in the proportions that did not intend to be more active, or intended to do so in the next month or six months. There was no increase in intention to be more active between 1997 and 1999, and a small short-term (one month) increase in intention to be more active in 2000.

Figure 3. Intention to be more active (per cent agree) 1997–2000

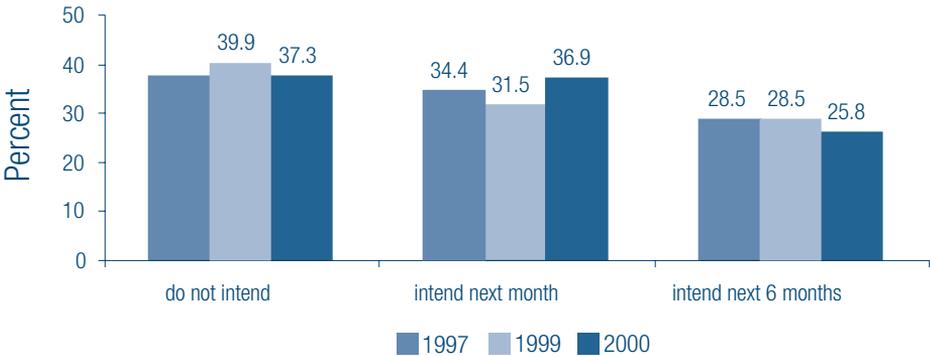


Table 2. Any intention to be more active (per cent agree)

	1997%	1999%	2000%
Sex			
Male	57.0	59.8	60.2
Female	63.1	66.0	65.2
<i>Total sample</i>	61.1	62.9	62.7
Age group (years)			
18–29	73.0	76.3	71.8
30–44	64.7	66.3	65.9
45–59	53.1	54.7	64.0
60–75	41.1	43.4	40.1

Overall, any intention to be more active is shown in Table 2. There were increases in intention for females (1997 to 1999), and for middle-aged adults (45–49 years, 1999 to 2000).

Participation in physical activity

The proportion of the population that met the criterion of sufficient activity for health benefit is shown in Table 3. There was a significant decline from 62 per cent in 1997 to 57 per cent in 1999 and 2000. This decline was noted for men and women, and for all age groups except older adults who showed a small (non-significant) increase in the proportion sufficiently active for health.

Table 3. Trends in 'sufficient' levels* of physical activity, 1997, 1999 and 2000 National samples (Australian estimates)

	1997%	1999%	2000%
Sex			
Male	63.4	59.6	57.6
Female	61.1	53.8	56.0
<i>Total sample</i>	62.2	56.6	56.8
Age group (years)			
18–29	74.0	68.7	68.5
30–44	63.6	53.5	54.2
45–59	53.8	50.0	49.7
60–75	53.4	54.1	54.4
Education			
Less than 12 years	55.1	49.6	50.6
HSC or equivalent	63.0	59.7	58.8
Tertiary	71.9	62.3	62.3

HSC, Higher School Certificate.

* 'Sufficient' time is 150 minutes total of all moderate walking, including vigorous physical activity minutes weighted by two, according to the method reported in Armstrong et al. (2000).

Education gradients showed that the greatest decline was noted for those with tertiary education, declining from 72 per cent in 1997 to 62 per cent in subsequent surveys, representing a 13 per cent decline in the proportion in this group achieving health-related levels of activity. Declines were seen in those with lower educational levels but of small magnitude (8.8% and 6.6% declines, respectively).

Table 4. People reporting no physical activity (sedentary), 1997, 1999 and 2000

	1997%	1999%	2000%
Sex			
Male	13.7	14.6	17.5
Female	13.1	14.7	13.1
<i>Persons</i>	13.4	14.6	15.3
Age group (years)			
18–29	7.3	6.3	10.1
30–44	11.7	16.9	15.6
45–59	18.1	18.2	18.2
60–75	19.2	17.9	18.3
Education			
Less than 12 years	18.2	19.5	20.1
HSC or equivalent	13.1	12.5	13.8
Tertiary	6.2	10.9	10.8

HSC, Higher School Certificate.

Table 5 shows the mean number of minutes spent in walking, moderate activities, vigorous activities and vigorous gardening in the previous week across the three surveys. These data also show declines in each of these dimensions of physical activity between 1997 and 1999 among adult Australians. These measures showed very little change between 1999 and 2000, which indicates that reported activity, across all four dimensions, remained unchanged during this period.

Table 5. Total time for physical activity during previous week, trends over the two time periods 1999 and 2000 (showing mean minutes, 75th and 95th percentiles)

Physical activity	1997			1999			2000		
	Mean min	75th %ile	95th %ile	Mean min	75th %ile	95th %ile	Mean min	75th %ile	95th %ile
Walking	137.0	180	487	114.2	170	420	123.5	180	420
Moderate-intensity	62.3	30	420	54.2	30	360	48.4	20	270
Vigorous-intensity	91.2	120	90	65.0	60	360	67.9	70	360
Vigorous gardening*	86.6	480	480	76.9	90	420	76.2	90	360

* Vigorous-intensity gardening and yard work.

State-level summary data from the first two surveys, in 1997 and 1999, are shown in the text box but no specific State-level estimates are provided because of the small samples sizes from some States and Territories. Generally, the trends were similar across States but the data suggest that increases in awareness were greater in NSW and the ACT than elsewhere in Australia. Declines in participation occurred everywhere but were less marked in NSW and WA.

State-level comparisons for 1997 and 1999

State-level sample sizes ranged from less than 100 to over 1,200, so no inferential analyses among all States would be statistically valid. Nonetheless, major trends between 1997 and 1999 showed that:

- awareness of the specific Active Australia campaign was greatest in the ACT and NSW, with 1999 recall by over 60 per cent of adults;
- knowledge change: measured by improvements in agreement with the statements about 'generally being more active'—this increased most in WA, NSW and Tas, the statement about brisk walking increased most in WA and NSW, the statement about accumulating 10-minute blocks increased most in NSW and NT;
- intention to be more active among people who were insufficiently active was highest in ACT, Tas and Qld in 1997, and in Qld, Tas and NSW in 1999;
- the largest decreases in the prevalence of 'sufficient physical activity for health' (150 minutes in the previous week) between 1997 and 1999 were noted in Qld, Tas, NT and Vic; and
- an additional question, only asked in 1997 and 1999, enquired about participation over the previous six months for an average or usual week—the greatest declines in this measure were noted in Vic, SA, Qld and Tas.

Groups identified as being at greater risk of inactivity

Analyses of representative data from Australian adults have profiled several population groups that were less likely to be active (Armstrong et al. 2000; p 46). The purpose of identifying these groups is to understand the populations that are more likely to be inactive, so that programs can take account of these groups. Six factors were associated with inactivity:

- women were 20 per cent less likely to report leisure time physical activity (LTPA) than men;
- people in all age groups were less likely to be active than people aged 18–29;
- there was a middle-aged ‘slump’ with lowest rates of activity among adults in their 40s and 50s, compared to the immediate post-retirement group (aged 60–69) that was slightly more active;
- people who had attained tertiary education were more likely to report sufficient LTPA than people who were least educationally advantaged but there have been opposite trends in recent years—declines in activity among middle-aged people who are most educated—suggesting that work pressures and lack of time may be playing a part in the decline in activity levels of adult Australians;
- people who did not speak English at home were less likely to report activity, even after adjustment for other demographic differences—this is a generic difference because the sample within any specific ethnic group was too small to detect differences accurately; and
- married women, especially those with children, reported less LTPA than their age-matched single counterparts.

It is apparent from other research that Indigenous adults are less active (NSW 1996), although even large population surveys have included too few Indigenous people; the detailed National Aboriginal and Torres Strait Islander Health survey in 1994 did not collect physical activity data. Other determinants include social supports, perceived social environments for activity (Macdougall et al 1997), perceived barriers to being active (Owen 1992). The USSG’s report identified other factors that were associated consistently with activity, including the presence of social supports, enjoyment of the activity, and perceptions that activity was not vigorous (USDHHS 1996).

Other intra-individual factors influence activity; for example, situation-specific confidence (self-efficacy), and beliefs about the benefits of activity may contribute to an individual’s likelihood of engaging in LTPA. There are also larger-scale economic and structural barriers, such as access to facilities, or being able to afford necessary equipment or programs, and other aspects of the social and physical environment are discussed further in chapter 2.6.

1.3.3. Conclusions

This chapter has identified various measures used to assess physical activity in Australian population surveys over recent decades. The main focus was to describe trends based upon recent population surveys of physical activity in Australia. Only one-half of the adult population achieves the recommended 150 minutes of at least moderate activity each week. This is a more attainable threshold than earlier recommendations for 'aerobic' levels of activity but large proportions of Australian adults do not achieve this level. The three identical and seasonally-matched surveys conducted in 1997, 1999 and 2000 showed that there were National increases in recall of the Active Australia message, and in some aspects of understanding the new moderate physical activity message, but declines in total participation in physical activity.

There were no seasonal or sample differences that might have explained this observation, and additional surveys are needed to confirm this trend. However, the interpretation is that at best, no change in activity participation has occurred. Moreover, the decline seems to have been smaller in NSW and the ACT, regions with stronger community Active Australia campaigns to increase community understanding about activity during 1998 and 1999.

Population data are also used to describe the sub-groups that are less active, so that equity-focused and targeted interventions and programs can be developed. Attention to these trend data, and to the groups identified for interventions, should be part of a best-practice approach to promoting physical activity.



References

- Armstrong T, Bauman A, Davies J. (2000). Physical activity patterns of Australian adults. AIHW Catalogue CVD 10. Canberra: Australian Institute of Health and Welfare.
- Bauman A, Owen N, Rushworth RL. (1990). Recent trends and socio-demographic determinants of exercise participation in Australia. *Community Health Studies* 14:19-26.
- Bauman A, Bellew B, Booth M et al (1996). Towards best practice for the promotion of physical activity in the areas of NSW. NSW Health Department.
- Bauman A, Brown W, Bellew B, et al. (1999). NSW 1996 physical activity survey: summary of major findings. NSW Health Department. www.health.nsw.gov.au/public-health/health-promotion.
- Bull F, Milligan R, Rosenberg M, et al. (2000). Physical activity levels of Western Australians, 1999. Perth: Health Department of Western Australia.
- Department of Human Services. (1999). South Australian Physical Activity Survey 1998. Adelaide: Department of Human Services, Government of South Australia.
- Department of Health and Aged Care (DHAC). (1999). National Physical Activity Guidelines for Australians, Canberra.
- Macdougall C, Cooke R, Owen N, et al. (1997). Relating physical activity to health status, social connections and community facilities. *Australian and New Zealand Journal of Public Health* 21:631-7
- National Heart Foundation of Australia (NHF). (1989). Risk factor prevalence study No. 3. Canberra: NHF
- NSW Health, Public Health Division (2000), The health of the people of New South Wales-Report of the Chief Health Officer. NSW Health Department: Sydney.
- Owen N, Bauman A. (1992). The descriptive epidemiology of a sedentary lifestyle in Australia. *International Journal of Epidemiology* 21:305-10.
- Smith J, Owen N, Leslie E, et al. (1999). Active for life physical activity patterns in Victoria 1998. Melbourne: Victorian Department of Human Services.
- United States Department of Health and Human Services (USDHHS). (1996). Physical activity and health: a report of the Surgeon General. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion.

1.4. Towards best practice: evidence and policy implications

Summary

Definitions of 'best practice' are necessary for policy makers and practitioners to have a good understanding of the types of programs and strategies that may result in greater participation in physical activity in Australia. Best practice is defined in terms of a scientific evidence base, and also the potential for programs to help achieve the goals of Active Australia partners and others interested in promoting activity. The evidence for the health benefits of activity, and trends suggesting no increases (and possibly declines) in physical activity in recent years, provides a strong case for increased attention and resources being devoted to this area.

1.4.1. Definitions of 'best practice'

This document is concerned with describing the state of the art with respect to increasing levels of physical activity among Australians. In order to achieve that, a 'best practice' approach is taken. This term is a misnomer, as it really implies 'better', rather than 'best' practice. It implies an improvement in current practices, to increase the likelihood of physical activity gains, or changes in likely antecedents of physical activity, as a result of programs and strategies.

The best-practice approach has its historical origins in the desire to promote effective and efficient programs to achieve a specific objective. A health-sector-derived framework is presented, that begins with the World

Health Organization's (WHO) definition of health promotion in broader terms than disease prevention alone. Health promotion is viewed as a societal resource, which requires a comprehensive and lifespan approach across different groups and settings, and is enhanced through partnerships across multiple sectors (WHO 1998). The priorities in health promotion included the building of broad and comprehensive frameworks for multisectoral intervention, and the accumulation of knowledge about best practice.

A relevant WHO initiative was the program entitled 'Global Active Living' in 1997, which emanated from public health, health promotion, Sport for All and many other movements, and culminated in several WHO meetings in Geneva. This process was reported as a 'statement on Active Living', at the Jakarta Conference for Health Promotion (Kickbush 1998). This identified the centrality of physical activity programs and policies within health promotion. The position paper also stated that:

Experience so far suggests three pathways to successful development and implementation of active living programs:

- sound scientific basis leading to policy support and programs;
- development and evaluation of [community] programs with an intersectoral involvement; and
- effective advocacy as well dissemination and communication of information.

These elements provided different ways of describing 'successful' initiatives, and encompassed ideas later described as 'best

practice'. To date, there is little in the academic literature on best practice, and at the administrative levels, it has generally been used to imply quality assurance. A group at the Center for Health Promotion in Toronto has developed the definitions further, defining best practice as 'sets of processes and actions consistent with [health promotion] values, evidence and ... that are most likely to achieve specific goals in a given situation' (Kahan and Goodstadt 2000). There are still various interpretations of this definition. One component is an evidence base, derived from research published in the peer-reviewed scientific literature. Another approach is based on values, such as equity, dealing with marginalised or disadvantaged populations, and consistent with a public health approach. A third may be based on the development and dissemination of more general guidelines for 'best-practice' programs. A fourth is an epidemiological outcomes framework that describes best practice in terms of programs that achieve the greatest levels of measurable outcomes—this may be similar to the evidence-based approach listed first.

All of these options are relevant to physical activity promoting efforts. Programs to increase physical activity among Australians should be based in scientific evidence of what works. One limitation is that innovative programs or collaborations across sectors initially may have little scientific evidence, and then require careful evaluation to assess their effects and wider applicability.

Best practice should start with careful identification of the problem, target populations or groups at risk, and the development of interventions that are consistent with the best available conceptual and theoretical models. Program planning and implementation should be accompanied by careful evaluation, so that effects—particularly for new programs or those that involve special population groups—can be understood.

One limitation to the advancement of best practice is a failure to disseminate positive scientific research findings and to translate them into practice (Nutbeam 1996). All of these elements contribute to best practice, in any efforts to increase participation in physical activity. In subsequent chapters, the current knowledge of physical activity programs is described, and the available evidence or suggestions for best practice in specific programs in each setting or with specific population groups is assessed.

1.4.2. Policy implications

There are substantial policy implications of the new epidemiological evidence, the recent population data and the notion of investing in best practice programs. Evidence is required by policy makers to identify programs and strategies which are most likely to result in increased activity levels, so that judicious investment of scarce resources can be directed to these programs. Accountability is required from physical activity program managers, to ascertain and report on the effective components of their practice.

The case for physical activity is clear. There would be substantial health gain as well as health cost savings if more Australians became more physically active. Physical activity is now in the same context of public health priorities as controlling blood pressure or cholesterol, and almost as important to disease prevention as tobacco control. It has important implications for quality of life and community well being (Brown et al. 2000), as part of broader social health. The relative importance of physical activity is now identified, both in physical activity-specific reviews (USDHHS 1996) and in general reviews of the major contributors to mortality (McGinnis and Foege 1993).

One of the first policy developments has been the development of National Physical Activity Guidelines (DHAC 1999). These encompass the new moderate and incidental physical activity messages, based on the evidence described above. They were

developed through community and professional consultation, guided by an expert steering committee to reflect current scientific evidence. The guidelines focus on enjoyment, and do not neglect the additional benefits to be gained from more prolonged or vigorous activity, especially among young adults. Nonetheless, the primary focus of these guidelines is to emphasise moderate intensity and incidental activity, and integrate these into the fabric of everyday life.

The guidelines now require intensive dissemination to health professionals and to the general community. The strategies for disseminating these guidelines will differ for health professionals, the general community or to special populations. Efforts at developing interventions should be preceded by efforts to increase awareness of these guidelines. Several of the key recommendations of the guidelines are shown in Table 6.

Table 6. National Physical Activity Guidelines for Australians

National Physical Activity Guidelines for Australians

- Think of movement as an opportunity, not an inconvenience
- Be active every day in as many ways as you can
- Put together at least 30 minutes of moderate intensity physical activity on most, if not all days of the week
- If you can, also enjoy some regular vigorous exercise for extra health and fitness

Source: Department of Health and Aged Care 1999

Despite this evidence, physical activity has to date been under-recognised and has globally received less attention and less funding as a health imperative. For many other agencies and sectors, it receives even less attention. In other sectors, the focus may be on, for example, encouraging organised sporting and recreation activities rather than total overall activity, or promoting transportation systems rather than the physical activity agenda of ‘active commuting’, or physical education curricula rather than ‘active children’, or building freeways rather than ‘active communities’. There is a need to reframe and reorient health policy, and other policy, towards more emphasis on ‘active living’ in a range of sectors, through partnerships and combined action.

Although there have been several initiatives in recent years, these efforts have been moderately resourced and there have been insufficient successful outcomes in participation levels to date. On the contrary rates of physical activity appear to have declined in Australia since 1997. Although the Active Australia message is better recognised, and the message about moderate intensity is better understood by the general community, levels of actual participation are lower than in 1997 in most States and Territories (chapter 1.3). This section also outlined population groups who were less likely to be physically active; these groups are similar to those identified in previous population research 10–20 years ago. This suggests the need for equity focused programs, targeting teenage girls, people at social or economic disadvantage, as well as those from a non-English-speaking or Indigenous background.

To summarise these issues, better evidence exists for investment in physical activity, and there is a better rationale for developing programs and policies in this area. Nevertheless, and notwithstanding the promising start developed through the initial Active Australia communications programs, the trends in participation are not encouraging.

The central challenge is to turn this evidence into appropriately funded health policy and programs. The next step is the even greater challenge of implementing integrated and multi-sectoral strategies to increase activity across the whole population (Sallis et al. 1998). Partners from beyond the Health sector are essential to this process; increasing physical activity requires the contributions not only of health promotion and behaviour change specialists, but also of professionals in the recreation and leisure sector, educators, and those in departments of urban planning, transport, environmental design and local government. The establishment of good monitoring systems to assess the impact of these strategies is an important investment, with changes in the prevalence of physical activity as the key outcome indicator. The next steps will be the development of effective multisectoral collaborations around physical activity (see part 4).

References

Brown WJ, Mishra G, Lee C and Bauman A. (2000). Leisure time physical activity in Australian women: relationship with well being and symptoms. *Research Quarterly for Exercise and Sport.*: 71(3) 206-16

Department of Health and Aged Care (DHAC). (1999). *National Physical Activity Guidelines for Australians*. Canberra.

Kahan B, Goodstadt M. (2000). *Best practices in health promotion working group*. Toronto: Center for Health Promotion, University of Toronto.

Kickbush I. (1998). WHO Statement on Active Living. Fourth International Conference on Health Promotion, Jakarta, July 21–25 1997.

McGinnis JM, Foege WH. (1993). Actual causes of death in the United States. *Journal of American Medical Association* 270:2207-12.

Nutbeam D. (1996). Achieving best practice in health promotion—improving the fit between research and practice. *Health Education Research* 11:317-26.

Sallis JF, Bauman A, Pratt M. (1998). Environmental and policy interventions to promote physical activity. *American Journal of Preventive Medicine*15(4):379-97.

United States Department of Health and Human Services (USDHHS). (1996). *Physical activity and health: a report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion.

World Health Organization. (1998). Fifty-first World Health Assembly, policy initiative WHA51-12. Geneva: WHO.



Part 2.

Interventions to
increase participation
in physical activity in
specific settings



PART 2

INTERVENTIONS TO INCREASE PARTICIPATION IN PHYSICAL ACTIVITY IN SPECIFIC SETTINGS

2.1 Linking research, practice and policy in the promotion of physical activity

Part 2 describes an organising framework for efforts to influence physical settings across Australia. This is comprised of a chapter on each setting, and a review of the evidence that promoting activity can be influenced effectively in that setting. This first chapter sets the scene for interventions, by providing a health promotion framework for physical activity programs, consistent with, and derived from the World Health Organization's 'Active Living' program.

2.1.1. Comprehensive approaches to physical activity

In view of the evidence for the health benefits of physical activity, the public health gain that may be possible from encouraging Australians to become more active is substantial (see chapters 1.1 and 1.4). Working towards increasing levels of physical activity in the Australian community is now a public health priority. However, major challenges remain in determining the most appropriate settings and methodologies for increasing population levels of physical activity in Australia.

There is growing recognition that while interventions in some settings may prove independently effective in raising community levels of physical activity, a combination of strategies is optimal to increase physical activity levels at the population level (Donovan and Owen 1994, King 1991). The World Health Organization (WHO) has acknowledged that comprehensive approaches to health development are the most effective (WHO 1997a).

A comprehensive approach, targeting the range of settings and population groups outlined in this report, with a combination of strategies can help ensure that:

- planners, policy makers and decision makers consider broader community impacts and are actively involved in physical activity coalitions and collaborations;
- social supports are provided in an equitable way that enables broad participation;
- the social and physical environment is supportive to participation;
- a range of convenient and enjoyable options for participation are provided;
- inequalities in health status are reduced;
- individuals have positive beliefs about the benefits of physical activity and the necessary knowledge to make informed choices; and
- individuals have enhanced skills and confidence in their ability to engage in physical activity.

Part two describes best practice in defined *settings* for promoting physical activity, including general practice, schools, worksites and community settings. In addition, approaches through environmental changes and policy interventions are included as a setting. WHO acknowledges that settings offer practical opportunities for the implementation of comprehensive health promotion strategies. These are described in chapters 2.2 to 2.7.

Part three of this document takes a physical activity perspective on special population groups, including a lifespan approach to promoting physical activity. This includes an equity focus on disadvantaged groups, and on groups least likely to be physically active or to be able to afford or access programs or facilities that encourage active participation.

2.1.2. A health promotion framework

Approaches to increasing population levels of physical activity in Australia can be described using a health promotion framework.

Comprehensive approaches are consistent with WHO policy (WHO 1986, WHO 1997a) and give due priority to strategies that:

- build healthy public policy;
- create supportive environments;
- strengthen community action;
- develop personal skills; and
- re-orient health services (WHO 1986).

In addition to the public health benefits that may accrue from a physically active community, it is important to acknowledge

the many benefits that physical activity can deliver that relate to the core business of transport, local government, education, planning, environment and sport and recreation. Physical activity is indeed a whole-of-community concern. An implication of this is the necessary priority that must be afforded to building partnership in the development of approaches to increasing physical activity levels in the community.

There is potential for physical activity to make an important contribution to social capital in neighbourhoods and communities (Putnam 1993). Physical activity can contribute to a sense of community, provide connectedness and freedom from isolation. This is linked to growing evidence about the importance of underlying social and economic determinants of health. Achieving sustainable increases in levels of community physical activity, and changes in the physical and social environment that will support physical activity choices, will require the forging of new partnerships and collaborations with sectors outside health (Harris et al. 1995; WHO 1997b; USDHHS 1996).

Successful partnerships between sectors require hard work and good will, as well as commitment to action, a considerable investment in building relationships, an agreed plan of action and planning to sustain outcomes (Harris et al. 1995). In addition, partnerships need to be constructed in such way that agreements are transparent and accountable and there is mutual understanding and respect among the players (WHO 1997, National Public Health Partnership). Partnership among agencies can result in efficiencies through

combined resources and programs (NSW Taskforce 1996). A critical element of any intersectoral partnership is the recognition of the interdependence among the partners to achieve a common end. It may be the means to an end that organisations share. For example, while health, transport and the environment seek quite different ends (improved health, decongested roads, clearer air respectively), the means to these ends (walking, cycling, public transport) may be the area where common ground can be found and built upon.

The partnership between research and practice is critical. When interventions are being planned, implemented and evaluated, major gains can be made by bringing together the complementary skills of researchers and practitioners (Holman 1996).

The next dimension of a health promotion framework is the provision of information, through community education and campaigns, to promote awareness of the benefits of being active. WHO contends that access to education and information is essential to achieving effective participation and the empowerment of people and communities (WHO 1997a). Specific cognitive behavioural skills have been found to be more prevalent among active members of the community (Corti and Bull 1998). The ability to plan exercise into a daily routine, set specific goals, and the presence of social support are all potentially important social–cognitive contributors to physical activity participation. Therefore, education that focuses on cognitive training in these skills, may assist individuals to translate their good intentions into action (Corti and Bull 1998).

Another important dimension is the notion of a supportive environment. Physical activity can be made convenient, easier, safer and more enjoyable through initiatives designed to influence the physical environment. This includes aspects of the physical environment, such as walking trails, park redevelopment, and provision of recreational facilities. Aspects of the social environment, including social support for activity and the provision of childcare, are also important.

It is clear that education is more effective when it takes account of social and cultural factors as well as those relating to health. Inactive people are more likely to be older, less well-educated and on lower incomes. (Stephens et al 1985; see also chapter 1.3) This has important implications for the development of targeted educational strategies. For example, consideration of social and cultural factors for parents (particularly women) who may lack time and opportunity for exercise, potentially leads to an intervention that makes physical activity more convenient through community based and neighbourhood programs or community facilities where child care is provided.

Another aspect of education is increasing skills in the professional workforces concerned with physical activity. This includes health professionals, local Government planners, sport and recreation professionals, general practitioners and allied health professionals.

Capacity building has been defined as ‘An approach to the development of sustainable skills, organisational structures, resources and commitment to health improvement in health and other sectors, to multiply health

gains many times over' (Hawe et al. 1999). The framework and indicators have much to offer in terms of assessing program sustainability, the strength of coalitions and the quality of program planning.

Finally, a health promotion perspective endorses an equity framework, identifying the people who are least active in the community, and developing specific interventions to address disparities among groups in physical activity behaviour or in their access to physical activity promoting environments or services. Physical activity interventions should consider the needs of people of different cultures or ages, and people with disabilities. The implications of geography, climate and remoteness on participation in physical activity should also be considered in the design of interventions.



References

- Corti B, Bull F. (1998). Increasing participation in physical activity—a review of published interventions. Report for the Commonwealth Department of Health and Aged care. Canberra: CDHAC.
- Department of the Arts, Sport, the Environment and Territories. (1992). Pilot survey of the fitness of Australians. Canberra: AGPS.
- Department of Health and Aged Care (DHAC), Australian Institute of Health and Welfare (AIHW). (1999). National health priority areas report. Cardiovascular health 1998. Canberra: AIHW.
- Department of Health and Aged Care (DHAC). (1999). National Physical Activity Guidelines for Australians. Canberra.
- Donovan RJ, Owen N. (1994). Social marketing and population interventions. In Dishman RK (Ed.), *Advances in exercise adherence*. Champaign, Illinois: Human Kinetics. pp 249-90.
- Harris E, Wise M, Hawe P, et al. (1995). *Working together: intersectoral action for health*. Canberra: AGPS.
- Hawe P, King L, Noort M, et al. (1999). *Indicators to help with capacity building in health promotion*. Sydney: NSW Health Department.
- Holman CDJ. (1996). Creating partnerships, building systems: Improving interactions between research and practice. *Health Promotion Journal of Australia* 6(2):21-5.
- King A. (1991). Community interventions for promotion of physical activity and fitness. *Exercise and Sport Sciences Review* 19:211-59.
- National Public Health Partnership URL: <http://www.dhs.vic.gov.au/nphp>
- NSW Premier's Taskforce on Physical Activity (NSW Taskforce). (1996). *Simply active every day: A plan to promote physical activity in NSW 1998 - 2002*. Sydney: NSW Health Department, Public Health Division.
- Putnam RD. (1993). *Making democracy work*. Princeton, New Jersey: Princeton University Press.
- Stephens T, Jacobs DR, White CC. (1985). A descriptive epidemiology of leisure-time physical activity. *Public Health Reports* 100:147-58.
- United States Department of Health and Human Services (USDHHS). (1996). *Physical activity and health: a report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, pp 3-8, 85-151.
- World Health Organization. (1986). *The Ottawa Charter for Health Promotion*. Geneva: WHO.
- World Health Organization. (1997a). *The Jakarta Declaration on leading health promotion into the 21st century*. Geneva: WHO.
- World Health Organization. (1997b). *Active Living policy* (Net address <http://www.who.int/hpr/active/index.html> no longer appears to be regularly functional, possibly due to restructuring of divisions in WHO – similar information available through the Non Communicable Disease Branch, Physical Activity Programme).

2.2 Promoting physical activity through general practice

General practice is an important setting for promoting physical activity given the great population-wide access to people of all ages. The evidence base is increasing, and suggests that short-term increases in physical activity are possible after brief, structured advice in this setting. Several Australian and New Zealand programs show considerable promise, and some principles for good practice are suggested.

2.2.1. Why general practice?

General practice has been the focus of interest in recent years as a setting for health promotion strategies, in particular the role of general practitioners (GPs) in increasing their patients participation in physical activity. The GP holds a unique position in influencing patients. As the largest single body of providers of health care, GPs see about 83 per cent of the Australian adult population each year (Bridges-Webb et al. 1992). Furthermore, doctors are seen by the public as credible sources of information, and patients perceive health promotion to be part of the GP's role. Indeed, the GP is often identified as the preferred source of health information on exercise (Booth et al. 1997).

Prevention activities and health promotion in general practice are recognised as important areas of primary health care in policy documents issued by the Royal College of General Practitioners (RACGP) and in the 1998 GP Strategy Review. The RACGP Guidelines to preventive screening (RACGP

2001) outlines the preventive activities that should be undertaken across the lifecycle, including advice on exercise. The College's publication 'Putting prevention into practice' (RACGP 1998) was designed to help GPs identify ways to undertake prevention activities; it recommends general practice as a setting for health promotion and that health promotion not be limited to patients receiving verbal advice from their doctors.

The context of primary care is a potential setting for physical activity programs, and is broader than general practice, but there is very little published evidence of the effectiveness of interventions to promote physical activity in this broader setting, which includes community and allied health settings. One study investigated the potential for physiotherapists, working in allied health departments in hospitals, to promote and encourage moderate physical activity—this trial produced modest increases in participation and confirmed the feasibility of evidence-based research in this setting (Sheedy et al. 2000). This is a potential opportunity that remains to be researched; thus, the information presented here is confined to the setting of general practice, for which some evidence exists.

2.2.2. Strengths of the general practice setting

General practice is an attractive setting for promoting physical activity due to its reach into the general population. The majority of Australian adults visits a doctor at least once a year—often such a visit is the individual's first point of contact with the health care system. It is suggested that effective

interventions in general practice have the potential to lead to positive effects on health care expenditure (RACGP 2001). General practice is an important setting for reaching older people and people with chronic diseases, who could benefit from increased physical activity. GPs are reliable sources of health information and the consultation represents a unique opportunity to provide personalised counselling on behaviour change. The opportunities to promote physical activity are not limited to the consultation and there is scope for interventions to use the waiting room, referral to other providers of advice and/or programs of physical activity, interventions using the patients' records and reminder systems, and other practice staff. More recent discussion has considered the role of general practitioners in community campaigns and the potential for GPs to be local advocates or lobbyists in support of environmental and policy changes to support physically active lifestyles. Furthermore, new research has broadened the context of primary care settings in Australia, to include the provision of exercise advice from other professionals (Halbert et al. 2000).

2.2.3. Barriers to the promotion of physical activity in general practice

The barriers to health promotion and, specifically, the promotion of physical activity in general practice are well known. Many surveys have been conducted with GPs to identify the opportunities and barriers to health promotion in practice in the USA and to a lesser extent in the UK. Five studies of Australian doctors have been undertaken

that include some aspect of the promotion of physical activity and doctors attitudes and practices related to physical activity (Bull et al. 1995, Bull et al. 1997, Bauman et al. 1989). The most frequently identified barriers facing future interventions in general practice in Australia were a lack of time, lack of training and expertise, financial disincentives, poor perception of the effectiveness of interventions, conflicting expectations of patients and doctors, and limited resources (Bull et al. 1995, Bauman et al. 1989).

Some of these barriers are clearly linked. For example, lack of time is likely to be associated with lack of training in brief interventions and the disincentives embedded in the current systems of reimbursement. Additional or improved continuing medical training in the area of health promotion and behaviour change may help combat the current pessimism about the effectiveness of interventions and the doctors' own approaches to patient education. Some of the barriers, however, need practical responses at the local or State level, such as the provision of resources and interventions of proven effectiveness. Other barriers are more systemic in nature and need addressing at the National level, such as, addressing the issues of training in medical school, financial reimbursement for preventive advice and provision of additional allied health staff; all require the key stakeholders to be involved. Clearly, any program or intervention must address as many of these key barriers as possible.

2.2.4. Summary of the research evidence on interventions in general practice

There have been three reviews of physical activity interventions delivered through the general practice setting (Ashenden et al. 1997, Eaton and Menard 1998, Simons-Morton et al. 1998) that collectively identify a total of 17 studies. These studies include both multiple risk factor interventions and single-focus (physical activity) interventions and vary in terms of who delivered the intervention (GP, nurse practitioner, health educator) and the components included in the interventions. Moreover, there is considerable variation in the method of patient recruitment to these trials, the outcome measures, and the length of follow-up. Unfortunately, the heterogeneity amongst the relatively small number of studies makes it inappropriate to conduct a statistical meta-analysis. However, it is possible to identify a general pattern in the findings and to identify the types of intervention that are producing beneficial outcomes.

The results of 10 trials have been published that were undertaken to test the effectiveness of promoting physical activity in general practice (Lewis and Lynch 1993, Schultz 1993, Calfas et al. 1996, Marcus et al. 1997, Swinburn et al. 1998, Bull and Jamrozik 1998, Stevens et al 1998, Smith et al. 2000, Halbert et al. 2000, Pinto et al. 2001). In most instances, a common feature is brief advice or counselling on exercise given by the GP. Additional information, such as a health education pamphlet or booklet or a written prescription on exercise, was sometimes given (or sent) to the patient as

an adjunct to the verbal advice. Most studies had short-term (4–6 weeks) follow-up and only a few trials included longer-term (6–8 months) follow-up. The outcome measures included total minutes of physical activity (or walking), total sessions of activity and change in intention or stage of change (Marcus et al. 1997). Other categorical measures included whether or not the patient met certain criteria, such as the recent recommendation from the US Surgeon General's report on physical activity (USDHHS 1996) for 30 minutes of moderate activity (equivalent to an energy expenditure of 800–1,000 kcal) on most days of the week.

The results across the studies show that brief interventions involving verbal advice on physical activity and the provision of supporting materials can produce modest, favourable increases in physical activity participation in the short term. There is no evidence indicating that these brief strategies can lead to sustained increases in participation in the longer term and there have been no studies of the relative effectiveness of interventions delivered by doctors, nurse practitioners and allied health professionals. A recent study by Halbert et al. (2000) used exercise scientists in this way, with modest success. Furthermore, it is not clear whether these interventions are more or less effective with older or younger patients or with males or females. No study has examined any differential effect across race or ethnicity, or health conditions.

2.2.5. Encouraging GPs to promote physical activity

The time pressures under which GPs work, and the competing demands upon them to participate in a range of activities beyond their routine care services, mean that encouraging them to promote physical activity is difficult. Some general tips for the recruitment and training of GPs are:

- form a partnership with local Divisions of General Practice and identify common goals for promoting physical activity;
- contact the RACGP and identify how your program may attract Continuing Medical Education (CME) and Clinical Audit points as an incentive for GPs to participate;
- promote the scheme through a CME session about physical activity and in related sessions that may be held (e.g. addressing cardiovascular disease, diabetes, falls etc); and
- contact interested individual GPs directly, by letter and/or telephone to explain the program and invite them to participate.

These strategies have been combined in various ways, e.g. workshops with telephone follow-up; written materials with academic detailing. As a general rule, personal contact with GPs—by telephone or face-to-face meeting—is the most important element in encouraging use of a behavioural intervention strategy. However, this approach is the hardest to organise and requires the most resources.

After interested GPs have been recruited, they need to be trained in the process of the intervention. Typically, there are two methods of training: 1. academic detailing on a one-to-one basis, usually in the GP's own practice, and 2. conducting a CME session specifically on the importance of physical activity and to provide an overview of specific tools that you would like them to use. The latter method may supplement or replace academic detailing.

2.2.6. Common intervention strategies used in general practice

Most interventions on physical activity involve:

- patient screening to identify current level of activity and readiness (motivation) to be more active;
- provision of brief advice or counselling on exercise by the GP;
- supporting written materials such as health education booklets; and, or
- written prescription for exercise.

Screening—Patients can complete short health surveys in the waiting room or be asked a series of questions by the doctor. Both approaches have advantages and disadvantages.

Advice on physical activity—The focus of advice has been to recommend 30 minutes of moderate intensity physical activity on most days of the week. The GP is ideally situated to highlight the importance of physical activity to the patient. A structure for delivering advice that was used in Project PACE in the United States was:

- ask the patient about their physical activity habits, their current risk factors, the benefits they hope to gain from physical activity and their barriers to activity;
- advise about benefits of physical activity, measures to overcome barriers and next steps that are appropriate to the patient's ability and motivation;
- assist through additional information materials, tools to develop a plan and monitor progress; and
- arrange follow-up appointments or other methods of reinforcement and support (e.g. phone calls, post cards).

Prescriptions for exercise—these are prescription pads with information for the doctor and patient on ways to be more active. Space is available for the doctor to give specific details for the patient on appropriate types, frequency and duration of activity. They were first tested in New Zealand with the 'Green Prescription' and the results were promising (Swinburn et al. 1998). Subsequent trials have been conducted in NSW and Victoria (Smith et al. 2000).

Supporting written materials—these are typically based on the stage-of-change model and provide details on the recommended level of physical activity and different ways to be more active. The materials are usually handed to the patient by the doctor in conjunction with the verbal advice or they can be sent to the patient through the mail. The latter approach can act as a reminder and overcome problems with doctors forgetting to give the materials

out but posting the materials requires additional administration.

Other strategies—other strategies that may offer some potential for the promotion of physical activity through general practice have not been explored fully:

- referral to other health professionals for counselling on physical activity;
- links to recreation facilities;
- promotional materials in the waiting room—e.g. posters, video tapes; and
- use of computer technology for screening patients or storing health education materials .

Case studies—Below are brief summaries of several current and recent interventions in the general practice setting. For a detailed description of individual trials, please see the primary references and the review papers.

- Project PACE in the United States was directed towards inactive patients who were coming in for a 'well-visit' (Calfas et al. 1996). Patients completed a short questionnaire in the waiting room, this was scored by the practice receptionist, and the doctor gave three to five minutes of counselling that was matched to the patient's stage of readiness to be more active. Patients also received a 10-minute booster telephone call two weeks later. Although the allocation to control or intervention group was not randomised, this study found small but significant improvements in the time spent walking, among intervention subjects after four to six weeks. In the Activity Counseling Trial, a randomised controlled trial with recruitment in 1995–1997, with 24 months of follow-up, 11 primary care

facilities affiliated with three US clinical research centres participated. The volunteer sample included 395 female and 479 male inactive primary care patients aged 35 to 75 years without clinical cardiovascular disease. Participants were assigned randomly to one of three groups: advice (n=292), which included physician advice and written educational materials (recommended care); assistance (n=293), which included all the components received by the advice group plus interactive mail and behavioural counselling at physician visits; or counselling (n=289), which included the assistance and advice group components plus regular telephone counselling and behavioural classes. Two patient counselling interventions differing in type and number of contacts were equally effective in women in improving cardiorespiratory fitness over two years compared with recommended care. In men, neither of the two counselling interventions was more effective than recommended care (The Writing Group 2001).

- In the Green Prescription trial in New Zealand, GPs were required to identify patients who might benefit from physical activity counselling, based on their health and their level of motivation, and to deliver some verbal advice about physical activity (Swinburn et al. 1998). A randomly-selected one-half of these patients had the advice and specific

goals written down on a Green Prescription. Patients receiving the prescription were more likely to be doing any physical activity after 6 weeks but the average duration of activity in minutes was not significantly different between the groups.

- A study carried out in Western Australia (Active Practice Perth) targeted sedentary patients (who did no physical activity) and entailed brief advice from GPs and supporting written material on physical activity (Bull and Jamrozik 1998). The purpose of the study was two-fold: 1. to evaluate the effectiveness of a brief intervention on physical activity in increasing the level of participation in physical activity by sedentary patients, and 2. to compare the effectiveness of two versions of the intervention, namely, advice from a GP plus a standard pamphlet, and advice from a GP plus a computer-generated tailored pamphlet. All sedentary adults attending the general practice were allocated to one of two interventions or to a no-intervention control group. Two days after the consultation patients were mailed either a 'standard' or 'tailored' information pamphlet as a form of additional instruction and reinforcement (Bull et al. 1999). The results showed that people receiving the intervention were significantly more likely to be active after one and six months but there was no difference between the groups after 12 months. There were also differences in the frequency but not duration of activity between the intervention and control

groups at one month. Although more tailored subjects than standard subjects reported participating in physical activity at both one and six months, this difference was not significant.

- The South Eastern Sydney Area Health Service (SESAHS) General Practice Physical Activity Project – Interested GPs within the St George Division of General Practice were trained to assess physical activity and give brief physical activity advice to patients. Patients consented to a telephone follow-up eight weeks later. Significant increases in physical activity were reported; however, the lack of a control group reduced the significance of the findings. Nonetheless, positive outcomes were obtained reinforcing the role GPs may play in promoting physical activity (Porter and Eccelston 1998).
- Active Practice NSW aimed to promote physical activity to routine care patients using brief advice, an active prescription and supporting booklets (NSW Health 1999, Smith et al. 2000). Because it was a controlled trial, control patients were recruited from the same practices as the intervention patients only they did not receive any physical activity counselling. The intervention patients were given brief verbal advice and an active prescription during their visit with the GP, after approximately one week a randomly-selected one-half of the intervention patients was mailed a supporting booklet. The patients who received the advice, prescription and booklets were significantly more likely to be active than the control group at six to 10 weeks.

However, while a difference still remained between groups it was not significant at seven to eight months. The advice-and-prescription-only group reported more physical activity than the control group at both follow-up visits but, again, the difference was not significant. Results were strengthened by treatment received analysis reporting significant results at seven to eight months for the prescription-plus-booklet group. The results indicate that this form of physical activity intervention delivered through general practice was feasible and effective in the short-to-medium term.

2.2.7. What is happening in Australia now?

In addition to the programs describe in section 2.2.6, several innovative and important programs are being developed or trialled in Australia at present. Some of these are conducted as research projects, and some by NGOs or States' health departments; the following examples illustrate the range of programs.

Active Practice II in 2000 (New South Wales)—was a randomised controlled trial using a similar intervention strategy to that employed in the first Active Practice trial (Smith et al. 2000) but focusing on usual patients compared to those with diagnosed hypertension. Perhaps patients with physical-inactivity-related chronic disease may benefit more from GP counseling.

Active Prescription Dissemination (New South Wales)—the New South Wales Division of the Heart Foundation is working with the Divisions of General Practice to provide GPs with evidence-based resources

(Active Prescription Kit) to assist the promotion of physical activity through general practice. More than 6,000 Active Prescription pads were distributed to interested Divisions and, or ordered by individual GPs. Various methods of distribution were used, depending on the Division of General Practice. Further dissemination and training is planned, along with an audit of Divisions and the use of the Active Script.

Active Script (Victoria)—a project designed to teach Victorian GPs to assess and advise patients on physical activity, adapting resources used in previous intervention trials. A comprehensive kit including a GP Guide, Patient physical activity assessment questionnaire, Active Script pad, poster, medical record stamp, information booklets, video and literature pack were developed and given to the GPs who request it. A pilot study was conducted and, initially eight divisions are testing the intervention.

Gently Physical (South Australia)—a physical activity prescription-based project funded by Transport South Australia and the South Australian Department of Human Services.

Walk-It Bunbury (Western Australia)—a three-year program (1999–2002) aiming to increase the number of adults in the City of Bunbury, who walk for at least 30 minutes at moderate intensity on most days of the week. The key strategies include free walking resources (map, path report form, information card, poster, magnet and bi-monthly newsletter); a path stencil system to direct walkers and indicate distances; a local mass-media campaign, and a GP and health professional based promotion. GPs are encouraged to counsel patients on the

benefits of physical activity and to recommend the Walk-It Bunbury program. GPs were trained in the three behavioural skills viewed as important in encouraging people to walk, but primarily to support patients' decisions to walk by directing them to a structured walking-program within their own community. The resources for the GP include a prompt card on physical activity for patients, a refrigerator (filing cabinet) magnet and posters.

There is also substantial systematic activity around prevention in general practice, including gradual changes to some of the mechanisms for reimbursement. Links to the National Public Health Partnership have been made through various general practice professional organisations. Prevention approaches are being developed under a combined non-communicable disease framework, SNAP (smoking, nutrition, alcohol and physical activity).

2.2.8. Conclusions

The typical net effects of GP interventions are modest but real short-term increases in physical activity participation. Longer-term maintenance has not been demonstrated clearly, irrespective of the supplementary materials added to advice from GPs. The setting of general practice allows most adults to be reached but strategies need to be developed to persuade most GPs to advise their patients in this area. The greatest research and program need is ways to disseminate these brief strategies into primary care, and to have them used widely, for example, brief advice for the cessation of tobacco use.

References

- Ashenden R, Silagy C, Weller D, et al. (1997). A systematic review of the effectiveness of promoting lifestyle change in general practice. *Family Practice* 14:160-75.
- Bauman A, Mant A, Middleton L, et al. (1989). Do general practitioners promote health? A needs assessment. *Medical Journal of Australia* 151:262-69.
- Booth M, Bauman A, Owen N, et al. (1997). Physical activity preferences and sources of assistance, and perceived barriers to increase activity among physically inactive Australians. *Preventive Medicine* 26:131-7.
- Bridges-Webb C, Britt H, Miles D, et al. (1992). Morbidity and treatment in general practice in Australia 1990–1991. *Medical Journal of Australia* 157:Suppl S1-S56.
- Bull F, Jamrozik K. (1998). Advice on exercise from a family physician can help sedentary patients. *American Journal of Preventive Medicine* 15(2):85-94.
- Bull F C, Jamrozik C, Blanksby BA. (1999). Tailored advice on exercise—does it make a difference? *American Journal of Preventive Medicine* 16(3):230-9.
- Bull F C L, Schipper ECC, Jamrozik K, et al. (1995). Beliefs and behaviours of general practitioners regarding promotion of physical activity. *Australian Journal of Public Health* 19(3):300-4.
- Bull FCL, Schipper ECC, Jamrozik K, et al. (1997). How can and do Australian doctors promote physical activity. *Preventive Medicine* 26(6):666-73.
- Calfas KJ, Long BJ, Sallis JF, et al. (1996). A controlled trial of physician counselling to promote the adoption of physical activity. *Preventive Medicine* 25:225-33.
- Eaton CB, Menard LM. (1998). A systematic review of physical activity promotion in primary care office settings. *British Journal of Sports Medicine* 32:11-6.
- Pinto B, Lynn H, Marcus B, et al. (2001). Physician-based physical activity counseling. *Annals of Behavioral Medicine* 23:2-10.
- Halbert JA, Silagy CA, Finucane PM, et al. (2000). Physical activity and cardiovascular risk factors: effect of advice from an exercise specialist in Australian general practice. *Medical Journal of Australia* 173(2):84-7.
- Lewis BS, Lynch WD. (1993). The effect of physician advice on exercise behavior. *Preventive Medicine* 22(1):110-21.
- Marcus BH, Goldstein MG, Jette A, et al. (1997). Training physicians to conduct physical activity counseling. *Preventive Medicine* 26(3):382-8.
- NSW Health Department. (1999). The active practice project: a controlled trial of physical activity promotion through general practice. State Health Publication Number (HP) 99110. Sydney: NSW Health Department.
- Porter S, Eccleston P. (1998). The general practice physical activity project implementation and evaluation. Sydney: South Eastern Sydney Area Health Service Health Promotion Unit.
- Preventive and Community Medicine Committee of the Royal Australian College of General Practitioners (RACGP). (1993). Guidelines for preventive activities in general practice, 2nd ed. Melbourne: RACGP Services.
- Royal Australian College of General Practitioners (RACGP). (1998). Putting prevention into practice: a guide for the implementation of prevention in the general practice setting, 1st ed. Melbourne: RACGP.

Royal Australian College of General Practitioners (RACGP). (2001). Guidelines for preventive activities in general practice, 5th ed. Melbourne: RACGP.

Schultz SJ. (1993). Educational and behavioral strategies related to knowledge of and participation in an exercise program after cardiac positron emission tomography. *Patient Education & Counseling* 22(1):47-57.

Sheedy J, Smith B, Bauman A, et al. (2000). A controlled trial of behavioural education to promote exercise among physiotherapy outpatients. *Australian Journal of Physiotherapy* 46:281-90.

Simons-Morton DG, Calfas KJ, Oldenburg B. (1998). Effects of interventions in health care settings on physical activity or cardiorespiratory fitness. *American Journal of Preventive Medicine* 15(4):413-30.

Smith BJ, Bauman AE, Bull FC, et al. (2000). Promoting physical activity in general practice: a controlled trial of written advice and information materials. *British Journal of Sports Medicine* 34(4):262-67.

Stevens W, Hillsdon M, Thorogood M, et al. (1998). Cost effectiveness of a primary care based physical activity intervention in 45–74 year old men and women: a randomised trial. *British Journal of Sports Medicine* 32:236-41.

Swinburn BA, Walter LG, Arroll B, et al. (1998). The green prescription study: a randomized controlled trial of written exercise advice provided by general practitioners. *American Journal of Public Health* 88(2):288-91.

The Writing Group for the Activity Counseling Trial Research Group (The Writing Group). (2001). Effects of physical activity counseling in primary care. The activity counseling trial: a randomized controlled trial. *Journal of the American Medical Association* 286(6):677-87.

United States Department of Health and Human Services (USDHHS). (1996). Physical activity and health: a report of the Surgeon General. Atlanta, GA: U.S. Department of Health and Human Services, Centers of Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion.

2.3 Schools as settings for intervention

Summary

Schools are important settings for physical activity programs—they reach the whole population group of young people aged 5–17 years. The efforts to produce sustained increases in physical activity participation by young people have not been very successful. New approaches, including working with school environments, school policies, and family and community settings hold promise in this area. The key aspects of the curriculum, such as mastering fundamental skills and developing diverse and acceptable programs targeting girls as well as boys, are future challenges in this area of intervention. Out-of-school programs including the family and community settings in which children and young people live, are also important.

2.3.1. Schools as settings for intervention

Children and adolescents are considered a population group (see chapter 3.2) and, for many interventions to promote physical activity, also a setting. The World Health Organization's frameworks have described schools as important settings for physical activity programs, and the settings approach is discussed here.

Although there is clear evidence of health benefits of physical activity among adults, the situation among children is less certain but still sufficiently convincing that action is warranted. Data on the increasing prevalence of overweight and obesity among

young Australians gives rise to particular concern. Settings for programs addressing inactivity among children include the school, the family and the broader community. Each of these settings has a role in supporting and encouraging the regular participation in enjoyable forms of physical activity by young people. This chapter focuses on the school, and on a review of the evidence of best practice in efforts to increase activity levels among children and adolescents.

2.3.2. The rationale for a settings approach

Health and physical education is one of eight key learning areas in the Australian National Curriculum Statements and Profiles. In all States where the State education authorities have developed their own curriculum statements, health and physical education is a key learning area. According to the 1996 report of the National Health and Medical Research Council (NHMRC 1996):

...the interaction between schools and young people, and the overall experience of attending school, provides unique opportunities for health promotion which can be sustained and reinforced over time.

Physical education makes an important contribution to the health of Australian children by contributing to an increase in their overall levels of physical activity. Comprehensive data on the amount of physical education received by Australian children is not available. Western Australian evidence shows that students receive an average of 100 minutes of physical education per week in lower primary, 130 minutes per week in upper primary and 114

minutes per week in lower secondary schools (Shilton 1997). The proportion of this time in which students are physically active is unknown. However, interventions in the United States have shown success in increasing participation and physical activity levels in physical education classes (Simons Morton et al. 1991).

The National Junior Sport Policy (1994) recognised that physical education has an important role in the development of knowledge, skills and attitudes related to health, fitness, sport and recreation (p. 6).

The rationale for schools as a setting for promoting physical activity include consideration that:

- The school is an environment where the majority of Australian children spend six hours per day for 40 weeks of the year between the age of 5 and 17 years. As such the environment provides an undoubted opportunity for promoting health (CDC 1997). Schools are also a potential avenue through which parents might be engaged.
- Educating children is the core business of schools, health and physical education is a key learning area in Australian schooling, and schools provide an infrastructure and context for physical activity programs, supportive physical activity environments, and school community links (Sallis and McKenzie 1991, Biddle et al. 1998).
- There is international consensus about the worth of schools as an appropriate setting for primary prevention interventions; and this has been informed

by considerable recent Australian work that has helped define best practice in school health promotion (National Health and Medical Research Council 1996, Australian Health Promoting Schools Association 1997a, b, USDHHS 1996).

- Health promoting schools (HPS) is an international movement. Recent reports from the NHMRC and the AHPSA have better defined the concept and identified opportunities for the HPS approach to affect the health related knowledge, attitudes and behaviour of Australian children positively (NHMRC 1996, AHPSA 1997a, b).
- Physical education classes foster positive attitudes towards physical activity and encourage physical activity outside formal classes (Simons-Morton et al. 1991).
- Physical activity and nutrition programs can change knowledge, fat intake and physical fitness (Vandongen et al. 1995).
- Children, schools and young people can be catalysts for change in the broader community (Perry et al. 1998).

School physical education (and other physical activity opportunities in the school setting) offer a unique opportunity for physical activity, physical fitness development, skill development in a structured, safe, supervised and regulated environment. There are also opportunities to modify the physical and social; environment in such a way that is supportive to physical activity participation (physical: safe walking and cycling routes, facilities and grounds, social: equity of opportunity, pastoral care, social safety).

The school and its community provides a unique opportunity to regulate, direct and ensure physical activity opportunities are provided for children and adolescents to ensure:

- social skill learning and enjoyment and cooperation;
- improvements in self-esteem, and self-efficacy for physical activity participation;
- fundamental movement skill learning to enhance lifelong participation; and
- equity of opportunity for the above for girls, students with lower levels of motor skills or those otherwise at risk or disadvantage.

Australian research gives rise to concerns that high levels of physical inactivity in the Australian community may be further exacerbated by poor fundamental movement skills in Australian children. The New South Wales Schools Fitness and Physical Activity Survey (1997) found the proportion of children who displayed mastery of each fundamental movement skill (run, vertical jump, catch, strike, kick and overhand throw) did not exceed 40 per cent (Booth et al. 1997).

Physical education provides an opportunity for a developmental approach to fundamental movement skill mastery. Such physical education programs can influence children's knowledge about and attitudes towards physical activity and social skills to enable their future participation in physical activity (Vogel 1986).

Children who develop confidence in their skills and abilities are more likely to continue their participation into adolescence (Godin

and Shephard 1986), and develop positive expectations about their participation in games and sport.

2.3.3. Limitations of schools as settings

Many of the evaluated interventions in schools have shown short-term outcomes and the sustainability of these interventions is a challenge to school systems and policy makers. At the most, there may be up to five hours per week available for physical education and sport combined but it is usually less than this. Students do not spend all of this time being active, as much of the time is spent in learning basic skills and in the achievement of educational objectives other than fitness. While it is important to be realistic about the opportunities for physical education to have a major impact on physical activity among students, schools can provide other opportunities for promoting physical activity. School policies and the school environment can provide further opportunities to promote safe and enjoyable physical activity. This may include attention to the school's physical environment, with play equipment available in lunch and recess breaks, shaded open space, and community programs, encouraging safe cycling and pedestrian access to encourage commuting to school. Recent programs in the USA have re-emphasised the need for 'walk to school' programs, and many of these have been initiated across North America.

Outside of school, students have at least 30 hours of discretionary time each week, estimated conservatively, and not including holidays, in which there may be opportunities

for them to be active. It is important that this area of potential for promoting physical activity be pursued thoroughly.

The following additional limitations of schools as settings for promoting physical activity apply:

- A substantial minority of young people does not like school and has little enthusiasm for being organised into activities that they do not want to do. This same group may be less likely to be active.
- Many physical education programs place greatest emphasis on competitive sport. Non-competitive and recreational physical activities are featured less. This problem requires a change in focus in the curriculum to better target and provide enjoyable alternatives for inactive students.
- Lack of teacher training, especially in the primary sector is another barrier. Different philosophies of teaching, with various emphases including skills-based approaches, fundamental-movement-skills approaches, sport education, and participation approaches, can mean that the physical education experience varies greatly and does not always promote enjoyable physical activity participation for all (CDC 1997).
- There is a potential problem if the physical activity experiences offered in schools are so tied to school structures and infrastructure that when students leave school they leave most of the cues

and opportunities to be physically active. This is a particular problem if there are no community facilities which enable school leavers to continue with activities they enjoy.

- Some activities in which students would like to participate are unavailable within school or they are unavailable at times when students want to participate.
- Many girls have reported through focus groups that one of the things that puts them off participating is that they do not want to participate with boys and do not even want boys looking on. This concern needs to be addressed by schools.
- Typically, the core business of schools may be defined as promoting literacy and numeracy as well as accommodating new and emerging priorities in education, including computer education and information technology, languages other than English, and vocational education and training. This is an environment in which the place of physical education will need strong support with the type of arguments that public health can provide.
- Data from Shilton et al. (1995) and Shilton (1997) indicate that the amount of physical education being taught may be in decline. In addition, State mandates for compulsory physical education are not supported, teacher knowledge, resources and training varies enormously (especially at primary level) and support for professional development is inadequate (Shilton 1997).

Clearly, there are advantages and limitations of schools as a setting for physical activity promotion and the relative importance of these will vary between primary and high schools, between the major school systems (government, Catholic education system and the Independent school system) and probably even between individual schools. There may also be inequity in opportunities and facilities between schools sectors, between low socioeconomic areas and higher socioeconomic areas, between metropolitan and rural and remote Australia, and between boys and girls.

Unfortunately, we cannot describe precisely what interventions should be put in place for children and adolescents. We can offer a range of activities to choose from which should make a good starting point for negotiating with schools and education systems, parents, local government, community organisations and non-Government organisations.

2.3.4. Barriers in the community environment

A major barrier to promoting physical activity among children is the many other (sedentary) recreations that compete for their time. The ‘window of opportunity’ between 3.30 pm and 6.30 pm is characterised by sedentary pastimes (TV, computer, internet). Watching television is now the principal leisure pastime of children for an average of 2.5 hours a day, as shown in a representative State-based survey of adolescents in NSW (NCHP 1998).

In addition to increasing sedentary time, there is the problem of less time spent by

children being active in local communities. This is fuelled, in part, by increased parental concerns about child security and safety, and barriers in neighbourhood and household environments. There are concerns about street safety, access to parks and recreation space, and access to or availability of local sporting and recreation organisations.

2.3.5. International recommendations for best practice in interventions

At least two sets of recommendations on promoting physical activity among children and adolescents are available. These are presented, then some specific recommendations for action in Australia are offered.

In 1998, Elaine Stone and others (Stone et al. 1998), in a review and synthesis of the effects of physical activity interventions in youth, concluded that there are limitations in the collection of studies available for review, and that special attention is needed for girls, middle schools, and community settings for all youth.

The recommendations from Stone et al. (1998) were to:

- establish school policies to ensure space, equipment and supervision is provided for before and after school, lunch and recess periods to promote physical activity;
- provide more resources for emphasis on mastery of fundamental movement skills – since these are essential for later participation;

- introduce more curricular and extra-curricular activities that direct more resources to programs that service all students;
- promote more programs and resources for family participation (and school–community partnership)
- increase emphasis on non-competitive sports and recreational activities to meet the needs of all youth (especially pre-adolescent youth and girls);
- increase training opportunities for teachers at the university level as well as after they are employed;
- provide more school- and community-linked physical activity programs that meet the needs and interests of girls as well as boys; and
- increase efforts to institutionalise programs that have been shown to be effective.

The United States Centers for Disease Control, in 1997 released *Guidelines for school and community programs to promote lifelong physical activity among young people* (CDC1997). This document was developed in collaboration with Commonwealth and State agencies, non-government peak bodies and academics and the guidelines are based on an extensive review of research and practice.

The guidelines state that physical activity programs for young people are more likely to be effective when they address the issues of:

- enjoyable participation in physical activities that are easily done throughout life;
- offer a diverse range of non-competitive and competitive activities appropriate for different ages and abilities.
- give young people the skills and confidence they need to be physically active; and
- promote physical activity through all components of a coordinated school health program and develop links between school and community programs.

The CDC recommendations for activity programs for young people also suggest that a few policy dimensions are relevant to best practice in this area:

- **policy:** provide physical and social environments that encourage and enable young people to engage in safe and enjoyable physical activity;
- **environment:** implement sequential physical education curricula and instruction in grades K–12.
- **physical education curricula and instruction:** implement sequential physical education curricula and instruction;
- **health education curricula and instruction:** implement health education curricula;
- **extracurricular activities:** provide extra-curricular physical activity programs that offer diverse, developmentally-appropriate activities, both non-competitive and competitive, for all students;

- **family involvement:** encourage parents and guardians to support their children's participation in physical activity, to be physically-active role models and to include physical activity in family events;
- **training:** provide training to enable teachers, coaches, recreation and health care staff and other school and community personnel to promote enjoyable, lifelong physical activity to young people;
- **health services:** assess the physical activity patterns of young people, refer them to appropriate physical activity programs, and advocate for physical activity instruction and programs for young people;
- **community programs:** provide a range of developmentally-appropriate community sports and recreation programs that are attractive to all young people; and
- **evaluation:** regularly evaluate physical activity instruction, programs and facilities.

2.3.6. Intervention menu for Australia

Recommendations for interventions for children

- Primary schools should include fundamental movement skills training as a key component of the health and physical education learning area and that at least 60 minutes per week be devoted to fundamental movement skills training. In-service training and support would assist schools in the effective delivery of the program. Liaison and sharing of resources between secondary and primary schools to support skill development may be appropriate. These changes may require vigorous advocacy and the benefits are worth the effort.
- Work with transport departments to facilitate lower use of cars for transport to and from school and greater use of feet and cycles. One example of this kind of program is 'Walk to School' events which have been developed in some local communities. In NSW, this was offered to interested schools in 2001 in partnership with the Pedestrian Council of Australia. Other initiatives promoting travel to school may also be beneficial if they result in some physical activity during the processes of commuting.
- Consider ways in which the school environment may encourage and support safe and enjoyable participation in physical activity. For example, pleasant shaded environments, play equipment and supervised activities at recess and lunch times, safe and ready access for bikes and pedestrians, physical activities on schools excursions and camps.
- Provide information to parents on strategies to reduce access to sedentary activities and to involve children and adolescents in more active recreation.
- Work with NGOs and agencies such as Australian Council of Health, Physical Education and Recreation (ACHPER), which focus on continuous improvement models around curricula, environments, and physical education in schools, to increase participants in the Active Australia schools network, and increase participation in this kind of standards setting endeavour to promote physical activity in schools.

Recommendations for interventions for adolescents

- Emphasise the needs and interests of adolescent girls in order to arrest the decline in physical activity participation across early to late high school.
- Consider working with schools and community organisations. Ask girls which types of activities they would most like to do (in summer and winter) from among those available in the local community and bring the two together in a Community Activity Day so the girls can trial different activities.
- Negotiate with schools to allow the girls to choose or design their own sports uniform, so they feel more comfortable wearing it, and to provide opportunities for girls to participate in activities of their choosing, either away from the presence of boys or in mixed programs that are appropriate for their skill level.
- Examine opportunities for collaboration with local government and community youth groups.
- Encourage secondary school physical education, particularly targeted at girls, to adopt a norm of emphasis on preparation of students to better engage in the wider range of physical activity opportunities in their community. This way students leave school with both the skills and the contacts to maintain physical activity in out-of-school settings.



References

- Australian Health Promoting Schools Association. (1997a). National strategy for health promoting schools 1998–2001. Draft. Sydney: AHPSA.
- Australian Health Promoting Schools Association. (1997b). School-based health promotion across Australia. Background briefing report no 1. National Health Promoting Schools Initiative 1997. Sydney: AHPSA.
- Australian Institute of Health and Welfare. (1998). Australia's health 1998: the sixth bi-ennial health report of the Australian Institute of Health and Welfare. Canberra: AIHW.
- Biddle S, Sallis J, Cavill N. (eds) (1998). Young and active? Young people and health enhancing physical activity: evidence and implications. London: HEA.
- Booth M, Macaskill P, McLellan L. (1997). NSW schools fitness and physical activity survey 1997. Sydney: NSW Department of School Education.
- Centers for Disease Control and Prevention. (1997). Guidelines for school and community programs to promote lifelong physical activity among young people. *Mortality and Morbidity Weekly Report* 46 (RR-6):1-36.
- Godin G, Shephard RJ. (1986). Children's perception of parental exercise. *Perception Motor Skills* 62:511-6.
- National Centre for Health Promotion (NCHP). (1998). Health behaviour in secondary school students, NSW 1998. Sydney: National Centre for Health Promotion, Sydney University.
- National Health and Medical Research Council (NHMRC). (1996). Effective school health promotion: towards health promoting schools. Canberra: NHMRC.
- Perry CL, Luepker RV, Murray DM, et al. (1988). Parent involvement with children's health promotion: the Minnesota Home Team. *American Journal of Public Health* 78:1156-60.
- Sallis JF, McKenzie TL. (1991). Physical education's role in public health. *Research Quarterly for Exercise and Sport* 62:124-37.
- Shilton TR, McBride S, Cameron I, et al. (1995). Advocacy for school health: the power of data. *Health Promotion Journal of Australia* 5(1):24-9.
- Shilton TR. (1997). Advocating for your discipline: why physical education? *ACHPER Healthy Lifestyles Journal* 44(1): 21-4.
- Simons-Morton BG, Parcel GS, Baranowski T, et al. (1991). Promoting physical activity and a healthful diet among children: results of a school-based intervention study. *American Journal of Public Health* 81(8):986-91.
- Stone EJ, McKenzie TL, Welk GJ, et al. (1998). Effects of physical activity interventions in youth: review and synthesis. *American Journal of Preventive Medicine* 15(4):298-315.
- United States Department of Health and Human Services (USDHHS). (1996). Physical activity and health: a report of the Surgeon General. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion.
- Vandongen R, Jenner D, Thompson C, et al. (1995). A controlled evaluation of a fitness and nutrition intervention program on cardiovascular health in 10–12 year old children. *Preventive Medicine* 24:9-22.
- Vogel PG. (1986). Effects of physical education programs on children. In Seefeldt V (ed.), *Physical activity and well being*. Reston, Virginia: AAHPER, pp 455-501.

2.4 Promoting physical activity in worksites

Summary

Worksites have had a history of more rhetoric than evidence on strategies to promote physical activity. Much has been written about their potential, especially to lower costs or reduce absenteeism. There is limited research evidence to support this enthusiasm. In Australia, many programs have been conducted but a few have been evaluated. Recent initiatives have included combined behavioural and environmental strategies in the worksite setting, and appear to show more promise. Future programs may use technologies such as intranet communication to deliver health messages. In addition, the worksite can be used as a setting for environmental interventions, such as 'walk to work' events, and encouraging stair use at worksites.

2.4.1. Background

In the 1970s, many large companies in the USA, and some in Australia, claimed there were benefits to reducing the risk of cardiovascular disease for senior management and executives. This claim manifested in the establishment of corporate fitness programs and that often included the building and staffing of on-site gymnasias, the offering of circuit and aerobics classes, and the provision of weights equipment and other activities.

The primary aim of worksite programs was to provide opportunities for employees to increase cardiorespiratory fitness and the key message was that staff should

undertake regular vigorous exercise consistent with the American College of Sporting Medicines' then current fitness guidelines (see Sallis and Owen 1999, Chapter 4). During the economic growth period in the 1980s, worksite programs continued to appear across Australia in companies such as Telstra, Xerox, Coca Cola, and in several National banks.

Gradually, a broader approach began to be taken and, in some cases, worksite exercise programs and facilities were made available to all employees. During the 1980s, an extensive body of research studies of variable quality accumulated, investigating rates of participation and adherence to various fitness, exercise and activity regimens. Worksites were seen as useful settings for programs because of the possible economic benefits of this setting, and the convenience of the worksite setting for implementing structured exercise programs.

Although many papers have been published, collectively they represent a haphazard mix of programs, selected worksite populations and with uneven research quality. Most of the reported data were from studies conducted in the USA and many were linked with attempts by large employer groups and health insurance bodies to contain the costs of medical care (see Dishman et al. 1998). In a review of published worksite interventions, Dishman et al. (1998) identified the shortage of evidence to substantiate the benefits of worksite programs, and noted that effects were uncorrelated with the intensity of programs or theoretical frameworks underpinning specific interventions. Much more seems to

have been written about improvements in work productivity outcomes or cost savings than can be substantiated (Shephard 1996).

2.4.2. Relevance to the Australian context

In the USA, the employer typically pays for the personal health insurance of the employee and their families, and retirees. Thus, in the USA the most expensive health care costs are associated with long-term chronic disease including heart disease, cancer and diabetes (Warner et al. 1988). In Australia, the greatest health care costs are due to musculoskeletal injury and stress. So, there are very important differences in the economic incentives and corresponding organisational objectives for workplace health promotion initiatives in Australia and the USA.

In Australia, the USA and elsewhere, the 1990s have seen a shift away from the promotion of fitness and physical activity as a sole issue in worksites and an increased interest in more comprehensive worksite health programs. Many of the limitations of individually-orientated lifestyle-change and advice-giving programs and resources have been recognised, and there is interest in combining socio-behavioural programs with structural–environmental interventions (Veitch et al. 1999a).

The current status of physical activity initiatives, and health promotion initiatives more generally, in the workplace in Australia is best described as ad hoc. There have been examples of State-based initiatives in research and program delivery but there is no coordinating body or forum for discussion and debate.

One large trial in Australia—the National Workplace Health Project (NWHP)—examined the effectiveness of socio-behavioural and environmental approaches promoting physical activity, healthy eating, smoking cessation and non-hazardous alcohol consumption (Simpson et al. 2000, Harris et al. 1999). The NWHP is one of the few studies in the world to have tested individual and environmental approaches separately and to have evaluated the process of implementing health strategies. More details of this case study and the future of this approach are discussed in the following sections.

Other initiatives, such as Gutbusters (Egger 1999, Egger 2000) are also being used through worksites, and although they are aimed primarily at achieving weight loss, they include components of advice on physical activity.

2.4.3. Strengths of the worksite setting

Worksites are seen as potentially important settings for programs aimed at physical activity because there is the opportunity to reach a ‘captive’ group of adults that spends a large proportion of its waking hours at work. Moreover, programs in worksites can benefit from the economies of scale and can target harder-to-reach populations, such as males, lower-SES people and migrants (see Veitch et al. 1999b).

Organisations have been interested in worksite programs to generally improve the health of their employees and many see the potential to reduce health care

costs, absenteeism, accidents and injuries. In addition, benefits such as improved teamwork, communication and morale have been researched.

A reduction in the risk of cardiovascular disease remains an important incentive for many programs but in the last decade there has been greater interest in programs that address stress management and the prevention of occupational injuries, especially those related to manual handling.

The shared history and common beliefs held by the workforce of an organisation mean that the 'culture' of an organisation can exert a powerful influence on the attitudes and behaviours of individual workers (Robbins 1993). Health strategies that can recognise and utilise such cultural nuances of the workplace are more likely to be successful in achieving higher participation and, ultimately, more positive health outcomes than programs that are not culturally relevant. Conversely, the culture of an organisation can act as a powerful barrier to health programs that fail to consider, or do not reflect, the unique aspects of culture (Harris et al. 1999).

Other advantages of the worksite setting include the ability to use existing resources and networks that can make the implementation of programs easier. For example, employees can be recruited through communications via email, posters in the work canteen and enclosures with employee pay slips.

2.4.4. Barriers to the promotion of physical activity at worksites

The implementation of programs at worksites has several well-known limitations. Programs usually require approval from various departments and levels of management, as well as employees, via representative organisations such as unions. Gaining such support and endorsement can take a significant amount of time. Company agendas and priorities can change, often suddenly.

Until programs and activities become entrenched in the culture of a company, they can be subject to limited, short-term support. In this climate, brief, discrete activities are favoured over more comprehensive approaches. Furthermore, worksite initiatives need to foster widespread support to avoid the potential set-backs caused when key staff leave or are relocated within the organisation.

Many of the barriers to effective interventions that have been discussed so far, are related to the economic climate and systems present in the workplace. Another major limitation that has affected many programs is the low level of participation and poor adherence rates. It has been reported previously that up to 50 per cent of participants can drop out of worksite-based programs in the first six months. Moreover, it has been argued that programs are likely to attract employees who are active already, who least need the incentive of on-site, convenient, facilities and programs (Dishman et al. 1998).

2.4.5. Types of intervention on physical activity at worksites

While it is generally appreciated that a range of programs has been developed for specific worksites across Australia, it is difficult to obtain specific details of the program components or to obtain the results of evaluations. Some programs have been presented at health promotion conferences but few have been earmarked for widespread dissemination, and little information has been published in scientific journals. Common features of these programs include screening for risk factors for chronic diseases, education seminars, organised on-site physical activity classes, and incentives for use of off-site health and fitness facilities. According to Dishman et al. (1998), generally, these programs are not evidence-based. The styles and types of programs typically used are shown in Table 7.

Table 7. Physical activity promotion options commonly used in worksite settings

- risk factor screening and advice on physical activity
- health risk appraisal and advice on physical activity
- full exercise stress tests under medical supervision plus advice
- submaximal fitness tests by exercise physiologists plus advice on exercising
- educational seminars on physical activity
- organised on-site programs and classes
- incentives for off-site use of facilities
- provision of on-site gymnasias for programs and ad-lib use
- provision of printed self-instructional programs and materials on physical activity
- new and emerging applications using workplace intranet systems to deliver multimedia, interactive behaviour change programs

Education programs can be run during lunchtime or after work and are usually voluntary. Qualified exercise instructors can be employed to run lunchtime classes (often circuit or weights classes) on either an on-going basis or as a short course, e.g. a 6- to 8-week block of tennis. Larger companies may fund the maintenance of on-site exercise facilities but it is now more common for programs to make use of low-cost, convenient areas, such as staff rooms or to link with local public or private recreational facilities. Companies and employers outside of the typical office-based professions often find innovative ways to provide and encourage physical activity and there are many examples across Australia. The Western Australian Department of Conservation and Land Management established a program in 1993 and at various depots around WA, and employees converted unused sheds to create exercise areas. Using local resources, they built weights equipment and marked out their own walking trails.

Most worksite programs have focused on less effective approaches that reach individual employees with educational and motivational strategies, either one-on-one or to small groups. The provision of these programs has been criticised due to their limited capacity to reach those most in need. Newly-emerging options that may provide educational and behaviour-change services using worksite intranet systems are under development. These systems have the potential to reach large numbers and to have a greater impact than have earlier print-based self instructional physical activity programs (Marcus et al. 1998; Fotheringham et al. 2000).

2.4.6. Promoting physical activity and links with occupational health and safety

The management of occupational health and safety is increasingly coupled with rehabilitation within the domain of human resource management. This was recognised formally in the *Workplace Injury Management and Workers Compensation Act 1998* (NSW), which integrates these previously distinct management domains. Importantly, the Act specifies prevention as the guiding principle for all organisational efforts in this arena.

It is logical to assume that advocates of workplace physical activity and advocates of health protection would collaborate in their common goal of creating a more healthy workplace; however, there has been considerable debate concerning priorities, strategies and cost-effectiveness of each approach (Shephard 1996, Walsh et al. 1991, Wegman and Fine 1990). It is only relatively recently that practitioners and researchers have begun to recognise the potential benefits associated with a more integrated approach to managing health at work (Sorensen et al. 1995, Baker et al. 1996).

For more than 20 years, the field of occupational health and safety (OHS) has adopted an industry-based approach to preventing injury. This approach is reflected in OHS legislation in each State, which refers to industry-based regulations and codes of practice. The depth of knowledge, skills and systems that have been developed for the more effective management of OHS must be understood by physical activity practitioners and advocates if they are to truly integrate strategies within the workplace setting.

2.4.7. Research evidence on interventions at worksites

A recent meta-analysis of 26 studies concluded that there was no clear evidence that worksite interventions aimed at increasing levels of physical activity or fitness were effective (Dishman et al. 1998), although the review was limited by the variability in design, measurement and, or, the representativeness of worksite samples. This review suggests that current evidence for the effectiveness of workplace initiatives is weak. Although this could imply that the worksite setting should be left alone, an alternative perspective is that the workplace still has potential as a setting. The challenge is to find ways to work better in this setting.

2.4.8. Examples of recent Australian initiatives

The following examples illustrate the range and diversity of workplace physical activity initiatives in Australia and the different frameworks within which they are being pursued. Limited data are available but some provide useful frameworks for action in this area.

VicHealth—Partnerships with Healthy Industry

The VicHealth Workplace Program aims to lead and facilitate sustainable improvements in organisational health, providing a broad framework for physical activity in initiatives and other health promotion strategies. The program attempts to build the capabilities of organisations, communities and individuals in ways that: 1. change social, economic and physical environments to improve the health

of all Victorians; and 2. strengthen the understanding and the skills of individuals in ways that support their efforts to achieve and maintain health. VicHealth has developed a framework that looks beyond a focus on individual health to a focus on understanding the health of individuals within the context of organisations and the communities in which they operate. The 'Partnerships with Healthy Industry' program aims to bring the principles of organisational health to Victoria's workplaces with a focus on sustainable change and improvement through education and consulting. The program helps organisations develop and design their own organisational health strategies, thereby affecting the culture, systems and practices of the organisation. For more information contact VicHealth web site or workplace@vichealth.vic.gov.au.

New South Wales—South Eastern Sydney Health, Health Promotion Service: Stairways to Health

Stairways to Health encouraged stair use to increase incidental activity and help meet current physical activity guidelines. This is more of an environmental intervention in a worksite, rather than a workplace-initiated project. Two sets of motivational signs were displayed at the lifts adjacent to the stairs in a multi-story office block over five months. Stair use increased by five per cent; overall men and people aged under 30 years were more likely to use stairs than women; overweight people were less likely. Men increased their use by 10 per cent, which was statistically significant, and at the end of the project 58 per cent of staff used the stairs at a level that was likely to have a

cardioprotective effect. Staff were aware of the signs and thought them personally relevant (unpublished data, South Eastern Sydney Health Promotion Unit).

Heart Foundation (Western Australia)—Climb to the Top

Climb to the Top was an innovative worksite program that encouraged people to use the stairs in their workplace every day. By encouraging employees to replace the lift with stairs, the program promoted incidental opportunities for exercise at work. Workers formed teams of up to 10 people and endeavour to climb the equivalent height of Mount Everest using the stairs in their workplace during stair-climbing month of August. The 8,848-metre-high Mount Everest equates to 2,212 floors (flights of stairs) which could be achieved by ten people walking about 10 floors (flights) per day for one month. Climb to the Top was first conducted in Western Australia in 1991, involved 120 teams. The success of the program has seen the number of participants grow each year with 600 teams in 1999. Climb to the Top plays a very important role in the National Heart Foundation's commitment to encourage Western Australian's to be more active.

National Workplace Health Project—Creating Health-Promoting Work Environments

The National Workplace Health Project (NWHP) was a strong effort to obtain evidence about worksite. It was Australia's largest controlled trial of worksite health promotion. The study investigated the

efficacy of behavioural and environmental approaches to promoting physical activity and other lifestyle changes. Twenty worksites were assigned randomly to one of four health programs: minimal program, sociobehavioural-only program (counselling and group education components), environmental-only program (utilising policies and information channels and targeting physical features at work, e.g. exercise equipment and vending machines), and combination sociobehavioural and environmental programs. The programs commenced in 1995 and ran for two years, with measures at baseline, 12 months and 24 months. The study developed an adaptable model for program planning and implementation and a Checklist for Health-promoting Environments at Work (CHEW). This instrument audits the health-promoting work environment and can monitor changes over time.

Western Australia—Combined NGO initiatives

The Men's Health Project (the Project) is a two-year Healthway-funded, joint initiative of the Cancer Foundation of WA, Diabetes Australia-WA and the Heart Foundation. The Project focuses on blue-collar men aged 40–60 years and aims to influence nutrition, physical activity and health service utilisation. It will also encourage these men to make healthy lifestyle choices that will enhance their current life and also help to reduce their risk of certain diseases, especially cancer, diabetes and heart disease in the future.

2.4.9. The future

The potential to promote physical activity through the workplace setting lies in the ability of the practitioner to link regular activity with health issues that are relevant to the individual employee, their work team and their job. New approaches, including intranet usage, or combining behavioural with environmental components, may offer promise. Some evidence for success in this area comes from health programs for employees in the armed services, emergency services or paramilitary organisations (Shephard 1996, Gomel et al. 1993). For these employees, lack of physical fitness represents an occupational hazard.

Overall in Australia, workplace physical activity programs are moving ahead of research. Many large-scale workplace programs are currently underway with varying degrees of integration, although few have been published and few are being evaluated with any real rigor. The evidence that these can contribute to population levels of physical activity remains mostly unproven.



References

- Baker E, Israel B, Schurman S. (1996). The integrated model: Implications for worksite health promotion and occupational health and safety practice. *Health Education Quarterly* 23(2):175-90.
- Dishman R, Oldenburg B, O'Neil, et al. (1998). Worksite physical activity interventions. *American Journal of Preventive Medicine* 15(4) :344-61.
- Egger G. (1999). A descriptive evaluation of the GutBuster's 'waist loss' correspondence program for men. Paper presented to the Australian Society for the Study of Obesity meeting, Sydney.
- Egger G. (2000). Intervening in men's nutrition: lessons from the GutBuster program. *Australian Journal of Nutrition and Dietetics* 57(1):46-9.
- Fotheringham MJ, Owen N, Leslie E, et al. (2000). Interactive communication in preventive medicine—internet based strategies in teaching and research. *American Journal of Preventive Medicine* 19:113-20.
- Gomel M, Oldenburg B, Simpson J, et al. (1993). Worksite cardiovascular risk reduction—randomized trial of health risk assessment, risk factor education, behavioral counseling and incentive strategies. *American Journal of Public Health* 83:231-8.
- Harris D, Oldenburg B, Owen N. (1999). Australian National Workplace Health Project: strategies for gaining access, support and commitment. *Health Promotion Journal of Australia* 9(1):49-54.
- Marcus BH, Owen N, Forsyth L, et al. (1998). Interventions to promote physical activity using mass media, print media and information technology. *American Journal of Preventive Medicine* 15:362-78.
- Robbins SP. (1993). *Organizational behaviour: Concepts, controversies and applications* (sixth ed.) New Jersey: Prentice Hall International.
- Sallis J, Owen N. (1999). *Physical activity and behavioral medicine*. Thousand Oaks, California: Sage Publishers.
- Shephard RJ. (1996). Worksite fitness and exercise programs: a review of methodology and health impact. *American Journal of Health Promotion* 10:436-52.
- Simpson JM, Oldenburg B, Owen N, et al. (2000). The Australian National Workplace Health Project: design and baseline findings. *Preventive Medicine* 31:249 -60.
- Sorensen G, Himmelstein JS, Hunt MK. (1995). A model for worksite cancer prevention: Integration of health protection and health promotion in the WellWorks project. *American Journal of Health Promotion* 10:55-62.
- Veitch J, Clavisi O, Owen N. (1999a). Physical activity initiatives for male factory workers: gatekeepers' perceptions of potential motivators and barriers. *Australian and New Zealand Journal of Public Health* 23:505-10.
- Veitch J, Salmon JL, Clavisi O, et al. (1999b). Physical inactivity and other health risks among Australian males in less-skilled occupations. *Journal of Occupational and Environmental Medicine* 41:794–98.
- Walsh D, Jennings S, Mangione T, et al. (1991). Health promotion versus health protection? Employees' perceptions and concerns. *Journal of Public Health Policy* 12:148-64.
- Warner KE, Wickizer TM, Wolfe RA, et al. (1988). Economic implications of workplace health promotion programs: review of the literature. *Journal of Occupational Medicine* 30(2):106-12.
- Wegman D, Fine L. (1990). Occupational health in the 1990s. *Annual Review of Public Health* 11:89-103.

2.5 Media- and community-wide interventions to promote physical activity

Summary

Mass-media campaigns have the potential to increase community awareness about physical activity. More localised campaigns target specific groups, or professionals, around this issue. Several campaigns, conducted by the Heart Foundation in 1990–91, and by Active Australia in 1998–99 have shown promising effects on community understanding (see chapter 1.3). The agenda-setting role of media seems to be complementary to other efforts promoting physical activity. New media, such as the Internet, remain to be tested in promoting physical activity.

2.5.1. Principles of media campaigns applied to physical activity

Media interventions have been defined as those interventions that reach groups of individuals using a medium other than personal contact, and offer means for reaching large numbers of people at less per-unit expense than that associated with face-to-face interventions (Marcus et al. 1998). Campaigns are specific uses of mass media, in purposive ways during defined time periods to increase the salience and community focus around specific issues, and to set the agenda for change (Flora et al. 1989). Research on print and other media-based interventions has not yet provided extensive data on long-term maintenance of change in physical activity behaviour.

For the impact of such media-based interventions to be maintained, support systems will be required to prompt and support participation over time.

Mass-media campaigns alone are unlikely to impact significantly on individuals' behaviour; campaigns to promote participation in physical activity in populations need to be combined with programs offered at the community level (Redman et al. 1990, Donovan and Owen 1994). In this way, mass-media campaigns can be used to increase awareness and motivation to participate in physical activity, while coordinated community-based programs provide opportunities to participate. Recent research has investigated the impact of tailoring mass-media messages to the different needs of individuals (Marcus et al. 1998). Theories that recognise the various levels of motivation, such as the Transtheoretical Model, may help to guide the design of more effective interventions that are tailored to the appropriate level of motivation. A consistent finding is that matching material content to individuals' stages of motivational readiness, particularly using the Transtheoretical Model, is helpful in media-based interventions (Marcus et al. 1998).

2.5.2. Media campaigns around physical activity in Australia

One of the first mass-media programs designed to promote physical activity in Australia was the 'Life. Be In It' campaign, which began in 1975 and was implemented until the early 1980s. One of its main objectives was to encourage people to do a little more exercise each day. This campaign used mass-media and other large-scale efforts but did not evaluate behaviour changes.

In the 1990s, two nation-wide physical activity campaigns conducted by the National Heart Foundation (NHF) provided an opportunity to examine the impact of serial, mass-media campaigns that were aimed at increasing levels of physical activity among people who had been inactive. In 1990, the first campaign used the slogan 'Exercise: make it part of your day' (Booth et al. 1992). In 1991 a second campaign was conducted, building on the previous campaign, using the slogan 'Exercise: take another step' (Owen et al. 1995). These campaigns were designed to promote increased physical activity that emphasised walking as the main activity, and were based on the Social Learning Theory and the Social Marketing Model.

Events were promoted through electronic and print news coverage, feature articles and editorials. Other local initiatives by the NHF were conducted in addition to the National media-based strategies. Face-to-face home based interviews were conducted using a representative National sample two weeks before, and three to four weeks after each campaign. After the first campaign, the

prevalence of walking reported in the survey increased from 70 to 74 per cent (Booth et al. 1992). The changes in reported walking for exercise and in readiness to exercise found in 1990 were not repeated in 1991 (Owen et al. 1995). However, this is likely to be due in part to the increases observed the previous year having been maintained (Owen et al. 1995).

More recently, mass-media campaigns were developed through Active Australia in 1998 and 1999 that encouraged participation in activity among the general community. The first of these was 'Exercise. You only have to take it regularly, not seriously', conducted initially in February 1998. Most of the mass-media campaign activity occurred in NSW, with sizeable additional funding provided by the NSW State Government, through the NSW Health Department, but also through collaborations across sectors and agencies through the Premiers Taskforce on Physical Activity. Initial results showed increased awareness of the Campaign and improved understanding of the moderate physical activity message (Bauman et al. 2001). Short-term changes in physical activity behaviour in the campaign target population were also noted. The evaluation design allowed comparisons with other States where the media campaign had yet to be implemented; this revealed that the positive effects were confined to NSW and ACT. Whilst this might appear to be a 'common sense' finding, it is rare for an evaluation to be able to provide clear evidence that effects are directly attributable to a campaign.

The 1999 campaign had a 'Rusty Tin Man' theme as part of the United Nations International Year of the Older Person.

Increased awareness of this message was shown in NSW and Victoria, the two States that contributed most to the running of this media initiative during 1999. Results showed further increases in awareness, and some changes in behavioural intention to be more active, among adults aged over 55 in the population (NSW Health 2000). Ongoing maintenance of awareness of the Active Australia message was noted.

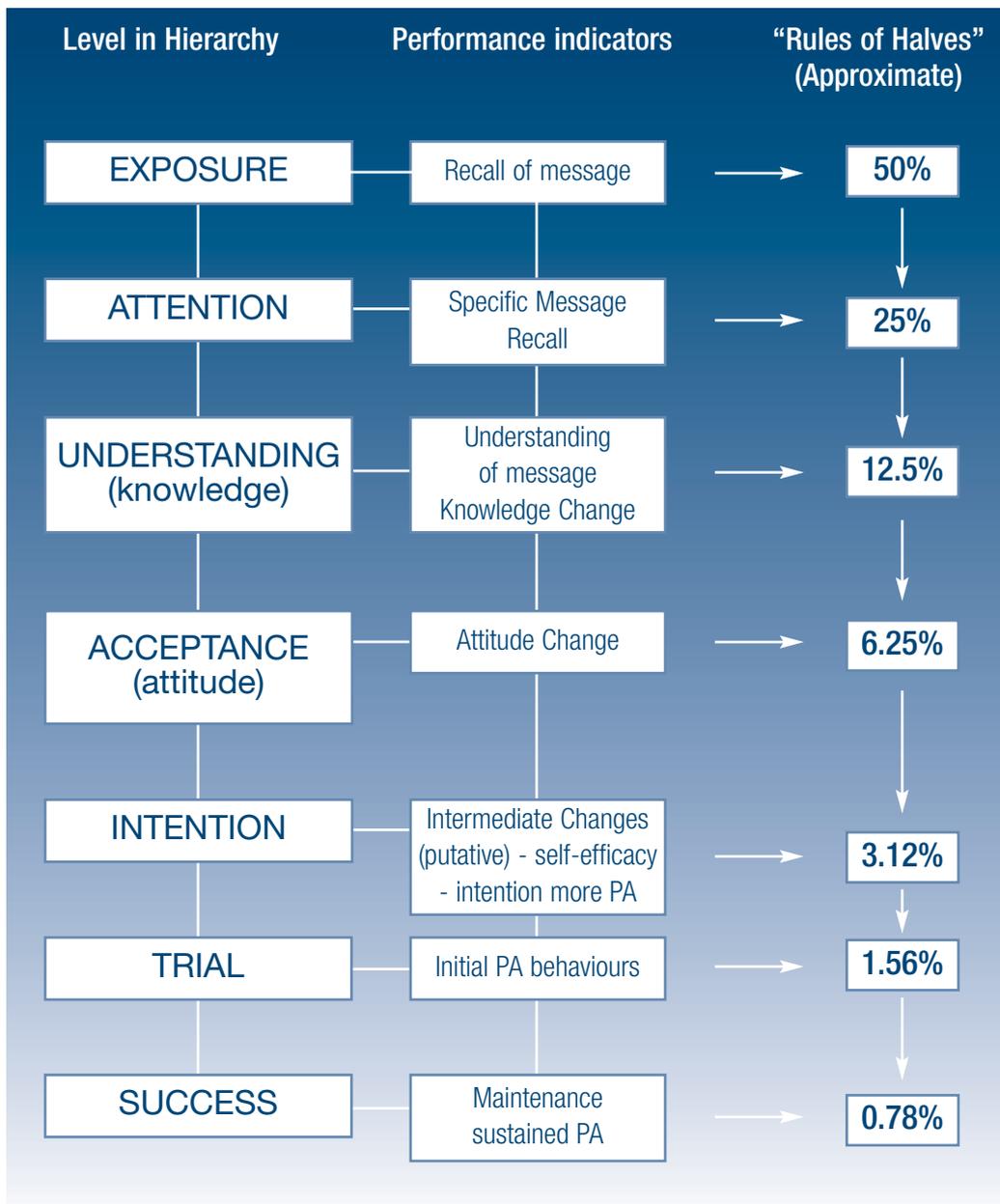
2.5.3. Evidence for the effectiveness of media campaigns

From a theoretical perspective, mass-media communication is most likely to be effective in influencing the knowledge and attitudes of people who are at the earlier stages of the exercise adoption process, particularly pre-contemplators and contemplators. Mass media have the potential to play a major role in promoting physical activity; however, more studies are needed, particularly systematic evaluations of physical activity programs in the community and long-term follow-up studies are warranted. In addition, the field would also benefit from studies investigating use of electronic mail, the Internet and other forms of interactive electronic communication to increase physical activity levels. The potential of such channels across the population is considerable.

The hierarchy of communication effects proposed by McGuire (1984) is illustrated as a hypothetical example in Figure 4. It is emphasised that whilst conceptually clear and useful for defining likely campaign effects, the hierarchical model has seldom been empirically tested in campaign evaluations. This hierarchy is based on the

notion of a causal chain providing the links between input and output. The model acknowledges that success becomes more difficult to achieve as we move from measures of basic awareness through to attitudinal and behaviour change. An approximate 'rule of halves' is advanced. Given a certain target audience (100%), if 50 per cent are exposed to a message, approximately half may typically attend to it (25%); of that 25 per cent, half may typically understand what they have deigned to attend to—12.5 per cent. Half of that proportion may accept the proposition they have understood (6.25%), which may lead to some intention to act in a little over 3 per cent. About half of that proportion may end up actually turning that intention into a trial of the behaviour—1.57%, and assuming a 50 per cent success rate, then a little under 1 per cent (0.78%) of the original target audience may achieve the desired (behavioural) objective. This model illustrates the importance of succeeding 'upstream' in the hierarchy—getting good exposure and attention, with clear communication for consumer understanding of the message.

Figure 4. A hierarchy of effects in a mass-media campaign for physical activity.
Adapted from McGuire 1984.



Arguments have been put forward about the potential uses of the new information technology to provide a variety of exercise adherence interventions to supplement, or possibly to replace, existing face-to-face counselling and social support mechanisms (Fotheringham et al. 2000a). The potentials of the Internet and email technologies to influence physical activity and other health-related behaviours are considerable, though largely untested. The potential advantages of website-based delivery of a self-help physical activity program include rapid, convenient access at networked worksites, cost-effective ways to reach large numbers, immediate feedback to participants through the interactive nature of this medium, and the capacity for specific tailoring of advice. Moreover, one recent study indicated that young adults prefer to obtain information through this medium than through more traditional print or broadcast media (Fotheringham et al. 2000b).

For a recent review, Marcus et al. (1998) screened over 200 published studies and identified seven that were mass-media campaigns at the State or National level, the main features and effects of which are summarised in Table 8. Only three of the seven studies that Marcus et al. identified as being State- or National-level, mass-media campaigns included a comparison group. To these three may be added the Active Australia campaign for which the evaluation included a comparison group and combination of longitudinal and cross-sectional surveillance. With these four exceptions, this type of campaign activity typically lacks robust evidence.

2.5.4. Conclusions

Well designed media campaigns can help to set the physical activity agenda, and inform the community and professional groups about the new moderate-intensity physical activity message. Media alone will only focus attention on the need for change, and additional supports are required for population change; for example, campaigns supported by community-based programs, primed health professionals, and environments which facilitate activity choices. Nonetheless, mass media has a clear role, as it did in the first two decades of tobacco control, when new messages and the mass dissemination of scientific evidence set the scene for later tobacco control work. In a similar vein, physical activity evidence is relatively new, and there is a role for organised public education, which, ideally, would be in the form of an integrated, multi-year, phased campaign.

The opportunities provided through Active Australia allow for campaigns to be developed in one location and run across diverse settings; the communication need is to orchestrate campaigns so that they are sequenced, build upon each other, and lead to a more informed community, with greater motivation to embark upon physical activity in organised and non-organised settings.

Table 8. Summary of physical activity campaigns

Campaign (duration)	Evaluation design	Activity target*	Theoretical basis(es)†	Results
Heart Week 1990 (NHF Australia) (1 week)	Quasi-experimental (pre & post)	Moderate activity — walking	SMT	71% (v 46% baseline) recall; no change in beliefs about benefits; increased walking among 50+ and less educated.
Heart Week 1991 (NHF Australia) (1 week)	Comparison of results with 1990	Moderate activity — walking	SMT	73.5% (v 62.5% baseline) recall; no change in intention; non-significant increase in physical activity from 1990 to 1991
Pawtucket Heart Health Program (USA sub-study) (6 weeks)	Pre & post test; no comparison group	LTPA; part of larger CVD risk reduction program	TTM/ SCT	Majority of subjects increased motivational readiness for physical activity
Slangerup— a Heart Healthy Town (Denmark) (1 year)	Comparison community	LTPA	SCT	No change in knowledge; small increases in motivational readiness and physical activity intervention and controls
Minnesota Heart Health Program (USA) (5–6 years)	Three matched pairs of communities— one education and one comparison site in each pair	Low-moderate LTPA; as part of larger CVD risk reduction program	SMT	Accelerated secular trend for increased physical activity (years 1–3); small increases in EE LTPA early phase; small reduction EE later phase
Stanford Five-City Project (USA) (6 years)	Two pairs of matched communities; fifth community with surveillance only	LTPA and incidental (e.g. walking/ taking stairs); part of larger CVD risk reduction program	SMT	Little consistent evidence of effect on knowledge, attitudes, self-efficacy. Small increases in vigorous physical activity (males) and moderate physical activity (females)
HEBS Walking Campaign (Health Education Board for Scotland) (1 year)	Omnibus survey Pre (Jun 95); Post (Jun 96) Tracking surveys Oct 95, Feb 96, Jun 96 Fitline (telephone) Callers surveyed at baseline, 10 weeks, 12 months	Walking ≥ 30 minutes /day on most days of the week	SMT SCT	Recall peaked at 70%; increase in knowledge and beliefs; no change in intention or physical activity behaviour. Average 670 calls/ wk; increased intention & walking among callers at 4 weeks and 1 year (0.1% used line)

*LTPA, Leisure time physical activity

†SMT, Social Marketing Theory; TTM, Transtheoretical Model; SCT, Social Cognitive Theory.

Source: Adapted from Marcus et al. (1998)

References

- Bauman A, Bellew B, Owen N, et al. (2001). Impact of an Australian mass media campaign targeting physical activity in 1998. *American Journal of Preventive Medicine* 21:41-7.
- Booth M, Bauman A, Oldenburg B, et al. (1992). Effects of a national mass-media campaign on physical activity participation. *Health Promotion International* 7:241-7.
- Donovan RJ, Owen N. (1994). Social marketing and mass interventions. In Dishman RK (Ed). *Exercise adherence: its impact on public health* (second edition). Champaign, Illinois: Human Kinetics.
- Flora JA, Maibach EW, Maccoby N. (1989). The role of media across four levels of health promotion intervention. *Annual Review of Public Health* 10:181-201.
- Fotheringham MJ, Owies D, Leslie E, et al. (2000a). Interactive health communication in preventive medicine: Internet-based strategies in teaching and research. *American Journal of Preventive Medicine* 19:113-20.
- Fotheringham M, Wonnacott RL, Owen N. (2000b). Computer use and physical inactivity in young adults. Public health perils and potentials of new information technologies. *Annals of Behavioral Medicine* 22:269-75.
- Marcus BH, Owen N, Forsyth LH, et al. (1998). Interventions to promote physical activity using mass media, print media and information technology. *American Journal of Preventive Medicine* 15:362-78.
- McGuire WJ. (1984). Public communication as a strategy for inducing health-promoting behavioral change. *Preventive Medicine* 13(3):299-319.
- NSW Health Department. (2000). *The Active Australia / International Year of Older People public education campaign to promote physical activity among older people*. State health Publication HP 000016. Sydney: NSW Health Department.
- Owen N, Bauman A, Booth M, et al. Serial mass-media campaigns to promote physical activity: reinforcing or redundant? *American Journal of Public Health* 85:244-8.
- Redman S, Spencer EA, Sanson-Fisher RW. (1990). The role of mass media in changing health-related behavior: a critical appraisal of two models. *Health Promotion International* 5:85-101.



2.6 Environmental, policy and intersectoral approaches to physical activity

Summary

What do crime, graffiti, potholes, dogs, local government bodies, street lighting, postboxes, local shops, the media, urban designers and parks have in common? Each is related to removing barriers that prevent many people from becoming more active. Environmental and policy change is a new and emerging influence on population levels of physical activity. Fundamentally, enabling people to be active is beyond the responsibility of the health sector alone—health professionals have a role to play, but many other key stakeholders have equal or greater roles. In particular, interventions through the transport sector ('active commuting') may represent important ways to increase incidental physical activity. Policy approaches are needed to shape and advocate for a decision-making agenda that is more oriented towards physical activity.

2.6.1. Rationale for a focus on environment and policy approaches to promoting activity

Overall, the combined efforts to promote physical activity have not influenced Australians to increase or even maintain participation levels (see chapter 1.3). To increase physical activity levels, there is a need to move beyond, and to complement, strategies for individual change. Furthermore, it is essential to work beyond the health sector to change the

environments where people work and live, and to develop policies that may influence those environments.

The importance of environment and policy elements was recognised in the World Health Organization's Ottawa Charter for Health Promotion (WHO1986), and further clarified in the Jakarta Declaration (WHO1997), which specifically stated that the environment can permit or deter people from being physically active. Environments can provide opportunities for individual change efforts, and may lead to sustainable increases in participation. One means of developing environmental interventions is through policy changes (see text box). Although many of the health benefits of being active occur at 30 minutes of moderate-intensity activity on most days of the week, additional benefits—especially weight loss and cancer prevention—may require the accumulation of at least 60 minutes of activity daily. Environmental interactions offer opportunities for accumulating more activity as part of everyday lifestyle, transport and daily tasks.

Policy definitions

Policy has been defined as: 'A set of principles guiding action towards predetermined ends' (Titmus 1974) and 'A narrative that provides guidelines for coordinated action across sectors and institutions.' (Legge et al. 1995)

Policy impacting on physical activity is extensive and in many areas, including the obvious areas of health, sport and recreation, and education, as well as perhaps less obvious areas, such as transport, urban safety, urban planning and design, worksite legislation, entertainment and environmental policies. (A National Heart Foundation study is currently compiling information on physical activity policies in Australia, and a 1997 NSW Health review assessed the State legislation that may be relevant to physical activity). Policy can be anything from codified rules documented and, or, enshrined in legislation, written organisational policy or the usual practice in an organisation, which may be unwritten. The WHO concept of Healthy Public Policy is important because it implies that policies may extend beyond the health sector, may include environmental policy, and is often educational and persuasive.

2.6.2. Environments where people are physically active

There are diverse settings and environments in which people can be physically active. Some obvious contexts include organised and sporting activities, which occur in specifically designed environments. Other types of physical activity may include recreational activity, which may be organised (e.g. a walking group) or non-organised, and may take place in a defined environment (a walking trail) or less formally defined environments, such as local streets. Other settings for activity include work and school environments. Another important dimension is active transport ('active commuting'), which involves using public transport or cycling or walking to get to or from places, instead of using a car. Finally, incidental activity such as walking to the local shops, digging in the garden, sweeping the floor or walking the dog, contributes to total daily physical activity. These extend beyond the simple leisure-time recommendations usually made with reference to physical activity.

People may be physically active for the health benefit and also for social and cultural reasons. Activity may be compulsory, such as in the school curriculum, and a few occupations are still physically active, such as that of cycle couriers, builders, and some farming tasks. In addition, environments may play a role in facilitating participation in activity (see text box).

Environments where people can be active

- the home—inside and outside environments
- streets and roads
- urban parks, ovals, defined green space, organised sporting fields
- in and around shops—malls, escalators, stairs, parking lots
- stairways, e.g. in buildings, and train stations (instead of lifts, escalators)
- worksites
- school yards
- gymnasias, sporting complexes, pools, tennis courts, other built facilities
- walking and cycling trails
- rural areas, National parks, forests
- beaches, lakes, waterways

When the above factors are considered, it becomes easier to see possibilities for action in these areas, particularly action related to environments and policy. The following environments may influence physical activity:

- physical: road system design and planning (e.g. roads, footpaths, roundabouts), parks, beaches, buildings, housing design, available transport, access to sports, gyms and recreation facilities;
- social: sense of community, crime, safety, acceptance, community spirit;
- cultural: cultural norms and customs, media, arts ,dance; and
- economic: equipment, membership fees, facilities for sport, transport costs.

2.6.3. The relationship between physical environments and physical activity

A modest amount of quantitative research has been conducted to identify the relationships between environments and levels of physical activity (Sallis and Owen 1997). Much of this research has examined perceived or measured environments, and ascertained that people are more likely to be active if they live near to, or can access, conducive or facilitatory environments (Sallis et al. 1997). There is a research need for more objective measures of environments, and new technologies, including geographical information systems (GIS) mapping may be used to define and quantify the physical activity ‘friendliness’ of local environments.

Good qualitative and quantitative research has been conducted in Australia that has explored some of these relationships. One study in South Australia concluded that if environments are to encourage physical activity, they should be designed from the point of view of the slowest walker or pedestrian and the learner cyclist, to optimise their accessibility. Access to public open space or to facilities has been identified through qualitative studies as having the potential to influence activity (Hahn and Craythorne 1994, Corti et al. 1997). Also, it has been shown that having good pedestrian facilities alongside road systems and having urban design features that allowed road users to reach destinations, may be important (Wright et al. 1996, Wright et al. 1999). The proximity to the coast, and associated walkways and parks, may positively influence the likelihood of being active (Bauman et al. 1999). Environmental variables add to the existing lists of intra-individual and cognitive variables and make a unique contribution to physical activity (Giles-Corti and Donovan In press).

2.6.4. Environmental Interventions to promote physical activity

The studies mentioned in section 2.6.3 provide evidence of consistent associations but few intervention studies have been conducted to influence environments and assess their effects on activity levels. Several researchers have developed ‘point of choice’ interventions with signage to encourage stair climbing, instead of using moving footways or escalators, to promote activity inside buildings, railway stations and shopping

centres (Blamey et al. 1995, Andersen et al. 1998). This may be particularly relevant in urban environments, where train stations, shopping malls and indoor city buildings and hotels might encourage activity through this simple environmental change. There are now seven or eight stair-use studies in press or in preparation, and although the effects are small, they are consistent and apply to large population groups, with reasonable access. There is sufficient evidence to develop policies around inexpensive and feasible stair-use interventions, and to disseminate the interventions widely.

Other opportunities for evaluating environmental interventions are being explored. These include assessment of active commuting interventions (such as the Travelsmart initiatives in Perth) and the evaluation of the introduction of new public transportation programs, such as the introduction of a light rail network into Inner Western Sydney. This evaluation research is often opportunistic—the costs and timing of intervention are borne by other agencies such as departments of transport, and evaluation focuses on population rates of active commuting patterns, not just on ticket sales. Active commuting interventions have been trialled in Finland, with modest success, in large occupational settings (Vuori et al. 1994).

The NSW Health Department, along with researchers in Western Australia have conducted assessments of the impact of urban park improvements upon usage patterns and physical activity. The intervention was developed in concert with local government and other local agencies.

Similar work, evaluating the impact of newly-developed walking trails has been reported from the USA (Brownson et al. 2000).

Restructuring the environment for whole communities has not been researched in any detail, except with respect to a Naval base in California that developed a more physical-activity-focused environment, and showed some increases in physical activity and fitness in that setting (Linenger et al. 1991).

2.6.5. Policy approaches to increasing physical activity

A strategic policy approach to physical activity involves using the principles of health promotion as a framework for action (see chapter 2.1). Key steps include the development of coalitions and partnerships to work together on physical activity issues. The concept of intersectoral action or collaboration between agencies and with people in the community is essential to create the healthy public policy and action that leads to supportive environments that are conducive to populations becoming physically active. The potential for partnerships among people interested in, and committed to, physical activity extends beyond the health sector, and includes government departments of transport, local government, urban planning, education and schools, sports and recreation, as well as NGOs, the fitness industry and the private sector.

The prerequisites for effective collaboration include a shared understanding (common goals), an approach that generates interest and shares resources among the collaborative partners, the concept of combined planning of initiatives, and linkages to the community as fundamental to the collaborative process.

Within the health sector, there are efforts directed through public education and health professional training to set physical activity on the agenda. Beyond the health sector are organisations that can make physical activity happen in local communities and regions, for children, special groups and populations, and different geographical locations. Incidental physical activity can be enhanced by policies which encourage public transportation, walking paths, indoor opportunities to use the stairs in buildings, and other modes of accumulating activity every day.

Strategic intersectoral planning is a necessary first step, to pool the resources and expertise of identified stakeholders and partners. Ideally, defined organisations would form a local- or State-level physical activity coalition, and develop a clear strategic plan, with the roles and accountability of each participating member defined in the plan. This process was adopted in New South Wales in 1996, and a framework for action developed (NSW Department of Health 1998). Each participating agency then had defined tasks for the promotion of physical activity for which they could be held accountable, and were required to demonstrate progress. Other State-level coalitions have been formed, and progress is well advanced in the Australian Capital Territory, Queensland, Victoria and Western Australia.

Other policy-related examples occur elsewhere, especially in the context of local government. In South Australia, the City of Salisbury (SA) Health Policy and Strategy (1999) was designed to promote healthy lifestyles, supported social and environmental change, and had a special focus on

a citywide environment encouraging active living. In Tasmania, the Launceston City Council developed a 'Dogs in Public Open Space Policy' in 1998, which recognised that pet owners gain health benefits— Council opened up public open space areas for dog walking.

Further examples of intersectoral processes include the Onkaparinga Physical Activity (OPA) project, the Just Walk it program and the Illawarra Physical Activity Program. The OPA in South Australia, was a local coalition of health, local government and land management professionals who worked together to increase awareness of physical activity in the community, and provide an infrastructure of walking and cycling trails that linked community services. The Just Walk it program was auspiced by the Heart Foundation in the Bunbury community of WA, and the Illawarra Physical Activity Program, which was conducted between 1995 and 1998 in the NSW City of Wollongong, yielded positive results for community understanding and participation in physical activity.

A good example of an intersectoral project in an environmental setting is the National Walk to Work Day, which is an initiative of the Pedestrian Council of Australia and was sponsored by the National Roads and Motorists Association (NRMA), the NSW Roads and Traffic Authority, NSW Health, VicRoads, the Heart Foundation and the Department of Health and Ageing. It is a community event, linked to transport-related physical activity but organised around the processes of getting to work, using health-related activity, less car use, and the use of more public transport.

2.6.6. Conclusions

Environmental approaches to increasing physical activity are a potentially useful adjunct to current awareness-raising and motivational programs; the individuals who are reached by such initiatives require access to physical environments to realise and maintain moderate-intensity physical activity. Environmental and policy interventions can have an equity focus, and reach many segments of the population, including women, the elderly, people at some social disadvantage, and people from a non-English-speaking background. These kinds of interventions require broad participation across a range of sectors, preferably in partnership, and working towards the development of health promoting policies to support environmental changes. In conjunction with existing programs, this approach offers some hope of increasing physical activity levels in communities and districts, and in creating the opportunities for sustainable population change.

References

- Andersen RE, Franckowiak SC, Snyder J, et al. (1998). Can inexpensive signs encourage the use of stairs? Results from a community intervention. *Annals of Internal Medicine* 129(5):363-9.
- Bauman A, Smith B, Stoker L, et al. Geographical influences upon physical activity participation: evidence of a 'coastal' effect. *Australian and New Zealand Journal of Public Health* 23:322-5.
- Blamey A, Mutrie N, Aitchison T. (1995). Health promotion by encouraged use of stairs. *British Medical Journal* 311:289-90.
- Brownson RC, Housmann RA, Brown DR, et al. (2000). Promoting physical activity in rural communities: walking trail access, use and effects. *American Journal of Preventive Medicine* 18:235-41.
- Corti B, Donovan RJ, Holman CDJ. (1997). Factors influencing the use of physical activity facilities: results from qualitative research. *Health Promotion Journal of Australia* 7:16-21.
- Giles-Corti B, Donovan RJ. (in press). The relative influence of individual, social and physical environmental determinants of physical activity. *Social Science in Medicine*.
- Hahn A, Craythorn E. (1994). Inactivity and physical activity in two regional centres. *Health Promotion Journal of Australia* 4:43-5.
- Legge D, Butler P, et al. (1995). *Policies for a healthy Australia*. Canberra: Commonwealth Department of Human Services and Health.
- National Heart Foundation. (1997). Supportive environments for physical activity (Newsletter), December.
- National Heart Foundation. (1998). Supportive environments for physical activity (Newsletter), June.
- National Heart Foundation. (1999). Supportive environments for physical activity (Newsletter), April.
- Linenger JM, Chesson CV, Nice DS. (1991). Physical fitness gains following simple environmental change. *American Journal of Preventive Medicine* 7:298-310.
- NSW Premier's Taskforce on Physical Activity (NSW Taskforce). (1996). *Simply active every day: A plan to promote physical activity in NSW 1998 - 2002*. Sydney: NSW Health Department, Public Health Division.
- Sallis JF, Bauman A, Pratt M. (1998). Environmental and policy interventions to promote physical activity. *American Journal Preventive Medicine* 15(4):379-97
- Sallis JF, Johnson MF, Calfas KJ, et al. (1997). Assessing perceived physical environmental variables that may influence physical activity. *Research Quarterly for Exercise & Sport* 68(4):345-51.
- Sallis JF, Owen N. (1997). Ecological models. In Glanz K, Lewis FM, Rimer BK (Eds.). *Health behavior and health education: theory, research, and practice* (second edition). San Francisco: Jossey-Bass, pp 403-24.
- Titmus R. (1974). *Social policy: an introduction*. London: Allen and Unwin.
- Travelsmart url. (WA Department of Transport) <http://www.travelsmart.transport.wa.gov.au>
- Vuori IM, Oja P, Paronen O. (1994). Physically active commuting to work: Testing its potential for exercise promotion. *Medicine and Science in Sports and Exercise* 26:844-50.
- World Health Organization. (1986). *The Ottawa charter for health promotion*. Geneva: WHO.
- World Health Organization. (1997). *The Jakarta declaration on leading health promotion into the 21st century*. Geneva: WHO.
- Wright C, MacDougall C, Atkinson R, et al. (1996). *Exercise in daily life, supportive environments*. Canberra: Commonwealth of Australia.
- Wright C, Atkinson R, Cox R, et al. (1999). *Supportive environments for physical activity: guidelines for local government*. Adelaide: National Heart Foundation.

2.7 Transport and physical activity

Summary

Strategies for active transport offer new challenges as well as promise for increasing levels of incidental physical activity (increasing daily energy expenditure through walking or cycling short trips, or through walking to get to or from public transport systems). Overseas data suggest that there have been declines in walking and cycling, and increases in the number of car trips since 1980. Substantial work is required in the development of indicators, and in the trialling of innovative interventions to confirm that this setting has the potential to contribute to population levels of physical activity, as is thought to be the case.

2.7.1. Introduction

This chapter describes an important setting for promoting incidental physical activity and for helping people to accumulate moderate-intensity physical activity through active use of transport. It follows on from, and is linked to, the work on environmental and policy interventions. It is related to environmental structures, such as urban density, connectivity, and the presence of accessible destinations, all of which are related to physical activity (Schmidt and Killingworth 2000). Transport is described in a separate chapter because the setting is quite specific although the principles of intersectoral collaboration remain important.

The links between transport and health have been made explicit, through the notion that cycling and walking for transport may

contribute to health, and through the understanding that better use of public transport systems may confer health benefits (Mason 2000). This process involves a range of sectors working with the transportation agencies, in the context of ‘active commuting’ and using public transport to promote physical activity. Working across sectors may be challenging but the opportunities and mass reach that the transport sector offers are substantial.

The rationale for efforts in this area relates to the greater use of private vehicles and fewer trips by walking or cycling, to get from one place to another, and is supported by data from the United States and the United Kingdom (see text box). Many journeys are over only short distances, and people should be encouraged to cycle or walk more often—walk (or ride) to the local shops, walk to work, walk children to school. Australian data have not been compiled in this way but the trends are likely to be very similar.

The benefits of active commuting include personal health benefits, as well as improved air quality through reduced car emissions, and improved utilisation of public transportation (Mason 2000). Thus this is an issue for environmental as well as individual health. This has been recognised in the World Health Organization’s Charter on Transport, Environment and Health (WHO 1999), which recognises the links between transport systems, environmental issues, and health. Solutions should be based on shared values, common planning processes, a focus on equity and sustainability, and multisectoral integration—these concepts are very similar to those derived from a

health promotion framework, described in chapter 2.1. The solutions are to develop innovative ways to promote active commuting, to increase walking and cycling for short trips, and ensure access to transport systems (Dora 1999).

The text box includes data from the United Kingdom; similar data exist for North America and for many other developed

countries. Many short journeys for which cars are currently used could be carried out by other means. The trend appears to be towards declines in the use of walking and cycling as means of transport; therefore, there should be opportunities for the promotion of both transport and physical activity promotion, with common objectives, to reverse this trend.

The need for more active transport in the UK

- Nearly 75 per cent of all journeys are under five miles and 50 per cent of journeys are less than two miles
- Twenty-eight per cent of journeys are under one mile but 20 per cent of these journeys are motorised transport
- The average person spends on average two weeks a year travelling, including nine days in cars and three days walking
- More bikes are sold in the UK than cars each year; twenty per cent of households own bikes that are not ridden
- The distance walked has declined from 255 miles per person per year in 1975–76 to 195 miles in 1995–97
- Walking to school is less common: 49 per cent of children walk to school compared to 59 per cent in the mid-1980s
- The proportion of people walking to work in the UK has fallen from 22 per cent in 1971 to under 11 per cent in 1997
- Cycling in the UK has declined from 51 miles per person per year in 1975–76 to 39 miles in 1995–97

Source: Health Education Authority, London 1999.

2.7.2. Research and intervention challenges

The major challenges are to develop ways of working with the transport sector, urban planning and roads and traffic agencies, and to promote active commuting and better use of urban space for walking and cycling. The key challenges for the future are in measurement and research, and in developing and evaluating interventions to promote active commuting or the better use of walking and cycling as transport. These issues, measurement and interventions, are summarised in Tables 9 and 10.

The research needs are shown in Table 9. The sharing of measurement systems, and further development of indicators is required to understand and identify opportunities for intervention, and to monitor the outcomes of such interventions. Examples of interventions are shown in Table 10.

Some of these kinds of interventions are opportunistic—assessing the impact of trail construction or rail-to-trail conversions, or the implementation of new public transport options—others are planned and structured interventions, such as the Travelsmart program in Western Australia, one of the few to collect evidence of program effects (Transport WA 2000).

In August 2001, the National Public Health Partnership and the Strategic Inter-Governmental forum on Physical Activity and Health (SIGPAH) produced a report that examined the factors associated with active transportation, and looked at barriers that hindered, and enablers that facilitated, population usage of active transportation

(NPHP 2001). The report identified demographic characteristics, e.g. young males are more likely to be active commuters, and other individual factors, including perceived benefits of active transport, and knowledge of accessible facilities. Social and environmental factors also were identified that influenced people's choices for active commuting, particularly the availability, quality and affordability of public transportation facilities. The report also defined a framework for interventions in this area, and a range of policy and environmental interventions that could increase the proportion of the population that engages in active commuting. The involvement of stakeholders from a range of sectors is one mechanism that could enhance the future integration and effectiveness of programs to promote active commuting.

In conclusion, there is a need to build the research and evidence base around transport-related interventions to promote physical activity. These approaches offer great promise, in terms of population access, affordability, time involved, and the likely amount of physical activity that active commuting requires. However, there is much work to be done before they can be recommended unequivocally as an effective method of increasing population levels of physical activity.

Table 9. Examples of measurement and research needs—linking health and transport agendas

Topic	Examples
Surveillance and monitoring data	Using transport and commuting surveys and data systems to identify 'physical activity' components and trends
Physical activity surveys (health)	Developing measures of incidental physical activity, including active commuting, in health surveys.
Urban design and transportation infrastructure research	Identifying the relationship between suburban design, the availability of public transport, and the active commuting habits of residents

Table 10. Examples of transport- and roads-related interventions that promote physical activity

Initiator	Intervention
Brownson 2000	Constructing trails in local communities to encourage walking for short trip
WA Dept of Transport	Travelsmart—an integrated, transport-promoting intervention in Perth, with unique features in design and implementation, that has been shown to be effective in promoting active commuting.
Pedestrian Council of Australia 2000	Walk to Work Day Walk to School events*
Brownson 2000	Rails-to-trails conversions
Various agencies	New public transport initiatives

References

- Brownson RC, Housmann RA, Brown DR, et al. (2000). Promoting physical activity in rural communities. Walking trail access, use and effects. *American Journal of Preventive Medicine* 18:235-41.
- Department of Transport, Western Australia. Travelsmart: <http://www.travelsmart.wa.gov.au>
- Dora C. (1999). A different route to health: implications of transport policies. *British Medical Journal* 318:1686-9.
- Health Education Authority (HEA), London. (1999). The HEA closed in 2000 and the website ceased to operate.
- Mason, C. (2000). Transport and health: en route to a healthier Australia. *Medical Journal of Australia*. 172:230-2.
- National Public Health Partnership (NPHP). (2001). Promoting active transport: an intervention portfolio to increase physical activity as a means of transport. August. <http://www.nphp.gov.au/sigpah/keyactiv.htm>
- Pedestrian Council of Australia. (2000). Walk to Work Day 2000. <http://www.walk.com.au>.
- Schmidt T, Killingsworth RE. (2000). How land use and transportation systems impact public health. ACE working paper no.1. Division of Physical Activity and Nutrition. Atlanta: Centers for Disease Control.
- Transport WA. (2000). Travelsmart. www.travelsmart.transport.wa.gov.au.
- World Health Organization 1999. Charter on transport, environment and health: <http://www.who.dk/London99/transporte.htm>



Part 3.

Promoting physical activity with defined population groups



PART 3

PROMOTING PHYSICAL ACTIVITY WITH DEFINED POPULATION GROUPS

3.1 Introduction to special population groups

Part 3 of this document presents a physical activity perspective on special population groups, including a lifespan approach to promoting physical activity. This includes an equity focus on disadvantaged groups, and on groups least likely to be physically active or to be able to afford or access programs or facilities that encourage active participation. Special populations are described, as suggested by an equity-based approach to increasing physical activity levels; this involves identifying the least active people in the community, and having special emphasis on programs for these groups. Specific concerns and approaches are required for promoting physical activity to adolescents, young adults, women, people from diverse cultures, Indigenous Australians and older adults. Special issues may sometimes be relevant for program development for people with chronic illness or disabilities. Limited data and even less intervention experience are available for many of these groups at the population level.

3.1.1. Introduction and data needs for special populations

Taking a ‘populations’ approach to the promotion of physical activity can be beneficial in terms of understanding which groups may be targeted for health promotion action. Descriptive epidemiological studies have helped us to identify the most sedentary groups in the population, and descriptive studies of the determinants of physical activity within population sub-groups helps to ensure that interventions are relevant to the life circumstances of these groups. For example, population studies have shown repeatedly that women are less active than men, at all life stages except in middle-age, and that women from some non-English-speaking backgrounds and those with young children are the least likely to be sufficiently active for health benefit (Brown et al. 2000, Armstrong et al. 2000). Socio-economically disadvantaged population groups are also less likely to participate in formal activity programs, though there is some evidence to suggest that these groups may be more active in terms of transport because they are less likely to own cars (Bauman et al. 1996).

The following chapters explore current thinking about physical activity, the effectiveness of interventions to promote physical activity in three specific ‘life stage’ population groups (childhood and adolescence, and young and older adulthood), and in other specific population groups including people with disabilities, people from non-English-speaking backgrounds, and Indigenous Australians. However, there is relatively little information about the promotion of physical activity in the latter groups.

These three life stages were selected because there is evidence of increasing sedentariness and overweight and obesity among children (Magarey et al. 2001), and because surveys of the adult populations of Australia and other industrialised countries have reported declines in physical activity through young adulthood and beyond (Bauman et al. 1990, Owen and Bauman 1992, Sallis 2000). In pooled Australian population data, the reported prevalence of sedentariness was 14 per cent for people aged less than 25 years and 24 per cent for people aged 25–39 years (Owen and Bauman 1992). An unrelated data set indicates a difference in mean population weight of about four kilograms between these age groups (McLennan and Podger 1995). The most recent population estimates also suggest that older people are amongst the least active of all Australian population groups (Armstrong et al. 2000).

Note that data are limited for most of the special population groups described in this chapter. For example, there are very limited data on physical activity participation amongst Aboriginal and Torres Strait Islander populations. For example, from the 1995 National Health Survey (ABS 1999), it was clear that Indigenous populations were less likely to do any physical activity in the two weeks prior to interview than non-Indigenous populations. Indigenous females were particularly likely to be inactive. However, in the only National Aboriginal and Torres Strait Islander Health survey, carried out by Australian Bureau of Statistics in 1994, information was sought about tobacco use, alcohol use, nutrition and obesity, but not physical activity.

Similarly, there are limited data on populations from a non-English-speaking background, other than those data collected as part of routine health surveys. Typically, the results on people from non-English-speaking backgrounds have been aggregated, and the populations shown to be less active than English-speaking Australians (Bauman et al. 1996, Armstrong 2000). Specific population surveys in identified cultural groups have been conducted for tobacco, alcohol and other drugs, but not for physical activity. For example, the NSW Health Department conducted several drug and alcohol research studies among non-English-speaking populations, including representative samples from the Italian, Greek, Vietnamese, Spanish and Arabic communities (NSW Drug and Alcohol Directorate).

Thus, physical inactivity has not been considered as an important measurement need in surveys of Indigenous or migrant populations. Similarly, data are sparse surrounding the elderly, those with disabilities and special needs. Further, no National child or youth health surveys have collected physical activity data, although State-based attempts have yielded good data (Booth et al. 1997). These, together, point to the need for physical activity to be taken more seriously in health surveys in disadvantaged and special populations, as an information base is a necessary antecedent to good intervention and program development.

References

- Armstrong T, Bauman A, Davies J. (2000). Physical activity patterns of Australian adults. AIHW Catalogue CVD10. Canberra: Australian Institute of Health and Welfare.
- Australian Bureau of Statistics (ABS). (1999). Aboriginal and Torres Strait Islander Survey. ABS Catalogue 4860.0. Canberra: ABS.
- Bauman A, Owen N, Rushworth RL. (1990). Recent trends and socio-demographic determinants of exercise participation in Australia. *Community Health Studies* 14(1):19-26.
- Bauman A, Bellew B, Booth M, et al. (1996). Towards best practice for the promotion of physical activity in the Areas of New South Wales. Sydney: NSW Health Department, Centre for Disease Prevention and Health Promotion.
- Booth M, Macaskill P, McLellan L, et al. (1997). NSW Schools fitness and physical activity survey. Sydney: NSW Department of School Education.
- Brown WJ, Mishra G, Lee C, et al. (2000). Leisure time physical activity in Australian women: relationship with well-being and symptoms. *Research Quarterly for Exercise and Sport* 71:206-16.
- Magarey AM, Daniels LA, Boulton TJ. (2001). Prevalence of overweight and obesity in Australian children and adolescents: reassessment of 1985 and 1995 data against new international standards. *Medical Journal of Australia* 174:561-4.
- McLennan W, Podger A. (1995). National Nutrition Survey. Nutrient intakes and physical measurements. Canberra: Australian Bureau of Statistics.
- NSW Drug and Alcohol Directorate. DAMEC Prevalence Studies 1992-1997. NSW Health Department. <http://www.damec.org.au>.
- Owen N, Bauman A. (1992). The descriptive epidemiology of a sedentary lifestyle in adult Australians. *International Journal of Epidemiology* 21:305-10.
- Sallis JF. (2000). Age-related decline in physical activity. *Medicine and Science in Sports and Exercise* 32:598-600.



3.2 Children and adolescents

This chapter extends the discussion of the school setting in chapter 2.3. Recent trend data suggest that the prevalence of obesity among Australian children is higher than it was in 1980 and that it is likely that they are less active. This trend is worrying because prevention of some chronic illnesses of adulthood may have their genesis in early childhood. The chapter concludes with recommendations for the amount of activity needed for health among children and adolescents.

3.2.1 Physical activity improves health in children

Physical inactivity in childhood is linked to several health risk factors for ill health. For example, numerous studies have shown the effectiveness of physical activity in reducing heart disease risk factors in children (Vaccaro and McMahon 1989, Vandongen et al. 1995), and analysis of the Australian Health and Fitness Survey data 1985, shows a link between fitness and blood pressure in children (Dwyer and Gibbons 1994). The Western Australian Schools Physical Activity and Nutrition program (WASPAN) also demonstrated a decline in diastolic blood pressure in girls who participated in a fitness program over nine months (Vandongen et al. 1995).

The increasing prevalence of overweight and obesity among Australia's children and youth is of growing concern (NHMRC 1997, Wake et al. 1999), and the 1997 NHMRC Report recommended that children be involved in physical activity (rather than diet restriction) as a means of maintaining healthy weight.

Physical activity is also linked with psychological health in children. Calfas and Taylor (1994) reviewed studies of the psychological effects of physical activity on children and adolescents. Despite the small number of studies, they concluded that there was a relationship between physical activity and anxiety and stress, depressed mood, self-esteem, self-concept and self-efficacy (which is a key factor in learning and anti-social behaviour).

3.2.2 Prevalence: how active are Australian children and adolescents?

Although there is growing concern about increasing levels of sedentary leisure behaviours (e.g. TV watching, playing computer games) among young children, there is uncertainty about the prevalence of physical activity among this population group. This uncertainty reflects the difficulty of obtaining accurate population estimates in young children. The most cost-effective method of obtaining data—population survey—is problematic because children under about 11 years of age lack the cognitive skills required to report their activities with acceptable accuracy. Activity can be measured indirectly using field measures of fitness such as the 20-metre shuttle run but this approach has some difficulties, particularly with regard to making decisions about which fitness levels equate with 'adequate' physical activity.

The 1997 NSW Schools Fitness and Physical Activity Survey, which used both self-report of activity and a field measure of aerobic power, found that approximately 80 per cent

of Year 8 boys and girls and Year 10 boys were adequately fit and active, but that a smaller proportion of Year 10 girls was sufficiently active, particularly in the winter months (Booth et al. 1997).

There are no reliable data on trends in physical activity in children and adolescents. However, it is suspected that declines in incidental and transport-related activity in recent years are major contributors to the greater levels of overweight and obesity in Australian children (NHMRC 1997).

3.2.3 Evidence supports the commencement of primary prevention at an early age

Both biological and behavioural precursors of cardiovascular disease in adult life are evident among children and adolescents. There is some evidence that blood cholesterol levels, hypertension and overweight 'track' from childhood and adolescence to adult life. Behaviours such as smoking, physical inactivity, binge drinking and poor diets begin in childhood and adolescence and 'cluster' as they do in adults (Burke et al. 1997, Zubrick et al. 1997).

Studies have shown that the prevalence of mastery of fundamental movement skills among Australian children and adolescents is surprisingly low (Booth et al. 1997). It is highly likely that young people with poor movement skills will be less successful in sports and, therefore, less likely to

participate in physical activity. They may even be subject to ridicule from their peers at school. Oakely (doctoral dissertation, University of Wollongong, 2001) has found that fundamental movement skill mastery accounted for 40 per cent of the variance in concurrently measured aerobic power among children and adolescents. Although this confirms a strong association between fitness and fundamental movement skill, the precise nature of this relationship has not yet been confirmed. In other words, it is not yet clear whether children with low skill levels do not participate in sports and, therefore, have low levels of fitness, or whether those with better fitness are more likely to participate and hence develop their fundamental motor skills.

Anecdotal reports from adults suggest that negative experiences as children, particularly peer ridicule, may discourage people from being active for life. One of the most useful things we can do for children may be to ensure that they have the skills to participate in sports and other activities in an enjoyable and rewarding way. This approach should not only promote activity among children but should also: 1. increase enjoyment of physical activity; 2. promote a sense of mastery that will support the development of self-esteem; and 3. develop a reservoir of skills that can be called upon across the life span.

3.2.4 How much physical activity is enough for children and adolescents?

Little work has been done on the development of evidence for recommended levels of physical activity in children and adolescents. A review from the United States (Sallis and Patrick 1994) reached some consensus on physical activity guidelines for adolescents and recommended that:

- all adolescents should be physically active daily or nearly every day, as part of play, games, sports, work, transportation, recreation, physical education, or planned exercise, in the context of family, school and community activities; and
- in addition to daily lifestyle activities, adolescents should engage in three or more sessions (each lasting 20 minutes or more) per week of activities that require moderate to vigorous levels of exertion.

In the United Kingdom in 1997, the Health Education Authority (HEA) coordinated a review that recommended one hour of physical activity per day for adolescents, based on:

- evidence that most adolescents already undertake 30 minutes of physical activity per day; and
- concern about rising levels of overweight and obesity in young people (Biddle et al. 1998).

There are no formal, evidence-based recommendations for younger children at this time in Australia.

3.2.5 Recommendations for action

Based on the available evidence, several potentially effective strategies are apparent for the promotion of increased levels of physical activity among children and adolescents (CDC 1997):

- encourage parents to limit access to sedentary recreation such as television, videos, computers and video games to a reasonable minimum;
- advocate for pre- and in-service education for early childhood and primary teachers, and appropriate curriculum change, so that fundamental movement skills are included as part of the core physical education curriculum in pre-schools and primary schools—at least one hour per week should be devoted to the development of fundamental movement skill mastery in the primary curriculum;
- encourage schools, community sport organisations and Government departments of sport and recreation to place more emphasis on skill development, participation and enjoyment than on competition;
- improve pedestrian safety and public transport so children may walk or cycle to school, rather than travel by car;
- re-orient school physical education programs for adolescent girls to encourage participation—this may mean providing a wider choice of relevant activities, offering a choice of co-ed or single sex activities, and re-thinking uniform requirements; and
- improve school–community links so that the transition into community-based activities is facilitated, and lifelong participation is encouraged, once formal schooling is completed.

References

- Biddle S, Sallis J, Cavill N. (eds) (1998). *Young and active? Young people and health enhancing physical activity: evidence and implications*. London: Health Education Authority.
- Booth M, Macaskill P, McLellan L, et al. (1997). *NSW Schools Fitness and Physical Activity Survey 1997*. Sydney: NSW Department of School Education.
- Burke V, Milligan RA, Beilin LJ, et al. (1997). Clustering of health-related behaviours among 18 year old Australians. *Preventive Medicine* 26 (5 pt 1):724-33.
- Calfas KJ, Taylor WC. (1994). Effects of physical activity on psychological variables in adolescents. *Pediatric Exercise Science* 6:406-23.
- Centers for Disease Control and Prevention (CDC). (1997). Guidelines for school and community programs to promote lifelong physical activity among young people. *Mortality and Morbidity Weekly Report* 46(RR-6):1-36.
- Dwyer T, Gibbons LE. (1994). The Australian Schools Health and Fitness Survey: physical fitness related to blood pressure but not lipoproteins. *Circulation* 89:1539-44.
- National Health and Medical Research Council. (1997). *Acting on Australia's weight: a strategic plan for the prevention of overweight and obesity*. Canberra: Australian Government Publishing Service.
- Sallis JF, Owen N. (1999). *Physical activity and behavioural medicine*. Thousand Oaks, California: Sage Publications
- Sallis JF, Patrick K. (1994). Physical activity guidelines for adolescents: consensus statement. *Pediatric Exercise Science* 6:302-14.
- Sallis JF, Patterson TL, Buono MJ, et al. (1988). Relation of cardiovascular fitness and physical activity to cardiovascular disease risk factors in children and adults. *American Journal of Epidemiology* 127:933-41.
- Vaccaro P, McMahon AD. (1989). The effects of exercise on coronary heart disease risk factors in children. *Sports Medicine* 8:139-53.
- Vandongen R, Jenner D, Thompson C, et al. (1995). A controlled evaluation of a fitness and nutrition intervention program on cardiovascular health in 10–12 year old children. *Preventive Medicine* 24:9-22.
- Wake M, Lazarus R, Hesketh K, et al. (1999). Are Australian children getting fatter. *Proceedings of the Royal Australian College of Physicians Annual Meeting*, Perth, May.
- Zubrick SR, Silburn SR, Garton A, et al. (1997). *Western Australian child health survey: developing health and well-being in the nineties*. Perth: Australian Bureau of Statistics and WA Institute for Child Health Research.

3.3 Young adults

Young adulthood is a time when participation in physical activity declines, potentially setting up lifelong patterns of sedentariness. This chapter reviews the factors associated with maintenance of physically active lifestyles through this period, and identifies barriers to activity such as time constraints, and the presence of young children. Too few interventions with young adults have been conducted for the outcomes to form the basis of policy recommendations.

3.3.1 Determinants of physical activity in young adults

Although there has been some research into factors associated with physical activity among young adults, most of this has been conducted with tertiary education students. Australian studies such as that completed by Leslie et al. (1999) provide valuable insights into physical activity in this group. Their work, which was based on the Social Learning Model (Sallis and Hovell 1990), found that tertiary students who had high enjoyment of activity, high levels of social support and high self-efficacy, were more likely to be sufficiently active for health benefit (Leslie et al. 1999).

While studies such as this extend previous work that has tended to focus on the influence of personal attributes such as knowledge, attitudes and beliefs towards physical activity (King et al. 1992), they do not develop our understanding of the longer-term maintenance of physical activity after tertiary education.

There is evidence to suggest that physical activity is ‘displaced’ in the lives of young adult Australians by more sedentary activities such as computer use and television viewing (Fotheringham et al. 2000). It is noteworthy that a large decline in physical activity occurs at the same time as many young people change their living arrangements: moving from the family home to ‘flat-share’ living and ‘couple’ relationships (Brown et al. 1998). The average age of Australian women having their first child is now 26.6 years (AIHW 1999). The demands of parenthood, often coupled with the establishment of a working career for one or both partners, mean that this is likely to be a time of great change in several health behaviours.

The data from the Australian Longitudinal Study on Women’s Health indicated that about 45 per cent of young women aged 18–22 lived at home with their parents, about 21 per cent lived in ‘share’ accommodation and another 22 per cent lived with a partner. Women who lived with a partner, particularly those with children, were more likely to report lower levels of physical activity (Brown et al. 1998).

Mothers of young children have recently been the focus of research attention in NSW. Qualitative work in Sydney has found that the main barriers to participation for mothers of young children are:

- personal resources (time and money);
- leisure companions;
- poor access to venues (including lack of transport); and
- lack of good quality childcare.

These are the issues that constrain mothers of young children from participating in organised physical activity (Gould and Hoggard 1999, Lo Cascio et al. 1999). Work in progress with 545 mothers of young children in the Hunter region confirms that time is the biggest barrier to physical activity at this life stage. While having 'no time' has long been known to be a barrier to physical activity (Owen and Bauman 1992) the reasons that women give for having no time need to be elucidated carefully (such as commitments to small children, partners, paid and unpaid work; Brown et al. (in press) shed light on the difficulties faced by young mothers who try to fit 'organised' physical activity into their daily lives.

Additional work is now required with fathers, and others with social and family responsibilities, to assess the impact on individual participation in physical activity. Increases in working hours may have some effects on young adults of both genders, as may the increasing demands of part-time tertiary education.

3.3.2 Physical activity interventions with young adults

In a recent review of physical activity intervention studies for young people (Stone et al. 1998), only two published studies targeting young adults (rather than adolescents) were identified. Both of these involved programs coordinated through tertiary-education settings; no community-based programs were identified in the published literature.

First, in the San Diego State University's 'Project GRAD' (Graduate Ready for Activity Daily; Calfas et al. 2000) 338 senior US college students were allocated randomly to a behaviour change intervention, or a general health, knowledge-oriented control group. The behavioural intervention, shaped by the Transtheoretical Model of behaviour change and delivered by physical education staff through a 15-week course of lectures and laboratory sessions, encouraged students to plan for structured, moderate activity; to increase and maintain their 'lifestyle' activity; and to incorporate muscle strengthening and flexibility exercises in their routine. The intervention had no immediate effects on physical activity patterns of men, and only modest effects among women. Behaviourally-oriented telephone and mail follow-up for 18 months after course completion also had little impact on physical activity outcomes at two-year follow-up for men or women.

Second, the quasi-experimental evaluation of the Deakin University ARTEC (Active Recreation on Tertiary Education Campuses) Project, aimed to increase on-campus and total physical activity amongst students

attending an Australian University. The eight-week intervention program involved aerobics, weights, circuits, demonstrations, free fitness testing, free swimming vouchers, and campus media promotion (Leslie et al. 1999). The results showed an increase in the proportion of students reporting high levels of physical activity but there was no follow-up to assess maintenance of physical activity over time (Leslie et al. 2000).

Other physical activity intervention studies are in progress overseas. For example, Project TEAM (Teaching Exercise/Activity Maintenance), described in the review by Stone et al. (1998) is a quasi-experimental study involving 550 students attending a US college that was underpinned by Social Cognitive Theory and the Transtheoretical Model of behaviour change. Using skills training and self-monitoring strategies, the intervention aimed to increase total physical activity and cardiovascular fitness, and to enhance the maintenance of post-intervention levels of physical activity over time. The results of this study have not yet been published.

In Australia the ProActive Mums project is one of the few young adult physical activity intervention studies that have not focused on tertiary students. It is a randomised trial that involves evaluation of community action interventions based around child care centres in low, moderate and high socioeconomic areas (Brown et al. 2000)

3.3.3. Conclusions

There is little evidence on which to base interventions for increasing physical activity among young adults. Existing studies have been conducted with tertiary students but it has not been established that interventions during this life stage, (even if they are shown to be effective in changing behaviour) will have any long-term impact once these young adults move into the next stage of their lives. Further extensive research is required, especially with population samples of young adults, who are in the transition stage between the end of formal education and the establishment of careers and families. If interventions that promote the establishment of healthy behaviours can be developed for this life stage, there may be the potential to reduce the longterm risk of several of the major chronic illnesses later in life.

References

- Australian Institute of Health and Welfare National Perinatal Statistics Unit. (1999). Australia's mothers and babies 1996. Perinatal Statistics Series, Number 7. Sydney: AIHW National Perinatal Statistics Unit.
- Brown WJ, Ball K, Powers J. (1998). Is life a party for young women? ACHPER Healthy Lifestyles Journal 45 (6):21-6.
- Brown PR, Brown WJ, Miller Y, et al. (In press). Perceived constraints and social support for active leisure among mothers with young children. Leisure Sciences.
- Brown WJ, Miller Y, Brown PR, et al. (2000). Pro-active mums. Promoting physical activity among mothers with young children: barriers and strategies. Abstract for International Behavioural Medicine Congress, November.
- Calfas KJ, Sallis JF, Nichols JF, et al. (2000). Project GRAD: two-year outcomes of a randomized controlled physical activity intervention among young adults. American Journal of Preventive Medicine 18(1):28-37.
- Fotheringham MJ, Wonnacott RL, Owen N. (2000). Computer-use and physical inactivity in young adults: public health perils and potentials of new information technology. Annals of Behavioral Medicine 22:269–75.
- Gould K, Hoggard L. (1999). Child care project - final report. Sydney: Vocational Education & Assessment Centre.
- King AC, Blair SN, Bild DE, et al. (1992). Determinants of physical activity and interventions in adults. Medicine and Science in Sports and Exercise 24(6):S221-36.
- Leslie E, Fotheringham MJ, Veitch J, et al. (2000). A university campus physical activity promotion program. Health Promotion Journal of Australia 10:51-4.
- Leslie E, Owen N, Sallis JF. (1999). Inactive Australian college students' preferred activities, sources of assistance, and motivators. American Journal of Health Promotion 13(4):197-9.
- Lo Cascio M, Thomas M, Connelly A, et al. (1999). Busy mums wanted: a qualitative study of mothers and physical activity. Sydney: Social Health Research Unit, Central Sydney Area Health Service.
- Owen N, Bauman A. (1992). The descriptive epidemiology of a sedentary lifestyle in adult Australians. International Journal of Epidemiology 21:305-10.
- Sallis JF. (2000). Age-related decline in physical activity: a synthesis of human and animal studies. Medicine and Science in Sports and Exercise 32:598–60.
- Sallis JF, Hovell MF. (1990). Determinants of exercise behaviour. Exercise and Sport Sciences Reviews 18:307-30.
- Stone EJ, McKenzie TL, Welk GJ, et al. (1998). Effects of physical activity interventions in youth—review and synthesis. American Journal of Preventive Medicine 15(4):298-315.

3.4 Older people

Given the increasing numbers of older adults in the populations of developed countries, and the likely high consumption of the health budget by older people, approaches to prevention are desirable in this age group. The evidence suggests that physical activity can play a role in maintaining functional status as well as in preventing disease among older adults. Effective interventions include components of muscle strength and flexibility training as well as moderate intensity activity. Major outcomes include lower risk of falls, and measures of improved quality of life.

3.4.1. Introduction

The proportion of people in the general population who were aged over 65 at the time of the last 1996 census was 14.3 per cent for women and 11.1 per cent for men. These proportions have been projected to increase to 18.7 per cent for women and 15.9 for men, by 2021. The majority of these survivors of the baby boomer generation are likely to experience at least one chronic health problem, most commonly cardiovascular disease, diabetes or musculoskeletal or mental health problems (Hoffman et al. 1996). As physical activity has a role in the prevention or management of most of these problems, and as older people are currently the least active of any population group, the potential health gains of promoting physical activity among this population group are considerable.

There has been some debate about the definition of the term 'older person'. For the International Year of Older People in 1999,

'older' was defined as 50 years or more. However, gerontologists generally categorise older people in terms of functional limitations, with people up to 75 with fewest limitations known as the 'young old'; people with some limitations, often in the 75–84 age range, as the 'middle old', and people who are totally dependent, usually over 85, as the 'very old'.

For older people, the loss of ability to do simple tasks such as get out of a chair, carry groceries, or do light house and garden work is common, and can interfere substantially with quality of life. It is thought that much of this loss of function may be due to atrophy resulting from years of inactivity, and that appropriate regular physical activity can help to minimise these biological changes (Sallis and Owen 1999). Regular physical activity may also help to prevent the onset of chronic illnesses and assist with their management, and may delay many of the functional losses that may lead to dependency and institutionalisation. (Shephard 1991, Carlson et al.1999).

3.4.2. Levels and types of activity in older people

Current estimates suggest that in Australia 51 per cent of men and 37 per cent of women aged between 60 and 75 years are sufficiently active for health benefit (AIHW 2000). There are no Australian population data on levels of physical activity among people aged over 75 years. However, the rates of regular physical activity are known to decline with age for both sexes, so that by the time Australians reach their 70s, it is estimated that they are only one-half as

likely to reach minimal criteria for adequate physical activity as people aged under 30 years (Bauman et al. 1996). Among the ‘young old’ there may be a small increase in physical activity at retirement among men, but not among women. As Australian time-use data suggest that retired husbands have more leisure time than any other men or women in the population (Bittman 1991), retirement may be an appropriate time to ‘target’ this group.

Qualitative work with older people in NSW has suggested that active older people participate in a wide range of organised and individual activities (Brown et al. 1999).

These include:

- club, team or group activities such as golf, bowls, line-dancing;
- activities which require infrastructure support such as swimming pools, and tennis courts;
- individual activities such as fishing and walking (popular in coastal areas);
- organised walking in groups such as in shopping malls, as part of cardiac rehabilitation programs, or with programs such as ‘Just walk it’ or ‘Walking for pleasure’;
- individual walking such as walking the dog, to get to or from places or simply for pleasure;
- work around the home and yard; and
- playing with grandchildren.

This qualitative work also found that the main motivations for activity in this group are:

- promoting positive health and preventing illness;
- the pleasure of doing something for oneself;
- having a purpose for activity (fetching the paper, working with the bush fire brigade or meals on wheels);
- positive environments (both built and natural resources) in which to exercise; and
- avoiding the negative stereotyping of old age.

Family and other social support were important motivations for women, who preferred having someone to exercise with or walking in organised groups. (Brown et al. 1999). Other researchers have also reported gender differences in motivations for physical activity—older men have reported that they are active for health reasons, while older women are more likely to report social interaction or improving appearance as motivators for activity (Dishman 1994).

3.4.3 Benefits of physical activity for older people

The benefits of physical activity for health and longevity among older adults are similar to those seen in younger people and are well established (e.g. ACSM 1998). There is now good evidence to show that physical activity is an effective intervention for the reduction or prevention of many of the functional declines of ageing. These include reducing the severity of cardiovascular disease (by lowering blood pressure, improving lipid profiles, reducing blood viscosity), obesity, chronic lung disease, diabetes (by improving

blood sugar regulation), osteoporosis and osteoarthritis, and improving sleep and immune function (USDHHS 1996, Carlson et al. 1999).

There may also be benefits for mental health. However, the limitations of study design in this area often make it difficult to establish whether it is activity per se or concomitant social contact that leads to improved psychological function.

One of the most important public health benefits of maintaining physical activity into older age is the prevention of injurious falls. Because bones break more easily in older people, especially among postmenopausal women, falls often result in fracture (Snow-Harter and Marcus 1991) which can lead to long-term disability, loss of confidence and sometimes institutionalisation and death. There is a clear relationship between sedentariness and increased risk of fracture, with the three most important risk factors for falls being balance, muscle strength and osteoporosis. Recent studies have documented reductions in the rate of bone loss (Kelley 1998) as well as increases in actual bone density with weight bearing exercise (Kohrt et al. 1997).

3.4.4 Effective interventions for older people

Although the effects of physical activity on the cardiovascular and musculoskeletal systems in older people have been widely researched, a recent review by King and colleagues identified only 29 community-based trials that explored issues relating to the promotion of physical activity in people aged 50 years or older (King 1998). Most of these showed beneficial effects, but the majority used physical activity regimens that exceeded the recommendations of the US Surgeon General for the general adult population.

The evidence seems to suggest that longer-duration activity (one hour of walking, swimming or gentle exercise three times each week) may be required for metabolic and body composition changes (King 1998). However, there is also evidence that improvements in muscle strength and balance can occur with gentle exercise such as Tai Chi (Wolf et al. 1996) and with everyday activities such as household work, walking and gardening (Rantanen et al. 1997). For people who have not had to use muscle strength over the years, resistance training may be an important adjunct to aerobic exercise, and there is a need for more evaluation of the behavioural aspects of strength training programs for older people.

Two systematic reviews have found that activity programs that include low-impact aerobic activity (such as walking), strength training and specific balance activities (even simple weight transfer) can reduce falls (Province et al. 1995; Effective Health Care Systematic Review 1996).

As is the case in overseas studies, Australian trials of physical activity in older adults have been limited by the non-random allocation of participants to groups, small sample sizes, poor adherence and high drop out rates. The intervention periods usually have been short and it has been difficult to recruit participants who are not already active (Halbert et al. 1999).

Randomised controlled trials of group exercise in Sydney have found significant improvements in reaction time, strength, memory span and measures of well-being among those who completed the intervention (Lord et al. 1995). Exercisers were less likely to trip and slip, and those who showed better adherence to the program had fewer falls. There were also beneficial effects on anxiety and depression in participants who had low initial scores on these variables (Williams and Lord 1997). The authors concluded that group exercise may be an effective strategy for improving both physiological and psychological functioning in older women.

There have been few evaluation studies of the promotion of physical activity among older people in Australia. During recent years, however, the 'Stay on your feet' program in northern NSW has become a model for falls prevention programs. It uses multi-focused community interventions including home visits and surveillance to assess and modify environmental and personal risk factors. Longitudinal monitoring of knowledge, attitudes, risks and the incidence of falls is ongoing (van Beurden et al. 1998).

3.4.5 Frail and very old people

A recent review by NSW Health found that most frail, elderly people live in environments and among care givers for whom exercise is 'a frightening concept' (NSW Health 1999). However, the benefits of physical activity for the frail or very old are wide-ranging, and can contribute substantially to quality of life (ACSM 1998). Therefore, there is 'a need to address physical surroundings, programming options, and staff training, to instill appropriate activity in private homes, retirement villages, and residential aged care facilities' (NSW Health 1999).

Among the elderly and frail, improving muscle strength, joint stability and balance improves tolerance to weight bearing activity such as walking, and reduces the risk of falls (ACSM 1998). Resistance training is a feasible and effective means of counter-acting muscle weakness and physical frailty in very elderly people (Fiatarone et al. 1994). In a recent randomised controlled trial of 100 nursing home residents, a high-intensity, strength-training program resulted in significant gains in strength, functional status and spontaneous activity. The authors concluded that exercise may minimise or even reverse the syndrome of physical frailty, through direct effects on muscle mass and strength (Evans 1999). Work in New Zealand has shown that a program that involves only four visits from a physiotherapist can improve strength and balance and reduce falls in women aged 80 years and older (Campbell et al. 1997).

Among very old people, especially octo- and nonagenarians, some conditions, such as severe mobility problems, arthritis, dementia,

and visual impairment, make physical activity very difficult. If activities can be modified suitably for people with these problems, it is likely that substantial health benefits will be achieved (ACSM 1998).

3.4.6 Safety considerations

Pre-activity screening is not necessary for older people who wish to commence gentle exercise. If we insist on a medical clearance before allowing older people to be active we may be reinforcing the misconception that 'activity is dangerous'. However, older people who have pre-existing health problems (e.g. cardiovascular disease, high blood pressure, diabetes) or who get symptoms such as light-headedness, dizziness or pain with exercise, should be encouraged to check with their doctor before commencing an activity program. This is essential for those who wish to begin a more vigorous program. In general, if exercise is properly initiated, gradually increasing in intensity and duration, with stretching, warming up, cooling down and appropriate supervision (especially for the frail and very old) the chance of injury will be minimised. Walking is the easiest way to be active. If this is not feasible, then older people should consider seated exercise or strength or balance training (ACSM 1998).

3.4.7 Conclusions

Participation in regular physical activity has the potential to contribute to a healthier independent lifestyle, and to greatly improve functional capacity and quality of life for older people. As is the case for younger people, aerobic activity can improve cardiorespiratory function and reduce risk factors for many chronic diseases, and strength training can offset the losses in muscle mass and strength which are associated with ageing. There are important additional benefits of activity for older people in terms of bone health, osteoporosis, improved postural stability, and decreased risk of falling. Regular physical activity may also contribute to psychological benefits including improved cognitive functioning, self-efficacy and control, and alleviation of depressive symptoms.

There is a need for better designed research to evaluate strategies for the promotion of physical activity among older people in Australia. The evidence suggests that the most effective regimens include both aerobic and musculo-skeletal components but there has been very little research on acceptance, adherence and maintenance of this type of program in the older population.

More work is required to evaluate the impact of household work, shopping and gardening, which may play a role in maintaining muscle strength and possibly fitness at the level required for independent living. There is also a need to explore the importance of physical activity in terms of social and productive activities, and to examine ways of motivating the 'young old' to become more active. It may be advantageous for communications to

focus on contributions to community and maintaining 'a sense of purpose and meaning in life' (Brown et al. 1999) rather than on 'prescription' of activity for aerobic or strength benefit. More work is also required in the area of safe environments for older people's activity, and, as the proportion of the population in this age group increases, there is likely to be a greater demand for more exercise leaders who are skilled in working with frail and very old people.

The promotion of exercise in this age group has been demonstrated to be a potentially cost-effective public health measure (Munro et al. 1997) and as our population ages this is likely to become one of the most important public health priorities for the first half of the twenty-first century.



References

- American College of Sports Medicine. (1998). Position Stand on exercise and physical activity for older adults. *Medicine and Science in Sports and Exercise* 30 (6):992-1008.
- Australian Bureau of Statistics (ABS). (1999) Older people, Australia: a social report. Cat. 4109.0. Canberra: ABS.
- Bauman A, Bellew B, Booth M, et al. (1996). Towards best practice for the promotion of physical activity in the areas of NSW. Sydney: New South Wales Health Department: Centre for Disease Prevention and Health.
- Bittman M. (1991). Juggling time—how Australian families use time. Fyshwick: CPN Publications.
- Brown WJ, Fuller B, Lee C, et al. (1999). Never too late: older people's perceptions of physical activity. *Health Promotion Journal of Australia* 9(1):55-63.
- Campbell AJ, Robertson MC, Gardner MM, et al. (1997). Randomised controlled trial of a general practice programme of home based exercise to prevent falls in elderly women. *British Medical Journal* 315 (7115):1065-70.
- Carlson JE, Ostir GV, Black SA, et al. (1999). Disability in older adults 2: physical activity as prevention. *Behavioral Medicine* 24 (4):157-78.
- Dishman RK. (1994). Advances in exercise adherence. Champaign, Illinois: Human Kinetics.
- National Health Service (UK) Centre for Reviews and Dissemination. (1996). Effective Health Care Systematic review (44) NHS Centre for Reviews and Dissemination, University of York. Effective Health Care—preventing falls and subsequent injury in older people: 2 (4).
- Evans WJ. (1999). Exercise training guidelines for the elderly. *Medicine and Science in Sports and Exercise* 31(1):12-7.
- Fiatarone MA, O'Neill EF, Ryan ND, et al. (1994). Exercise training and nutritional supplementation for physical frailty in very elderly people. *New England Journal of Medicine* 330(25):1769-75.
- Halbert JA, Silagy C, Finucane P, et al. (1999). Recruitment of older adults for a randomized controlled trial of exercise advice in a general practice setting. *Journal of the American Geriatric Society* 47:477-81.
- Hoffman C, Rice D, Sung H. (1996). Persons with chronic conditions: their prevalence and costs. *Journal of the American Medical Association* 276:1478-9.
- Kelley GA. (1998). Exercise and regional bone mineral density in post-menopausal women: a meta-analytic review of randomized trials. *American Journal of Physical Medicine and Rehabilitation* 77(1):76-87.
- King AC, Rejeski WJ, Buchner DM. (1998). Physical activity interventions targeting older adults. *American Journal of Preventive Medicine* 15(4):316-33.
- Kohrt WM, Ehsani A, Birge S Jr. (1997). Effects of exercise involving either joint reaction or ground reaction forces on bone mineral density in older women. *Journal of Bone and Mineral Research* 12(8):1253-61.
- Lord SR, Ward JA, Williams P, et al. (1995). The effect of a 12-month exercise trial on balance, strength and falls in older women: a randomized controlled trial. *Journal of the American Geriatric Society* 43:198-206.
- Munro J, Brazier J, Davey R, et al. (1997). Physical activity for the over 65s—could it be a cost effective exercise for the NHS? *Journal of Public Health Medicine* 19:397-402.
- NSW Health Better Health Centre. (1999). Healthy ageing and physical activity. NSW State Health Publication No: (HP) 980195. Sydney: NSW Health Department.
- Province MA, Hadley EC, Hornbrook MC, et al. (1995). The effects of exercise on falls in elderly patients. A pre-planned meta-analysis of the FICSIT trials. *Journal of the American Medical Association* 287:1341-7)
- Rantanen T, Era P, Heikkinen E. (1997). Physical activity and changes in maximal isometric strength in men and women from the age of 75–80 years. *Journal of the American Geriatric Society* 45:1439-45.

Sallis JF, Owen N. (1999). Physical activity and behavioural medicine. Thousand Oaks, California: Sage Publications.

Shephard RJ. (1991). Fitness and aging. In Blais C (ed.) Aging into the twenty-first century. North York, ON: Captus.

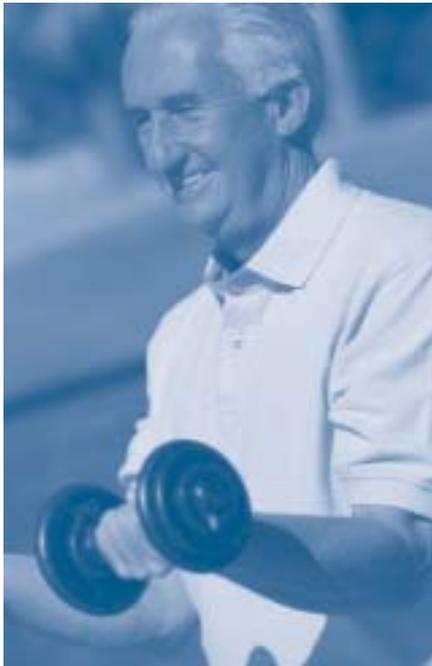
Snow Harter C, Marcus R. (1991). Exercise, bone mineral density and osteoporosis. Exercise and Sport Science Review 19:351-88

US Department of Health and Human Services (USDHHS). (1996). Physical activity and health: a report of the Surgeon General. Atlanta GA: US Department of Health & Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion.

van Beurden E, Kempton A, Sladden T, et al. (1998). Designing an evaluation for a multiple-strategy community intervention: the North Coast Stay on Your Feet Program. Australian and New Zealand Journal of Public Health 22(1):115-9.

Williams P, Lord SR. (1997). Effects of groups exercise on cognitive functioning and mood in older women. Australian and New Zealand Journal of Public Health 21:45-52.

Wolf SL, Barnhart HX, Kutner NG, et al. (1996). Reducing frailty and falls in older persons: an investigation of tai chi and computerized balance training. Journal of the American Geriatric Society 44:489-97.



3.5 People with special needs

This chapter is concerned with equity issues in our approach to physical activity for special populations. Some people with chronic illnesses or with disabilities may benefit from physical activity but may find it difficult to access relevant and appropriate programs. People from a non-English-speaking cultural background and Indigenous Australians appear to be among the least active groups in the community. Specific community-developed approaches may be required to engage these population groups in the design and delivery of culturally-appropriate and relevant physical activity programs.

It is well established that several population groups are less likely to be adequately active for health benefit. These include people with chronic illness or disability and people from some non-English-speaking backgrounds (Taylor et al. 1998). There is some evidence to suggest that women may be less active than men at some life stages (see chapters 1.3 and 3.4, and Appendix 4). The aim of this chapter is to review the current Australian recommendations and initiatives for the promotion of physical activity among these groups with special needs.

3.5.1 People with chronic illness

Physical activity plays a role in both the prevention and management of many chronic illnesses, including cardiovascular disease, diabetes, lung disease, obesity, osteoporosis and some forms of arthritis (Carlson et al. 1999). Most of the research

into the role of physical activity in the management of, and rehabilitation from, chronic illness has focused on heart disease.

Primary prevention studies have clearly identified the protective effects of regular physical activity for people with coronary artery disease. These include increased efficiency of oxygen extraction in skeletal muscles and reduced myocardial ischaemia (Schuler et al. 1992). The results of coronary angiography studies suggest that the minimum level of leisure time physical activity required to improve cardiorespiratory fitness in these patients is about 1400 kcal/week (or about 40 minutes walking daily for an 80-kg person) (Hambrecht et al. 1993). However, work by Hambrecht et al. suggests that considerably more activity, about 2200 kcals per week, is required to achieve regression of coronary atherosclerotic lesions—this equates with at least one hour of moderate-intensity walking exercise every day of each week. In this study, it was achieved by having patients exercise on a cycle ergometer six times a day for 10 minutes, and attend at least two one-hour group activity sessions each week (Hambrecht et al. 1993).

While regular physical activity is the central focus of many cardiac rehabilitation programs, most published studies are compromised by 'drop-out' and short periods of follow-up data collection. 'Drop-out' is a perpetual problem—50 per cent of patients typically leave programs before the end of the first six months (Marcus et al. 2000). In a review of intervention studies that have included collection of follow-up data at least six months after the end of the intervention, Simons-Morton et al. (1998)

located 14 studies involving cardiac rehabilitation patients. Factors associated with improved adherence were:

- supervision of exercise;
- loaning of equipment;
- frequent contact;
- inclusion of behavioural components;
- promotion of moderate intensity exercise; and
- specific maintenance interventions.

Two studies have shown very good longer-term maintenance. In the 'Treatment of mild hypertension study' (Elmer et al. 1995), 900 men and women were randomised to lifestyle plus placebo or drug treatment. The lifestyle intervention began with group sessions that were followed by newsletters, outings and competitions during follow-up. Increases in energy expenditure of over 50 per cent above baseline were maintained after four years of follow-up. In the MULTIFIT trial (MULTIFIT trial 1997), nurses provided education and counselling (for multiple risk factors) by mail and telephone. After 12 months, 71 per cent of the study group was still exercising an average of five times per week. More studies like these, with longer-term active maintenance strategies, are required.

In the NSW Health funded 'Heart moves' project, National Heart Foundation researchers are aiming to build partnerships between key stakeholders who have the opportunity or the responsibility to provide modified physical activity programs to individuals who have heart disease or risk factors for heart disease. Group programs

are delivered by specially trained and accredited fitness leaders. They are designed specifically to be safe for people with, or at risk of, heart disease and diabetes, and to be acceptable to health professionals who are likely to refer 'at-risk' clients. The main outcome indicator in this project is a change in the proportion of 'at-risk' clients who participate in exercise classes in commercial fitness centres.

3.5.2. People with disabilities

The term 'disability' refers to problems or difficulties experienced by a person as a result of a health condition. Most commonly these problems include locomotion, sensory and/or cognitive impairment. The *International classification of impairment, disability and handicap* (ICIDH, WHO 1999) defines disability at three levels:

- *functional* (e.g. memory, vision or hearing);
- *structural* (e.g. heart or spinal cord);
- *personal* (in which routine activities such as reading, walking and communicating are limited); and
- *societal* (in which a person's participation in education, work, recreation or leisure is restricted).

For example, a child with spina bifida has *structural* impairment of the spinal cord, which may limit function in terms of the child's *personal* ability to walk, as well as participation in *societal* activities such as the local junior sports club.

In considering the promotion of physical activity for people with disabilities it is important to recognise the great diversity of health problems faced by this population group. Nevertheless, it is acknowledged that most people with disabilities will gain the same health benefits from physical activity as the general population (Heath and Fentem 1997). In general, however, people with disabilities have lower rates of participation than the able bodied population, and most perceive their disability to be a barrier to physical activity. People with disabilities who are physically active have lower rates of hospital admission and fewer secondary health complications, and there is evidence that physical activity may ameliorate some of the psychological sequelae associated with disability. Measures of independence and quality of life in this group are also improved by participation in physical activity (Heath and Fentem 1997).

In relation to disability discrimination and duty of care, health promotion professionals must take all reasonable steps to ensure that services and facilities take account of the needs of people with disabilities. The *Disability Discrimination Act 1992* (Commonwealth) aims to 'eliminate, as far as possible, discrimination against persons on the grounds of disability, in the areas of work, accommodation, education, access to premises, clubs and sport' (DDA 1992). This has clear implications for health promotion programming. In addition, in all cases where a service provider has a duty of care, all reasonable steps must be taken to ensure the safety of the participants. People with disabilities may be more vulnerable to injury if they have a specific, relative or absolute

contraindication to physical activity resulting from their disability, or if they are less able to understand safety instructions as a result of their disability. Consequently, practitioners should ensure that they establish a risk management plan which incorporates appropriate pre-participation screening tools. If in doubt, seek specialist advice from healthcare providers who are familiar with the needs and activity limitations of specific disabilities.

In the United States, the 'Strong for life' program in Boston has found that home-based resistance exercise programs show promise as an effective public health strategy for people with disabilities (Jette et al. 1999). Participants in this program followed a home-based, video-taped exercise routine, with elastic bands for resistance training. There were modest improvements in strength, balance, and mobility among older people with a disability (Jette et al. 1999).

A home-based approach is particularly attractive for this group, who often face difficulties with access and transport, as well as psychological barriers to exercise (King et al. 1994).

There appear to have been few population-based strategies to encourage Australian people with disabilities to be more physically active. The Australian Sports Commission and relevant State-based lead agencies provide information and programs for people with disabilities, as well as information about educational opportunities for encouraging participation, such as 'Willing & able' and 'Coaching athletes with disabilities.' States' and Territories' departments of sport and

recreation and local government offices may also have strategies (including financial incentives) to encourage community groups and sporting bodies to cater for people with disabilities.

There is a need for more research into the development of physical activity measures, and the role of physical activity in the maintenance of function and independence among people with disabilities. There is also a need for improved understanding of the environmental and social barriers to physical activity, and the feasibility and efficacy of activity promotion for this population group.

3.5.3. People from non-English-speaking backgrounds

The available data suggest that Australians from some non-English-speaking backgrounds have consistently lower levels of self-reported physical activity than their Australian-born counterparts. These population groups have been the focus of health promotion action in the last decade. For example, in Central Sydney, the 'Andiamo' project aimed to encourage activity among Italo-Australians and preliminary data suggest that there were changes in intention to exercise (Health Promotion Unit, Central Sydney Area Health Service 1999). In Western Sydney, there is an ongoing project with migrants from Croatia — 'Get up, have a go, and be active' (Blacktown, WSAHS)—and in South Eastern Sydney, health workers are collaborating with TAFE to develop bilingual, bi-cultural fitness leader training, and to evaluate the success of classes for older, non-English-speaking people. In many areas, culturally

specific program development is required, for example to preserve cultural values and traditions. Physical activity programs may range from a segregated pool class for Muslim women, to programs that foster traditional dance and recreation, as a forms of energy expenditure.

In the Hunter region of NSW, women from Polish, Dutch, Greek and Macedonian backgrounds participated in a quasi-experimental study to evaluate the efficacy of a 12 week minimal intervention combined activity and nutrition program. Women in the intervention groups showed significant decreases in BMI and blood pressure, and improvement in fitness (Brown et al. 1996, Brown et al. 1997). This study has similar limitations to those described above—the samples were relatively small and the intervention and follow-up periods were short. Nevertheless, adherence and maintenance were greatest when programs were conducted by bilingual community educators in culturally appropriate and accessible venues, such as local church halls, and where there was strong community support for the initiative (Lee and Brown 1998).

3.5.4. Indigenous communities

The higher burden of illness due to chronic diseases in Indigenous communities is a cause for great concern. Higher rates of cardiovascular disease, diabetes, hypertension, and renal disease are particularly alarming and both diet and physical inactivity play a role in the aetiology of these problems (Mathers et al. 1999). Mass-media promotion campaigns may be of little benefit

in remote communities because of limited communication technology and, possibly inappropriate language and messages.

There have been few carefully evaluated intervention studies in Aboriginal communities, but, as is the case for people from other culturally diverse backgrounds, there is some evidence that strategies are more likely to be effective when local communities are responsible for their development, implementation and direction (Simmons et al. 1997). The Looma Healthy Lifestyle Programme in the Kimberley region of Northwest Australia has developed during the period since 1994, and is using multiple interventions including participation in sports and walking groups, as well as several innovative dietary change strategies, to promote changes in risk factors for diabetes. This program shows promise in terms of sustainability and long-term increases in physical activity over time (White et al. 1997).

Other interventions in Indigenous populations include youth sport programs, particularly in rural communities, which have engaged Indigenous youth. A range of similar programs is offered throughout Australia by the Australian Sports Commission and States' and Territories' departments of sport and recreation. Despite these initiatives, few evaluations have been carried out, and the recommended 'best practice' programs, using evidence-based approaches, remain difficult to define.

3.5.5. Conclusions

'Populations with special needs' is a term used in this report to define a broad range of population groups. While population data can be used to describe physical activity patterns in these special groups, there is little scientific evidence of effective interventions for promoting physical activity among these groups. An equity approach to physical activity would require that such evidence be accumulated. Most of the available research has focused on small convenience samples, and most studies have been descriptive. Research and evaluation resources should be provided to better define 'best practice' programs for special populations.



References

- Brown WJ, Lee C, Oyomopito R. (1996). Exercise and dietary modification with women of non-English speaking background: a heart health program for Greek-Australian women. *Health Promotion International* 11:117-25.
- Brown WJ, Lee C, Nasstasia YN. (1997). Heart health for migrant women: a short intervention with Macedonian Australian women. *Health Promotion Journal of Australia* 7(2):134-37.
- Carlson JE, Ostir GV, Black SA, et al. (1999). Disability in older adults 2: physical activity as prevention. *Behavioral Medicine* 24 (4):157-78.
- Disability Discrimination Act 1992 (Commonwealth) (DDA), [http://www.austlii.edu.au/doi/au/legis/cth/consol_act/dda1992264](http://www.austlii.edu.au/au/doi/au/legis/cth/consol_act/dda1992264)
- Elmer P, Grimm R Jr, Laing B, et al. (1995). Lifestyle intervention: results of the treatment of mild hypertension study (TOMHS). *Preventive Medicine* 24(4):378-88.
- Hambrecht R, Niebauer J, Marburger C, et al. (1993). Various intensities of leisure time physical activity in patients with coronary artery disease: effects on cardiorespiratory fitness and progression of coronary atherosclerotic lesions. *Journal of the American College of Cardiology* 22:468-77.
- Heath GW, Fentem PH. (1997). Physical activity among persons with disabilities: a public health perspective. *Exercise Sport Science Reviews* 25:195-234.
- Jette AM, Lachman M, Giorgetti MM, et al. (1999). Exercise—it's never too late: the Strong For Life program. *American Journal of Public Health* 89(1):66-72.
- King AC, Blair SN, Bild DE, et al. (1994). Determinants of physical activity and interventions in adults. *Medicine and Science in Sports and Exercise* 24:S221-S236.
- Lee C, Brown WJ. (1998). Australian migrant women and physical activity: attitudes, preferences and participation. *Journal of the Australian Council for Health, Physical Education and Recreation* 45(3):5-10.
- Marcus BH, Dubbert PM, Forsyth LH, et al. (2000). Physical activity behaviour change: issues in adoption and maintenance. *Health Psychology* 19(1):(Suppl) 32-41.
- Mathers C, Vos T, Sevenson C. (1999). *The burden of illness and injury in Australia*. Canberra: Australian Institute of Health and Welfare.
- MULTIFIT trial. (1997). Nurse driven management cuts hospitalisation. *Healthcare Demand and Disease Management* 3:78-80.
- Schuler G, Hambrecht R, Schlierf G, et al. (1992). Regular physical exercise and low fat diet: effects on progression of coronary artery disease. *Circulation* 86:1-11.
- Simmons D, Voyle J, Swinburn B, et al. (1997). Community based approaches for the primary prevention of non-insulin dependent diabetes mellitus. *Diabetic Medicine* 14:519-26.
- Simons-Morton DG, Calfas KJ, Oldenburg B. (1998). Effects of interventions in health care settings on physical activity or cardio-respiratory fitness. *American Journal of Preventive Medicine* 16:19-22.
- Taylor W, Baranowski T, Young DR. (1998). Physical activity interventions for low income, ethnic minority, and populations with disabilities. *American Journal of Preventive Medicine* 15:334-43.
- White GA, Skinner K, Skinner M, et al. (1997). A community based intervention program for the prevention and treatment of obesity and diabetes in Aboriginal people – the Looma Diabetes program. Proc 4th National Rural Health Conference. Perth: National Rural Health Alliance, pp 653-7.
- World Health Organization. (1999). ICDH-2: international classification of functioning and disability. Beta-2 draft, full version. Geneva: World Health Organization.

3.6 Social disadvantage and inactivity

A socio-economic distribution in physical activity patterns has been apparent for several decades. Australian data is no exception, although walking shows less of a socio-economic gradient than other activities. In considering a population approach, the concept of social disadvantage, and the potential barriers that it may cause, should be considered.

3.6.1. Introduction

The concept of equity is an important perspective on physical activity promotion. Australian population surveys and studies in other countries have shown consistently that people who are socially and, or, economically disadvantaged are less likely to engage in specific activities and are generally more likely to be sedentary in their leisure time (Bauman et al. 1990, USDHHS 1996). Population data on education level, income and living in rural regions can be used to illustrate how different manifestations of social disadvantage are associated with being less physically active. For example, we now have data from five National random population surveys of physical activity in Australian adults. These data can be pooled to examine socio-demographic differences in participation (see NHMRC 1997, NSW Health, Public Health Division 2000, Owen and Bauman 1992).

3.6.2. Australian data on SES differentials in physical activity

Between 1984 and 1987, 17,053 people answered questions about their activity patterns in the previous two weeks (through surveys conducted by the Commonwealth Department of Arts, Sport, Environment, Tourism and Territories). Most adults (11,975 or 70.3%) reported at least one leisure-time moderate-intensity or vigorous physical activity within the previous two weeks. However, individuals could report multiple activities, and 36.2 per cent of the total sample reported participating in a second activity, while 16 per cent reported three or more recent physical activities. There were statistically significant differences in participation in relation to education and area of residence (* $p < 0.001$ from chi-squared analyses, see Table 11).

For most activities, there is a clear socio-economic gradient, particularly demonstrated through level of education. Those who did not complete school have lower participation rates in all listed activities than the tertiary educated. Rural Australians who live in small communities or on farms are less likely to participate in formal leisure time activity, with the exception of cycling, which is not different in urban and rural samples. Although this may reflect a lack of access to facilities, or lack of time to exercise, it may also be true that rural people have higher levels of activity in their work and, therefore, do not feel the need to participate in leisure time activity.

Table 11: Sociodemographic differences in walking and in participation in vigorous sporting and fitness activities in Australian adults

Variable	Walking	Jogging	Aerobics	Swimming	Cycling
Number reporting Activity within previous 2 weeks (total N = 17,053)	7007 (41%)	1742 (10%)	2255 (13%)	3084 (18%)	1769 (10%)
Education level					
<10 yr schooling	35%*	6%*	7%*	11%*	8%*
10–12 yr school	41%	9%	14%	19%	10%
Tertiary education	48%	17%	19%	24%	13%
Urban/rural comparison					
Capital Cities	42%*	11%*	14%*	19%*	9%
Towns<10,000 pop	36%	8%	10%	15%	11%

The available data suggest that the socio-economically disadvantaged are more likely to be sedentary and also more likely to be above the healthy weight range. The data further suggest that the promotion of walking may be the most appropriate strategy for slowing or preventing weight gain in this group (see NHMRC 1997, chapter 6; Owen and Bauman 1992).

In their report on barriers to physical activity, Owen and Bauman (1992) found that the most commonly reported reasons for inactivity were a lack of time, physical inability, and not wanting to exercise. Socioeconomic predictor variables

associated with each of these reasons for inactivity were examined. Significant independent predictors of the three most common reasons for physical inactivity are presented in Table 12. The least affluent, less educated, women, and older people were most likely to report that they were physically unable to exercise. The determinants of 'not enough time to exercise' were different, and included people having higher incomes, people with more than three children, and people in rural communities and small towns. The third reason, 'don't want to exercise' was most likely to be nominated by older people and the least educated or least affluent people.

Table 12. Reported reasons for inactivity, by gender, age, education and income

Reported reason for inactivity	<i>More likely reported by:</i>	Independent predictors
Physically unable to exercise	women least educated	older people lowest income
Not enough time for exercise	<i>More likely reported by:</i> women families with at least 3 children rural dwellers	older people higher income
Do not want to exercise	<i>More likely reported by:</i> least educated lowest income	older people

In light of these findings, the socially disadvantaged and elderly may benefit most from easier forms of exercise (to overcome ‘physically unable’) and more information to make exercise behaviour more salient (to overcome ‘don’t want to exercise’). These groups may benefit from information campaigns, accessible and affordable facilities, and convenient simple exercise modalities. On the other hand, some groups perceive time pressure as a central reason for inactivity—these busy groups include the more affluent, rural dwellers, and families with several children. These groups may need highly focused strategies to increase the convenience of activity, in ways that they can integrate into everyday life.

The concept of social disadvantage, and the need for equity in community-wide physical activity strategies, underpins several of the chapters in this document. SES differentials have been seen in the National health surveys, as well as in recent National physical activity surveys (Armstrong et al. 2000). The need to identify and understand socioeconomic differences among different population groups is an important dimension of developing strategies to address physical inactivity in Australia.

References

- Armstrong T, Bauman A, Davies J. (2000). Physical activity patterns of Australian adults. AIHW Catalogue CVD 10. Canberra: Australian Institute of Health and Welfare.
- Bauman A, Owen N, Rushworth RL. (1990). Recent trends and socio-demographic determinants of exercise participation in Australia. *Community Health Studies (now Australian and New Zealand Journal of Public Health)* 14:19-26.
- National Health and Medical Research Council (NHMRC). (1997). *Acting on Australia's weight: a strategic plan for the prevention of overweight and obesity*. Canberra: Australian Government Publishing Service.
- NSW Health, Public Health Division (2000), *The health of the people of New South Wales-Report of the Chief Health Officer*. NSW Health Department: Sydney.
- Owen N, Bauman A. (1992). The descriptive epidemiology of physical inactivity in adult Australians. *International Journal of Epidemiology* 21:305-10.
- US Department of Health and Human Services (USDHHS). (1996). *Physical Activity & Health: a report of the Surgeon General*. Atlanta GA: US Department of Health & Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion.



Part 4.

Next steps:
Recommendations
for research and
implications for policy



PART 4

NEXT STEPS: RECOMMENDATIONS FOR RESEARCH AND IMPLICATIONS FOR POLICY

4.1 Recommendations for research

This chapter summarises the major research needs for physical activity in Australia; these include further understanding of the benefits of activity, improving the measurement of physical activity, understanding why people are active and inactive, and developing a better evidence base around the evaluation of interventions to promote physical activity.

A range of different studies is needed for a more complete understanding of population approaches to physical activity (see Sallis and Owen 1999, chapter 10). In addition, a range of effective and innovative interventions, especially in the environmental and policy arena, are required to promote and foster activity. Below is a summary of some of the key recommendations that relate to the Australian context.

4.1.1. Answering questions about the quantum of physical activity for health

Although much progress has been made in this area, especially through the US Surgeon General report in 1996 (USDHHS 1996), several questions and issues remain for further research and clarification.

- The issue of accumulation has attracted much interest and there is some evidence that several eight- to ten-minute bouts of physical activity may have some effects comparable to doing all 30 minutes in single sessions. Further work in this area is necessary before policy directions are definitive.
- Further work needs to elucidate whether it is overall energy expenditure or the intensity or type of physical activity that is more important to health.
- There is a need to specify how much physical activity is needed for different health and physiological outcomes; the ‘30 minutes moderate physical activity on most days’ seems to be most relevant to the prevention of cardiovascular disease, diabetes, hypertension and, possibly, colon cancer. Understanding of the health outcomes of different types and amounts of physical activity can lead to more precise recommendations for the general public and for those with various clinical conditions.
- There is a need to identify the lower thresholds of activity or energy expenditure which produce health benefits; for example, ‘Is low-intensity (light) activity better than being sedentary, in terms of measurable health outcomes?’.

4.1.2. Understanding the mental health and psychosocial effects of physical activity

Several psychological outcomes appear to be improved by regular physical activity but there is only a limited understanding of the mechanisms that underlie psychological changes, particularly as a result of moderate-intensity and vigorous aerobic activities. Understanding the extent to which psychological benefits are the result of biological changes, or mediated through cognitive, affective or attitudinal mechanisms, or by combinations of these, is an area for future research. There have been relatively few intervention studies in this area, especially at the population level, and important questions about social health and quality of life remain to be demonstrated in well designed intervention studies.

4.1.3. Refining and developing the measurement of physical activity for population monitoring and for interventions

Substantial progress has been made in the measurement of physical activity (see Appendix 2) but additional tasks remain. It is necessary to:

- characterise and assess new domains of measurement, such as incidental activity, occupational tasks and domestic chores;
- develop sets of indicators to monitor incidental physical activity
 - environmental measures, including geographic information systems

- methods for auditing policy, structural and organisational changes relevant to physical activity;

- understand the reliability and validity of all methods; and
- develop standardised physical activity questions for population surveillance to describe the prevalence of physical activity participation in populations, and to monitor trends.

4.1.4. Understanding the factors that cause people to become more physically active

There is much scope for additional research on the causes of physical activity and inactivity, with a priority on examining factors that influence the different stages of adults' readiness to be more active, and the ways in which environmental and structural factors and even genetic-environment interactions may influence both sedentary behavior and participation in physical activity.

4.1.5. Developing and evaluating community intervention strategies

There is an urgent need for better evidence to describe best practice in the promotion of physical activity. This requires well designed and carefully evaluated intervention studies, in all of the settings and for each of the population groups described in this report.

School-based interventions for children have repeatedly been found to be effective but studies in secondary schools and other community settings are scarce. Small- and

large-scale interventions delivered through work sites, community agencies, and the mass media, have often not been evaluated systematically, and there is the need to build high quality measurement into such evaluations. In particular, there is a dearth of information on environmental and policy interventions for physical activity—further evaluation of such types of programs is needed to generate a more comprehensive evidence base for promoting physical activity. It is likely that intersectoral interventions, delivered within defined geographic regions, may be among the most effective approaches. Further research is required to evaluate the return on the substantial investments required to make an impact.

4.1.6. Understanding and influencing the societal barriers to physical activity

There have been very few studies of the extent to which effective physical activity interventions are being used in work sites, schools, primary care settings, community organisations, and media outlets. Chapter 6 of the United States Surgeon General’s report *Physical activity and health* (USDHHS 1996), contains a limited amount of data suggesting that effective programs are probably not being used and disseminated extensively. On the contrary, approaches that are known to be ineffective, such as programs that rely heavily on enhancing knowledge, may be in widest use. More systematic research on the application of interventions in field settings is needed. Studying the diffusion of programs in diverse settings throughout a nation is a difficult

research challenge but behavioral medicine researchers have recently developed models and methods to guide this type of research (Oldenburg et al. 1997).

Sedentary lifestyles are epidemic in industrialised societies because humans have worked hard over the last two centuries to make these lifestyles possible. Thus, it is important to understand that physical inactivity is a societal problem, not just an issue of individual choices. What will it take to get us to drive less and walk more for errands? What will it take to get us to use the stairs in buildings? How much of our transport budgets are we willing to spend on attractive cycle and walking trails? Is it possible to move people away from their television sets for one-half hour of activity per day? How can we best impress upon our politicians and bureaucrats the importance of considering the impact on physical activity of laws and policies that affect health care, transportation, building codes, zoning ordinances? This suggests an agenda for dissemination of research, implementing what we know works, and for policy research, understanding the context in which physical activity programs are funded and developed. These areas have had minimal consideration within the portfolio of physical activity research to date.

References

Oldenburg B, Hardcastle DM, Kok G. (1997). Diffusion of innovations. In Glanz K, Lewis FM, Rimer BK (Eds.), Health behavior and health education: theory, research, and practice (second edition). San Francisco: Jossey-Bass. pp 270-86.

Sallis J F, Owen N. (1999). Physical activity and behavioral medicine. Thousand Oaks, California: Sage Publications.

US Department of Health and Human Services (USDHHS). (1996). Physical Activity & Health: a report of the Surgeon General. Atlanta GA: US Department of Health & Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion. pp 209-59.



4.2 Implications for policy and action

This chapter summarises the evidence described throughout this report. Multicomponent, integrated, comprehensive and collaborative approaches offer the best hope of adequately resourced physical activity interventions that may reverse the current trend of non-participation. Through Active Australia, other State-based coalitions, or National partnerships such as the Strategic Inter-Governmental forum on Physical Activity and Health (SIGPAH), comprehensive initiatives are possible.

4.2.1. Summary of best practice for the promotion of physical activity

This report describes some of the approaches towards the promotion of physical activity both in the health sector, and through interventions outside of the health sector. There has been growth in terms of strategic and programmatic development at the State level, at the local level, and through a range of agencies in both Government settings and in the non-government sector.

Despite the efforts to date, the participation in physical activity in Australia was lower in 2000 than it was in 1997. This suggests that the net sum benefit of recent interventions is insufficient to reverse the trends in physical activity in Australia, and better co-ordinated approaches are required to achieve this.

Despite the strong case for investment in physical activity, it remains relatively under-resourced compared to other risk factors and health concerns, and efforts to increase physical activity typically have been carried out on very modest budgets. Thus, one of the key strategies for the future will involve a more organised approach to physical activity advocacy by non-government organisations to position physical inactivity more favourably on the agendas of health and other agencies. The cost savings that would emanate from even small increases in physical activity participation are substantial, and many of these costs would be delivered as savings within a few years of such population changes.

This document has attempted to identify positive interventions which are likely to impact upon participation in physical activity. One of the key strategies is the development of integrated and co-ordinated approaches to physical activity, across sectors, and developing phased initiatives that are conceptually and temporally linked to each other; it is likely that the greatest progress will result from effective partnership approaches. Some attempts at co-ordination are already well in place, particularly through the development of State-based coalitions and physical activity taskforces. These now exist or are in advanced stages of development in most parts of Australia. Strategic National co-ordination and better integration of awareness raising initiatives through Active Australia at the same time will enhance this process further.

Several specific settings are described in this document through which interventions can be delivered to increase participation in physical activity. A promising setting is that of primary care and general practice, for which there is reasonably good evidence that brief structured advice and the written prescription of physical activity targets individualised for each person can contribute to increases in physical activity levels. The key challenges here are the dissemination of such brief advice throughout primary care and general practice settings.

Schools are important settings for intervention, particularly as physical activity levels decline in secondary schools, notably for girls. The rates of obesity and overweight amongst young people have increased since 1998, which is a further cause for concern. Efforts to increase physical education time, improve fundamental motor skills, and increase out-of-school participation in regular activities are promising, and may contribute to an overall reversal of the decline in physical activity through adolescence and young adulthood.

Worksites are a potential setting but behavioural and educational approaches alone do not seem to have been sufficient to utilise this setting for the effective promotion of physical activity. More innovative approaches are being developed around environmental interventions at the worksite, and around active commuting to and from work. In addition, the encouragement of incidental physical activity, such as using the stairs at work, may provide some solutions.

The role of mass-media campaigns and community-wide interventions is important, particularly to set the agenda and raise community understanding of the new, moderate-intensity physical activity message. Effective and targeted campaigns can result in greater awareness of the moderate-intensity message, and greater short-term trialing of physical activity behaviours by the targeted populations. The media can also target professional groups and organisations, and raise awareness of new evidence and new strategies for improving participation and physical activity levels in the community. Integrating mass-media campaigns over several years into the fabric of a broader framework for the promotion of physical activity provides a defined role for this strategy, and a mechanism whereby it can contribute to greater participation in physical activity in Australia.

The newest area comprises environmental and policy interventions to promote physical activity. Substantial research is being conducted in this area, which offers great hope for encouraging incidental activity, active commuting and the use of improved facilities, such as walkways or trails. These approaches have yet to achieve the status of being truly evidenced-based but there are sound theoretical and practical reasons why these strategies, in combination with awareness-raising and behavioural strategies, may ultimately prove to be effective.

A key theme of this report is that there are populations at particular risk of inactivity, and that special efforts are required to address the challenges of promoting physical activity in these special groups. Working with communities from a range of diverse cultural backgrounds, or with populations of Aboriginal and Torres Strait Islanders also requires a redoubling of efforts, both in providing culturally appropriate physical activity programs and in encouraging populations to use them and increase activity levels. Different problems occur in addressing physical activity in the elderly, particularly developing appropriate and accessible programs for people in the older age groups, for example those over 75 years old, for whom the setting for programs may be institutional. A final group includes people with disabilities, who require special services and programs to enable them to be active. There remains an over-arching relationship between socio-economic disadvantage and physical inactivity, and the structural and intra-personal barriers to activity in this group remain to be further defined and addressed. This relationship is apparent across studies in many countries.

The greatest gains in physical activity are likely if an integrated and organised approach to interventions across Australia is developed further and supported. Systematic co-ordinated campaigns should be integrated with broader environmental and policy interventions. Optimal use of the most effective primary care and general practice based interventions should be disseminated widely through divisions of general practice and other agencies linked to primary care. An integrated approach to schools, worksites and other settings should also be adopted, and the equity dimensions for special populations should be an important consideration. In order to achieve this, co-ordinated administrative structures are required, including an integrated strategic planning process. A clear timeline, with planning for at least three years is required to develop and institutionalise change programs (HEA 1996). These processes have now commenced, through SIGPAH and through Active Australia initiatives. Further developments of these processes are likely to allow evidence-based initiatives to flourish and to contribute to increasing participation rates.

References

Health Education Authority (HEA). London. (1996). Physical Activity Strategy. The HEA closed in 2000 and the website ceased to operate.

Strategic Inter-Governmental forum on Physical Activity and Health (SIGPAH). (2001). URL: www.health.gov.au/pubhlth/strateg/active/index.htm

Appendices



APPENDIX 1

ACTIVE AUSTRALIA— A NATIONAL APPROACH TO SPORT AND PHYSICAL ACTIVITY

Background

The Australian Sports Commission initially devised a concept known as ‘Active Australia’ during 1996. It was an inclusive concept of physical activity that proved to be attractive to other partners and has led to collaborative efforts of international note. In July 1997, *Active Australia—a National participation framework* was formally endorsed by the Commonwealth ministers for sport and health and all States’ and Territories’ ministers for sport. It was a joint commitment by key stakeholders in the sport, recreation and health sectors to develop a strategic and cooperative approach to encouraging participation in physical activity by all Australians.

The first phase of Active Australia, 1996–2000, focused on building partnerships between agencies interested in encouraging all Australians to be actively involved in sport, community recreation, fitness, outdoor recreation and other physical activities.

The response from States’ and Commonwealth health agencies resulted in the formation of the Strategic Inter-Governmental forum on Physical Activity and Health (SIGPAH). This group led the way in providing National direction and a strategic and cooperative approach to encouraging participation in physical activity by all Australians.

A working party that was established to develop Active Australia in 1996 evolved from a large representative group to a group with senior representation from the Australian Sports Commission, the then Commonwealth Department of Health and Aged Care, Standing Committee on Recreation and Sport, Sport Industry Australia, the Recreation Industry Council of Australia and the National Heart Foundation of Australia. This group, known as the Active Australia Alliance (the Alliance), was established in 1999 to formalise the intersectoral approach between sport, recreation and health and to oversee the monitoring of *Active Australia*. The Alliance then developed a *National Plan 2000–2003*. This plan formed the basis of a National approach. It enabled and encouraged agencies to work independently to achieve National outcomes.

The role of the Australian Sports Commission

During this time, the Australian Sports Commission also funded the establishment of three networks to improve the delivery of sport and physical activity in the community:

- Local Government Network—local councils are key providers of programs, services and facilities within the community, and many have sport and recreation officers who work with clubs and schools in their council regions;
- Club–Provider Network—clubs and organisations provide opportunities for sport and physical activity for members of the community; and
- Schools Network—schools provide the opportunities for young Australians to develop links with community sporting organisations and ensure positive attitudes and behaviours to be active for life.

In April 2001, the Prime Minister launched a new sport policy, *Backing Australia's sporting ability—a more active Australia*, which affirms the commitment of the Australian Sports Commission (ASC) to Active Australia and emphasises that the Commission's focus is on provision of opportunities for positive sporting experiences for all Australians. During 2001–2004 the Sport Development Group (SDG) of the ASC will work closely with National sporting organisations (NSOs) to deliver the second phase of the sport component of *Active Australia*.

Resources and further information about *Active Australia* are available on these websites: www.ausport.gov.au and www.activeaustralia.org



APPENDIX 2

STRATEGIC INTER- GOVERNMENTAL FORUM ON PHYSICAL ACTIVITY AND HEALTH (SIGPAH)

The Strategic Inter-Governmental forum on Physical Activity and Health (SIGPAH) held its inaugural meeting on 6–7 May 1999 in Canberra, after having held several informal meetings. Under the auspices of, and reporting to, the National Public Health Partnership, SIGPAH works to facilitate National coordination for government action in physical activity and provides strategic direction on health promoting physical activity. SIGPAH also works towards building partnerships with other sectors and organisations within and outside the traditional health arena such as transport and the environment. It consists of members from all States' and Territories' health departments as well as representatives from the Australian Institute of Health and Welfare and the Australian Sports Commission.

SIGPAH is directed by the document *Developing an active Australia: a framework for action for physical activity and health*. This Framework is the health sector response to Active Australia, the Australian Sports Commission's National call to action to increase participation levels in sport and incidental physical activity in the Australian

population. To build on the framework, SIGPAH produced, *Developing an active Australia: a work plan for 2000–2003*. This strategic work plan is intended to supplement and extend the strategies in the framework document.

Resources such as the SIGPAH work plan and further information about SIGPAH are available on the website:
<http://www.nphp.gov.au/sigpah/index.htm>

The National Public Health Partnership is responsible for the coordination of public health action in Australia. It seeks to improve the health of the Australian population by enhancing National efforts and supporting a sustainable and systematic approach to the business of public health. The partnership was established in 1996 through a Memorandum of Understanding endorsed by Commonwealth, State and Territory Health Ministers. The partnership operates through the National Public Health Partnership Group and reports to Health Ministers through the Australian Health Ministers' Advisory Council (AHMAC). The National Public Health Partnership Group is comprised of a senior representative from the Commonwealth and each State and Territory health department. Senior representatives of the Australian Institute of Health and Welfare and the National Health and Medical Research Council also participate on the Partnership Group.

For resources and further information on the work of the Partnership, please visit the website, www.nphp.gov.au

APPENDIX 3

SAMPLE OF NATIONAL, STATE- AND TERRITORY- BASED ACTIVITIES: BY JURISDICTION AND AGENCY

Introduction

Numerous activities are being undertaken throughout Australia to promote physical activity. In the following sections, each jurisdiction has provided a brief summary of its organisational arrangements and infrastructure components. This is followed by highlights of key activities including current and planned projects. Where possible, they are organised in terms of the four major themes of activity identified in the SIGPAH workplan:

- education
- environments
- infrastructure
- evidence

Please note that not all activities fit neatly into these categories. Each State and Territory has also provided an overview of its institutional arrangements for physical activity.

National organisations are described first, since the Active Australia framework and SIGPAH workplan inform and provide a reference for the States' and Territories' activities.

Australian Institute of Health and Welfare

The Australian Institute of Health and Welfare (AIHW) is the National agency for health and welfare statistics and information. As an independent agency, the AIHW works with many government and non-government bodies across the nation to generate reliable, regular and current facts and figures on the health and welfare of Australians. The AIHW undertakes activities related to the SIGPAH workplan, as detailed in the following sections.

Education

Although the AIHW has no direct role in education, dissemination of results of its work is of paramount importance. In 2001, the AIHW and National Heart Foundation (NHF) publication *Heart stroke and vascular disease: Australian facts 2001* had a special focus section on physical activity. This section provided a concise summary of the most recent epidemiological information on physical activity and heart disease, trends in participation of physical activity in Australia, and the NHF's policy to increase participation in activity among Australians.

Infrastructure

As part of the AIHW's commitment to ensuring reliable data are collected, collated, analysed, interpreted, and disseminated in a timely fashion, AIHW is a member of SIGPAH. The AIHW auspices an Expert Working Group for the Measurement of Physical Activity whose role is to assist in the development of standards to assess the population level of physical activity.

The AIHW also provides advice on developing modules and data elements for physical activity among adults and children, along with other population health risk factors. Members of the AIHW have published in National and international journals on physical activity and regularly attend and are invited to present at National and international forums on physical activity.

Evidence

The AIHW is involved in the monitoring of physical activity patterns of Australian adults. Under the auspice of the AIHW, the 1999 National Physical Activity Survey was undertaken. This collection gave prevalence rates of participation in physical activity, enabled assessment of compliance with the National Physical Activity Guidelines, and provided information for evaluating the Active Australia campaign.

The AIHW and the then Department of Health and Aged Care funded the 1999 National Physical Activity Survey. Members of the AIHW also examine other surveys that contain information on physical activity (e.g. PSM, NHS, AusDiab, RFPS) to provide Australian evidence on the association of physical activity with positive health and wellbeing outcomes. Work is also being

conducted on the association between physical activity and socioeconomic status in Australia.

The AIHW has been instrumental in the development of a standard instrument to measure levels of participation among Australians in population surveys. The *Active Australia*-AIHW instrument provided, for the first time in Australia, the opportunity to assess trends in the physical activity over time in a comparable manner.

The AIHW is continuing to be involved in the development of standard measures of physical activity participation.

For more information about the role of the AIHW and monitoring of physical activity and other risk factors for Active Australia, refer to the website <http://www.aihw.gov.au>

Australian Sports Commission

The Australian Sports Commission (ASC) has led the Active Australia initiative since 1996 and owns the Active Australia trademark. With the launch of the Federal Government's new sport policy *Backing Australia's sporting ability—a more active Australia* in April 2001, a major change occurred for Active Australia. It became one of two focus areas of the ASC. The Australian Institute of Sport, already well known, is responsible for excellence in sports performance while Active Australia is now responsible for building an effective National sports system that offers increased participation in quality sporting activities and increased sporting club membership by Australians. The major impact of the change is to work more closely with National sporting organisations (NSOs) to help them build the capacity and quality of their particular sports.

For more information about the role of the ASC and new Active Australia projects such as the *Targeted Sport Participation Growth Program*, *National Sport Awareness Week* and *Street Active*, refer to the website <http://www.activeaustralia.org>

History of promotion of Active Australia during the 1990s

In the late 1990s, the ASC worked with partners in Sport and Health to develop and fund several National physical activity promotion and awareness campaigns, including:

- mass media campaigns such as the *Fired Up* and *Rusty Man* commercials and advertisements promoted through television, radio and in newspapers and magazines;
- *Active Australia Day* which is a National day of action that calls on all Australians to get up and get involved in some form of sport or physical activity;
- *Active Australia Awards* that recognise and acknowledge the efforts of individuals, sporting organisations, clubs, schools and local government councils that are committed to the Active Australia goals and principles;
- quarterly publication of *Activate* magazine, which shared knowledge and ideas with members of the Active Australia Networks (Clubs and Organisations, Local Councils and Schools) and communicated events and happenings at the broader level in Active Australia; and,

- resources such as the *Getting Started* brochure that educates, encourages and supports those who want to make physical activity a part of their lifestyle.

Environments

The ASC has developed several programs and resources aimed at providing advice, services, policies and products to help sporting organisations, clubs, schools and local governments to make their environments and provision of sport and physical activities relevant, appropriate and welcoming to all people. Targeted populations include juniors, people with a disability, women and Indigenous Australians.

Infrastructure

The ASC supports the Active Australia Networks to improve the delivery of sport and physical activity in the community. The Networks target:

- clubs and organisations, which provide opportunities to participate in sport and physical activity;
- local councils, which are key providers of programs, services and facilities; and
- schools, which provide the opportunities for all Australians to develop positive attitudes and behaviours towards playing sport and being active for life.

Other programs such as Coaching, Officiating, Volunteering, Club Development and Management Improvement have been developed to help clubs and organisations improve their management capacity, capability and effectiveness.

Evidence

The ASC places a major emphasis on supporting National Sporting Organisations in addressing their research needs, monitoring and evaluating Active Australia programs, products and physical activity behaviour to ensure sound policy development and cost-effective and efficient delivery of services. For example, the ASC helps fund the collection of sport and physical activity participation data, reviews the recognition and recall of health and sport promotion messages and gathers information about progress of the Active Australia Networks. Other examples of research carried out by the ASC includes examining health and social outcomes stemming from sport and physical activity programs in Indigenous communities and how sport and physical activity programs can be used to reduce and prevent anti-social behaviour.

Commonwealth Department of Health and Ageing

The Nutrition and Physical Activity Section of the Department of Health and Ageing aims to improve health and well-being by promoting increased levels of moderate-intensity physical activity in the Australian population. Adequate levels of physical activity can be protective against cardiovascular disease, some cancers, diabetes, injury and mental health. With physical inactivity now recognised as the second greatest risk factor for ill health after tobacco, work in this area is more important than ever.

Education/Promotion

The then Department of Health and Aged Care (the Department) produced the National Physical Activity Guidelines in 1999. They have been widely promoted since and the recommendations have become the basis of several other educational campaigns. The Department also supported *Active Australia Day*, continues to support *Walk to Work Day* and contributed to the development of the Australian Sports Commission brochure *Getting Started*.

Environment

The Department has participated in research into health-promoting physical activity in relation to transport and the environment and considers this a priority area. It contributed to *Australia Cycling*, the *National Strategy 1999–2004* which promotes cycling participation and recognises its contribution to health and the environment and more recently participated in a National Public Health Partnership pilot to define a portfolio of interventions to promote physical activity for transport, Promoting Active Transport: an intervention portfolio to increase physical activity as a means of transport.

Infrastructure

The Department provides secretariat support to the Strategic Inter-Governmental forum on Physical Activity and Health (SIGPAH) and is also a member of the Active Australia Alliance.

The Department also supports workforce development through the funding of courses in physical activity epidemiology and best practice for health promotion, community health and other related areas.

The Department strives to ensure the importance and benefits of physical activity are included in other related National strategies by working with related areas across government and within the Department. Both SIGPAH and the Department have assisted in the development of the *Smoking, Nutrition, Alcohol and Physical Activity Risk Factor Framework* initiated by the Joint Advisory Group on General Practice and Population Health. Priority action areas and an implementation strategy are still to be developed. Once finalised, the Department will be involved in implementation of the strategy.

Evidence

The Department is investing considerably in the collection and monitoring of physical activity data and development of standard measurement tools for physical activity to build the evidence base, guide policy direction and identify effective interventions. A partnership with the AIHW has seen the completion of three Active Australia surveys on adult participation in physical activity and to complement this, a tender has recently been let to complete a validation and comparison study of physical activity questions for use in Australian population surveys. The development of measurements of child and youth participation in physical activity is also a priority.

The Department has also funded the development of this document, outlining best practise in physical activity promotion and *The costs of illness attributable to physical inactivity in Australia*.

For more information about the work of the Nutrition and Physical Activity Section and on-line resources, refer to the website: <http://www.health.gov.au/pubhlth/strateg/pp>

Non-government organisations

Physical activity and the role of non-government organisations

Various non-government organisations (NGOs) have potential roles related to physical activity. To date, among NGOs, the Heart Foundation (HF) has been singularly involved in the area of physical activity, with little involvement in population-wide aspects from NGOs concerned with diabetes, mental health and cancer prevention. Work has begun in some of these agencies but it is neither well developed nor intervention-oriented. Some work has come from injury-prevention groups but these are often based in the public sector.

One group that has just commenced work in this area is the Cancer Council Australia, which recently released the *National cancer prevention policy 2001–2003*. This document identifies the role of physical inactivity in the development of cancer, and starts to indicate some of the strategies and directions that may be required to include physical activity as part of cancer prevention. This is an important first step for a NGO, in defining the role of physical inactivity in its work. However, much of this section is devoted to the HF and its work in this area, because it has been involved in physical activity at the National level since 1990. The HF's public health arm, Health Development and Delivery, has four key areas for action, one of which is physical activity. The HF National Physical Activity Program is guided by the National Physical Activity Program Committee, the members of which are experts in the area from around Australia.

The committee has produced several papers including, most recently the paper *Physical activity policy* and a brochure for general distribution, *Be active every day*.

The aims of the National Physical Activity Program are:

- to enable all Australians to be able to choose enjoyable active living, incorporating physical activity into usual activities of daily living, as well as participation in exercise or sport for recreation or fitness; and
- to increase the structural, organisational and environmental support for such regular physical activity through leadership, advocacy and coalition building programs.

Other HF initiatives include advocating at all government levels and with other sectors for increased resources for physical activity, supporting the implementation of *Jump Rope for Heart* and advocating for quality physical activity initiatives and opportunities in schools, and disseminating information on physical activity to the public and to health professionals via HF's National information service *Heartline*. Specific efforts are made to target health professionals.

State-level projects occur in the divisions of HF, and include the *Just Walk It* project in Queensland, a signpost and walking project in South Australia, and working across Australia with divisions of general practice to support and provide GPs with appropriate resources for the routine prescription of physical activity and education on physical activity where appropriate. The *NSW GP/Physical Activity Project* funded by NSW

Health, works with GP Divisions, and disseminates an *Active Prescription* pad.

All of the strategies include working with the media (paid and unpaid) where appropriate to promote physical activity messages, promote the establishment of walking and other appropriate activities, and enlist the support of the community to demand an environment shared between motorists, cyclists and pedestrians that is safe and inviting. National strategies include collaborating as a key partner with the Active Australia campaign at both National and State levels, and working collaboratively toward the provision of environments that support physical activity with local, States' and Commonwealth governments and relevant partners. This work aims to ensure that urban, rural and remote environments are conducive to people being physically active through public transport options, shared road use, cycle ways, footpaths and walkways, parking outside central business districts, parks, gardens and facilities.

One larger initiative is the *Supportive Environments for Physical Activity (SEPA)* project, which originated in South Australia and aims to increase environmental support and opportunities for people to lead physically active lives in local communities, began in 1996 with Commonwealth Government support. The SEPA project, which began as a health initiative, has shown that the urbanised environment is a public health issue that requires the response of a range of sectors, including the health sector. Another project, *Physical Activity Policy Project*, is auditing and documenting policies relevant to the improvement of physical activity levels of

Australians through the improvement of knowledge and understanding of relevant policies.

The HF actively promotes local government awards that encourage and reward the development of projects, facilities and policies conducive to physical activity. The awards recognise that local government is the tier of government able to deliver heart health programs for their own communities, and therefore encourage and reward local governments for such initiatives.

These diverse roles indicate the potential ways in which NGOs can contribute to physical activity initiatives, through media, health professional education, school programs, environmental change, and working with local communities. Other NGOs that are relevant to the promotion of physical activity also need to be engaged in this kind of process at a level of involvement similar to that of NHF, and efforts to encourage and foster partnerships across NGOs remain as important further work in this area.

Physical activity initiatives in the Australian Capital Territory

Background: organisational and infrastructure arrangements

In 2001, the ACT Department of Health and Community Care established the ACT Health Promotion Unit (HPU) which brings together the staff of Healthy City Canberra and Healthpact to deliver health promotion policy and program outcomes. The Unit has responsibility for coordinating all departmental health promotion activity related to physical activity, including representing the ACT on SIGPAH.

Under the aegis of the HPU, the Healthy City Canberra Physical Activity Taskforce acts as a steering committee to oversee/coordinate a number of physical activity projects in the ACT. The Taskforce has representatives from the HPU, the Department of Urban Services (DUS), Calvary Hospital, the ACT Bureau of Sport and Recreation, the Heart Foundation ACT, Fitness ACT, and ACT Community Care.

Healthpact, the operating name of the ACT Health Promotion Board, funds grants and sponsorships to community, sporting and arts organisations for health promotion activity. In 2001 and recent years, Healthpact has invested approximately \$350,000 in physical activity programs. This includes provision of resources, physical activity programs for high-risk groups, and sponsorship of a range of physical activities.

ACT Community Care provides a range of program-based health promotion activities, which focus on physical activity for disease prevention, and promotion of wellbeing. Examples of the programs through which this focus is delivered include Ageing Well, Nutrition, Falls Prevention, Disability and Chronic Illness, Well Women's Information and Education, Health Matters for Women over 60, Walk and Talk, Osteoporosis Prevention, and Healthy Bones Week.

The Heart Foundation actively fosters partnerships to develop physical activity projects and messages. The ACT Bureau of Sport and Recreation had developed and is implementing a strategic plan for the promotion of physical activity.

The Health Partnership for Active Australia Committee has representatives from the Heart Foundation, Cancer Council, Diabetes

Australia, ACT Community Care, the HPU, and the ACT Division of General Practice. This Committee has developed a public education action plan and has delivered a forum on physical activity and health for health professionals and other interested sectors. The Active Australia Schools Network has representation from the ACT Department of Education and Community Services, the Bureau of Sport and Recreation, and the Heart Foundation ACT. It works to develop links to provide and promote the Active Australia Schools program in the ACT. The Active Australia Industry Group comprising ACT Bureau of Sport and Recreation, the Heart Foundation, sport and recreation and education sectors, is a provider network that promotes Active Australia intersectorally.

Education

The Bureau of Sport and Recreation is the lead agency in promoting the Active Australia message with a comprehensive approach to both the 'More People' and 'Better Places' components of the initiative. It has worked to establish inter-sectoral committees and partnerships to increase awareness of initiatives in physical activity in the ACT. The Heart Foundation, apart from its work with the above mentioned committees, conducts the *Young at Heart Program*, the *Jump Rope for Heart* program which reaches 7,000 children in the ACT, and promotes the *Be Active for Life* message as a Healthpact funded partner organisation.

Healthpact-funded programs include promotion of the *Be Active for Life* message via groups in the sports, arts and health

sectors. They provided funding to support the 2000 Physical Activity and Health Forum and the Health Partnership for Active Australia project. Healthy City Canberra supports schools in the development of health promotion activities including physical activity projects through the annual Healthy Schools Awards. The Physical Activity and General Practice Project is a clinical pilot to examine the impact and effectiveness of prescribing physical activity to patients.

Environments

The *Healthy Hospital Walking Track* at Calvary hospital is an excellent example of partnerships working to create improved environments for physical activity in the ACT. The walking track was launched at Calvary Hospital in November 2001. It provides a safe environment for in-patients, rehabilitating patients, staff, and community members visiting the hospital grounds. Another example of such partnerships working to increase physical activity in the ACT is the pilot community walking path project in Tuggeranong.

This project marked out walking tracks in the area, provides appropriate signs to increase awareness of the track and the ways in which it may be used, and promotes the walking track to the community as a social-capital-building physical activity. After the initial success of the pilot, this program was expanded to other areas by the ACT Government. The Physical Activity Taskforce, chaired by Healthy City Canberra, has overseen a Review of Public Exercise Stations and Trails in the ACT. The Minister for Urban Services received the report of this

review and took action to remove unsafe exercise stations and to make appropriate improvements to trails. A travel blending project is being developed by Environment ACT to increase use of public transportation and walking while decreasing use of private motor vehicles.

Infrastructure

The HPU continues to work in partnership with other government and non-government agencies to ensure appropriate coverage of physical activity in the ACT. Partnerships with key agencies such as the Division of GPs, the Heart Foundation, the Bureau of Sport and Recreation, the Department of Education and Community Services and the Department of Urban Services ensure sustained, high-quality coverage of physical activity issues across settings and sectors. Several key organisations are now working towards developing a physical activity strategic plan to strengthen links across existing committees and to agree to a common direction for best practice initiatives in the ACT.

Evidence

The Department of Health, Housing and Community Care funded a special ACT-specific data set collected by the Australian Institute of Health and Welfare at the end of 2000. The results of this data set better informs the collaborative efforts in physical activity and health promotion in the Territory. The Review of Public Exercise Stations and Trails Report in 2000 provided an analysis based on evidence with users of the trails and stations. Results of evaluations of

projects such as the *Tuggeranong Walking Trails Project* and the *Calvary Hospital Walking Track* also add to the evidence around efficacy of projects and use of infrastructure.

The Physical Activity and Health Forum 2000 provided an opportunity for dissemination of evidence to a broad range of stakeholders. The *Physical Activity and General Practice Project* that is running from July 2001 to June 2002 will further add to the evidence base on physical activity in the ACT. Research and contribution to the evidence base for health promotion, including physical activity, feature in the HPU's *ACT Health Promotion Strategic Framework*.

Physical activity initiatives in New South Wales

Background: organisational and infrastructure arrangements

NSW Health has led the development of several important initiatives in NSW since 1998. One of the most significant has been an intersectoral policy initiative, the Premier's NSW Physical Activity Task Force (PATF), which launched its strategic plan in 1998. *Simply Active Every Day: A plan to promote physical activity in NSW 1998-2002* is a 'whole of Government' coalition which includes Fitness NSW and the Heart Foundation. The integrated plan identifies lead agencies for specific tasks and outlines 64 short- and longer-term objectives that aim to increase the proportion of the NSW population that is adequately active. Mechanisms to ensure successful collaboration across sectors were built into the

plan, as was a focus on individual change strategies, working with organisations and environmental change approaches. Since 2000, the taskforce's role and terms of reference have changed into being a Lead Agency Committee, coordinating the implementation and monitoring of the plan. The NSW Health Department provides secretariat functions for the PATF Lead Agency Committee.

In NSW, the health system is devolved with a Central office (NSW Health Department) and 17 Area Health Services that have mandates to protect, promote and maintain the health of their communities. NSW Health Department provides an overarching strategic framework, develops and disseminates Statewide products and allocates funding tied to annual Area Performance agreements. Each area has a nominated Physical Activity Coordinator (PA network). The Health Promotion Branch in NSW Health Department coordinates the PA network, which usually meets on a quarterly basis with the purpose of building the capacity of the NSW Health system to promote physical activity.

Education

There has been considerable social marketing activity aimed at increasing community awareness and understanding of the moderate-intensity physical activity message. Three phases of the Active Australia campaign activity have occurred during the period 1998–2001, targeting adults aged 25–65 years and 35–55 years in 1998 and older people (55+ years) in both 1999 and 2001 using the *Exercise. You only have to take it regularly not seriously*

slogan. The multi-faceted approach has targeted both the general public and key health professionals including general practitioners. In addition, NSW Health has been working closely with the Pedestrian Council of Australia to promote *Walk to Work Day*, and more recently in piloting *Walk Safely to School Day*, and with NSW Sport and Recreation and the Australian Sports Commission in supporting *Active Australia Day*.

Environments

In March 2001, *Creating active communities: physical activity guidelines for local councils* was released. Developed jointly by the Department of Local Government, NSW Sport and Recreation and NSW Health, the guidelines are designed to assist all local councils to encourage physical activity in their communities in an integrated whole-of-council approach. Other relevant activities include, development by Planning NSW (formerly the Department of Urban Affairs and Planning) of *Guidelines for Integrated Land Use*, and the evaluation of the City to Lilyfield Light Rail System on local area residents' commuting and physical activity patterns by researchers from the University of Sydney and the University of NSW.

Infrastructure

NSW Health is working with key partners including NSW Department of Sport and Recreation, Department of Education and Training, Department of Local Government and the Heart Foundation to build both system and workforce capacity to promote physical activity across the range of settings identified in *Simply Active Every Day*. The Heart Foundation (NSW Division) is

increasing the knowledge and skills of health professionals including leading the dissemination and uptake of the *Active Script* pad through the NSW Divisions of General Practice.

NSW Department of Sport and Recreation coordinates the Active Communities Local Government Network and have several grant schemes that aim to improve facilities and extend the range of programs available that target special populations (or those that are less likely to be active). The Department of Education and Training has been working to develop strategies to increase motor skills among young school students, and initiating curriculum changes to increase the focus on activity and lifestyles throughout school years. The Gold Medal Fitness program was rolled out during 2001, using Olympic and Paralympic athletes as school ambassadors to promote the importance of physical activity.

Evidence

Since 1997, NSW Health has significantly invested in several major physical activity demonstration projects and also several smaller projects across the State. Projects have focused on promoting physical activity through general practice in South Western Sydney; referral programs from GPs to activity facilities in the Hunter; a project to encourage women aged over 50 to walk in Concord; and the impact of park redevelopments in Western Sydney. Other projects elsewhere in the State have included programs targeting mothers with small children and improving fundamental movement skills in primary school children in both metropolitan Sydney and in Northern

NSW. In addition, NSW Health has been working with the Roads and Traffic Authority to develop and evaluate the impact of 'rails to trails' conversions in Western Sydney.

Physical activity initiatives in the Northern Territory

Background: organisational and infrastructure arrangements

The Northern Territory Government's direction for physical activity is outlined in the Department of Sport and Recreation 2003 Corporate Plan. It encourages the development of strategic partnerships with other government agencies, community organisations and interest groups to ensure the government plays a significant role in encouraging and assisting Territorians to develop an active and healthy lifestyle.

The Active Australia Network is widely promoted in the Northern Territory as a framework to assist in improving the management and provision of sport and recreation opportunities and to encourage greater participation in physical activity. Both the Department of Sport and Recreation (DSR) and Territory Health Services (THS) promote this framework to providers of physical activity, local government and schools and health professionals throughout the Territory.

Education

Interagency Group

In early 2000, an interagency group was formed to promote physical activity and Active Australia to Territorians. Members of the group include THS, DSR, National Heart

Foundation, Office of Senior Territorians, Diabetes Australia NT, Australian Council for Health, Physical Education and Recreation (ACHPER) and the Education Department. The group met regularly throughout 2000, and currently its priorities are to identify and develop strategies to:

- promote the National physical activity guidelines to Indigenous Australians in a culturally appropriate manner; and
- assist health professionals to promote physical activity to their clients.

To this end, DSR and THS have produced an information leaflet and a series of posters aimed at promoting physical activity amongst Indigenous people.

Environments

Darwin and Palmerston Bike Strategy

The Darwin City Council, Palmerston City Council, Department of Transport and Works, Parks & Wildlife Services and the Department of Sport & Recreation have created an interagency task force to provide a co-ordinated approach to the development of bike paths within the Palmerston and Darwin regions. One initiative of the taskforce was the production of the Darwin and Palmerston Recreation and Cycle Guide that identifies and promotes existing and potential cycle networks. A future initiative of the task force is the formation of a community bicycle user group to promote the use of bike paths and provide a forum for consumer advocacy.

Alice Springs Cycle and Recreation Map

In September 2000, a Bicycle Working Group was created, comprising representatives from the Departments of Sport and Recreation, Transport and Works, Lands, Planning and Environment, Parks and Wildlife Commission of the Northern Territory and the Alice Springs Town Council. The key aim of the group is to produce an 'Alice Springs Recreation and Cycle Map' with the intent to raise awareness with local residents of cycle and mountain bike paths within Alice Springs. An emphasis of the map is to highlight safe paths to schools, recreational and sporting venues, and areas of local interest.

Infrastructure

Indigenous Community Sport and Recreation Officers

Through its annual grants program, the Department of Sport and Recreation provides subsidiary funding for the employment of community based sport and recreation officers. The aim of this program is to facilitate the provision of physical activity, sport and recreation programs in remote Indigenous communities. There are currently 34 officers employed under this scheme.

Katherine Aged Consortium Older Persons Activity Program

Eight community organisations in Katherine have joined together to foster community spirit and fellowship for older people in Katherine to maintain socialisation skills, promote physical activity and support independence, with the view to

strengthening community self-support networks. The consortium was created in February 1999 to organise a physical activity program for the Year of the Older Person. The Local Government Association of the Northern Territory provided a small amount of funding and the events conducted were popular and well attended. Due to the program's success, ongoing support has been provided by Office of Senior Territorians to ensure the program will continue.

PACNET

The town of Palmerston, around 20 km from Darwin, is one of the fastest growing areas in Australia, mostly through an influx of young families. With an average age of 27 years, its population is among the youngest in Australia. Palmerston Town Council and the NT government are working together to meet the education, sporting and entertainment needs of Palmerston and to provide adequate youth and family services. The primary needs of the community are:

- new sporting and recreational facilities
- employment opportunities, and
- a pleasant and safe environment.

The council recognises the contribution that sport and recreation makes to enhancing the quality of life of its residents and visitors. In 2001, the council consulted on the sport and recreation needs of specific population groups, such as women, younger people, older adults and people with a disability. In a community meeting convened by the Australian Sports Commission (ASC) with representatives from these key groups, the council identified local issues and

highlighted opportunities to be developed and explored how the ASC could publicise its relevant print resources.

An action plan for sport and recreation in the area was developed as part of the consultation process.

Physical activity initiatives in Queensland

Background: organisational and infrastructure arrangements

Sport and Recreation Queensland is working with key partners from the government and non-government sectors to direct and plan coordinated action to increase physical activity levels of all Queenslanders through intersectoral collaboration, environmental change, advocacy, research and the development of joint programs. This has resulted in the development of the Queensland Physical Activity Strategy (QPAS). The QPAS will provide a framework for the coordinated development and implementation of policy, programs and services to encourage and support Queenslanders to participate in regular physical activity. The strategy will set the direction for the implementation of physical activity initiatives throughout Queensland over the next five years (2001–2006).

Education

Queensland Health is developing and implementing several initiatives that aim to promote the messages of the National Physical Activity Guidelines for Australians to stakeholders that deliver health messages to the community. The Department is also

implementing strategies to upskill the public health workforce to increase health's capacity to work in the area of physical activity health promotion and to contribute to the implementation of the Queensland Physical Activity Strategy.

Sport and Recreation Queensland is the lead agency involved in developing a public awareness and promotional campaign that aims to increase awareness of the availability of local physical activity programs, services, facilities and opportunities.

The Queensland Olympic Committee worked with Queensland Government departments to implement an educational program in 2001 that involved Olympians promoting messages about the benefits of participation in physical activity to school students.

Queensland Transport offers programs that encourage active transport, for example Safe Routes to School, Safe Walking and Pedalling Program for school students, Bike Week and Bike Education courses.

The Department also coordinates the development of the Program for Active Kids resource which outlines and links programs from across transport, health, sport and recreation, police and the Heart Foundation to promote safe, active and environmentally friendly behaviours. The resource targets school students from grades 1 to 10.

Environments

Supportive Environments for Activity Living, Queensland (SEAL) is a strategic framework for action intended to implement the 'Environments Focus Area' of the Queensland Physical Activity Strategy and is currently being developed by Queensland

Health Public Health Services in close consultation with many stakeholders. In addition, Queensland Transport is working to produce a plan to guide integrated transport (including cycling and walking).

The Queensland Conservation Council and the Queensland Parks and Wildlife Service promote physical activity through a range of activities including walking to work, wilderness walks, school holiday walks and improved management of protected areas.

Infrastructure

The Queensland Cycle Strategy currently being developed by Queensland Transport will establish a Statewide strategic framework that will ensure a consistent and coordinated approach to increasing cycling and the safety of cyclists. The strategy identifies key outcomes, including a quality network, provision of end-of-trip facilities, safety, links to public transport, marketing and encouragement of collaboration between stakeholders.

Sport & Recreation Queensland is continuing its work with local councils, schools and sport and recreation organisations through the Active Australia networks and is developing and implementing resources, products and services to encourage greater participation by older people, women and girls, juniors and Indigenous people.

The Heart Foundation (Qld Division) is responsible for the Statewide coordination of the *Just Walk It* program which involves training volunteer leaders to conduct walking programs in local areas. A comprehensive process evaluation has been completed and the first impact evaluation is underway. The *Jump Rope for Heart* program is also continuing.

Evidence

Queensland Health has provided funding for a community based multi-strategy health promotion intervention study. This innovative community development project is based in Bowen and Collinsville, and aims to develop a sustainable health program that addresses the risk factors (including physical inactivity) that cause cardiovascular disease, some cancers and type II diabetes. Another large-scale community based multi-strategy project is currently being funded in Rockhampton with a focus on physical activity and social determinants of health.

Queensland Health has also provided funding for a whole-of-community physical activity intervention. This project will develop, implement, and evaluate an innovative community-based and multi-strategy health promotion program focusing on physical activity and the social determinants of health. The overarching goal of the project is to create a sustainable model of community-based physical activity promotion by working with the Rockhampton community to increase capacity to address the determinants of physical activity. The aim of this program is to increase participation in physical activity in the community, with a particular focus on sedentary people from socially and economically disadvantaged groups.

The objectives of the program are to:

1. Create sustainable strategies for promoting physical activity at the local level by:

- raising community awareness of the health benefits of moderate physical activity;
 - strengthening the capacity of GPs and other health professionals to promote physical activity;
 - strengthening the capacity of the community to provide improved opportunities, social support, policies and environments for physical activity; and
 - strengthening the capacity of individuals to be more active, by addressing modifiable individual, social and environmental determinants of (in)activity.
2. Establish an evaluation framework to determine:
 - the effectiveness of the overall program, using valid and reliable outcome measures of physical activity and its major determinants; and
 - the success of each of the intervention strategies in terms of engaging community partners, developing supportive policies and environments, and developing initiatives suggested by community members.
 3. Disseminate the findings widely to the community, and to State, National and international stakeholders.

Brisbane North Division of General Practice is working with general practitioners to trial and promote GP prescription of physical activity, waiting room screening tools, exercise prescription pads and an education program focusing on exercise prescription principles. Also, GPs in the Inala area are working with University of Queensland researchers to promote physical activity among overweight patients.

Several researchers from Universities in Queensland are now focussing on population initiatives to promote physical activity in different communities (e.g. rural, urban, Indigenous, disadvantaged), and continue to work at a policy level with both State and Commonwealth government departments.

Physical activity initiatives in South Australia

Background: organisational and infrastructure arrangements

South Australia has a strong commitment to physical activity with work being undertaken in many sectors. Active Australia has been the recent catalyst to bring the sectors together to take a collaborative approach in this important area. The Active Australia State Working Party has overseen the development of a Physical Activity Strategy for South Australia, which is awaiting consideration by Cabinet. A Physical Activity Interagency Group is coordinated by the Department of Human Services and has met regularly to inform, plan and share strategic initiatives to increase population levels of physical activity. Through these structures, both formal and informal alliances are in place, resulting in networking, coordination and sharing of knowledge gained from physical activity projects. The participants in the Interagency group come from a broad range of sectors and government and non-government organisations.

Education

South Australia is currently planning a multi-strategy physical activity initiative for children including a social marketing

component. It is anticipated that this will commence in 2002. The National Physical Activity Guidelines for Australians are distributed on an ongoing basis. The Department of Human Services has also supported the Heart Foundation in sponsoring Walk to Work Day and has sponsored the *City to Bay Fun Run*, and, in particular, provided support for participation by children.

Environments

The Heart Foundation's major National project, Supportive Environments for Physical Activity (SEPA), originated in SA and works at both local and State government levels. It has a strategic approach towards improving the local environment to make it conducive for all people to be active in their daily life, thereby improving heart health in the context of overall health (see earlier section Non-government organisations). The Heart Foundation is working with various local governments to assist them to integrate SEPA into their work.

The State Cycling Strategy is currently being revised and includes reference to the need to create environments supportive of cycling, which is expected to result in health and other benefits. Transport SA is coordinating the State Walking Strategy and the development of the Strategy will occur in 2002. The National Heart Foundation (SA) and its partner Quality Environmental Decisions have won the tender to conduct this work.

The Onkaparinga Physical Activity (OPA) project is an important multi strategy project implemented through a collaborative partnership between the Heart Foundation,

Noarlunga Health Services, City of Onkaparinga, Southern Division of GPs and the SA Government Land Management Corporation. OPA aims to develop and promote a network of integrated walking and cycling trails throughout Seaford and surrounding areas to improve access to services and facilities while enhancing community health and well being.

Smart Play is a program funded through the Department of Human Services and Sports Medicine Australia (SA Branch) to assist sporting organisations to promote safe environments for competitors.

Infrastructure

The Office for Recreation, Sport and Racing (ORS&R) has recently announced the development of the South Australian Institute for Physical Activity (SAIPA). Its function will be to promote physical activity and provide coordination across government for physical activity initiatives. The ORS&R aims to increase participation by the community in physical activity through sport and recreation organisations, including ensuring the provision of quality management and facilities.

The Department of Education Training and Employment assists schools and other relevant organisations to increase levels of physical activity among children. Cabinet has supported the implementation of a major new initiative in the education sector titled *Active for Life*. \$16 million has been committed over four years to promote physical activity through schools.

In order to increase the knowledge and skills of people working in the area of physical

activity, South Australia recently hosted the Physical Activity Specialist Training Course, which was attended by 55 participants.

In April 2000, The Health and Physical Education conference attracted a range of people interested in promoting physical activity, including teachers, health promotion professionals, sport and recreation professionals and researchers.

The Department of Human Services acts as secretariat to the Physical Activity Interagency Group and supports an e-mail group, including providing regular literature search abstracts of journal articles of interest regarding physical activity that are sent to over 180 people. Other important networks include the Active Australia Schools Network, the Local Government Network and the Provider Network. The networks are designed to bring those in each of the given fields together to support physical activity.

Evidence

The South Australian Physical Activity Survey 1998, funded by the Department of Human Services, was developed by Health Promotion SA, with a Research Reference Group of members from the State Interagency Group. A telephone survey of over 3,000 adult South Australians was conducted in September and October 1998 and results published in 1999. This survey was replicated in part in September–October 2001. The results will be due for release in early 2002.

Several smaller projects have been funded with a view to adding to the evidence around interventions for physical activity. *Gently Physical* aimed to increase General

Practitioners' prescription of physical activity to their patients. *Stepping Out* is a program aimed at encouraging more organised walking groups in which older people can become involved. It has been piloted in several regions and is looking at expanding to other areas.

The Children's Health Development Foundation continues to support school communities build supportive physical activity environments and cultures. Recent significant projects include:

- *Fit To Lead*—a Commonwealth funded research project to promote physical activity and leadership for adolescent girls;
- *The Human Race*—the world's first on-line health and physical activity program for school students;
- *Enjoy Active Living* (formerly *Enjoy Being Active*)—a physical activity grant incentive scheme and research project for students 10 to 15 years, for which funding is managed by the Department of Human Services; and
- *Get Active / Get in GOSH (Games Out of School Hours)*—in partnership with the University of South Australia, funded by the Department of Human Services and involves researching interventions in Out of School Hours Care settings.

Physical activity initiatives in Tasmania

Background: organisational and infrastructure arrangements

The Tasmanian Government is establishing a Physical Activity Council to develop and implement a Physical Activity Strategy to increase participation in physical activity and enhance the physical, social and emotional wellbeing of all Tasmanians.

The Physical Activity Council will be chaired by Professor Terry Dwyer and consist of representatives of the sport and recreation industry, Unions Tasmania, TCCI, allied health professionals, Tasmania Together Community Leaders, local government and the Department of Premier and Cabinet. The Council was launched on 6 June 2001.

The Council will be responsible for coordinating government and community physical activity projects, encouraging an increase in physical activity participation, supporting physical activity as integral to a balanced lifestyle and promoting physical activity as a key preventive health measure. A draft strategy has been prepared for the Council's consideration.

Education

The Tasmanian Department of Health and Human Services (DHHS) has organised several initiatives relating to physical activity. Allied health staff have been targeted in a program for developing physical activity knowledge and attitudes including the provision of a *Physical Activity and Health Resource Kit*.

The Tasmanian Department of Education is implementing the Health and Physical Education Core Curriculum K–10 that forms part of a package, including Health Promoting Schools. This approach focuses on achieving five key intentions in relation to responsibility, identity, relationships, active participation and wellbeing in Tasmanian schools. Physical activity is seen as a cornerstone of implementation strategies because it is clearly understood that the activity levels of most young Tasmanians must be elevated.

Schools have a limited but important role in achieving increased levels of physical activity, given that students only spend about 10 per cent of the year with a teacher. Schools are encouraged to work in conjunction with their communities to ensure that there is a lifelong emphasis and encouragement for everyone to be physically active—including reorienting solely sport-oriented strategies and activities to ensure better long-term outcomes. More flexible approaches, especially to meet the needs and aspirations of young women, require particular attention.

The Southern Tasmanian Division of General Practice piloted the Be Healthy: Be Active / Be Active: Be Healthy physical activity program for use in the general practice setting in 2001. The model has been developed in consultation with a reference group with both GPs and physical activity stakeholders. The model includes the use of physical activity advice (scripts), training, equipment, tools and resources to deliver this advice.

Environments

Key departmental action areas have incorporated knowledge and activities supporting the role of physical activity targeting those with diabetes and older Tasmanians. The Tasmanian Plan for Positive Ageing 2000-2005 emphasises active and participative living and has been promoted extensively in the media and incorporated in their programs. Examples of programs that support the Plan include, the development of a 'Healthy Ageing' Network to promote healthy ageing, share information and work collaboratively, an Osteoporosis Prevention Program in NW Tasmania and an Older Adults Sport and Recreation Project. A study is also currently being carried out by the Menzies Centre to examine the effect that lifestyle changes (including increased physical activity) have on the prevention of osteoporosis.

Several initiatives have been undertaken using the Active Australia framework. These include the Burnie Pilot, a partnership between the Office of Sport and Recreation and the Burnie Take Heart Project (Commonwealth funded and managed by the Menzies Centre for Population Research), and the Port Sorell Active Australia Project, which has seen the formation of a local committee made up of local and State government representatives, sport and recreation providers and other community organisations.

A project *Whose Health is it Anyway?* was initiated in conjunction with the Commonwealth to run various programs (including physical activity) that are developed as a result of local need and requests from people with chronic health conditions.

Infrastructure

The Tasmanian Office of Sport and Recreation, part of the Department of State Development, aims to have more Tasmanians involved in sport and recreation regardless of their age or fitness level. OSR supports the development of sport and recreation through its funding programs, which include the *Sport Tasmania Program*, the *Community Sport and Recreation Development Program*, the *Sport and Recreation Facilities and Open Space Development Program*, and the *State Sport and Recreation Development Program*.

The Office of Sport and Recreation supports the Active Australia Local Government Network, the Active Australia Schools Network and the Active Australia Provider Network and has promoted physical activity through a State-funded media campaign. OSR works closely with local government and has been encouraging and supporting a strategic approach to sport and recreation planning and provision. Major projects such as the NTMO Future Game Plans and the North West Recreation Planning Framework reflect the move to a regional rather than just a local approach.

A Statewide forum for walking groups, Spring into Walking, was held with 120 people attending. This led to the establishment of a Steering Committee involving Commonwealth and State government agencies, the Heart Foundation and the fitness industry. The aim is to focus on a practical plan for supporting the sustainability of these groups in Tasmania, including leadership training, coordination and supportive environments.

The Office of Sport and Recreation has supported the Walking in Tasmania Steering Committee, and together with Health, Heart Foundation, Department of Veteran's Affairs and Fitness Industry representatives, has progressed to the stage of compiling recommendations for strategies for referral to the Premier's Physical Activity Council.

The Heart Foundation (Tasmania Division) has developed many *Heart Walk* groups in the State since 2000 and has now moved into a new phase to build greater sustainability through local leadership. This approach is supported by the recently-established Steering Committee to support the ongoing development of walking groups in Tasmania.

The Heart Foundation recently appointed a Physical Activity Promotions Officer to reflect an ongoing commitment to build physical activity capacity in Tasmania. The formation of the Tasmanian Health Alliance between the Heart Foundation, Quit and Medical Benefits Fund (MBF) also adds to this capacity. The Alliance will engage with the community in raising awareness about health issues and focus on new initiatives in physical activity for children and youth.

Physical activity initiatives in Victoria

Background: organisational and infrastructure arrangements

The Victorian "Active for Live" *Physical Activity Framework* is a Cabinet-endorsed document providing a structured approach for the promotion of physical activity across all areas of government. The Framework has four key objective areas:

1. building partnerships
2. educating and engaging the public and professionals
3. improving physical activity services and removing barriers to participation
4. improving places in which physical activity occurs.

The ongoing management and implementation of the Framework is through a Lead Agency Committee that consists of representatives from all government departments. Key partners in achieving the Framework objectives will include local government, non-government organisations and other health promotion organisations.

The major focus for current activity is walking promotion. Walking is significant because it is relevant and links to a whole range of different government priorities, including health, sports and recreation, transport, the environment and physical infrastructure, education and community connectedness and safety.

A Walking Forum held in November 2001 brought together representatives from all the different sectors associated with walking

promotion to highlight and examine options to progress walking. Ongoing activity including the development of a Victorian walking action plan is anticipated.

Education

The Active Script Project has made significant progress with a program model that has been shown to be successful in involving GPs and Divisions of General Practice in promoting physical activity to at-risk patients. *Walk and Talk* is a community-based program to increase walking in older adults and people in public housing, which is being implemented by Victorian Council of Fitness and General Health (VicFit). VicFit also provides a Physical Activity Information Line. In addition to providing information and advice, it is a referral service for people interested in increasing their level of physical activity.

An internal program within the Department of Human Services focussed on the promotion of physical activity to people with an intellectual disability who live in Community Residential Units (CRUs). A resource to support CRU workers to identify and implement appropriate physical activity, and an associated training program, have been developed.

A new Victorian TravelSmart, travel behaviour change program, is currently being developed by the Department of Infrastructure. Incorporating elements from the WA *TravelSmart* program, this program will seek to change travel behaviour including the incorporation of greater public and active travel options.

Environments

Local government plays a pivotal role in physical activity. Victorian local governments are responsible for much of the local infrastructure and services necessary for physical activity participation. In addition to this, many are actively involved in specific programs that promote physical activity through community-based initiatives and programs that target specific and at risk groups.

Sport and Recreation Victoria has programs including *Access for all Abilities*, which aims to achieve sport and recreation environments that are inclusive of and accessible to people with disabilities. Their Older Adults Recreation Networks aim to achieve sport and recreation environments that are inclusive of and accessible by older people. The SRV Community Facilities Funding Program contributes to the provision of high quality and accessible sport and recreation facilities across Victoria.

The Victorian Health Promotion Foundation is actively involved in promoting physical activity. This has included funding for community grants to support local organisations to promote increased physical activity including the development of supportive environments.

Parks Victoria manages the State's network of National, State, regional and metropolitan parks, other conservation reserves, and Melbourne's bays and major waterways. Parks Victoria is the lead agency in a number of programs to increase public use of parks, bicycle and walking tracks, and waterways. Many of these are awareness raising initiatives, for example, *On Your Bike* has involved increasing the availability of information about bicycle trails safe for

families and off-road recreational cycling. Parks Victoria is currently implementing the *Healthy Parks, Healthy People* project.

Infrastructure

Regional Sports Assemblies (RSAs), a program of Sport and Recreation Victoria, are community-based organisations located across Victoria whose primary aim is to identify and address sport and recreation issues in the region. They were established progressively across the State from the early 1980s and have enjoyed bipartisan support from major political parties since that time.

Regional Sports Assemblies are supported by Sport and Recreation Victoria and work with local communities to promote participation in physical activity through sport and recreation at the grass roots level. They deliver participation opportunities under the Active Australia banner, work across the State on regional specific initiatives and have a range of partnerships with State, Commonwealth and local government authorities and private enterprise. The Assemblies have links with the Health Sector (Central Highlands/Loddon Campaspe) and coordinate interventions and initiatives to promote physical activity, such as regional games. RSAs are represented on the Victorian Active Australia Reference Groups.

Examples of current RSA collaborations include working with VicHealth to deliver the education component of the *How to become a Sport Safe club* workshops with all sport safety equipment grant recipients in the State. Regional Sports Assemblies are working with the Australian Drug Foundation in the piloting and monitoring of the Goodsports program. The Central Highlands and Wimmera Assemblies initiated a community recognition program to highlight

community role models who are physically active and all Assemblies promote Active Australia in their strategic plans.

Sport and Recreation Victoria (SRV) programs include the *Indigenous Sports Program* for increasing physical activity skills and opportunities for Indigenous Victorians. The *State Sporting Association Development Program* provides financial assistance to State sporting associations with the aim of increasing and enhancing lifelong participation and the social benefits of sport for all members of the community. SRV is also involved in several Active Australia initiatives such as the Active Australia Schools Network, and Active Australia Day.

A new TravelSmart—Better Ways to Work program encourages employers to work closely with staff to develop sustainable transport options and devise incentives for employees for participating. This may include the development of car pooling arrangements, facilities to encourage people to walk or ride to work or better timetabling arrangements with local public transport operators. The program is a partnership between the Sustainable Energy Authority Victoria, the Department of Infrastructure, the Department of Human Services, Bicycle Victoria and the City of Darebin.

Parks Victoria has released a Draft Victorian Trails Strategy to encourage use and development of public trails. The strategy is underpinned by guiding principles of:

- social health and wellbeing;
- environmental protection; and
- economic benefits to State or region.

Evidence

The Department of Human Services has recently commissioned work on the development of a Physical Activity Monitoring

and Surveillance Program. This will provide key information for the ongoing development and implementation of physical activity programs across the State. It is anticipated that the information will be of value and used by all organisations involved in physical activity promotion.

Two projects are being implemented to examine approaches and options to support community partnerships contributing to increased physical activity opportunities. These are directly linked to the implementation of the Physical Activity Framework, with one targeting the sporting sector and the second with a broader, community-based focus.

VicHealth has recently identified physical activity as a key priority area for health promotion initiatives, and commissioned a report of the evidence of promotional strategies from Deakin University, Melbourne. A research gaps workshop was held by VicHealth (February 2000) to identify where health promotion research should be directed in physical activity and other health priorities (healthy eating, and alcohol).

Victorian Universities are actively involved in physical activity related research. For example, the research agenda of the Faculty of Health and Behavioural Sciences at Deakin University includes studies of how to assess occupational and leisure-time physical activities and sedentary behaviours; physical activity and weight maintenance; physical activity and sedentary behaviours in women, children, older adults and those from diverse ethnic backgrounds; environmental influences on physical activity; and web-based physical activity interventions.

Physical activity initiatives in Western Australia

Background: organisational and infrastructure arrangements

Several initiatives and networks aim to bring together a collaborative approach to increasing physical activity. There is considerable support and momentum in Western Australia for the creation of a formal cross-community alliance for physical activity to coordinate future strategy development and a complementary approach across sectors.

This desire was realised with the formation of the Premier's Physical Activity Task Force, formally launched on 1 June 2001. The Task Force aims to develop a whole of community Physical Activity Strategy for Western Australia, with a target of increasing the level of physical activity by five per cent over the next 10 years. The *Strategic Direction Report*, endorsed by Cabinet in November 2001, focused on the identification of outcome areas and high level strategies that will contribute to increasing levels of physical activity. The next phase will involve the Task Force, in conjunction with relevant key agencies, developing an implementation plan that will incorporate detailed strategies and costings and identify lead and partner agencies for each strategy.

Education

The Heart Foundation has been a key leader in the development of physical activity policy and programs. The *Be Active Every Day (BAED)* program (1994–1998) funded several physical activity initiatives and programs that aimed to raise community awareness of the new physical activity message and attracted participation in BAED

programs. The *Be Active* health message continues to be used in health sponsorships conducted by the Heart Foundation and funded by Healthway. The *Walk-it Bunbury* program (1999–2001) aimed to raise awareness of the benefits of walking and increase behavioural and structural supports for walking, with a comprehensive strategy mix including a sign-posting system, map development, general practitioner program and complementary mass media (television, radio and print), as well as walking programs. *Walk-it Bunbury* is co-funded by the Heart Foundation, Healthway and the Health Department.

The Education Department has developed a Primary School Physical Activity Strategy 2000–2004. The Australian Council for Health, Physical Education and Recreation (ACHPER) plays an important role in the schools area conducting professional development for teachers and coordinating an annual *Physical Education Week*. Other school programs include the *Canning Stock Route Challenge* and *Goldfields Pipe Line Challenge*. The Heart Foundation *Jump Rope for Heart* program continues to attract very strong participation from primary schools throughout the State.

Environments

The Department of Transport has developed *Perth Walking: The Metropolitan Region Pedestrian Strategy*, which provides a framework for increased participation in walking as part of an integrated transport system and makes recommendations in relation to the needs of pedestrians. The *Travelsmart* project is a local- government-based program that uses direct marketing strategies to influence demand for green means of transport (principally walking, cycling and public transport). Transport's

BikeWest has, for many years, promoted the benefits of cycling and developed policy to support cycling infrastructure development. *Cycle Instead* is a promotional campaign that aims to encourage people to use bicycles for short trips. *Cycle Instead* features television and print advertising, as well as promotional events like 'bike to work' days, bicycle safety checks, displays and the promotion of 'end-of-trip' facilities such as bike racks, showers and lockers.

The Department of Sport and Recreation places a high priority on partnerships with local government and is a co-funder of sport and recreation facilities and services in regions throughout Western Australia. The Department of Sport and Recreation has developed the *Walk Friendly Project* which aims to assist local government in the provision of supportive environments for walking, with a focus on access, safety and security, comfort and aesthetics. The program includes an assessment guide for local government to assist them achieving Walk Friendly environments, a comprehensive manual for walkers, and a *Walk Friendly Schools* pilot project.

The Department of Planning and Infrastructure has developed *Livable Neighbourhoods Design Codes*. These have significant potential to contribute to neighbourhood design in which walking and cycling access are enhanced.

Infrastructure

Several initiatives and networks aim to bring together a collaborative approach to development in physical activity. The Departments of Sport and Recreation, Health, Education and Transport, along with the Heart Foundation, have formed strong informal partnerships. Examples of existing partnership initiatives include:

- The *Western Australian Pedestrian Advisory Committee* includes representatives from several government and non-government agencies and aims to improve the physical environments in Perth and regional and rural centres of Western Australia to enhance walking and shift the community's cultural mindset towards pedestrians and walking.
- The *Schools Physical Activity, Travel and Safety Alliance (SPATSA)* is a group of government and non-government agencies who recognise the importance of partnership and coordination in developing and delivering programs to schools. A primary school information folder was launched in March 2000 that brings together a summary of programs available from various agencies in SPATSA.
- The *Children's Physical Activity Coalition (CPAC)* is a collaborative alliance to advocate for improved physical activity opportunities for children and youth. CPAC has developed an advocacy kit for use in schools, and has conducted a State conference to build capacity and communication around physical activity issues for children and youth.
- The development of the *Walk There Today* walking guide is a joint project between the Heart Foundation, the Department of Planning and Infrastructure, the Department of Sport and Recreation and the WA Pedestrian Advisory Committee to encourage more people to become active by walking.
- The Physical Activity e-mail interest group, is an electronic interest group and forum (hosted by the Heart Foundation) to foster communication among key stakeholders in physical activity.

The Health Department of WA has identified physical activity as a priority area and is initiating strategies including a communication strategy to: increase awareness amongst the public and health professionals of the type and frequency of physical activity necessary for good health; and, to increase the capacity of the health sector workforce to improve physical activity levels. Public health units in regions as diverse as South West, Great Southern, Geraldton and the Mid West, and the Metropolitan North and Eastern regions have prioritised physical activity for attention. Regional activities include policy initiatives (South West), and community walks (South West, North Metro, Eastern Metro).

The Eastern Perth Public & Community Health Unit (EPPCHU) has a priority focus on building the capacity of other organisations and sectors to engage in a range of sustainable physical activity partnerships and initiatives. EPPCHU supports programs including: *Be Active Together*, a community based program using a collaborative and multi-strategic approach to increase the number of adults who participate in regular physical activity; a small walking promotion grants scheme; initiatives targeting a range of culturally and linguistically diverse communities; advocacy with policy makers; and research and evaluation.

The North Metropolitan Health Service Population Health Unit implements the *Be Active Together* project within the City of Joondalup. The main focus in the initial phase is to provide resources with a focus on education and local facilities and resources, especially local walking groups. Maps are being developed.

Evidence

Healthway (the Western Australian Health Promotion Foundation) is an important funder of health promotion programs, research and sponsorships in Western Australia. Many of the programs listed above are funded wholly or in part by Healthway. Evaluation of Healthway funded programs and sponsorships is undertaken by the Health Promotion Evaluation Unit (HPEU) based at the University of Western Australia (UWA) Department of Public Health.

The *Physical activity levels of Western Australian adults 1999 report* was a joint initiative of the Health Department of Western Australia, Sport and Recreation WA and the Department of Public Health at the UWA undertaken to obtain an indication of current levels of physical activity levels in Western Australia. Prior to this survey there had been few Western Australian data available. This information will help program planners identify target populations and develop appropriate strategies aimed at improving levels of physical activity in Western Australia. In addition, this survey provides baseline data for Western Australia and will allow efforts to be monitored over time as well as comparisons between other recent National and State surveys.

Physical activity research is undertaken by a number of agencies in Western Australia. The Health Department of WA has an important role in monitoring and community surveys. The UWA Department of Public Health is conducting research in the supportive environments area as well as examining issues in the recall of moderate activity in research. The UWA Department of Medicine is examining benefits of home-based and centre-based interventions for women. The UWA Department of Human

Movement is conducting research into physical activity during and after pregnancy, exercise and the prevention of osteoporosis and exercise in cardiac rehabilitation. Research regarding school and youth physical activity is undertaken at the Schools Physical Activity Research Centre (SPARC) at Edith Cowan University. The Combined Universities Centre for Rural Health (Geraldton), the Mid West Public Health Unit and the Heart Foundation are undertaking formative research into physical activity in children and youth.

The Heart Foundation gathers data on a triennial basis from schools throughout WA to monitor health and physical education in schools. This provides vital information for planning and advocacy.



APPENDIX 4

MEASUREMENT OF PHYSICAL ACTIVITY

When considering the measurement of physical activity, it is important to acknowledge the multidimensional nature of the term, and the impact of different elements of physical activity (duration, intensity, frequency and type) on health. Within a broad framework, physical activity measurements can be used to estimate the proportion of the population that is 'sufficiently active for good health'. Current evidence suggests that a minimum of '30 minutes of moderate-intensity activity on most days of the week' is required for good health (USDHHS 1996). However, it is possible that there may be health effects of different types and patterns of physical activity than those suggested by this message, such as might be observed in sports such as golf and bowls (which are low-intensity but long-duration activities) and competition squash or basketball (which are higher-intensity activities).

The methods of measuring physical activity are classified as direct and indirect. Direct methods, which provide measures of the energy cost, types, and patterns of human movement, and physiological responses to human movement, include:

- the use of doubly-labelled water
- behavioural observation techniques
- diaries and logs
- motion sensors
- self-reported physical activity.

Indirect validation methods reflect patterns of habitual activity and risks for injury and, or, disease that regular physical activity can reduce. Indirect validation methods include various measures of fitness and indirect physiological measures, such as assessment of body composition, heart rate responses and lipid profiles.

All of these methods are attended by various degrees of cost, reliability, validity and acceptability to the respondent. For the purpose of population surveys (and other types of physical activity research), self-report measures of participation in physical activity represent the best compromise between acceptability and accuracy. The most commonly used method of estimating population levels of physical activity is by self-report survey, which can be administered by mail, telephone or face-to-face by personal interview (Booth et al 1996). The time frame for recall of activities in most commonly used surveys ranges from 24 hours to 14 days but can be as long as 12 months.

While there is currently no universally accepted gold standard for measuring physical activity prevalence, the current

best-practice method for assessing the criterion validity of self-recall questions on the intensity, duration and frequency of physical activity undertaken in specific domains (e.g. leisure, occupational), is a combination of accelerometers and log books (Ainsworth 2000). Accelerometers are small computer motion sensors, which measure intensity, duration and frequency of activity. Their use is recommended in conjunction with log books to enable information to be collected on the type of physical activity and whether it was undertaken for work, as part of non-leisure or leisure-time physical activity. The use of a log book (usually 7-day) is essential if the requirement is for separate analyses of the validity of the questionnaire items on walking and the items on moderate-intensity physical activity, because accelerometers cannot differentiate between walking activity and other moderate-intensity activities. This limitation means that data from the accelerometers can only be used to assess the validity of the self-reported minutes of participation in walking and moderate-intensity activities combined. This approach is currently being used in Australia to assess the criterion validity of five major existing physical activity prevalence surveys.

The use of more complex measures of physical activity, such as direct measurement of energy expenditure using doubly-labelled water, is not practical for regular population monitoring because of its cost. In addition, although such a measure provides information on energy expenditure, it does not provide crucial policy information on where people are undertaking their physical activity (e.g. at work, through domestic work, through leisure time).

The measurement of *maximal oxygen uptake* is also sometimes used as a surrogate measure of physical activity. It is more applicable as a measure of fitness, which correlates reasonably well with measures of physical activity, especially among people who are ‘vigorously’ active. For people who participate only in lower-intensity activities, the correlation between activity and fitness may not be so high. In any event, measures of fitness require complex laboratory equipment and are neither practical nor appropriate for monitoring population levels of activity.

Challenges to measurement of physical activity

Almost every aspect of the assessment of participation in physical activity presents some challenge to the development of a reliable and valid questionnaire. The challenges are presented below and, when possible, solutions are offered:

- meanings of the words ‘exercise’ and ‘physical activity’;
- domains of physical activity (leisure-time, gardening/yard work, household chores, physical activity for transport, occupational physical activity);
- time frame (e.g. last week versus usual week);
- seasonality of participation—may vary, especially in more variable/extremes of climate by season;
- need to have consistent timing of surveys for trend comparisons;

- classes of activity (generic questions) versus questions asked about each specific activity;
- the use of symptoms of activity (sweating, breathlessness) versus examples of types of activity to illustrate questionnaire items; and
- the impact of different modes of questionnaire administration: telephone, interview, or self-completed questionnaire.

Measurement of self-reported physical activity

Anecdotal evidence suggests that the terms ‘exercise’ and ‘physical activity’ may be understood differently by different people. For some people, exercise may mean sports participation, vigorous intensity or structured activity. In other cases ‘exercise’ may only be thought of as something one does as a leisure-time activity. Effective questionnaires must ensure that the respondents have an unambiguous understanding of the types of activity being assessed by each item. The domains or various dimensions related to physical activity are shown in Table A4.1.

Table A4.1. Domains of physical activity for questionnaires

Domain of physical activity	Examples
Leisure-time physical activity	Various types of activity; different surveys use generic or activity specific questions, and may ask details of activity frequency, duration and intensity.
Gardening and yard work	Various definitions, of varied intensities; may range from light-intensity gardening to vigorous chores or digging/moving heavy objects.
Household chores	Heterogeneous set of tasks; large gender differences; energy expenditure across tasks not well understood.
Active transport	Walking or cycling for transportation.
Occupational physical activity	Diverse occupations, with changes in energy expended in many occupations over recent decades.

Measurement of frequency, duration, intensity and type of activity

Frequency and duration describe the number of times (usually each week) that the activity is undertaken and the total time spent in physical activity during the same period. In terms of current recommendations for the health benefits of physical activity, it is important to be able to determine whether there is activity 'on most days of the week.' In Australia, this has come to be defined as a minimum of five days per week. Similarly, based on the current recommendation, the minimum duration of (leisure time) physical activity for health benefit is defined as at least 150 minutes (derived from 30 minutes of activity on five days per week).

Intensity is usually reported in terms of 'light', 'moderate' and 'vigorous' activity. Recording the actual type of activity can help to define intensity but the intensity at which different activities (e.g. cycling, swimming, running) are performed varies depending on individual fitness and on the circumstances of the activity, such as whether or not it is in 'competition' or as a 'leisure activity.' Previous work has used phrases such as 'activity which makes you breathe harder or puff and pant' to help people assess whether an activity is 'vigorous'.

Data about 'type' of activity may be collected in broad categories: 1. leisure time physical activity, 2. activities associated with work in the house, yard or garden, 3. activity associated with travel to and from places, and 4. activity related to occupation. The current recommendations about activity for

health benefit focus on 'leisure time activity,' because the evidence on which this message is based relates to activity over and above that which occurs in the workplace. However, difficulties arise in trying to determine whether activities such as gardening, which is the most commonly reported leisure time activity for mid-age women and for older men, should be included in 'counts' of leisure time activity. If gardening is included, then other house and yard activities are also candidates for measurement. Similarly, in terms of walking, which is the most commonly reported activity for women, it is difficult to justify inclusion only of 'recreational' walking, and not walking for transport. Other modes of active transport, such as cycling or roller-blading may also be useful measures.

In Australia, several measures are currently used or proposed. A group of researchers convened by the AIHW have developed some standard measures for the National Data Dictionary about leisure time physical activity in Australia. The ABS National Health Survey also has its own set of leisure time physical activity (LTPA) questions, as do several States' health surveys. The population survey monitor (PSM) collected by the Australian Sports Commission may also produce some useful estimates of activity participation. Other internationally used surveys, such as those developed by the (US) Centers for Disease Control for telephone surveys (Behavioral Risk Factor Surveillance System questions), and the World Health Organization International Physical Activity Questionnaire (long and short versions) are of interest.

Data handling

Translating the questionnaire responses into estimates of the prevalence of 'adequate activity for health benefit' also presents challenges to researchers and practitioners. There is some consensus that 'most days of the week' implies a minimum of five days so that the minimum requirement of '30 minutes of moderate intensity activity on most days of the week' becomes 150 minutes of moderate activity each week. There has been some debate about whether this 150 minutes must be taken on five separate days, or whether it is the total weekly energy expenditure that is critical for health benefit. There has also been some debate about whether three sessions of more vigorous activity (which equates with the same level of energy expenditure as five sessions of more moderate intensity activity), is sufficient to achieve good health. Usually, three sessions of vigorous activity for 20 to 30 minutes on each occasion, is considered also to meet the standards for health benefit (ACSM 1978).

In Australia, this issue is being resolved by assigning a measure of intensity or relative energy expenditure (called metabolic equivalents or 'METs') to each activity category. A total of 150 minutes of sufficient activity for health would be achieved through 150 minutes of brisk walking or of moderate intensity activities, or through around one-half of this time spent in vigorous activity (with vigorous physical activity weighted by two to indicate that it is carried out at least twice the METs or energy expenditure level of moderate activity—see Armstrong et al 2000).

It is interesting to note that the early epidemiological work on which the relationships between physical activity and health are premised were based on occupational physical activity. The work of Morris and Heady (1953) with the London bus drivers and that of Paffenbarger and Hale (1975) with the San Francisco longshoremen was seminal in this field. Since occupations became more sedentary during the 1970s and 1980s, the contribution of work-related physical activity to daily expenditure has declined. This decline, and the fact that people are more likely to have control over their leisure than their work time physical activity, partly explain why the focus today is only on leisure time activity. A few occupations, such as parking officer and nurse, still involve considerable daily energy expenditure, and a challenge for future research in this field will be to assess more carefully the relative impact of occupational and leisure time activity on health. Work is in progress in South Australia and Queensland to further explore the energy expenditure of work-related activity, including domestic house and yard activities.

Conclusion

It is important that instruments for the measurement of population levels of physical activity include measures of frequency, duration and intensity of activity. Type of activity may help to define intensity. In Australia, standard measures of activity are being trialled. Consistent use of these measures is required for effective monitoring of trends in population physical activity levels and comparing activity levels among different population groups. More work is

required to assess the 'threshold' of activity required for good health, and the contributions to health of different forms of work-related activity, domestic and gardening tasks, and to assess these measures for their reliability and validity across different population groups.

The over-arching need is for consistency and standardisation of measurement; State, National and regional survey systems need to use identical measures, so that monitoring and surveillance, from a population perspective, is consistent. This is essential to track changes and trends in physical activity in Australia.

References

- Ainsworth BE, Haskell W, Whitt MC, et al. (2000). Compendium of physical activities: an update of activity codes and MET values. *Medicine and Science in Sports and Exercise Suppl.* 32:498-504.
- American College of Sports Medicine. (1978). American College of Sports Medicine position statement on the recommended quantity and quality of exercise for developing and maintaining fitness in healthy adults. *Medicine and Science in Sports and Exercise*10(3):vii-x.
- Armstrong T, Bauman A, Davies J. (2000). Physical activity patterns of Australian adults. AIHW Catalogue CVD10. Canberra: Australian Institute of Health and Welfare.
- Booth ML, Owen N, Bauman A, et al. (1996). Relationship between 14-day recall measure of leisure time physical activity and a submaximal test of physical work capacity in Australian adults. *Research Quarterly for Exercise and Sport* 67:221-7.
- Morris JN, Heady JA. (1953). Coronary heart disease and physical activity of work. *Lancet* 2:1053–57.
- Paffenbarger RS, Hale WE. (1975). Work activity and coronary heart disease. *New England Journal of Medicine* 292:545–50.
- US Department of Health and Human Services (USDHHS). (1996). *Physical Activity & Health: a report of the Surgeon General*. Atlanta GA: US Department of Health & Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion

APPENDIX 5

USEFUL LINKS, BOOKS AND RESOURCES

Following is a list of useful sites focusing on interventions, measurement or trends in physical activity in populations or communities. This listing is not comprehensive—such a listing is beyond the scope of this document. This listing is divided into 1. international sites of interest, and 2. useful Australian sites.

1. INTERNATIONAL SITES

Site	Purpose
http://www.americanheart.org/Heart_and_Stroke_A_Z_Guide/exercise.html	Position statement from American Heart Association
http://www.justmove.org/	Advice on being active
http://www.cdc.gov/nccdphp/dnpa/readysset/index.htm resources]	Centers for Disease Control Media Campaign [and on Physical activity
http://www.nih.gov/health/exercise/index.htm	NIH position statement (National Institute Health, USA)
http://www.participaction.com/	Canadian media campaigns 1974–2001
http://www.activelivingatwork.com/	Canadian site, case for worksite physical activity
http://www.hc-sc.gc.ca/hppb/paguide/main.html	Canadian Physical Activity site (produced by Health Canada)
http://www.paguide.com/english/main.html	Canada's Physical Activity Guide
http://prevention.sph.sc.edu/PALinks/index.htm	University of South Carolina Prevention Center – physical activity focus; good listserver
http://www.beactive.org/	Washington (State) Coalition for promoting physical activity

http://www.cflri.ca	Canadian Fitness and lifestyle research institute - population monitoring of physical activity among Canadians
http://www.iotf.org	International Obesity Taskforce/WHO global obesity report
http://www.ipaq.ki.se	International Physical Activity Questionnaire
http://www.cdc.gov/mmwr/PDF/rr/rr5018.pdf or http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5018a1.htm	US Task Force on Community Preventive Services were released October 26th , 2001 – report describes evidence on effectiveness of interventions used in communities to promote physical activity
http://www.acsm.org/	American College of Sports Medicine
http://www.aahperd.org/naspe/wahtsnew-pep.html	NASPE – National Association for Sport and Physical Education
www.aahperd.org/aahperd/programs-convention.html	AAHPERD – American Alliance for Health Physical Education Recreation and Dance
http://www.who.int	World Health Organization
http://www.utahfitness.org/	USCHPA - Utah State Council for Health and Physical Activity
http://www.cdc.gov/nccdphp/dnpa/readysset/calendar.htm	Centers for Disease Control
http://www.hillarysport.org.nz	Hillary Commission – New Zealand
http://www.detr.gov.uk	Department of Transport – United Kingdom [look at publications site, where some are relevant to physical activity and Active transportation]

2. AUSTRALIAN SITES

Site	Purpose
http://www.activeaustralia.org	Active Australia site
http://www.health.gov.au/pubhlth/strateg/active/index.htm	Department of Health and Ageing and documents on physical activity and health
http://hna.ffh.vic.gov.au/hphp/signal/index.htm	Strategic Inter-Governmental Nutrition Alliance
http://www.cpaa.sa.gov.au/	Royal Adelaide Hospital Centre for Physical Activity in Ageing (CPAA)
http://www.heartfoundation.com.au/sepa/index_fr.html	National Heart Foundation Australia
http://www.sport.vic.gov.au	Sports and Recreation Victoria
http://www.msr.wa.gov.au	Sport and Recreation (WA)
http://www.dsr.nsw.gov.au/	NSW Sport and Recreation
http://www.sportrec.qld.gov.au/	Sport and Recreation Queensland
http://www.recsport.sa.gov.au/	Office of Recreation and Sport (South Australia)
http://www.nt.gov.au/dsr/	Department of Sport and Recreation (Northern Territory)
http://www.osr.tas.gov.au/home.htm	Office of Sport and Recreation (Tasmania)
http://www.health.gov.au/pubhlth/strateg/active/index.htm	Australian Department of Health and Ageing
http://www.health.nsw.gov.au http://www.health.nsw.gov.au/public-health/hpdp/phyactive.html	NSW Health Department Physical Activity

http://www.health.wa.gov.au/ http://www.public.health.wa.gov.au/	Health Department of Western Australia Public Health
http://www.dhs.sa.gov.au/ http://www.dhs.sa.gov.au/pehs/topics/topic-health-promo-sa.htm	Department of Human Services (South Australia) Health Promotion
http://www.dhs.vic.gov.au/	Department of Human Services (Victoria)
http://www.health.qld.gov.au/	Queensland Health Department
http://www.dhhs.tas.gov.au/	Department of Health & Human Services (Tasmania)
http://www.dhhs.tas.gov.au/services/healthy_living/hwbou.html	Health and Wellbeing Unit
http://www.nt.gov.au/ntg/health.shtml	Northern Territory Health and Family
http://www.nphp.gov.au/sigpah/	Strategic Inter-Governmental forym on Physical Activity
http://www.health.gov.au/nhmrc/publications/synopses/n22syn.htm	Acting on Australia s Weight



