

Physical activity patterns of Australian adults

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Physical activity patterns of Australian adults

**Results of the 1999 National
Physical Activity Survey**

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Australian Institute of Health and Welfare
Canberra

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Contents

List of tables	vii
List of figures	viii
List of boxes	viii
List of abbreviations	ix
Preface.....	xi
Acknowledgments.....	xii
Summary.....	xiii
1. Introduction	1
2. Physical activity and health	3
Physical activity and all-cause mortality.....	3
Physical activity and cardiovascular disease	4
Physical activity and diabetes.....	6
Physical activity and cancer	7
Physical activity and injury prevention and control	8
Physical activity, mental health and psychosocial benefits.....	9
3. Physical activity measurement	10
Physical activity concept.....	11
Physical activity duration	11
Physical activity frequency	11
Physical activity intensity.....	11
Physical activity type.....	12
Physical activity context.....	12
Physical activity to confer a health benefit	13
4. Survey methodology.....	14
Overview.....	14
Sample size	14
Sample selection	14
Response rate.....	15
Questionnaire	15
Derivation of the physical activity measures	16
Weighting.....	18
Predictor variables of participation.....	18

5. Demographic profile of survey respondents	19
Age and sex	19
Children in the household	20
Language spoken, marital status, education level, occupation status.....	20
Body mass index.....	22
6. Physical activity patterns of Australian adults.....	24
Total sessions spent in activities.....	24
Total time spent in activities	27
Measures of physical activity.....	28
Physical activity habits (a usual week).....	33
7. Awareness and understanding of current physical activity media messages	36
Promotion of physical activity in Australia	36
Message recall.....	37
Understanding of physical activity messages	42
Intentions to become more active	44
Factors independently associated with participation.....	46
8. Trends in Australians' physical activity habits, 1997 and 1999	49
9. Discussion.....	51
Glossary	54
Appendixes.....	56
References	63

List of tables

Table 5.1: Age and sex of survey respondents (per cent), 1999.....	19
Table 5.2: Percentage of children in the household for survey respondents, 1999.....	20
Table 5.3: Language spoken, marital status, education level, occupation of survey respondents, 1999.....	21
Table 5.4: BMI categories of survey respondents by age, sex, education level (per cent), 1999.....	23
Table 6.1: Sessions of physical activity in the previous week by sex (per cent), 1999.....	25
Table 6.2: Sessions of physical activity in the previous week by age group (per cent), 1999.....	26
Table 6.3: Total time (minutes) for physical activity during the previous week, 1997 and 1999.....	27
Table 6.4: Mean minutes for physical activity during the previous week by age group and sex, 1999.....	27
Table 6.5: Percentage of people reporting no physical activity (sedentary) during the previous week, 1997 and 1999.....	29
Table 6.6: Percentage of people achieving 'sufficient' time during the previous week by sex, age group and education level, 1999.....	29
Table 6.7: Percentage of people achieving 'sufficient' time and sessions during the previous week by sex, age group and education level, 1999.....	30
Table 6.8: Trends in 'sufficient' levels of activity (per cent), 1997 and 1999.....	32
Table 6.9: Mean minutes of physical activity over the previous six months, 1997 and 1999.....	33
Table 6.10: Percentage of people achieving a 'sufficient' time in physical activity over the previous six months, 1997 and 1999.....	34
Table 7.1: Percentage of people recalling generic messages about exercise and physical activity, 1997 and 1999.....	38
Table 7.2: Percentage of people recalling the <i>Active Australia</i> campaign, 1999.....	39
Table 7.3: Percentage of people recalling the <i>Active Australia</i> tagline 'Exercise – you only have to take it regularly, not seriously', 1997 and 1999.....	40
Table 7.4: Percentage of people recalling the 'Rusty' campaign, 1999.....	41
Table 7.5: Percentage of people agreeing (combined 'strongly agree' and 'agree') with knowledge statements, 1997 and 1999.....	43
Table 7.6: Percentage of people intending to be more physically active, 1999.....	45
Table 7.7: Adjusted odds ratios for factors associated with participation in 'sufficient' physical activity, 1999.....	47
Table 8.1: Summary of changes between the 1997 and 1999 surveys.....	50
Table A3.1: Percentage of people achieving 'sufficient' levels of physical activity, 1999.....	60

List of figures

Figure 6.1:	Percentage of people achieving a 'sufficient' time in physical activities in the previous week, 1999.....	31
Figure 6.2:	Percentage of people achieving a 'sufficient' time and sessions in physical activities in the previous week, 1999	31
Figure 6.3:	Percentage of people achieving a 'sufficient' time in physical activities in the previous six months, 1999	34
Figure 7.1:	Any intention to be more active (combined intention in the next month and in the next six months), 1999.....	45

List of boxes

Box 2.1:	Heart disease in Australia	4
Box 2.2:	Stroke in Australia	4
Box 2.3:	Cardiovascular risk factors in Australia.....	5
Box 2.4:	Diabetes in Australia	6
Box 2.5:	Cancer in Australia	7
Box 2.6:	Injury prevention and control in Australia	8
Box 2.7:	Mental health in Australia	9

List of abbreviations

ACSM	American College of Sports Medicine
AIHW	Australian Institute of Health and Welfare
BMI	body mass index
CATI	Computer-Assisted Telephone Interview
CI	confidence interval
CVD	cardiovascular disease
DHAC	Department of Health and Aged Care
DHFS	Department of Health and Family Services
HDL	high-density lipoprotein
HSC	Higher School Certificate
HVRF	Hunter Valley Research Foundation
ICC	intra-class correlation
MET	metabolic equivalent

Preface

Physical inactivity is recognised as one of the most important population health risk factors. Its role as a risk factor is at least as significant as hypertension or high cholesterol in contributing to cardiovascular disease, one of Australia's major killers. In addition, physical activity protects against several cancers, reduces the risk of diabetes, improves mental health and may reduce the risk of falls and injuries in the elderly.

Overall, physical inactivity ranks second only to tobacco smoking in importance for the burden of disease and disability from all-causes in Australia (Mathers et al. 1999).

Participation in regular physical activity has important health and social benefits. In fact, physical activity can play a part as a preventive factor in five of the six National Health Priority Areas—cardiovascular disease, cancer control, mental health, diabetes mellitus and injury prevention and control.

Physical Activity Patterns of Australian Adults, released on the eve of the 2000 Sydney Olympics, provides much-needed information on national physical activity levels of Australian adults, as well as providing an indication of the impact of the *Active Australia* initiative. The Olympics is a time to focus on elite athletes and their performances, but also to think about the performance of Australia more broadly as an active nation. This report documents current patterns of physical activity participation among Australian adults in 1999 and provides information on trends from 1997.

In order to assess current patterns of physical activity and the impact of the *Active Australia* campaign, a survey of 3,841 people was conducted during November 1999. The information presented in this report includes the most up-to-date data on physical activity levels and attitudes among Australians adults.

The 1999 National Physical Activity Survey was jointly funded by the Commonwealth Department of Health and Aged Care and the Australian Institute of Health and Welfare. It follows an earlier comparable survey funded under the auspices of *Active Australia* in November 1997. The report is a valuable resource for researchers and those interested in public health policy and health promotion.

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Summary

This report presents results from a national physical activity survey of Australian adults conducted in November and December 1999. It covers current (1999) activity patterns and recent national trends. This report represents the most up-to-date information using recognised measures and methods to ensure comparable information on trends in physical activity.

A large and growing proportion of Australians see the health benefits of physical activity

- 88% of people believe that their health could be improved by being generally more active.
- 92% of people believe that health could be improved by participation in 30 minutes of moderate-intensity physical activity each day.
- There was an increase in overall knowledge of the health benefits of physical activity and awareness of physical activity messages between 1997 and 1999.
- 42% of people recognised the *Active Australia* tagline 'Exercise – you only have to take it regularly, not seriously'.
- Recall of 'Rusty', the 1999 International Year of Older People physical activity campaign, was 24% in those aged 60–75 years.

however, participation is declining...

- The average number of times each week people participated in walking, moderate and vigorous leisure-time physical activity declined between 1997 and 1999.
- The average amount of time people spent each week in physical activity declined between 1997 and 1999.
- This finding held for participation in physical activity done in the 'previous week' and over a 'usual' week.

the proportion of physically inactive people is increasing...

- The proportion of physically inactive Australians increased between 1997 and 1999 (13% to 15% respectively).
- This increase in physical inactivity was greatest for those people aged 30–44 years (12% to 17%), and among those people with tertiary levels of education (6% to 11%).

and the percentage of those achieving 'sufficient' levels of physical activity for a health benefit is declining.

- Between 1997 and 1999 there was a decline in the proportion of Australians participating in 'sufficient' physical activity to provide a health benefit (62% to 57%).
- The decline was seen for both men (63% to 60%) and women (61% to 54%).
- The decline was greatest for people aged 30–44 years (64% to 54%).
- The proportion of people aged 60–75 years participating in 'sufficient' levels of activity did not change between 1997 and 1999.

Who achieved 'sufficient' levels of physical activity in 1999?

- Participation at a 'sufficient' activity level for a health benefit was greatest among 18–29-year-olds (69%) and lowest among 45–59-year-olds (50%).
- Men (60%) were more likely than women (54%) to participate at 'sufficient' levels.
- For men, participation at a 'sufficient' activity level was greatest for those aged 18–29 years (74%) and lowest among those aged 45–59 years (50%).
- Among women, participation at a 'sufficient' activity level decreased with age from 64% in those aged 18–29 years to 48% in those 60–75 years of age.
- Participation at a 'sufficient' activity level increased with educational attainment.

Who is more likely to participate in physical activity?

- Obese Australian adults were 50% less likely than other Australian adults to reach a 'sufficient' level of physical activity compared with those of healthy weight.
- Older Australians were less likely to participate in 'sufficient' physical activity than younger people.
- Women were 20% less likely to achieve 'sufficient' physical activity compared with men.
- People with at least one child at home were 20% less likely to be 'sufficiently' active than those without.
- People who did not recall the *Active Australia* slogan 'Exercise – you only have to take it regularly, not seriously' were 19% less likely to achieve 'sufficient' levels of physical activity than people who did recall it.

Do Australians intend to increase their participation?

- In 1999, one-third of Australian adults said that they intended to become more physically active in the next month and 29% said that they were intending to become more physically active in the next six months.
- Intentions to become more physically active were greater for women than for men, and decreased with age.

1. Introduction

Physical activity—vital for health

Participation in physical activity has important benefits for the physical and mental health of Australians, and for social and cultural values in our communities.

Physical activity is recognised as an important factor in reducing the risk of chronic disease among Australians. It is important for the reduction of mortality and morbidity from cardiovascular disease, type 2 diabetes, some forms of cancer, and morbidity from some injuries, and mental health conditions.

This report presents details of a national physical activity survey conducted with Australian adults in November 1999. It covers patterns of participation in physical activity, along with knowledge and awareness of public health messages about physical activity. Further, the report details changes in participation and knowledge since 1997.

Promoting physical activity

Making people aware of the benefits of participation in physical activity to improve health is a major challenge for public health policy makers, health care providers and communities. Effective interventions are required to fulfil the overall population-health aim to increase total physical activity in the community. One process in Australia has been the development of National Physical Activity Guidelines (DHAC 1999), which serve to bring public attention to the minimum amount of physical activity required to achieve health benefits. These guidelines operate within a broader physical activity initiative in Australia, namely the *Active Australia* campaign. This campaign brings together the major stakeholders from government and non-government sectors to provide the structures for effective promotion of, and opportunities to participate in, physical activity in Australia.

The need for good quality data and evaluation

The information presented in this report relates primarily to leisure-time physical activity. Methods to accurately measure occupational and incidental physical activities are yet to be developed. Further, the relationship between health benefits and occupational and incidental physical activities are yet to be elucidated.

One limitation for the effective promotion of physical activity in Australia is a lack of data on participation rates and evaluations of effective interventions. This report takes a first step in remedying the lack of coordinated monitoring of physical activity in Australia. Data on participation in physical activity at recommended levels are presented here, along with knowledge and awareness of specific campaign messages.

Monitoring *Active Australia*

As one of the benchmarks for the *Active Australia* initiative, a national baseline survey was conducted in November 1997. This report documents the results of a second survey two years after the baseline. It provides population data on the trends in physical activity among Australian adults over the two-year time-period of the *Active Australia* initiatives. Monitoring changes in the prevalence of physical activity and demonstrating any changes in the awareness of moderate physical activity are indicators of population changes.

Continued monitoring of patterns and trends in physical activity is needed to help assess the impact of specific interventions and campaigns such as *Active Australia*. To in part achieve this, another national physical activity survey, using comparable methodology, should be conducted in two to three years' time. The peak national body providing leadership in physical activity and health in Australia, the Strategic Inter-Governmental forum on Physical Activity and Health (SIGPAH) endorses replication of the *Active Australia* baseline survey.

Work to further develop nationally agreed standard methods of measurement appropriate for population-based observational studies should continue.

Structure of this report

Chapter 2 provides an overview of the relationship between physical activity and health, specifically in the areas of cardiovascular disease, diabetes, cancer, injury prevention and control, and mental health. Chapter 3 summarises the development of questions used to measure physical activity and includes a discussion of the key concepts in this area. The following chapter details the methodology used in the 1999 survey. The demographic profile of survey respondents is provided in Chapter 5. The results from the 1999 survey are presented in Chapter 6, specifically, the number of sessions spent in activities, the total time spent in activities and the levels of physical activity 'sufficient' to confer a health benefit. Chapter 7 presents information on the recall of generic messages on physical activity, and as they relate to the *Active Australia* campaign. The respondents' knowledge of physical activity is reported, as well as their intentions to become more active in the future. Chapter 8 reviews the trends in physical activity participation levels in Australia by comparing the 1999 survey results with those of a similar survey conducted in 1997. Finally, a discussion is given in Chapter 9.

2. Physical activity and health

Physical activity of moderate intensity has been recommended for health and wellbeing since the time of Hippocrates (460–370 BC). Despite this long interest in physical activity, its recognition as an important public health issue has lagged behind that for other traditional risk factors such as tobacco smoking (Bauman & Owen 1999). Only in the last two decades has consistent epidemiological evidence identified that physical activity is a major modifiable risk factor in the reduction of mortality and morbidity from many chronic diseases. The release in 1996 of the United States Surgeon General's report on physical activity and health (USDHHS 1996) gave physical activity an internationally recognised legitimacy as an important component of public health and wellbeing.

According to recent estimates, physical inactivity is responsible for about seven per cent of the total burden of disease in Australia (Mathers et al. 1999). This places physical inactivity second, behind tobacco control, in terms of national importance in health promotion and disease prevention. Physical inactivity also places an enormous economic cost on Australia (Stephenson et al. 2000).

Data collected from studies using different measurement techniques (i.e. self-reported physical activity, fitness assessments, motion sensors) show similar associations between physical inactivity and a range of health outcomes such as coronary heart disease, ischaemic stroke, type 2 diabetes, osteoporosis and some cancers, as well as disease risk factors such as high blood cholesterol, hypertension and obesity (Bauman & Owen 1999).

The quality of the current evidence showing physical inactivity as a risk factor is similar to that for tobacco smoking in the 1970s. Most of the evidence has been provided by population-based cohort studies. The more recent and better quality studies adjust for confounding factors such as high blood cholesterol, hypertension and obesity. Meta-analyses of the evidence show a stronger association between physical activity and health outcomes where the research methods are optimal (Ainsworth et al. 1998; Berlin & Colditz 1990; Powell et al. 1987).

Physical activity and all-cause mortality

People who participate in moderate to vigorous levels of physical activity and/or have high levels of cardiorespiratory fitness have a lower mortality rate than those with a sedentary lifestyle or low cardiorespiratory fitness. The effects of physical activity on reducing all-cause mortality are strong and consistent across studies and populations (Blair et al. 1996; Lee & Paffenbarger 1997; Villeneuve et al. 1998). Even among diverse elderly populations in studies in Israel and in Holland, relationships between regular physical activity and reduced risks of death are consistently demonstrated (Bijnen et al. 1999; Stessman et al. 2000).

Although these associations are generally stronger for measured cardiorespiratory fitness than for self-reported participation (Blair et al. 1989), moderate types of self-reported physical activity such as climbing at least 20 flights of stairs per week confer a benefit on all-cause mortality (Paffenbarger et al. 1993). Dimensions such as transport-related activity, such as regular bicycling to work, may confer benefits independent of other leisure-time physical activity (Andersen et al. 2000). Participation in more vigorous physical activity confers an even greater benefit in terms of overall risk of death (Lee & Paffenbarger 2000). Overweight or obese individuals who are physically active and fit are

less likely to suffer early death than normal-weight persons who lead a sedentary lifestyle (Blair & Brodney 1999). Further, among obese men, low cardiovascular fitness has been shown to be at least as important a predictor of all-cause mortality as type 2 diabetes, high cholesterol, smoking and high blood pressure (Wei et al. 1999).

Physical activity and cardiovascular disease

Heart disease and stroke

The strongest evidence for the benefits of physical activity is in reducing the risk of mortality and morbidity from cardiovascular disease (CVD). Compared with those that are at least moderately physically active, people who are sedentary have a one-and-a-half to twofold increase in the risk of a fatal or non-fatal cardiovascular event such as coronary heart disease or acute myocardial infarction (Bauman & Owen 1999; Berlin & Colditz 1990; USDHHS 1996). These associations are strong and are independent of the definition of physical activity or cardiorespiratory fitness used. The maximum cardiovascular disease benefit occurred when people moved from a sedentary lifestyle or low state of cardiorespiratory fitness to a moderately active or moderate fitness level (Blair et al. 1995, 1996; Lakka et al. 1994). Participation in walking confers a clear benefit for women, but more vigorous activity confers an even greater reduction in risk (Manson et al. 1999).

It seems that recent participation in physical activity is required for cardioprotective benefits (Sherman et al. 1999), suggesting that ongoing participation may be required for ongoing health gain.

Existing data are less definitive for the association between physical activity and both types of stroke (i.e. ischaemic and haemorrhagic) (Kohl & McKenzie 1994). Generally, for ischaemic stroke, studies show a decrease in the risk of stroke with increasing physical activity (Ellekjaer et al. 2000; Hu et al. 2000; Wannemethee & Shaper 1999).

Box 2.1: Heart disease in Australia

Much progress has been made in recent years in improving the cardiovascular health of Australians. Death rates have fallen dramatically, some risk factors have improved, and there have been major advances in treatment and care.

However, cardiovascular disease is still Australia's greatest health problem. In 1995, an estimated 2.8 million Australians, or 16% of the population, had a cardiovascular condition (AIHW 1999a). The disease kills more people than any other disease (almost 51,000 deaths in 1998) (AIHW 2000) and creates enormous costs for the healthcare system. In 1997–98 there were 434,748 hospitalisations for cardiovascular conditions (AIHW 1999b).

Box 2.2: Stroke in Australia

Stroke is Australia's second greatest single killer after coronary heart disease, claiming almost 12,000 lives in 1998 (AIHW 2000). It is the leading cause of long-term disability in adults and it places great demands on family members and caregivers. Death rates from stroke have been falling since the late 1960s. Given the rapid ageing of the Australian population, however, and a slowing of the decline in stroke death rates in recent years, the number of people dying from stroke and those surviving with a permanent disability is likely to increase in the future (AIHW 1999a).

Risk factors for cardiovascular disease

Physical activity affects CVD independently of other CVD risk factors (Berlin & Colditz 1990; Blair et al. 1996; Paffenbarger et al. 1993; Powell et al. 1987). However, physical activity and fitness are also associated with other risk factors such as high blood pressure, high body mass index (BMI) and unfavourable high-density lipoprotein (HDL)/blood cholesterol levels (Bauman & Owen 1991).

Vigorous physical activity has been shown to decrease systolic and diastolic blood pressure (Arroll & Beaglehole 1992; Kelley & McClellan 1994; McMurray et al. 1998; Mensink et al. 1999). There is some evidence that participation in more moderate physical activity may achieve similar or even greater effects in lowering blood pressure than vigorous activity (Hagberg et al. 1989; Marceau et al. 1993; Matsusaki et al. 1992).

Physical activity and cardiorespiratory fitness are both associated with improved total blood cholesterol levels (McMurray et al. 1998) and improved HDL subfraction profiles (Moore 1994). Recent research suggests that there may be a threshold for the relationship between physical activity and improvements in the HDL subfraction of cholesterol – more prolonged or intensive exercise may be more beneficial for HDL to total cholesterol ratios (Kokkinos & Fernhall 1999).

Physical activity has also been shown to have a role to play in the prevention, maintenance, and treatment of obesity, although more prolonged activity is required for weight loss (Grundy et al. 1999). Most reviews suggest that at least 2,000 Kcal of energy expenditure per week is required for maintained weight loss (Rippe & Hess 1998), which equates to at least one hour of moderate or half-an-hour of vigorous leisure-time physical activity every day. Nonetheless, more moderate levels of activity can assist with weight maintenance, as well as conferring other health benefits.

Box 2.3: Cardiovascular risk factors in Australia

In 1995, around 2.2 million Australian adults (17% of the adult population) had high blood pressure (AIHW 1999a). There have been significant declines in the proportion of people with high blood pressure and/or receiving treatment since the 1980s.

The last national survey to assess blood cholesterol levels in Australia was conducted in 1989. At that time it was estimated that over 4.5 million Australians adults (aged 20–69 years) had higher than desirable cholesterol levels (AIHW 1999a).

In 1995, around 7.4 million Australian adults (around 56% of the adult population) were overweight (BMI = 25) (AIHW 1999a). Almost 2.5 million (or 19% of the adult population) of those were obese (BMI = 30). There have been significant increases in the proportions of overweight and obese Australians in the last 15 years (AIHW 2000).

Adult smoking rates have been declining since the 1960s and this trend has continued into the 1990s. National surveys show, however, that the rate of decline has slowed in more recent years. In 1995, almost 3.2 million Australian adults (around 24% of the adult population) were at risk of developing heart disease and other chronic conditions from smoking tobacco products (AIHW 1999a).

Physical activity and diabetes

A recent review shows that the benefits of physical activity in the prevention and treatment of type 2 diabetes are strongly supported by current research (Ivy et al. 1999). It has been estimated that 30–50% of new cases of type 2 diabetes could be prevented by appropriate levels of physical activity (Manson & Spelsberg 1994). Both moderate and vigorous physical activity reduces the risk of type 2 diabetes in women (Hu et al. 1999). The benefits accrue in diverse populations (Folsom et al. 2000; Okada et al. 2000). The benefits of physical activity for preventing and treating diabetes only occur from regular sustained physical activity patterns. The physiological adaptations that are responsible for the protective effects of physical activity subside within a short period of the cessation of physical activity (Arciero et al. 1999; Dela et al. 1993; Rogers et al. 1990).

Box 2.4: Diabetes in Australia

Diabetes has a major impact on quality of life and its long-term complications include a greater risk of heart attack, stroke, impotence, blindness, kidney problems, lower limb amputations and reduced life expectancy.

In 1995, over 350,000 Australians (2% of the population) reported having type 1 or type 2 diabetes (AIHW 1999a). Self-reported diabetes underestimates the true prevalence of the condition. Studies suggest that there is one undiagnosed person for each known case of type 2 diabetes (AIHW 1999a).

Physical activity and cancer

There is evidence suggesting that participation in physical activity and high cardiorespiratory fitness reduce the risk of developing some forms of cancer. Numerous studies show the protective effect of physical activity on risk of colon cancer (Colditz et al. 1997), and on the prevention of precancerous polyps in the large bowel (Neugut et al. 1996; Slattery et al. 1997).

The evidence relating to physical activity and other cancers is less conclusive. Most studies of physical activity report a reduction in the risk of breast cancer among physically active women (Gammon et al. 1998; Latikka et al. 1998; Verloop et al. 2000). There is some evidence for vigorous activity providing a protective effect for prostate cancer in men (Giovannucci et al. 1998), although some researchers do not find such a relationship (Liu et al. 2000). There are too few studies to enable clear statements to be made on the associations between physical activity and uterine and ovarian cancer in women, testicular cancer in men, and lung cancer. However, a recent study showed a promising reduction in risk of lung cancer in physically active men (Lee & Paffenbarger 2000).

Box 2.5: Cancer in Australia

Cancer has a major impact on the Australian community in terms of morbidity, mortality and costs. On average, one in three men and one in four women are likely to develop cancer before the age of 75 (DHFS & AIHW 1998).

The incidence of cancer continues to increase and, while the overall death rate has begun to fall, the death rate from many of the most common cancers is either stable or increasing. The most common cancer in Australia in both males and females is the non-melanocytic skin cancer. The next most common cancers in males are cancers of the prostate, colon and rectum, lung, melanoma of the skin, and bladder. Common cancers in females are those of the breast, colon and rectum, melanoma of the skin, and lung (DHFS & AIHW 1998).

Physical activity and injury prevention and control

Participation in physical activity throughout the lifespan can increase, maintain or reduce the decline of musculoskeletal health that generally occurs with aging in sedentary people (Brill et al. 2000). Participation by older adults can help maintain strength and flexibility, resulting in an ability to continue to perform daily activities (Brill et al. 2000; Huang et al. 1998; Simonsick et al. 1993). Further, participation can reduce the risk of falling and hip fractures in older adults (Grisso et al. 1997; Lord 1995).

The development of osteoporosis and bone fractures are associated with physical inactivity (Drinkwater 1994). Weight-bearing activity is important in the development of peak bone density for adolescents (Welten et al. 1994) and for middle-aged women (Zhang et al. 1992). Cross-sectional studies show that participation in physical activity, aerobic fitness and muscular strength are all positively associated with bone density (Gutin & Kasper 1992).

The position statement on osteoporosis by the American College of Sports Medicine (ACSM 1995) stated that functional loading through physical activity exerts a positive influence on bone mass, but the types of activity most effecting such change are still not clear. Systematic reviews of the literature have identified the beneficial role of physical activity in reducing the risks of falls in the elderly, but often in combination with other program components such as reviewing medications and improving the safety of the domestic environment (Gillespie et al. 1998).

Physical activity is essential for maintaining the health of joints and appears to be beneficial for controlling the symptoms of osteoarthritis. There is no evidence that physical activity itself causes osteoarthritis although injuries sustained during participation in training and competition in elite sports may increase risk of osteoarthritis (Kujala et al. 1994; Kujala et al. 1995; USDHHS 1996). However, these studies are based on extremely small sample sizes and this limits their generalisation to the population. Participation in recreational running, as opposed to competitive athletics, over a long period has been shown not to increase risk of osteoarthritis (Lane 1995).

Box 2.6: Injury prevention and control in Australia

Falls account for 15% of deaths from injury in Australia and for 33% of hospitalisations due to injury. The vast majority of falls occur in older people, with 94% of male and 70% of female deaths due to falls being in those aged over 65 years.

Musculoskeletal disorders are a cause of mortality and considerable morbidity and disability in Australia. Chronic musculoskeletal disorders are reported by 29% of Australians aged 15 years and over, and 56% of Australians aged 60 years and over (Mathers & Penm 1999).

Physical activity, mental health and psychosocial benefits

Studies consistently show that participation in physical activity reduces symptoms of stress, anxiety and depression (Glenister 1996; Hassmén et al. 2000; Paffenbarger et al. 1994; Petruzello et al. 1991). Physical activity is associated with increased mental health in population studies (Simonsick 1991; Stephens 1988) and is recognised as an evidence-based treatment for clinical anxiety and depression (Bauman & Owen 1999).

Participation in physical activity may also confer other psychological and social benefits that impact on the health and wellbeing of Australians. Participation by individuals can help build self-esteem (Sonstroem 1984), social skills among children (Evans & Roberts 1987) and positive self-image among women (Maxwell & Tucker 1992), and improve quality of life among children and adults (Hassmén et al. 2000; Laforge et al. 1999; Morans & Mohai 1991). These benefits are probably due a combination of participation in the activity itself and from the sociocultural aspects that can accompany physical activity.

Further, participation in physical activity may reduce self-destructive and antisocial behaviour among young people (Mutrie & Parfitt 1998).

Box 2.7: Mental health in Australia

The progress in physical and material wellbeing for most Australians during the twentieth century has not necessarily been matched by gains in mental health and subjective wellbeing. More than one million Australians are estimated to suffer from a mental disorder, with almost half of these affected long-term (ABS 1997).

Mental health disorders are responsible for a larger number of hospitalisations than any other National Health Priority Area, including cardiovascular disease, diabetes, asthma and cancer (DHAC & AIHW 1999a). Mental health problems also account for much disability, incur high direct and indirect costs, and impose a heavy burden of human suffering.

3. Physical activity measurement

The process to develop national standards for the measurement of physical activity was coordinated by the Australian Institute of Health and Welfare (AIHW). An Expert Working Group was established in 1997 to review national physical activity measures and develop standard data elements to measure physical activity in population surveys. Membership of the Expert Working Group is provided in Appendix 1.

The development of an appropriate tool is a challenging task. Physical activity for health benefit comprises several components (e.g. intensity, frequency, duration and type) that can be carried out in different settings or contexts (e.g. leisure-time, occupational, incidental and transport). Measurement is further complicated because there are several dimensions of physical activity related to health (e.g. energy expenditure, fitness, strength and flexibility). Methods for measuring activity range from self-reported instruments to more objective assessments of movement, fitness or energy balance.

An example of issues surrounding measurement relate to the quantum of activity needed for different health outcomes. For example, the primary type of physical activity required to prevent cardiovascular disease (i.e. moderate-intensity regular physical activity) is not the same as that required to prevent falls in the elderly (i.e. weight-bearing and strength-training activity). Different intensities and duration of activity are needed for different purposes – for example, more vigorous and sustained activity may confer additional benefits for disease prevention, but may be *required* for weight loss or improvements to lipid profiles.

Emanating from the work of the Expert Group, a standard instrument for collecting physical activity information was developed. The instrument questions were derived from questions used in the National Heart Foundation Risk Factor Prevalence Survey (Risk Factor Prevalence Management Committee 1990), the Australian Bureau of Statistics National Health Surveys 1989–90 and 1995, and the New South Wales State Health surveys (Bauman et al. 1996). Information on the utility, reliability and validity of earlier Australian physical activity survey instruments was of great value in helping the Expert Group develop the current proposed instrument (Bauman et al. 1996; Booth et al. 1995, 1996; Gore et al. 1999; National Centre for Health Promotion and Health Promotion Branch 1994). This instrument was used in both the 1997 and 1999 national physical activity surveys to assess participation in physical activity among Australian adults.

A project to assess the reproducibility of this instrument was funded by the Commonwealth Department of Health and Aged Care (DHAC) in late 1999, through the University of Western Australia. Repeatability data for these physical activity questions were collected by Dr Fiona Bull from the University of Western Australia, in a population sample of 237 adults in WA (Bull et al. 2000, in press). Data were collected as a supplementary study to the 1999 National Physical Activity Survey. Data were collected by telephone survey, and again from the same individuals three days later. Recall was of the same week. In general, for those individuals reporting activity (walking, gardening, moderate and vigorous activity), the test–retest agreement coefficients were in the moderate to very good range – intra-class correlation coefficients ranged from 0.6 to 0.8. (personal communication, Bull et al. 2000). This suggests that these questions, in a population setting, are at least as reproducible as other commonly used physical activity instruments.

Underpinning the measurement of physical activity is the integration of information on intensity, frequency, duration and type of physical activity. Furthermore, recent developments in the epidemiology of physical activity suggest that components of

everyday activity, such as transport-related activity and incidental or unplanned activity, might be considered in broader approaches to measurement. Key concepts used to measure physical activity are presented below.

Physical activity concept

Physical activity is defined as 'any bodily movement produced by skeletal muscles that results in energy expenditure' (Caspersen et al. 1985). Some examples of physical activity are walking, walking up stairs, gardening, playing sport and work-related activity. Exercise is a subset of physical activity defined as planned, structured and repetitive bodily movement done to improve or maintain one or more components of physical fitness. Exercise has specific objectives of improving fitness, performance and health, and providing a means of social interaction. Physical activity comprises duration, frequency, intensity, type and context.

Physical activity duration

Duration is defined as the length of time spent participating in physical activity as self-reported by the respondent within a reporting period. This item is generally reported in hours and minutes and may be summed to provide an indication of total time participating in physical activity over the reporting period. Typically, reporting periods have been lengthy, with recall of activity patterns over the previous one to twelve months. More recent surveys focus on a shorter time period, with one or two weeks often used. This is considered to be less prone to recall bias and hence to provide better population estimates of activity patterns.

Physical activity frequency

Frequency is defined as the number of times the respondent self-reported participating in physical activity, within a reporting period.

Physical activity intensity

Intensity is the self-perceived and self-reported intensity at which a respondent participated in physical activity. Generally, to obtain health benefit, physical activity at a moderate intensity (at least) is required. Brisk walking is an example of a moderate-intensity physical activity. Participation in vigorous-intensity physical activities confers even greater health benefits than does participation in more moderate activity. The primary measurement goal is to provide examples within questions of the kinds of activity that reach a sufficient energy expenditure threshold to be of health benefit. This is usually activity that results in energy expenditure of at least three times the resting rate (resting metabolic rate, RMR) or activities which correspond to at least three metabolic equivalents (METs). Brisk walking and other moderate-intensity activities (e.g. gentle swimming, social tennis) correspond to around 3–5 METs. More vigorous activities such as aerobics, jogging and competitive tennis correspond to around 7–9 METs (USDHHS 1996).

Physical activity type

Type is defined as the specific physical activities self-reported by respondents, for example, walking, gardening and yardwork.

Walking is the most prevalent physical activity reported in Australian population surveys. Walking is identified as a specific activity as it is carried out in several contexts (e.g. exercise, recreation, transport, at work, etc.). Although some occupations involve considerable amounts of walking (e.g. traffic warden), there is currently insufficient evidence to assume that self-reported walking at work will provide health benefit on a population basis. A specific question on other walking is therefore included in the questionnaire to ensure that only information on walking that most likely contributes to health benefit is collected.

Gardening and yard work are also commonly reported physical activities. Information on these specific activities is required because it is unclear whether they contribute to achieving a 'sufficient' level of physical activity for health benefit. To ensure that these activities are not included with other leisure-time physical activities, a specific question is included about gardening and yard work. The wording of these questions and the energy expenditure associated with these tasks need further validation for their use in population surveys. Similarly, other important settings for expending energy, such as domestic or occupational settings, require validation studies to determine their usefulness in routine physical activity self-reported surveys.

Physical activity context

This is the context in which a person participates in physical activity. The term physical activity commonly represents sport, active recreation, exercise, fitness, incidental activity and active living. The majority of the data in this report refer to leisure-time physical activity, which refers to an individual's discretionary time that is time left after completion of work, travelling, domestic chores and personal hygiene. The element of personal choice is inherent to this definition (Bouchard & Shephard 1994).

One of the important aims of population physical activity measurement is to measure physical activity in as many settings as possible, using reliable and valid self-reported questions. Hence the questionnaire used as a basis for this report asked about walking 'continuously for at least 10 minutes, for recreation, exercise or to get to or from places', thus capturing leisure-time walking and some walking for transport. In this way, walking that is most likely to be associated with a health benefit (i.e. moderate or brisk-paced walking) is separated from walking at work which is unlikely, in most cases, to be done at an intensity and/or of a duration associated with a health benefit. In this instrument, moderate and vigorous leisure-time activities are illustrated by examples which reflect the appropriate energy expenditures for those pursuits.

Physical activity to confer a health benefit

'Sufficient' leisure-time physical activity for health results from participation in regular physical activity of 'sufficient' duration and intensity. Although there is no clear absolute threshold for health benefit, recommendations from experts agree that for better health, physical activity should be performed regularly. A landmark document, the United States Surgeon General's report on physical activity and health (USDHHS 1996), provided a scientific basis for health benefits to be achieved from the participation of regular, moderate intensity physical activity. In keeping with this concept, the National Physical Activity Guidelines for Australians (DHAC 1999) recommend that the 'accumulation of 30 minutes of moderate physical activity on most days of the week' is beneficial for health. One interpretation of this is the accrual of 150 minutes of moderate-intensity (at least) leisure-time physical activity over a period of one week. This equates to approximately 30 minutes of physical activity on five (most) days of the week. Therefore, the first definition used in this report for 'sufficient' physical activity for health benefit is based on a duration of greater than or equal to 150 minutes of walking and/or moderate-intensity physical activity, and/or vigorous-intensity physical activity per week (where vigorous-intensity physical activity is weighted by a factor of two to reflect its greater intensity). A further refinement to the measure is to take into account the number of sessions and set the criteria of 'sufficient' to include that 150 minutes of moderate-intensity activity (at least) be accrued over at least five sessions. The rationale for this is that, for most people, each session would be undertaken on a separate day.

Physical activity related to gardening and yard work is not accepted as a contributor to 'sufficient' physical activity because there is currently limited research on the validity of the self-reported intensity of these activities. Due to the widespread self-reported participation in gardening and yard work as leisure-time activities, this work, to quantify the health benefit of those activities is required as a matter of urgency.

'Sufficient' physical activity is an important concept because it reflects the amount and type of physical activity that is likely to have a health benefit. This quantum applies to several but not all health benefits – it is chosen as the level where a substantial number of benefits might accrue (USDHHS 1996). It also provides an insight into the remaining proportion of the population that is insufficiently active. This group includes people who are completely inactive or sedentary (i.e. who report no physical activity) as well as those who are active but not sufficiently active for good health as defined by the National Physical Activity Guidelines for Australians (DHAC 1999).

4. Survey methodology

Overview

The data presented in this report are from the 1999 National Physical Activity Survey with trend information from the 1997 *Active Australia* Baseline Survey (ASC 1998) (referred to in this report as the 1999 survey and 1997 survey, respectively).

The 1999 survey was jointly funded by AIHW and DHAC. Data were collected by telephone by the Hunter Valley Research Foundation (HVRF) on behalf of the funding agencies.

Details of the survey methodology are presented in a technical report (HVRF 1999) and a brief outline is provided below.

Sample size

The scope of the survey was Australian adults aged 18–75 years. The national sample size required for the 1999 survey was estimated to be at least 2,500 and was distributed proportionally by population across States and Territories. The age range of 18–75 years, rather than the standard 18–74 years, was to ensure data were collected for the entire age range (18–75 years inclusive) for which public health messages on physical activity were targeted and to maintain consistency with the 1997 survey.

The NSW Health Department contracted the HVRF to increase the sample size in New South Wales to 2,000 (originally estimated at 846) to allow for within-State comparisons. Also, to assess the impact of a physical activity campaign targeted at an older age group within New South Wales, a further 100 respondents aged between 55 and 75 years were interviewed.

The additional interviews for New South Wales were obtained using the existing survey methodology. To obtain the additional 100 interviews, the wording of the introduction was changed to ask for the number of people aged 55 to 75 years in the household rather than the number of people aged 18 to 75 years.

The final national sample includes the additional interviews from New South Wales, which increased the sample size to 3,841.

Sample selection

The 1999 survey was conducted by the HVRF using a Computer Assisted Telephone Interviewing (CATI) system. Respondents were selected using a two-stage sampling process. Firstly, households were randomly selected using the electronic White Pages telephone directory. Then, once contact with the household was established, the person aged between 18 and 75 years who had the most recent birthday was asked to participate. Once identified, the respondent was not substituted with other members of the household for any reason.

A small pilot test conducted by the HVRF in early November 1999 tested the wording and flow of the survey. More extensive pilot testing was not considered necessary as comparable questions were tested for the 1997 survey.

Interviewers were trained using the CATI system and familiarised with material from the *Active Australia* campaign using posters, brochures and a videotape of the 'Rusty' television commercial.

The 1999 survey was conducted between 10 November 1999 and 17 December 1999 to ensure comparability with the 1997 survey, which was conducted during November–December 1997. Conducting the surveys at the same time of year ensures that participation rates are not affected by seasonal conditions. It was also important to conduct the surveys before the December holiday period (late December) as participation rates may be influenced by increased leisure time.

The CATI system directed all wording used by the interviewers for the introduction, and for all of the survey questions. Survey answers were entered by the interviewers during the interview and automatically checked for validity by the CATI system. Open-ended responses were transcribed verbatim by the interviewer.

Response rate

A potential respondent was defined as a person currently living in the household aged between 18 and 75 years. If there was more than one person in this category, the person with the most recent birthday was selected.

Several methods were used by HVRF to improve response rates. A minimum of six call attempts were made to establish contact with a survey respondent. A further five attempts were made once contact had been made, to obtain either a completed interview or a refusal. Respondents were able to make appointments to complete the interview at a more convenient time. Interviewers left messages on answering machines as well as providing a toll-free number to potential respondents.

Telephone contact was made with 5,936 households and resulted in 3,841 completed interviews. This represented a *household* response rate of 65%. Of the eligible individuals contacted, the *individual* response rate was 89%.

The response rate in 1999 was higher than in 1997, where *household* response rate was 61% and *individual* response rate was 81%.

Response rates were similar between States and Territories, although rates in the Australian Capital Territory, South Australia and Tasmania were slightly higher.

Questionnaire

Questions asked about respondents' awareness and understanding of the moderate-intensity physical activity messages, their intentions to become more active in the future, their participation in predominantly leisure-time physical activities (including walking for transport) during the previous week and their usual physical activity patterns over the last six months (i.e. a 'usual' week) (Appendix 2).

Information was collected on:

- walking continuously for at least 10 minutes, for recreation, exercise or transport;

- other moderate-intensity physical activities, e.g. gentle swimming, social tennis;
- vigorous-intensity physical activities, e.g. jogging, cycling, aerobics, competitive tennis; and
- vigorous-intensity gardening or heavy yardwork.

Participants were asked to report the frequency and duration for each activity. Prescriptive definitions of the terms 'vigorous' and 'moderate' were not provided, and thus respondents interpreted these terms in the context of the questions and examples provided. Perceptions of intensity may therefore vary, and are likely to be influenced by factors such as fitness level and age.

Unlike the 1997 survey, the 1999 survey did not include questions on the frequency and duration of participation in vigorous-intensity household and domestic chores and hours of television watching.

Open-ended questions

Following a response of 'yes' to the message recall questions, survey participants gave an open-ended response. For open-ended questions, two of the authors developed coding frames, and then independently content-analysed the responses into closed coded categories (Appendix 4). The authors then met and discussed coding frames, and reconciled any differences. These data are shown in the relevant sections.

Derivation of the physical activity measures

The measures identified below are an informative way of examining population levels of physical activity. As well as providing an indication of population prevalence, they can assist in identifying particular population groups that need to be targeted by specific intervention strategies.

Total sessions per week

The number of times a respondent reported participating in a physical activity is presented. This is of interest because, the majority of participants report fewer than six sessions per week and it is assumed that the sessions relate to 'days' of activity. Hence, the number of sessions can be related to the current recommendations, which are to participate in activities on most, if not all, days of a week, i.e. five sessions or more in one week.

Total time per week

The total time spent participating in physical activity is calculated from the sum of total time spent in walking, moderate-intensity physical activity and vigorous-intensity physical activity during the previous week.

Physical inactivity (sedentary)

Respondents reporting no participation in physical activity are classified as being physically inactive or sedentary.

‘Sufficient’ physical activity to confer a health benefit

The level of physical activity that is ‘sufficient’ to confer a health benefit has been subject to debate. The accrual of 150 minutes of moderate-intensity (at least) physical activity over a period of one week is believed to confer health benefit and reflects the current National Physical Activity Guidelines message (DHAC 1999). Walking is included as a moderate-intensity physical activity.

Health benefits can also be obtained by participating in vigorous-intensity physical activity, in approximate proportion to the total amount of activity performed, measured in minutes of physical activity. Participation in vigorous-intensity leisure-time physical activity for 60 to 90 minutes over a period of a week will confer health benefits.

The definition of ‘sufficient’ does not include gardening or heavy yardwork (although these activities were self-rated as being of vigorous intensity) because there is limited research regarding the actual energy expenditure of these activities. It is likely that, in future, these activities will be included as indicators of moderate-intensity physical activity.

Insufficient physical activity is defined as some reported physical activity, but not meeting either of the ‘sufficient’ criteria.

To avoid measurement error due to over-reporting (Bauman 1987), data were truncated using the following criteria:

- maximum ‘allowable’ recorded time doing any of the three types of physical activity was 14 hours per week (any reported time spent greater than 14 hours was recoded to 14 hours); and
- maximum ‘allowable’ recorded total hours per week was 28 hours per week (any total hours greater than 28 were recoded to equal 28 hours).

Fewer than 1% of the data required truncation.

Two working definitions of ‘sufficient’ physical activity are used in this report, derived from the information collected on total time and total sessions.

‘Sufficient’ time

The first definition of ‘sufficient’ physical activity was based on the sum of the total minutes of walking, moderate-intensity and/or vigorous-intensity physical activity. ‘Sufficient’ health benefit is obtained if minutes walking plus minutes moderate plus (twice vigorous minutes) is greater than or equal to 150 minutes. Vigorous-intensity physical activity was weighted by a factor of two, to account for its greater intensity.

This definition is used to provide estimates of participation in the previous week and in the past six months (i.e. ‘usual’ week).

‘Sufficient’ time and sessions

A second definition of ‘sufficient’ activity to confer health used in this report takes into account frequency of participation. For this definition, ‘sufficient’ activity is only achieved when 150 minutes of activity (when vigorous-intensity activity is weighted by a factor of two) is accrued in at least five separate sessions of activity.

This definition is applied only to participation over the previous week.

Weighting

The data collected in the survey were provided with weights which were used to obtain estimates which were representative of the national population. The age groups used for weighting were the standard age groups, except for the age group 70–74 which was replaced by 70–75 (see page 14).

To allow for the impact of relatively more interviews in New South Wales compared to the number of interviews in other States and Territories, data were down-weighted to an effective sample size of 3,000. This weighting ($WSAMP_{ras}$) was used when estimating the proportion of people who are physically active and for statistical tests of significance at the national level.

The formulas used to calculate the weights are:

To estimate numbers for total and regional populations,

$$WPOP_{ras} = \frac{N_{ras}}{n_{ras}}$$

where $WPOP_{ras}$ is the weight used to estimate numbers applied to each respondent in region r , age group a , with sex s , N_{ras} is the population in region r , age group a , with sex s , and n_{ras} is the sample size (i.e. number of respondents) in region r , age group a , with sex s .

To estimate proportions and to perform statistical tests at the national level,

$$WSAMP_{ras} = WPOP_{ras} \times \frac{n}{N}$$

where $WSAMP_{ras}$ is the weight used to estimate proportions applied to each respondent in region r , age group a , with sex s , $WPOP_{ras}$ is the weight used to estimate numbers applied to each respondent in region r , age group a , and with sex s , N is the total national population (aged 18 to 75 years), and n is the total national sample size (i.e. number of respondents).

Predictor variables of participation

Logistic regression was used to summarise associations between the sociodemographic predictor variables and participation in 'sufficient' physical activity.

5. Demographic profile of survey respondents

This section provides a demographic profile of respondents in the 1999 survey. Australian Bureau of Statistics (ABS) Population Statistics Group (PSG) standards were used for the demographic categories sex, age and main language spoken at home. For the other demographics listed below, definitions used in the 1997 survey were adopted for comparability.

The following demographic characteristics of respondents are provided:

- Sex
- Age
- Number of children under 18 years living in the household
- Number of children aged 5 and under living in the household
- Main language spoken at home
- Marital status
- Education level
- Occupation status
- BMI.

Age and sex

Table 5.1 shows the profile of respondents by age group and sex. The mean age of respondents in 1999 was 42 years.

The 1999 survey comprised a weighted sample of 3,000 adults, derived from an actual sample of 3,841 telephone survey respondents. In the weighted sample, men comprised 49.6% and women comprised 50.4% of the total. The age and sex distribution of respondents in the 1999 survey was very similar to that in the 1997 survey (ASC 1998).

The distribution by age and sex of the 1999 survey respondents is comparable with the Australian population in 1998 (ABS 1999) (Table 5.1).

Table 5.1: Age and sex of survey respondents (per cent), 1999

Age group (years)	Men		Women		Persons	
	1999 survey	Australian population	1999 survey	Australian population	1999 survey	Australian population
18–29	26.0	25.8	25.4	25.1	25.7	25.5
30–44	33.1	32.7	33.4	32.8	33.2	32.8
45–59	25.0	25.7	24.1	25.1	24.6	25.4
60–75	15.9	15.8	17.1	16.9	16.5	16.3
Total	100.0	100.0	100.0	100.0	100.0	100.0

Note: Australian population data is for 1998 (ABS 1999).

Children in the household

Table 5.2 shows the percentage of children in the household for respondents in 1999. It shows the percentage of households with children under 18 years and the percentage of households with children aged 5 years or under.

Forty-three per cent of households had one or more children under 18 years and less than 20% had children aged 5 years or under.

Table 5.2: Percentage of children in the household for survey respondents, 1999

Household composition	Percentage of respondents
Children (aged 5 years or under)	
Nil	80.9
1 or more	19.1
Total	100.0
Children (less than 18 years)	
Nil	56.9
1 or more	43.1
Total	100.0

Note: Components may not add to totals due to rounding.

Language spoken, marital status, education level, occupation status

Table 5.3 shows the main language spoken at home, marital status, education level and occupation of respondents.

Six per cent of respondents used a main language other than English at home.

Nearly 70% of respondents were married or in a de facto relationship, 28% were single or never married and 3% were widowed.

Thirty-eight per cent of respondents had attained the Higher School Certificate or equivalent, 37% had less than 12 years' education and 25% had a tertiary education.

Nearly one-third of respondents were managers or administrators, 25% were in white collar professions, 14% did home duties, 12% were retired, 9% in blue collar occupations, 5% were students, and 3% were unemployed.

Table 5.3: Language spoken, marital status, education level, occupation of survey respondents, 1999

	Percentage of respondents
Main language spoken at home	
English	94.4
Other	5.6
Total	100.0
Marital status	
Never married/single	27.8
Married/de facto	69.1
Widowed	3.0
Total	100.0
Education level	
Less than 12 years	37.0
HSC or equivalent	38.0
Tertiary	25.0
Total	100.0
Occupation status	
Manager/administrator	32.6
White collar	25.0
Home duties	14.1
Retired	11.9
Blue collar	8.5
Student	4.6
Unemployed	3.2
Total	100.0

HSC = Higher School Certificate. White collar = professional, para-professional. Blue collar = tradesperson, clerk, salesperson and personal service worker, plant and machine operator/driver, labourer.

Note: Components may not add to totals due to rounding.

Body mass index

BMI is a measure of a person's weight in relation to their height, calculated as weight in kilograms divided by height in metres squared. Physical measurement of overweight and obesity was beyond the scope of this survey, but data were collected on self-reported height and weight for calculation of BMI.

The BMI categories are:

- underweight: BMI less than 18.5
- healthy weight: BMI from 18.5 to less than 25
- overweight: BMI from 25 to less than 30
- obese: BMI greater than or equal to 30.

The mean BMI of respondents in 1999 was 25.1. This was similar to that of respondents in 1997 (mean = 24.8) (ASC 1998).

Table 5.4 shows the distribution of the sample according to the BMI categories, based on self-reported height and weight. Forty-four per cent of people were above healthy weight (32% overweight and 12% obese), 53% were within the healthy weight range, and 3% were underweight. The proportion of overweight and obese adults (18–75 years) in 1999 was similar to that found for adults 18–74 years from self-reported information collected in the 1995 National Health Survey (ABS 1997; DHAC & AIHW 1999b).

Table 5.4 shows that women were more likely to have a healthy weight (59%) than were men (47%). Levels of obesity were similar for men (12%) and women (13%). Underweight was more common among women (4%) than men (2%). The proportion of people in the healthy weight category decreased with age and increased with level of education. The prevalence of obesity generally increased with age and decreased with level of education, from 15% in those with less than 12 years of education to 8% among those with tertiary education.

Table 5.4: BMI categories of survey respondents by age, sex, education level (per cent), 1999

	Underweight	Healthy weight	Overweight	Obese
Sex				
Men	1.7	46.9	39.5	11.9
Women	4.2	59.0	24.0	12.7
<i>Persons</i>	<i>3.0</i>	<i>52.9</i>	<i>31.8</i>	<i>12.3</i>
Age group (years)				
18–29	7.5	65.9	19.8	6.8
30–44	1.9	53.1	32.9	12.2
45–59	0.8	46.0	36.9	16.3
60–75	1.5	42.8	40.5	15.2
Education level				
Less than 12 years	2.5	46.9	35.5	15.2
HSC or equivalent	3.7	55.6	28.1	12.7
Tertiary	2.9	57.7	31.8	7.7

HSC = Higher School Certificate.

6. Physical activity patterns of Australian adults

The purpose of this section is to profile the physical activity patterns of Australians adults aged 18–75 years in 1999 and show trend comparisons with the 1997 survey where relevant. Statistically significance (at least $p < 0.05$) is reported as a significant change in the following sections.

Total sessions spent in activities

Table 6.1 shows the percentage of sessions of each category of physical activity that respondents participated in during the previous week. Thirty-five per cent of people reported that they walked (for recreation/exercise or to get to or from places) on at least five occasions during the previous week. Lower rates were noted for regular moderate-intensity or vigorous-intensity activities, with 9% reporting they participated in vigorous-intensity activity at least five times, and only 5% reporting that they participated in moderate-intensity physical activity on at least five occasions during the week.

Participation in regular vigorous-intensity physical activity was more common among men (11%) than women (6%).

Forty per cent of people aged 18–29 years reported walking five or more times during the previous week, and 33% of people in this age group reported doing vigorous-intensity activity on at least three occasions during the previous week (Table 6.2).

Thirty-seven per cent of people aged 60–75 years reported walking five or more times during the previous week, and 7% of people in this age group reported doing vigorous-intensity activity on at least three occasions during the previous week. Vigorous-intensity gardening and yardwork on at least three occasions was more common among older age groups.

Between 1997 and 1999, there has been a significant decline in the number of sessions of physical activity that people reported during the previous week. Fifty-eight per cent of respondents walked at least three times during the week in 1997 compared with 54% in 1999. The proportion of people reporting three or more sessions of vigorous-intensity activity during the week also declined from 24% in 1997 to 19% in 1999. The proportion of people doing moderate-intensity physical activity three or more times per week remained constant between 1997 (11%) and 1999 (10%). Similarly, participation in vigorous-intensity gardening or yardwork on at least three occasions per week remained constant between 1997 (10%) and 1999 (11%).

Table 6.1: Sessions of physical activity in the previous week by sex (per cent), 1999

Physical activity	Men	Women	Persons
Walking			
Nil	31.5	24.1	27.8
1–2	17.7	19.3	18.5
3–4	16.6	20.5	18.6
5 or more	34.2	36.0	35.1
Total	100.0	100.0	100.0
Moderate-intensity^(a)			
Nil	67.2	75.6	71.4
1–2	22.0	14.9	18.4
3–4	6.1	5.2	5.7
5 or more	4.7	4.3	4.5
Total	100.0	100.0	100.0
Vigorous-intensity^(b)			
Nil	59.1	65.4	62.3
1–2	19.1	19.0	19.1
3–4	10.6	9.2	9.9
5 or more	11.1	6.4	8.7
Total	100.0	100.0	100.0
Vigorous-intensity gardening/yardwork			
Nil	54.0	60.5	57.3
1–2	32.8	30.0	31.4
3–4	7.3	5.4	6.3
5 or more	5.9	4.1	5.0
Total	100.0	100.0	100.0

(a) Examples of moderate-intensity activities are gentle swimming, social tennis.

(b) Examples of vigorous-intensity activities are jogging, cycling, aerobics, competitive tennis.

Note: Components may not add to totals due to rounding.

Table 6.2: Sessions of physical activity in the previous week by age group (per cent), 1999

Physical activity	Age group (years)			
	18–29	30–44	45–59	60–75
Walking				
Nil	20.0	31.6	29.3	30.2
1–2	20.5	19.8	18.0	13.6
3–4	19.3	17.9	18.4	19.1
5 or more	40.2	30.8	34.4	37.1
Total	100.0	100.0	100.0	100.0
Moderate-intensity^(a)				
Nil	69.9	72.7	75.4	65.3
1–2	21.3	19.2	15.7	16.6
3–4	4.8	4.8	3.9	11.3
5 or more	4.0	3.3	4.9	6.9
Total	100.0	100.0	100.0	100.0
Vigorous-intensity^(b)				
Nil	40.9	60.6	72.0	84.4
1–2	26.4	21.7	14.8	8.7
3–4	17.3	9.2	7.3	3.8
5 or more	15.5	8.5	5.8	3.0
Total	100.0	100.0	100.0	100.0
Vigorous-intensity gardening/yardwork				
Nil	68.5	52.2	52.1	57.9
1–2	26.7	37.5	33.6	23.3
3–4	2.9	6.3	8.0	9.1
5 or more	1.9	4.0	6.2	9.7
Total	100.0	100.0	100.0	100.0

(a) Examples of moderate-intensity activities are gentle swimming, social tennis.

(b) Examples of vigorous-intensity activities are jogging, cycling, aerobics, competitive tennis.

Note: Components may not add to totals due to rounding.

Total time spent in activities

Table 6.3 shows the total time (in minutes) people reported spending in each category of physical activity in the previous week. The inclusion of the 75th percentile and 95th percentiles in Table 6.3 is necessary because the distribution of activity is skewed, indicating that some caution is needed in interpreting the mean values. However, for illustrative purposes (and because the medians are often zero), mean values are shown for each category of activity, by each age group and sex (Table 6.4).

Table 6.3 shows that walking was the most common activity, followed by vigorous-intensity gardening and yardwork, other vigorous-intensity activities and moderate-intensity activities other than walking.

Between 1997 and 1999, the total time spent participating in physical activity declined significantly. The mean time spent walking declined (137 to 114 minutes per week, Table 6.3) between 1997 and 1999. Similarly, the mean time people spent participating in vigorous-intensity activities declined, from 91 to 65 minutes; and moderate-intensity activities declined, from 62 to 54 minutes. Mean time spent in physical activity declined for all age groups except for those aged 60–75 years (ASC 1998). For this age group the mean time spent in each of walking, other moderate activity, vigorous gardening and yardwork, and other vigorous activities increased between 1997 and 1999.

Table 6.3: Total time (minutes) for physical activity during the previous week, 1997 and 1999

	Walking		Moderate-intensity		Vigorous-intensity		Vigorous gardening ^(a)	
	1997	1999	1997	1999	1997	1999	1997	1999
Mean	137	114	62	54	91	65	87	77
75th percentile	180	170	30	30	120	60	90	90
95th percentile	487	420	420	360	480	360	480	420

(a) Vigorous-intensity gardening and yardwork.

Mean minutes of total activity by age and sex show some clear patterns (Table 6.4). Walking was common in both sexes, across age groups, and increased in prevalence among older men. Older adults of both sexes spent the greatest time in moderate-intensity physical activities. Men, especially those aged 18–29 years, spent the most time in vigorous-intensity activity. Men also spent more time than did women doing vigorous-intensity gardening and yardwork, and this increased with age.

Table 6.4: Mean minutes for physical activity during the previous week by age group and sex, 1999

Age group (years)	Walking		Moderate-intensity		Vigorous-intensity		Vigorous gardening ^(a)	
	Men	Women	Men	Women	Men	Women	Men	Women
18–29	111.3	132.1	59.3	29.5	148.8	91.7	53.7	29.8
30–44	98.1	110.4	58.2	24.2	74.2	49.8	95.7	67.4
45–59	98.0	122.5	59.5	37.0	47.2	36.6	107.2	76.3
60–75	146.1	112.5	132.3	79.6	23.5	16.3	139.0	65.3
All ages	109.2	119.2	70.6	38.1	78.8	51.5	94.5	59.6

(a) Vigorous-intensity gardening and yardwork.

Measures of physical activity

This section describes current patterns and trends for the following measures of physical activity:

- physical inactivity (sedentary, no minutes of activity); and
- physical activity to confer a health benefit:
 - ‘sufficient’ time (150 minutes per week, using the sum of walking, moderate activity and vigorous activity (weighted by two));
 - ‘sufficient’ time and sessions (150 minutes and five sessions of activity per week).

Physical inactivity (sedentary)

In 1999, almost 15% of Australian adults reported no leisure-time physical activity during the previous week (Table 6.5). Sedentary behaviour increased with age, from 6% in people 18–29 years old to around 18% in those aged 45 years and over. The prevalence of sedentary behaviour in people with less than 12 years of education (20%) was almost twice that of people with tertiary education (11%).

The proportion of people reporting no physical activity did not change significantly from 1997 to 1999 (13.4% to 14.6%). However, during this period there was a significant increase in physical inactivity among people aged 30–44 years, from 12% to 17%. There were no changes in physical inactivity for other age groups during that period.

Between 1997 and 1999, the proportion of people with tertiary education reporting no physical activity increased from 6% to 11%, although no significant changes were noted for other categories of educational attainment.

Physical activity to confer a health benefit

‘Sufficient’ time

The categories of ‘insufficiently active’ and ‘sufficiently active’ were derived using participation in weighted vigorous-intensity activity to reflect its extra health benefits.

In Table 6.6, 29% of people were doing some physical activity, but not enough to be categorised as ‘sufficient’. Participation at this level was more common among women (32%) than men (26%). Participation increased with age (until age 60) and decreased with educational attainment.

Over half (57%) of the population was undertaking ‘sufficient’ physical activity to obtain a health benefit. Participation at this level was more common among men (60%) than women (54%) and decreased with age, until age 60. Participation in ‘sufficient’ activity increased with education, from 50% in those with less than 12 years of education to 62% in those with tertiary education.

Table 6.5: Percentage of people reporting no physical activity (sedentary) during the previous week, 1997 and 1999

	1997	1999
Sex		
Men	13.7	14.6
Women	13.1	14.7
<i>Persons</i>	13.4	14.6
Age group (years)		
18–29	7.3	6.3
30–44	11.7	16.9
45–59	18.1	18.2
60–75	19.2	17.9
Education		
Less than 12 years	18.2	19.5
HSC or equivalent	13.1	12.5
Tertiary	6.2	10.9

HSC = Higher School Certificate.

Table 6.6: Percentage of people achieving 'sufficient' time during the previous week by sex, age group and education level, 1999

	Sedentary	Insufficient	'Sufficient' ^(a)
Sex			
Men	14.6	25.9	59.6
Women	14.7	31.5	53.8
<i>Persons</i>	14.6	28.7	56.6
Age group (years)			
18–29	6.3	25.0	68.7
30–44	16.9	29.6	53.5
45–59	18.2	31.9	50.0
60–75	17.9	28.1	54.1
Education			
Less than 12 years	19.5	30.9	49.6
HSC or equivalent	12.5	27.9	59.7
Tertiary	10.9	26.7	62.3

HSC = Higher School Certificate.

(a) 'Sufficient' time is defined as 150 minutes per week, using the sum of walking, moderate activity and vigorous activity (weighted by two).

'Sufficient' time and sessions

Table 6.7 shows the proportion of people doing insufficient and 'sufficient' physical activity to obtain a health benefit, when 'sufficient' is defined as the accumulation of at least 150 minutes of physical activity (where vigorous-intensity activity is weighted by a factor of two) in at least five sessions over the week. When defined in this manner, 45% of people participated in physical activity to obtain a health benefit. Participation decreased with age until age 60. About 43% of women and 47% of men participated at this level. Participation in 'sufficient' physical activity increased with education level. Only 39% of people with less than 12 years of education did 'sufficient' physical activity compared with 52% of people with tertiary education.

Table 6.7: Percentage of people achieving 'sufficient' time and sessions during the previous week by sex, age group and education level, 1999

	Sedentary	Insufficient	'Sufficient' ^(a)
Sex			
Men	14.6	38.3	47.1
Women	14.7	41.9	43.4
Persons	14.6	40.2	45.2
Age group (years)			
18–29	6.3	37.5	56.3
30–44	16.9	41.9	41.2
45–59	18.2	41.6	40.2
60–75	17.9	38.5	43.6
Education			
Less than 12 years	19.5	41.9	38.6
HSC or equivalent	12.5	40.5	47.0
Tertiary	10.9	36.8	52.3

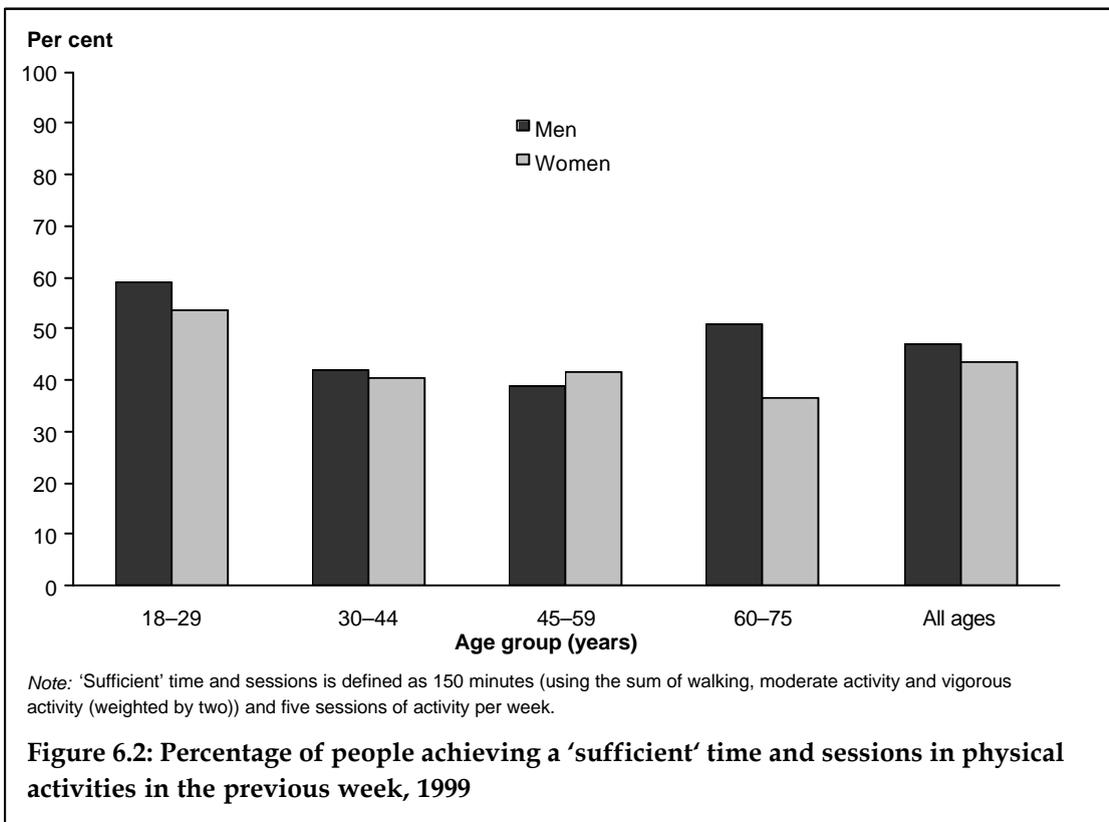
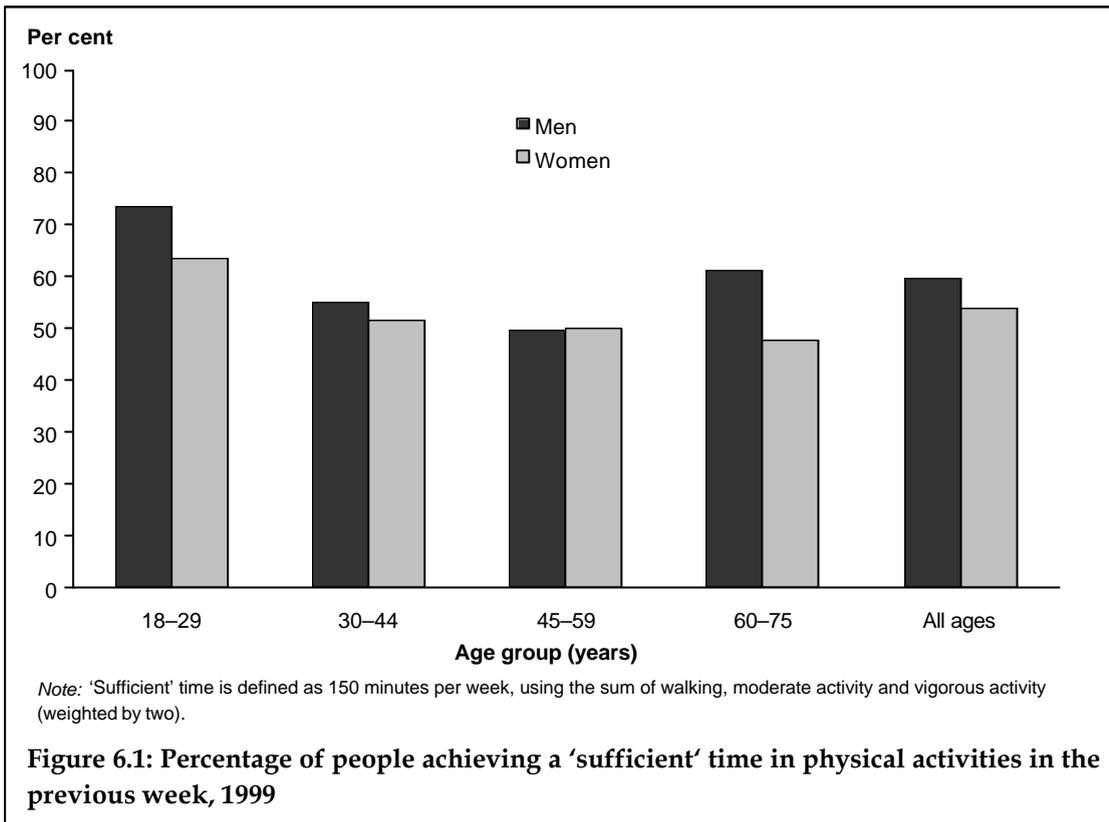
HSC = Higher School Certificate.

(a) 'Sufficient' time and sessions is defined as 150 minutes (using the sum of walking, moderate activity and vigorous activity (weighted by two)) and five sessions of activity per week.

'Sufficient' levels by age and sex

Figures 6.1, 6.2, and Table A3.1 show participation levels of men and women in each age group. For men, participation decreased with age until age 60 when participation increased to levels greater than those seen among men in the 30–44 age group. This was due to greater participation in moderate-intensity physical activity among older men. This pattern was not seen for women, where participation declined with age.

These patterns were seen for both measures of 'sufficient' activity.



Trends 1997 and 1999

Participation in physical activity has declined significantly between 1997 and 1999 (Table 6.8). This decline was true for both interpretations of the 'sufficient' category, for both men and women, for ages up to 60 years and across levels of educational attainment. The continued participation by those 60 years of age and older is of particular interest given the public education campaign to promote physical activity among older people during 1999 (NSW Health 2000).

Data for both definitions of 'sufficient' activity (described page 17) are presented below. For the 'sufficient' time category (at least 150 minutes of physical activity is accumulated, where vigorous-intensity activity is weighted by two) the decline in participation at 'sufficient' level dropped from 62% to 57% between 1997 and 1999. The decline was greater for women (61% to 54%) than for men (63% to 60%), among those aged 30–44 years (64% to 54%), and for those with tertiary education (72% to 62%).

When 'sufficient' time and sessions is calculated (the accumulation of at least 150 minutes of physical activity, where vigorous-intensity activity is weighted by a factor of two, in at least five sessions over the week) the decline in participation was from 51% to 45% between 1997 and 1999, with similar groups showing the most decline, namely women, those aged 30–44 years and the tertiary-educated group.

Table 6.8: Trends in 'sufficient' levels of activity (per cent), 1997 and 1999

	'Sufficient' time ^(a)		'Sufficient' time and sessions ^(b)	
	1997	1999	1997	1999
Sex				
Men	63.4	59.6	51.7	47.1
Women	61.1	53.8	50.1	43.4
<i>Persons</i>	62.2	56.6	50.9	45.2
Age group (years)				
18–29	74.0	68.7	62.9	56.3
30–44	63.6	53.5	51.6	41.2
45–59	53.8	50.0	43.1	40.2
60–75	53.4	54.1	42.7	43.6
Education				
Less than 12 years	55.1	49.6	43.9	38.6
HSC or equivalent	63.0	59.7	51.4	47.0
Tertiary	71.9	62.3	61.2	52.3

HSC = Higher School Certificate.

(a) 'Sufficient' time is defined as 150 minutes per week, using the sum of walking, moderate activity and vigorous activity (weighted by two).

(b) 'Sufficient' time and sessions is defined as 150 minutes (using the sum of walking, moderate activity and vigorous activity (weighted by two)) and five sessions of activity per week.

Physical activity habits (a usual week)

Time spent in activities over the previous six months

The mean amount of time people reported that they usually spent (i.e. each week over the past six months) in various physical activities declined significantly from 1997 to 1999 (Table 6.9). The average time spent in each activity (walking, moderate, vigorous) decreased between 1997 and 1999. The greatest decline was for participation in vigorous activity, from a mean of 104 minutes in 1997 to 75 minutes in 1999.

Table 6.9: Mean minutes of physical activity over the previous six months, 1997 and 1999

	Walking		Moderate-intensity		Vigorous-intensity ^(a)	
	1997	1999	1997	1999	1997	1999
Mean	158.5	120.7	65.5	57.6	103.8	75.1
75th percentile	210	180	60	60	120	100
95th percentile	600	420	360	300	480	360

(a) Vigorous-intensity activity is unweighted.

Physical activity to confer a health benefit over the previous six months

Questions about the previous six months' activity were asked to reflect usual physical activity patterns. These three questions only asked about *usual* total weekly time for participation in moderate, vigorous and walking activities. Since no information was collected on the number of sessions done in the previous six months, a 'sufficient' time and sessions measure could not be calculated. The following results are produced using only the 'sufficient' time measure, with the same derivation as reported in the previous section.

Table 6.10 shows that the proportion of people who reported they were usually active (i.e. in a typical week over the previous six months) active at 'sufficient' levels to achieve a health benefit decreased from 1997 to 1999 (69% to 62%). The pattern of decline was similar to that shown in Figures 6.1 and 6.2, and occurred for each age group (except for ages 45–59 years), for men and women, and for each level of educational attainment.

Age and sex

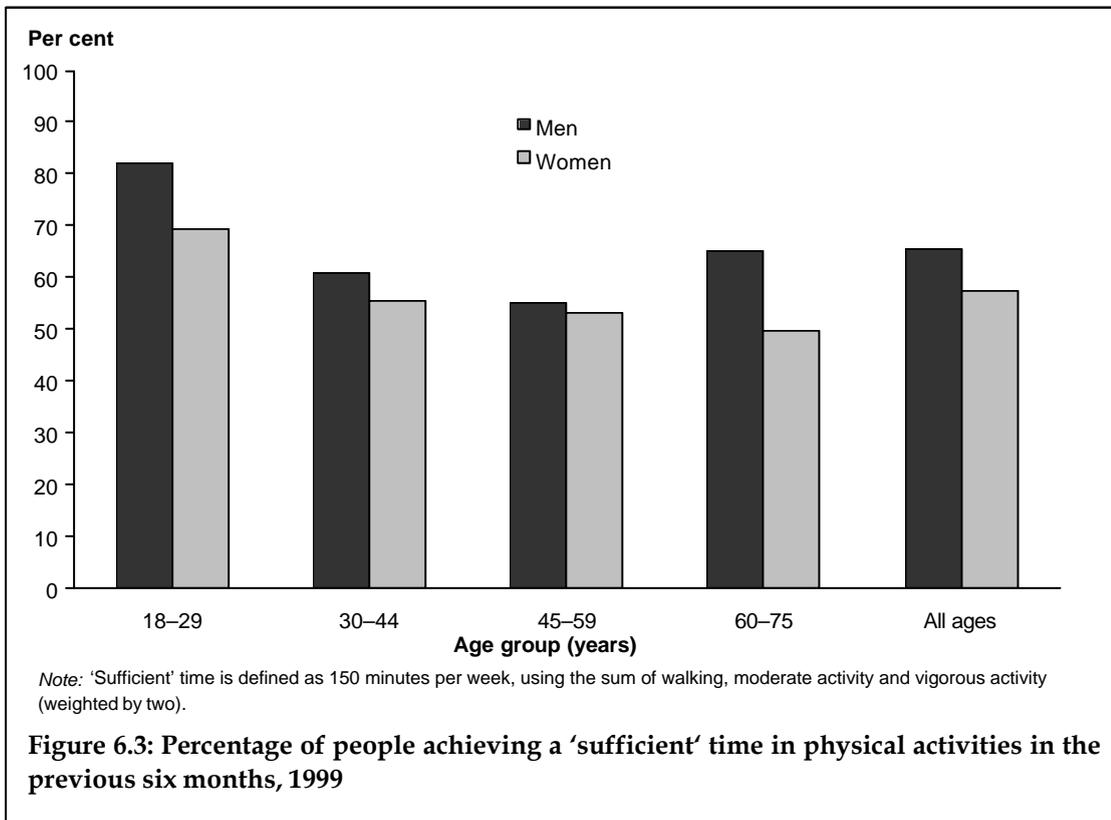
Figure 6.3 and Table A3.1 shows that usual participation (i.e. over the past six months) in 'sufficient' activity declined with age for men until age 60 when it increased to levels greater than that seen among men aged 30–44 years. For women, usual weekly participation at 'sufficient' levels declined across age groups.

Table 6.10: Percentage of people achieving a 'sufficient' time in physical activity over the previous six months, 1997 and 1999

	'Sufficient' time ^(a)	
	1997	1999
Sex		
Men	71.6	65.6
Women	67.1	57.4
Persons	69.3	61.5
Age group (years)		
18–29	83.1	75.8
30–44	70.7	58.1
45–59	58.9	54.1
60–75	60.5	57.2
Education		
Less than 12 years	62.2	52.8
HSC or equivalent	71.5	65.1
Tertiary	77.2	68.6

HSC = Higher School Certificate.

(a) 'Sufficient' time is defined as 150 minutes per week, using the sum of walking, moderate activity and vigorous activity (weighted by two).



Correlation of 'usual' week and 'previous' week

It is of interest to assess the relationship between the reported average weekly physical activity over the previous six months (i.e. a usual week) and the activity reported for the previous week. Although reporting of the usual week provided higher estimates of activity, the two measures showed broad agreement. In terms of total minutes reported, intra-class correlation (ICC) of the two measures was 0.76 (95% confidence interval (CI) 0.74–0.77). In 1997, similar agreement was found (ICC = 0.77, 95% CI = 0.75–0.78).

When categorised as 'sufficient' (e.g. 57% in previous week; 62% in usual week), good agreement was also obtained (kappa = 0.65, 95% CI 0.62–0.67). This result was consistent with the 1997 survey results (kappa = 0.66, 95% CI 0.63–0.69).

7. Awareness and understanding of current physical activity media messages

Promotion of physical activity in Australia

The central aim of promoting physical activity is to improve health and wellbeing by promoting increased levels of moderate-intensity activity in the Australian population. Strategies and approaches for increasing physical activity at the population level include those which target individuals through health professionals, in settings where they live and work, and through community-wide campaigns and programs. Obtaining timely information on physical activity habits is essential for monitoring the effectiveness of community-wide efforts to promote exercise. Regular information on physical activity habits is important for assessing national trends, identifying sedentary groups for targeted programs, and for better planning of sport and recreation facilities.

Active Australia

The *Active Australia* concept was launched in December 1996. It involves a partnership of the Australian Sports Commission, DHAC, the National Office of Local Government, and Sport and Recreation departments in all States and Territories.

Active Australia is a public health initiative to promote regular moderate-intensity physical activity and to increase participation in sports. It is unique in that it is a national initiative promoting population-wide strategies and public policies to encourage people to become and remain physically active at levels 'sufficient' to confer a health benefit.

Active Australia's vision is for 'all Australians to be actively involved in sport, community recreation, fitness, outdoor recreation and other physical activities' (DHFS 1998). The three major goals of *Active Australia* are to realise and enhance lifelong participation in physical activity; to realise the social, health and economic benefits of participation in physical activity; and to develop quality infrastructure, opportunities and services to support participation in physical activity.

Mass media campaigns conducted through Active Australia

The first campaign produced through *Active Australia* was a pilot physical activity campaign in New South Wales, implemented in February and March 1998. It was funded by NSW Health, with the support of DHAC and *Active Australia*. The central theme of this campaign was 'Exercise – you only have to take it regularly, not seriously'. It was disseminated through various media, including mainstream television, radio and print.

The 'Rusty' (tin man) campaign was a more specific initiative in the following year which focussed on older Australians. This campaign was a Commonwealth, State and Territory initiative celebrating the International Year of Older Persons in 1999. It was jointly funded by *Active Australia*, the Commonwealth Department of Veterans' Affairs, NSW Health and New South Wales Sport and Recreation. In addition, versions of this campaign were

conducted in other States, especially Victoria. It encouraged older Australians to have an active lifestyle to improve their health and wellbeing. The media campaign portrayed 'Rusty', a tin man who was squeaky and rusty. With increased physical activity he had more energy and get-up-and-go, and started to participate in a range of moderate-intensity physical activities.

Both the campaigns encouraged the 'moderate message': they both indicated that people could derive benefits from '30 minutes of moderate exercise on most days of the week', 'you can do it in three lots of ten minutes', 'just 30 minutes of regular moderate activity, such as brisk walking or participating in a sporting group'.

Message recall

To assess the impact of the *Active Australia* campaign, respondents were asked if they recalled any generic messages about exercise and physical activity, and the *Active Australia* campaign, specifically, on the recall of its 1998–99 campaign tagline and the 1999 'Rusty' (tin man) physical activity campaign theme.

Recall of generic messages about physical activity and exercise

In 1999 64% of people recalled that they had heard or seen any message about physical activity in the previous month. This generic recall was more common among females than males, but showed no significant gradient with age or educational attainment.

Although the overall proportion of people recalling a generic physical activity message did not change between 1997 and 1999 (Table 7.1), message recall declined significantly for 30–44-year-olds, but increased among those aged 60 years or greater. Recall also significantly increased from 1997 to 1999 among those with the highest levels of education.

The content analysis of the open-ended recall of the generic messages about physical activity and exercise showed that many people recalled only a non-specific physical activity message (8.2% of total respondents), 5.7% recalled a gym or private facility advertisement, 5.1% recalled something about walking, 2.9% identified a National Heart Foundation message, 2.8% reported association with other diseases, and 2.1% recalled an 'older people message'. A further 3.3% identified a specific recommended level for physical activity (five sessions of 30 minutes, or 'be more active every day', or half an hour daily), and 3% identified other health and physical activity resources.

Table 7.1: Percentage of people recalling generic messages about exercise and physical activity, 1997 and 1999

	1997	1999
Sex		
Men	60.2	61.5
Women	67.1	66.3
<i>Persons</i>	63.7	63.9
Age group (years)		
18–29	65.6	66.8
30–44	64.9	61.8
45–59	62.4	64.3
60–75	60.0	63.1
Education		
Less than 12 years	62.3	63.4
HSC or equivalent	65.3	63.5
Tertiary	63.1	65.4

HSC = Higher School Certificate.

Recall of the *Active Australia* campaign

An unprompted question on the recall of the *Active Australia* campaign was asked for the first time in 1999 and the results are presented in Table 7.2.

In 1999 almost 18% of Australian adults had heard of the *Active Australia* campaign. Knowledge of this campaign was more common among people aged 30–44 years (19%) than among older or younger people. Recall of the *Active Australia* campaign was better among those with tertiary education (21%) than those with the HSC (17%) or less than 12 years of education (16%).

The open-ended question about *Active Australia* was content-analysed and closed-coded (see coding frame in Appendix 4). The most frequent responses were a generic physical activity promotional message (reported by 4.3% of total), whereas 1.3% identified a national campaign, 1.8% identified the 'Rusty' campaign or older adults message, 0.8% identified walking, and 0.4% specified an '*Active Australia* day in October'.

Table 7.2: Percentage of people recalling the unprompted *Active Australia* campaign, 1999

	Percentage of respondents
Sex	
Men	17.0
Women	18.6
Persons	17.8
Age group (years)	
18–29	16.2
30–44	19.2
45–59	17.7
60–75	17.9
Education	
Less than 12 years	16.4
HSC or equivalent	17.4
Tertiary	20.6

HSC = Higher School Certificate.

Recall of the *Active Australia* tagline

Prompted recall of the *Active Australia* tagline 'Exercise – you only have to take it regularly, not seriously' (Table 7.3) increased markedly from 14% to 42% between 1997 and 1999. Increases in recalling this message occurred for both men and women, all age groups and all levels of education. Note that the pre-campaign levels are a 'spurious baseline' as the campaign had not been conducted yet – this is typical of media campaigns, and this rate was higher for the least educated group and among older adults.

The increase in recalling this specific campaign occurred across all ages, both sexes and all education groups. This indicates increased awareness of the *Active Australia* media campaign, with awareness maintained at around 40% of the population approximately 18 months after the campaign had been conducted.

Content analysis of the open-ended question relating to the *Active Australia* tagline revealed that 15.4% repeated the message, 1.6% reported 'fun', 2.6% identified the '30 minutes daily' theme, 5.6% reported 'some or any level of even gentle exercise useful', and 3% identified a walking message. Some (1.8%) reported (inappropriately) that activity once or twice a week was 'sufficient'.

Table 7.3: Percentage of people recalling the prompted *Active Australia* tagline 'Exercise – you only have to take it regularly, not seriously', 1997 and 1999

	1997	1999
Sex		
Men	14.5	39.6
Women	14.1	44.0
Persons	14.4	41.8
Age group (years)		
18–29	11.4	46.8
30–44	14.1	42.0
45–59	16.6	39.7
60–75	16.3	36.8
Education		
Less than 12 years	17.1	40.8
HSC or equivalent	13.9	44.3
Tertiary	10.9	39.5

HSC = Higher School Certificate.

Recall of the 'Rusty' campaign

Table 7.4 shows that 21% of people recalled 'Rusty', the (1999 International Year of Older People) mass media campaign. Recall of this campaign tended to increase with age from 19% among those 18–29 years to 24% among those aged 60 years and over. Recall of the 'Rusty' campaign declined with increasing levels of education.

Content analysis of the open-ended question relating to 'Rusty' identified the most common understanding of this message (3.8%) was describing features of the advertisement in detail, 3.8% reporting 'use it or lose it' or 'get up and go', 2.6% reported arthritis, 'seizing up' or movement stiffness, 1.7% identified walking daily and 3.7% reported other physical activity messages.

Table 7.4: Percentage of people recalling the 'Rusty' campaign, 1999

	Percentage of respondents
Sex	
Men	20.6
Women	21.7
<i>Persons</i>	21.2
Age group (years)	
18–29	19.4
30–44	21.9
45–59	19.9
60–75	24.3
Education	
Less than 12 years	22.1
HSC or equivalent	22.0
Tertiary	18.5

HSC = Higher School Certificate.

Understanding of physical activity messages

It is generally accepted that people need to recognise and understand public health messages in order for them to change behaviour to comply with such messages.

To assess whether people remember particular messages about physical activity, respondents were asked to rate (on a five-point Likert scale) the extent to which they agreed with the statements below:

Message 1: Taking the stairs at work or generally being more active for at least 30 minutes each day is enough to improve your health.

Message 2: Half an hour of brisk walking on most days is enough to improve your health.

Message 3: To improve your health it is essential for you to do vigorous exercise for at least 20 minutes each time, three times a week.

Message 4: Exercise doesn't have to be done all at one time – blocks of 10 minutes are okay.

Message 5: Moderate exercise that increases your heart rate slightly can improve your health.

Table 7.5 shows people's agreement with these statements, using combined 'strongly agree' and 'agree' categories versus other categories (namely 'neutral', 'disagree', 'strongly disagree') in 1997 and 1999. In general, the strength of agreement for the three statements about moderate activity (messages 1, 2 and 5) increased significantly from 1997 to 1999.

The proportion of people agreeing that 'vigorous activity three times per week for 20 minutes each time was essential' to obtain a health benefit did not change from 1997 to 1999. This message (message 3) is the 'old' public health message suggesting that only participation in vigorous physical activity is beneficial for health. The proportion of people agreeing that 'exercise doesn't have to be done all at one time' increased from 74% to 79%.

Women more commonly reported agreement with the three statements about moderate activity (messages 1, 2 and 5) than did men. Men more often reported agreement with the vigorous activity statement than did women (64% and 58%, respectively).

Table 7.5: Percentage of people agreeing (combined 'strongly agree' and 'agree') with knowledge statements, 1997 and 1999

	Message 1	Message 2	Message 3	Message 4	Message 5
Sex					
Men	86.1	90.7	63.8	77.3	95.3
Women	90.2	93.4	57.9	81.1	94.4
<i>Persons 1999</i>	<i>88.1</i>	<i>92.1</i>	<i>60.8</i>	<i>79.2</i>	<i>94.9</i>
<i>Persons 1997</i>	<i>84.6</i>	<i>90.3</i>	<i>62.2</i>	<i>74.1</i>	<i>92.7</i>
Age group (years)					
18–29	86.6	91.2	65.9	76.3	93.1
30–44	88.3	93.6	61.4	76.1	95.6
45–59	89.6	91.4	60.3	81.0	95.3
60–75	88.1	91.4	52.5	87.0	95.4
Education					
Less than 12 years	88.4	92.6	60.5	84.3	94.2
HSC or equivalent	87.9	91.7	63.4	77.2	95.0
Tertiary	88.2	91.7	57.6	74.5	95.5

Message 1: Taking the stairs at work or generally being more active for at least 30 minutes each day is enough to improve your health.

Message 2: Half an hour of brisk walking on most days is enough to improve your health.

Message 3: To improve your health it is essential for you to do vigorous exercise for at least 20 minutes each time, three times a week.

Message 4: Exercise doesn't have to be done all at one time—blocks of 10 minutes are okay.

Message 5: Moderate exercise that increases your heart rate slightly can improve your health.

HSC = Higher School Certificate.

Intentions to become more active

A population's level of intention to be more active is an intermediate outcome, on the way towards increasing physical activity levels. An increase in intention is considered a precursor to trialling active behaviours, and this question was to monitor this intermediate variable. Survey participants were asked whether they did not intend to increase their activity levels, intended to increase them in the short term (over the next month) or in the longer term (over the next six months). More than one-third of respondents (37%) indicated that they did not intend to become more physically active in 1999 (Table 7.6). This was significantly less than responses in 1997, where 40% did not intend to be more active.

Just over one-third of respondents (34%) indicated that they intended to become more physically active in the next month. This was significantly greater than in 1997, where 32% intended to be more active in the next month.

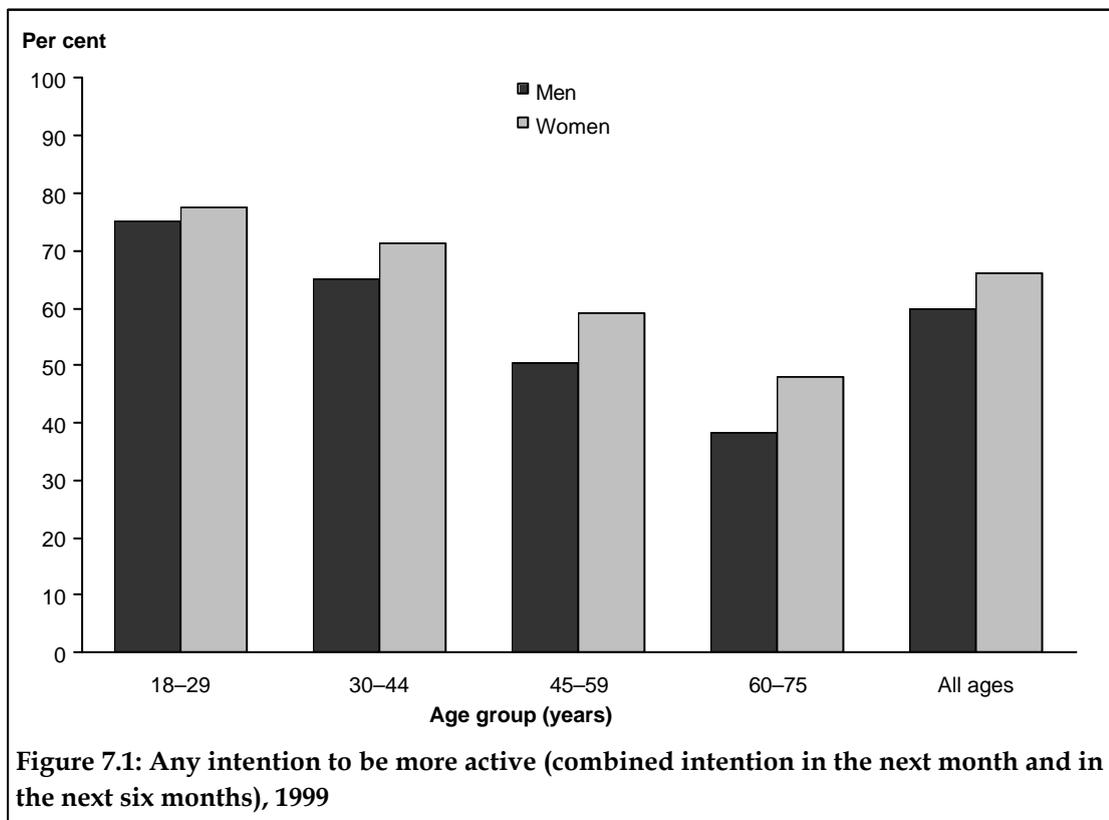
Over the coming six months, 29% of respondents indicated that they intended to become more physically active. This was the same as in 1997. Interestingly, more women indicated that they intended to be more active over the next six months than men, 30% and 27% respectively.

Figure 7.1 shows any intention to be active (combined intention in the next month and next six months) by sex and age group. Women (66%) were more likely to report an intention to become more active than were men (60%). This was true for each age category (see Table A3.1).

Table 7.6: Percentage of people intending to be more physically active, 1999

	Do not intend	Intend next month	Intend next 6 month
Sex			
Men	40.2	32.8	27.0
Women	34.0	36.1	29.9
<i>Persons 1999</i>	<i>37.1</i>	<i>34.4</i>	<i>28.5</i>
<i>Persons 1997</i>	<i>39.9</i>	<i>31.5</i>	<i>28.5</i>
Age group (years)			
18–29	23.6	43.1	33.2
30–44	31.8	36.1	32.2
45–59	45.4	31.1	23.5
60–75	56.6	22.5	20.9
Education			
Less than 12 years	41.4	31.3	27.3
HSC or equivalent	34.8	36.3	28.9
Tertiary	34.0	36.3	29.7

HSC = Higher School Certificate.



Factors independently associated with participation

Logistic regression was used to assess the independent factors associated with participation in physical activity in 1999. Forced entry models, which include non-significant variables, are shown in Table 7.7. Forward stepwise models reached almost identical conclusions, with the variables employment, language spoken at home, and children under five not included in the final model.

These analyses are shown in Table 7.7, with adjusted odds ratios and 95% CIs shown. These data indicate that increasing education level is associated with an increased likelihood of participation in 'sufficient' physical activity. Older age groups are less likely to be sufficiently active, compared with the youngest age category. Women are 20% less likely to achieve this threshold of activity compared to men. The obese are 50% less likely to reach this sufficiently active threshold than those of healthy weight.

Factors that are positively associated with participation in 'sufficient' physical activity include being single and not having children at home.

Of particular interest in the assessment of the *Active Australia* campaign is that people not recognising the *Active Australia* tagline 'Exercise – you only have to take it regularly, not seriously' were 19% less likely to achieve 'sufficient' physical activity than people who did recall the campaign tagline. This was significant, after adjustment for demographic differences between those who recalled the message and those who did not.

Table 7.7: Adjusted odds ratios for factors associated with participation in 'sufficient' physical activity, 1999

	'Sufficient' time ^(a)		'Sufficient' time and sessions ^(b)	
	Adjusted odds ratio	Confidence interval	Adjusted odds ratio	Confidence interval
Sex				
Men	1.00	—	1.00	—
Women	0.80	(0.68–0.96)	0.80	(0.69–0.96)
Age group (years)				
18–29	1.00	—	1.00	—
30–44	0.64	(0.51–0.82)	0.64	(0.51–0.82)
45–59	0.55	(0.42–0.73)	0.50	(0.38–0.67)
60–75	0.63	(0.43–0.94)	0.60	(0.40–0.88)
Education				
Less than 12 years	1.00	—	1.00	—
HSC or equivalent	1.27	(1.05–1.53)	1.24	(1.02–1.50)
Tertiary	1.48	(1.18–1.86)	1.42	(1.13–1.79)
Occupation				
Manager	1.00	—	1.00	—
White collar	1.04	(0.83–1.29)	0.96	(0.77–1.22)
Blue collar	0.91	(0.66–1.26)	0.81	(0.59–1.12)
Unemployed	0.77	(0.48–1.25)	0.76	(0.47–1.24)
Home duties	1.12	(0.84–1.25)	1.05	(0.79–1.41)
Student	0.76	(0.50–1.15)	0.81	(0.53–1.25)
Retired	1.18	(0.84–1.67)	1.11	(0.78–1.57)
Main language spoken at home				
English	1.00	—	1.00	—
Other	0.73	(0.52–1.01)	0.78	(0.56–1.08)
Marital status				
Married/de facto	1.00	—	1.00	—
Never married/single	1.14	(1.05–1.53)	1.21	(0.95–1.53)
Widow	0.66	(0.39–1.02)	0.64	(0.39–1.04)
Children (less than 5 years)				
Nil	1.00	—	1.00	—
1 or more	0.81	(0.64–1.04)	0.82	(0.64–1.06)
Children (less than 18 years)				
Nil	1.00	—	1.00	—
1 or more	0.81	(0.66–0.99)	0.81	(0.66–1.00)

(continued)

Table 7.7 (continued): Adjusted odds ratios for factors associated with participation in 'sufficient' physical activity, 1999

	'Sufficient' time ^(a)		'Sufficient' time and sessions ^(b)	
	Adjusted odds ratio	Confidence interval	Adjusted odds ratio	Confidence interval
BMI categories				
Healthy weight	1.00	—	1.00	—
Underweight	0.88	(0.55–1.41)	0.95	(0.60–1.49)
Overweight	0.93	(0.77–1.11)	0.86	(0.72–1.03)
Obese	0.51	(0.40–0.66)	0.55	(0.43–0.72)
Recall of <i>Active Australia</i> tagline				
'Exercise—you only have to take it regularly, not seriously'				
Yes	1.00	—	1.00	—
No	0.81	(0.68–0.96)	0.81	(0.68–0.96)

HSC = Higher School Certificate. White collar = professional, para-professional. Blue collar = tradesperson, clerk, salesperson and personal service worker, plant and machine operator/driver, labourer. BMI= body mass index.

BMI categories are: underweight = BMI less than 18.5; healthy weight = BMI from 18.5 to less than 25; overweight = BMI from 25 to less than 30; obese = BMI greater than or equal to 30.

(a) 'Sufficient' time is defined as 150 minutes per week, using the sum of walking, moderate activity and vigorous activity (weighted by two).

(b) 'Sufficient' time and sessions is defined as 150 minutes (using the sum of walking, moderate activity and vigorous activity (weighted by two)) and five sessions of activity per week.

8. Trends in Australians' physical activity habits, 1997 and 1999

Table 8.1 summarises the trends in physical activity from 1997 to 1999. Between 1997 and 1999, there was no change in the proportion of Australian adults recalling any generic physical activity message they may have heard or seen during the previous six months.

In general, there was an increase in the knowledge and awareness of the health benefits of participating in moderate physical activity from 1997 to 1999.

The proportion of people who believed that their health could be improved by being more active increased from 85% to 88% between 1997 and 1999. Similarly, the proportion of people agreeing that health could be improved by participation in 30 minutes of activity each day (the current physical activity guidelines) increased from 90% to 92%. The proportion of people perceiving that blocks of 10 minutes could accumulate to provide a health benefit increased from 74% to 79% between 1997 and 1999. Similarly, the proportion of people with the perception that moderate activity could improve health increased from 93% to 95% during that time. There was no change in the proportion of people having the perception that a health benefit required three sessions of 20 minutes of vigorous activity each week.

Although levels of knowledge of the health benefits of physical activity have increased from 1997 to 1999, actual participation in physical activity declined. This decline is apparent in terms of the mean amount of time each week people spent walking and in moderate- and vigorous-intensity physical activity. The decline in vigorous-intensity activity was particularly marked, from a mean of 91 minutes each week in 1997 to 65 minutes in 1999.

The proportion of people participating in physical activity to obtain a health benefit, (defined as 150 minutes of physical activity per week, with vigorous physical activity weighted by a factor of two to reflect its greater intensity and therefore greater health benefits) declined from 62% to 57% between 1997 and 1999. If the advice to undertake this level of physical activity over five sessions per week (to reflect the public health message of 'on most if not all days of the week') were taken into account, then the decline was from 51% in 1997 to 45% in 1999.

Estimates of usual participation (assessed by reported participation over the past six months) at a 'sufficient' level (defined as 150 minutes of physical activity per week, with vigorous-intensity physical activity weighted by a factor of two) declined from 69% to 62% between 1997 and 1999.

In 1997 14% of adults recalled the *Active Australia* tagline 'Exercise – you only have to take it regularly, not seriously'. This was a 'spurious' pre-campaign recall rate, as the campaign tagline had not yet been launched. In 1999, 42% of people recalled the tagline some 18 months after the campaign tagline had been introduced.

The proportions of Australian adults that did not intend to become more physically active declined from 40% to 37% between 1997 and 1999. The proportion of people saying that they intended to become more active next month increased from 32% in 1997 to 34% in 1999. However, there was no difference between the two surveys in the proportion of people saying they intended to become more active in the next six months (29%).

Table 8.1: Summary of changes between the 1997 and 1999 surveys

	1997	1999
Message recall (per cent)		
Recall of generic message about exercise or physical activity	63.7	63.9
Recall <i>Active Australia</i> tagline 'Exercise—you only have to take it regularly, not seriously'	14.4	41.8
Intention to be active (per cent)		
Do not intend	39.9	37.1
Intend next month	31.5	34.4
Intend next 6 months	28.5	28.5
Knowledge of physical activity (per cent agreement)		
Message 1 Taking the stairs at work or generally being more active for at least 30 minutes each day is enough to improve your health.	85.0	88.1
Message 2 Half an hour of brisk walking on most days is enough to improve your health.	90.3	92.1
Message 3 To improve your health it is essential for you to do vigorous exercise for at least 20 minutes each time, three times a week.	62.2	60.8
Message 4 Exercise doesn't have to be done all at one time—blocks of 10 minutes are okay.	74.1	79.2
Message 5 Moderate exercise that increases your heart rate slightly can improve your health.	92.7	94.9
Total minutes (mean) in previous week		
Walking	137.0	114.2
Moderate	62.3	54.2
Vigorous	91.3	65.3
<i>Total (WMV)</i>	291.2	233.2
Physical activity categories (per cent)		
'Sufficient' time ^(a)	62.2	56.6
'Sufficient' time and sessions ^(b)	50.9	45.2
Physical activity habit (last six months) categories (per cent)		
'Sufficient' time ^(a)	69.3	61.5

(a) 'Sufficient' time is defined as 150 minutes per week, using the sum of walking, moderate activity and vigorous activity (weighted by two).

(b) 'Sufficient' time and sessions is defined as 150 minutes (using the sum of walking, moderate activity and vigorous activity (weighted by two)) and five sessions of activity per week.

9. Discussion

The information presented in this report reveal the current patterns and trends of physical activity of Australian adults.

Surveys to assess the participation in, and awareness of, physical activity were conducted in 1997 and 1999. The surveys were conducted at the same time of year (November–December) and used identical sampling methodology and comparable questions.

The questions used in the surveys represent one of the established methods for collecting physical activity information in Australian population surveys. Both surveys had good response rates, providing for a representative sample of Australian adults.

Awareness and understanding of physical activity messages

Between 1997 and 1999, several public education activities (including initiatives under the auspices of *Active Australia*) around physical activity were implemented throughout Australia. However, different initiatives occurred in different States and Territories, and the same initiatives were implemented to different degrees in different areas.

Results indicate that there is an increased awareness of physical activity initiatives among the Australian public. The *Active Australia* tagline ‘Exercise – you only have to take it regularly, not seriously’ was recognised by over 40% of adults in the 1999 survey. Further, one predictor of participation in physical activity at levels to achieve a health benefit was the recall of this tagline.

The understanding of current physical activity messages also increased between the two surveys. This was particularly evident for the message that the 30 minutes of moderate-intensity physical activity required daily for health benefits can be accumulated in blocks of at least ten minutes. Unlike the understanding of the current messages, the perception that physical activity for health required at least three sessions of vigorous activity per week (i.e. the ‘old’ public health message) showed no change between the two surveys. The proportion of people agreeing with this message was less in both 1997 and 1999 than those agreeing with the current physical activity messages emphasising more moderate physical activity.

Trends

Despite the increase in awareness and understanding of physical activity, there was no increase in actual participation. In fact, there was an overall decline in participation in physical activity between 1997 and 1999 among adults. Australians spent less time each week walking, doing other moderate-intensity physical activities such as gentle swimming and social tennis, vigorous activities such as aerobics and jogging, and more intense gardening and yardwork. People also did these activities on fewer occasions each week in 1999 than they did in 1997. However, older Australians (those 60 years and older) did not show these declines, and in fact spent more time doing physical activity each week in 1999 than in 1997.

Information on frequency and duration in physical activity of different activities is used to assess participation in physical activity to achieve health benefits. The decline in participation at a level to achieve health benefits between 1997 and 1999 was greatest among women, people aged 30–44 years, and among those with tertiary levels of education.

However, it is of interest that there was no decline in participation among people aged 60 years and over. Although participation tends to decline with age, people in this age category, and especially men, were more likely to participate in moderate physical activity. It is possible that at retirement (around 60 years of age) people have more time to participate in physical activity (Armstrong 1998). Further, older Australians were the target of a specific physical activity education program to increase awareness and participation in physical activity during the Year of Older Persons (1999). One of the campaign themes (a rusty 'tin man') was well recalled by older Australians. This campaign may have influenced behaviour among older Australians and helped to slow the decline in physical activity seen for other age groups.

An area for further research stems from the observation that the largest decline in participation occurred among the middle aged and well educated, as it lends weight to the suggestion that pressures associated with modern living including longer working hours are influencing the physical activity behaviours of Australian adults. This is supported by the lack of decline among older Australians who are presumably retired and were the focus of a specific public health campaign.

Despite declines in actual participation in 1999, most people said that they intended to become more physically active in the coming months.

'At risk' groups

The findings of this report indicate that the following groups were less likely to participate in physical activity:

- women
- middle aged (45–59 years)
- lower educated
- widowed
- parents
- obese.

Monitoring issues

The information presented in this report relates primarily to leisure-time physical activity. The occupational and incidental physical activities people do each day were not captured. Methods to accurately assess these types of activities and to relate them to health are yet to be developed.

Further analysis of the 1999 data set is suggested to assess physical activity participation levels and awareness of physical activity messages among adults in New South Wales and Victoria, where *Active Australia* campaigns, and specifically the 'Rusty' tin man campaign were implemented to a greater degree than in the others States and Territories (NSW Health 2000). This information would provide more detailed and accurate evaluation of other public education campaigns.

Despite any limitations that may exist in the methods used here, monitoring physical activity using consistent methods is essential to continue tracking not only the end-point indicator of physical activity (i.e. participation), but also intermediate indicators such as awareness and intentions to become active.

The large differences reported for some trends between 1997 and 1999 need to be treated with caution. Although reported differences are statistically significant, further data points are required to ascertain whether the observed changes are real phenomena. It is therefore recommended that a national physical activity survey using comparable methods be conducted during November and December 2001.

Glossary

Body mass index (BMI) is a measure of a person's weight in relation to their height, calculated as weight in kilograms divided by height in metres squared.

Context is the context in which a person participates in physical activity, e.g. leisure-time, incidental, and occupational.

Duration is the length of time spent participating in physical activity as self-reported by the adult person.

Energy expenditure is an estimate of the energy costs of physical activity derived from reports, observation or indirect objective assessments of people's activity levels.

Exercise is a subset of physical activity and is defined as planned, structured and repetitive bodily movement done to improve or maintain one or more components of physical fitness.

Frequency is the number of times the adult person self-reported participating in physical activity, within a reporting period.

Health as defined by the World Health Organization is a state of complete physical, mental and social wellbeing, and not merely as the absence of disease or infirmity.

Health benefit is participation in leisure-time physical activity of 'sufficient' intensity and duration. The accrual of 150 minutes of moderate-intensity physical activity over a period of one week is thought to confer health benefit. Participation in vigorous-intensity leisure-time physical activity for 60 to 90 minutes over a period of a week will also confer health benefit.

Incidental physical activity/unplanned physical activity includes the forms of physical activity done at work and home, and activity in which people take part as they go about their day-to-day lives, generally using large skeletal muscle groups, for example, using stairs, domestic tasks.

Intensity is the self-perceived and self-reported intensity at which an adult person participated in physical activity, e.g. moderate, vigorous.

Leisure-time physical activity refers to sport and recreational physical activity, including a range of activities conducted specifically for enjoyment, social, competitive or fitness purposes, performed in leisure or discretionary time.

METs (metabolic equivalents) is a unit used to estimate the metabolic cost (oxygen consumption) of physical activity. One MET is defined as the energy expenditure for sitting quietly, which for the average adult is 1 kilocalorie body weight in $\text{kg}^{-1} \text{hr}^{-1}$ or 3.5 ml of oxygen body weight in $\text{kg}^{-1} \text{min}^{-1}$. METs are used as an index of the intensity of activities.

Moderate-intensity physical activity is physical activity requiring 3–4 times as much energy as at rest or intensity of 3–4 METs, e.g. brisk walking.

Physical activity is any bodily movement produced by skeletal muscles that results in energy expenditure.

Physical inactivity is conceptualised in population surveys as no reported physical activity.

Risk factor is an exposure or characteristic that increases the rate of disease relative to those unexposed or without the characteristic.

Sedentary denotes people who are physically inactive, in this case survey respondents who reported no participation in walking, moderate-intensity or vigorous-intensity activity

during the previous week, resulting in an estimated energy expenditure of less than 50 kilocalories per week.

Sufficient (see *health benefit*)

Type is the specific physical activity self-reported by adults, e.g. walking, gardening or yardwork.

Vigorous-intensity physical activity is physical activity requiring 7–9 times as much energy as at rest or intensity of 7–9 METs, e.g. running.

Appendix 1

Membership of the AIHW Expert Working Group on the Measurement of Physical Activity as at September 1999

Professor Adrian Bauman (Chair)	School of Community Medicine University of New South Wales
Dr Tim Armstrong	National Centre for Monitoring Cardiovascular Disease Australian Institute of Health and Welfare
Dr Michael Booth	Centre for Advancement of Adolescent Health New Children's Hospital
Dr Wendy Brown	Research Institute for Gender & Health University of Newcastle
Dr Billie Corti	Department of Public Health University of Western Australia
Mr Peter Crowe	Health Section Australian Bureau of Statistics
Professor Terence Dwyer, AM	Menzies Centre for Population Health Research University of Tasmania
Dr Ian Ford	Research & Evaluation Coordinator Australian Sports Commission
Dr Chris Gore	Laboratory Standards Assistance Scheme Australian Institute of Sport
Ms Penny Graham	Primary Prevention Section Commonwealth Department of Health and Aged Care
Professor Andrew Hills	Department of Human Movement Studies Queensland University of Technology
Professor Neville Owen	School of Nutrition and Public Health Deakin University

Appendix 2

1999 National Physical Activity Survey

Introduction

Hello, are you (RESPONDENT'S NAME)? My name is....., I'm calling on behalf of the Australian Institute of Health and Welfare. We are conducting a national study on physical activity.

The research results will be important for the planning of future health and exercise programs. All that is involved is answering a few questions over the phone. The Act of Parliament setting up the Institute guarantees that your answers will be kept confidential. We don't need to know your name and no individuals will be identified or described in any reports. (If there are any questions you prefer not to answer just say so).

The survey should take NO MORE THAN 15 minutes. Can you help us with this study?

Questions

- Have you heard or seen any messages about exercise or physical activity IN THE PAST MONTH? What is one message that you remember?
- Have you heard of the *Active Australia* campaign? What is it?
- Have you heard of the exercise and physical activity campaign 'Exercise – you only have to take it regularly not seriously'? What messages do you remember?
- In the last month, have you seen a TV advert that shows a tin man character getting up from a couch and walking around the neighbourhood? What messages do you remember?

We would like to ask you about the physical activity you did IN THE LAST WEEK:

- IN THE LAST WEEK how many times have you walked continuously, for at least 10 minutes, for recreation/exercise or to get to or from places?
- What do you estimate was the total time that you spent walking in this way IN THE LAST WEEK?
- IN THE LAST WEEK how many times did you do any vigorous gardening or heavy work around the yard which made you breathe harder or puff and pant?
- What do you estimate was the total time that you spent doing vigorous gardening or heavy work around the yard IN THE LAST WEEK?

The next question excludes household chores or gardening or yardwork

- IN THE LAST WEEK, how many times did you do any vigorous physical activity which made you breathe harder or puff and pant? (e.g. jogging, cycling, aerobics, competitive tennis, etc.)
- What do you estimate was the total time that you spent doing this vigorous physical activity IN THE LAST WEEK?

The next question excludes household chores or gardening or yardwork

- IN THE LAST WEEK how many times did you do any other more moderate physical activity that you haven't already mentioned? (e.g. gentle swimming, social tennis, golf, etc.)
- What do you estimate was the total time that you spent doing these activities IN THE LAST WEEK?

The next three questions are about your average WEEKLY level of activity IN THE LAST SIX MONTHS

- On average, IN THE LAST SIX MONTHS how much time did you spend each week walking for recreation/exercise or to get to or from places? (THIS IS WALKING CONTINUOUSLY FOR AT LEAST 10 MINUTES)

The next question excludes household chores or gardening or yardwork

- On average, IN THE LAST SIX MONTHS how much time did you spend each week doing vigorous physical activity which made you breathe harder or puff and pant? (e.g. jogging, cycling, aerobics, competitive tennis, etc.)

The next question excludes household chores or gardening or yardwork

- On average, IN THE LAST SIX MONTHS how much time did you spend each week doing any other more moderate physical activity that you haven't already mentioned (e.g. gentle swimming, social tennis, golf, etc.)

The following statements are about the amount of exercise you intend to do in the near future

- Which one best describes how you feel at present?
 - You do NOT intend to be more active than you have been over the last week
 - You intend to be more active over the NEXT MONTH than you have been over the last week
 - You intend to become more active sometime over the NEXT SIX MONTHS than you have been over the last week
- To what extent do you agree or disagree with the following statements about physical activity and health?
 - Taking the stairs at work or generally being more active for at least 30 minutes each day is enough to improve your health
 - Half an hour of brisk walking on most days is enough to improve your health
 - To improve your health it is essential for you to do vigorous exercise for at least 20 minutes each time, 3 times a week

- Exercise doesn't have to be done all at one time – blocks of 10 minutes are okay
- Moderate exercise that increases your heart rate slightly can improve your health

Finally a few questions to make sure we've spoken to a wide range of people

- What is your sex?
- Could I ask your age please?
- What is your MARITAL STATUS?
- What is your approximate weight in pounds, stones, or kilograms?
- What is your approximate height in feet & inches or cms?
- How MANY people UNDER 18 reside at your home?
- How many children AGED 5 AND UNDER reside at your home?
- How many adults aged between 18 and 75 years, including yourself, live in your household?
- What is the highest level of education you have COMPLETED?
- What is your current occupation?
- What language do you USUALLY speak at home?
- What is your postcode?

Appendix 3

Table A3.1: Percentage of people achieving 'sufficient' levels of physical activity, 1999

	18–29	30–44	45–59	60–75	All ages
Over previous week					
'Sufficient' time					
Men	73.6	55.2	49.6	61.1	59.6
Women	63.8	51.8	50.3	47.6	53.8
'Sufficient' time and sessions					
Men	59.1	41.9	39.0	51.1	47.1
Women	53.5	40.5	41.6	36.6	43.4
Over previous 6 months					
'Sufficient' time					
Men	82.2	60.9	55.1	65.1	65.6
Women	69.4	55.3	53.1	49.9	57.4
Any intention to be more active^(a)					
Men	75.2	65.2	50.3	38.4	59.8
Women	77.6	71.3	59.1	48.0	66.0

(a) Combined intention in the next month and in the next six months.

Appendix 4

Coding frame for content-analysed questions

Question 3a: Generic message about exercise or physical activity

1. Generic physical activity message, exercise for health, keep fit
2. Running, aerobic activity, 3 sessions of 20 minutes
3. Walking, walk more
4. Cardiovascular, heart disease, National Heart Foundation message
5. Other diseases
6. Daily, five times per day
7. Be more active, do more physical activity, get out and do some
8. 30 minutes, 30 minutes per day
9. Actual tag line
10. Exercise machines, gym, slimming centres
11. Older people need exercise
12. Other physical activities, e.g. tai chi
13. Other sports
14. Television advertisements
15. Other health messages, smoking, diet
16. Life Be In It, fit for life

Question 3b1: Recall of the *Active Australia* campaign

1. Keep fit, generic physical activity message, moving, general health
2. Television advertisements
3. *Active Australia* campaign, get Australians to do physical activity, national advice
4. 30 minutes of activity most days, 10 minute blocks
5. Specific *Active Australia* national day, Sunday, October
6. Older people, 'Rusty', get up and go
7. Sports, athletics
8. Life Be In It, 'Norms'
9. Only two to three times per week, not every day
10. Walking
11. Don't remember, unrelated, vague, not physical activity

Question 4a1: Recall of the 'Rusty' (tin man) message

1. Older adults and exercise
2. Recalled features of message, tin man with tin dropping off, becomes human, oiling hip joints, rusty
3. Get up and move, get off the couch, get up and go, use it or lose it, never too old to start
4. Seize up, mobility, free movement, stiffness, arthritis, back pain
5. Walk, regular walking daily
6. 30 minutes per day, regular exercise, daily
7. Two to three times per week only is needed, only a bit needed
8. Lazy, inert, inactive (generic message)
9. Other, unrelated

Question 5: Recall of the Active Australia tagline 'Exercise—you only have to take it regularly, not seriously'

1. Repeated slogan, tagline, logo
2. Fun
3. Daily, regular, 30 minutes per day, recall partial tagline 'regularly'
4. Less often, 3 sessions of 20 minutes, 3 sessions of 30 minutes, one to two times per week
5. Don't overdo it, gently, not vigorous, moderate, pace yourself, better than none, good for you
6. Walking, walk more
7. Life Be In It
8. Tin man, older people
9. Other, diet, weight watchers, cardiovascular health

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