



# Physical Activity Levels of Western Australian Adults 2009

Findings from the Physical Activity Taskforce  
Adult Physical Activity Survey



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## Acknowledgements

This research is a joint project of the Physical Activity Taskforce, the Health Promotion Evaluation Unit at the University of Western Australia, the School of Sport Science Exercise and Health at the University of Western Australia, the Edith Cowan University (ECU) Survey Research Centre and the Department of Sport and Recreation, Western Australia. The survey was undertaken during November–December 2009 by the Health Promotion Evaluation Unit and ECU Survey Research Centre. The survey items on level of physical activity were obtained with permission from the Australian Institute of Health and Welfare (Dr Tim Armstrong, Active Australia Physical Activity Survey).

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## MINISTER'S FOREWORD

The Physical Activity Taskforce is committed to supporting a cross-government and community approach to support physical activity programs and policies for all Western Australians. A key part of achieving this is through conducting robust research to monitor issues and trends in the community.

The Western Australian adult physical activity survey has been conducted every three years since 1999. With the 2009 report complete, there is a unique opportunity to investigate physical activity trends over the past ten years.

Since the first survey there have been significant improvements in adult physical activity levels and a greater understanding of the barriers and motivators that influence this. Collecting information helps design programs and services for our growing state whether that is active transport policy, health promotion programs, sport and recreation planning or planning for public open space or nature trails.

For the first time, the 2009 survey measured new and evolving areas linked to physical activity. New questions measured resistance and strength training, as well as physical activity in the workplace and the perception of safety within neighbourhoods. Monitoring these new areas will ensure we can track new trends and support new initiatives into the future.

The latest results show only three in five Western Australian adults are getting enough activity for their health. With 40% of the population insufficiently active it remains imperative the focus on physical activity should continue to be a priority for State Government.

The research also shows an increasing number of Western Australians who are above a healthy weight. More than one-half of Western Australians are now overweight or obese, alarmingly this is a 6% increase since 2006.

If we are to reverse the trends in increasing body size and improve health and quality of life in our community it is important that we continue to promote a lifestyle that includes healthy, active choices. With an aging population and increasingly sedentary lifestyles, we must remain ever vigilant in our efforts.

I commend the work of the Physical Activity Taskforce and strongly urge all levels of Government and the community to continue the efforts.



**Terry Waldron MLA**

Minister for Sport and Recreation  
Chair Physical Activity Taskforce

## EXECUTIVE SUMMARY

### PHYSICAL ACTIVITY LEVELS OF WESTERN AUSTRALIAN ADULTS

#### Introduction

Participation in sufficient levels of physical activity provides significant health benefits. The monitoring of physical activity levels in the Western Australian population is therefore necessary for developing and implementing strategies and programs for increasing participation. In 2009, the Physical Activity Taskforce (PATF) conducted a survey to measure physical activity levels amongst Western Australian adults. This survey is a follow up to surveys conducted in 1999, 2002 and 2006 (1-3).

#### Survey method and sample

The telephone survey, conducted during November and December 2009, included 3,363 Western Australian adults (response fraction 72%). Respondents were randomly selected from four geographical regions including the Perth metropolitan area, Kimberley/Pilbara, Midwest/Goldfields and the South West. The sample included approximately equal numbers of men and women from all age groups 18 years and over.

#### Participation in recommended levels of physical activity

In 2009, 60% of survey respondents were sufficiently active to accrue health benefits (i.e. the accumulation of 150 minutes of moderate-intensity physical activity on five or more sessions, or 60 minutes of vigorous-intensity physical activity per week); 28% were insufficiently active and 12% were inactive.

Slightly more men than women were sufficiently active (62% vs. 59%), and participation in sufficient levels of physical activity decreased with advancing age (18–29 years 73%; 60 years and over 51%). Participation in sufficient levels of physical activity was highest amongst 18–29 year olds (73%), those with a university education (66%), household incomes  $\geq$  \$1200/wk (64%), and those not in a relationship (i.e. single) (65%). Participation in sufficient physical activity was higher in 2009 (60%) compared with the 1999 (56%) and 2002 (54%) surveys, and similar to the 2006 (59%) survey. Physical inactivity in 2009 (12%) was similar to levels found in 1999 (13%) and 2006 (12%), and slightly lower compared with levels found in 2002 (14%). In 2009, inactivity increased with advancing age from 6% among those aged 18–29 years to 18% among those 60 aged years and over.



## Participation in walking, moderate-intensity and vigorous-intensity physical activity

Seventy-eight percent of men and 82% of women reported walking in the past week. More men than women participated in moderate-intensity (32% vs. 25%) and vigorous-intensity (46% vs. 43%) physical activity in the past week. Compared with all other age groups, a higher proportion of adults aged 18-29 years of age participated in walking, moderate-intensity and vigorous-intensity activities.

In 2009, walking for recreation (52%) followed by gardening (32%) and walking for transport (21%) were the most reported types of physical activities engaged in by active respondents. Participation in walking for recreation was higher in the 1999 survey (61%) compared with 2009 (52%). Walking for transport was lowest in 2009 (21%) compared with all previous survey years.

## Places/facilities used for physical activity

The most popular places/facilities used for physical activity in 2009 were the home, streets/footpaths and cycle/walking paths. The home was the most popular place for both men (53%) and women (57%) to be physically active. The proportion of adults being physically active at home increased with advancing age.

The use of streets/footpaths for physical activity was lower in 2009 (33%) compared with previous survey years (48% in 2006, 57% in 2002 and 54% in 1999). From 1999 to 2009, there has been a steady increase in the proportion of adults using cycle/walking paths (7% in 1999; 31% in 2009). Since the 2006 survey there has been an increase in the proportion of adults using their workplace (5% in 2006, 12% in 2009) or shopping malls (1% in 2006, 7% in 2009) to be physically active.

## Levels of habitual incidental physical activity

Habitual incidental physical activity is activity performed while undertaking other activities or chores. In 2009, participation in incidental physical activity was highest on weekdays (61%), followed by Saturdays (49%) then Sundays (42%). Overall, 32% of respondents participated in incidental physical activity every day. The proportion of respondents participating in incidental physical activity on all days decreased with advancing age and increased with higher levels of education. The prevalence of habitual incidental physical activity (weekdays, Saturdays, Sundays, every day) was higher in the 2009 survey compared with the 2002 survey.

## Strength Training

In 2009, 33% of respondents participated in at least one weekly exercise session designed to increase muscle strength or tone. A similar proportion of males (32%) and females (34%) participated in at least one weekly session of strength training. Engagement in at least one session of strength training was inversely related to age. Respondents least likely to engage in weekly sessions of strength training were aged 60 years or over, retired, or had an education less than TEE level.

### **Workplace physical activity**

Over one half of respondents reported mainly sitting (30%) or standing (26%) as part of their job. A further 16% performed light manual work with 5% engaged in heavy manual work. Compared to other groups, respondents with a tertiary qualification or in professional/managerial and white collar jobs were most likely to report that their work was largely sedentary.

The provision of change rooms were the most frequently reported physical activity related workplace facility. Few participants reported the provision of organised lunchtime physical activity programs or smart riders for business travel. One in five respondents reported their workplace provided secure bike racks.

### **Influences on achieving sufficient physical activity for good health**

The 'readiness' of respondents to increase physical activity as described in the 'stage of change' model was measured. Overall, 4.2% of 2009 survey respondents were pre-contemplating, 10% contemplating and 24% in preparation to become physically active, while 9% were taking action to become more active and 53% maintaining their level of activity.

Most respondents (61%) were aware that 30 minutes of moderate-intensity physical activity is required on most days for good health. The majority of respondents were aware of the 'Find 30' and 'Be Active' messages.

Overall, 21% of respondents reported receiving advice about physical activity during their last visit to their doctor/general practitioner. Obese respondents (42%) and those who were insufficiently active (28%) or inactive (25%) were most likely to report receiving physical activity advice from their doctor/GP.

### **Overweight and obesity**

Over one-half of Western Australian respondents were categorised as either overweight (37%) or obese (18%), with 39% in a healthy BMI weight range and 5% categorised as underweight (5%). Overweight and obesity was highest in males, those aged 45-59 years, those living in the South West, and those from low socioeconomic status groups such as lower education level, the unemployed and retired.

Adults in the healthy BMI range (65%) were more likely than those who were classified as overweight (62%) or obese (48%) to undertake sufficient levels of physical activity. Compared with other BMI/physical activity categories, inactive obese adults reported the highest number of hours per week spent in sedentary behaviour (i.e. television and recreational computer use). The proportion of respondents who engaged in incidental physical activity was lower in overweight and obese adults compared to those in the healthy BMI range.

## **Environmental supports of physical activity**

The 2009 physical activity survey included items about respondent perceptions of their local neighbourhood to support physical activity. Compared with inactive and insufficiently active respondents, sufficiently active respondents had more positive attitudes towards their local neighbourhood in relation to environmental supports of physical activity. Regardless of their BMI classification, most respondents disagreed with the statement 'there aren't many places to be active'; 'I don't know much about recreation facilities near where they lived' and 'I feel unsafe walking around during the day'.

## **Level of physical activity as measured by pedometer steps**

Pedometer data collected in 2002 and 2009 were compared. Pedometers provide an objective assessment of physical activity, particularly for activities involving walking or running.

On average, in 2009, females accumulated significantly more steps than males (females 9,094 steps males 8235 steps) and participants aged 60 years and older recorded significantly fewer steps than younger respondents (18-29 years 8,992 steps, 30-44 years 9,398 steps, 45-59 years 8,659 steps, 60+ years 7,243 steps). Overall, sufficiently active respondents recorded significantly more steps than insufficient or inactive participants and were more likely to accumulate at least 10,000 steps compared with other study participants.

On average, pedometer study participants recorded significantly fewer steps in 2009 compared with 2002. In 2009, 32% of respondents performed 10,000 steps or more per day, this was significantly lower than the 46% of respondents who performed 10,000 or more steps per day in 2002.



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## 1. INTRODUCTION

### 1.1 The importance of physical activity

It is widely recognised that physical activity contributes to a healthy lifestyle and is critical in the prevention and management of many chronic diseases (4-9). Research over the last decade shows that engaging in regular, moderate-intensity physical activity improves physical and mental well-being, quality of life and life expectancy (5-7, 10). Sedentary lifestyles impact on mortality and disability, contributing to five to ten percent of deaths and 19 million Disability Adjusted Life Years worldwide (i.e. years of life lost plus years lived with disability) (11). In Australia, physical inactivity contributes to 13,019 deaths annually (12). In Western Australia sedentary lifestyles are responsible for approximately six to seven percent of the burden of disease and disability (12-14).

An inactive lifestyle increases the risk of chronic disease including cardiovascular diseases, stroke, some cancers (e.g. colorectal and breast cancer), diabetes, osteoarthritis, osteoporosis, circulatory diseases and obesity (8, 10, 15-18). Growing scientific evidence continues to support the link between physical activity and improved mental health (6, 19), increased social capital (i.e. the willingness of individuals to participate in collective and civic activities) (5, 20, 21), and reduces the risk of falls and disability in the elderly (22). The economic benefits of physical activity are increasingly evident as the cost of physical inactivity emerges as a major avoidable contributor to the cost of illness (13, 23, 24).

Physical activity, together with a regulation of dietary energy intake, is vital in the prevention of overweight and obesity. Participation in physical activity positively reduces the risk of chronic diseases directly and indirectly through its effect on weight and adiposity as overweight and obesity are risk factors for diabetes, hypertension, cardiovascular disease, and cancer (16). Obesity has escalated to epidemic proportions worldwide, with three-fold increases in the prevalence of obesity in North America, the United Kingdom and Australasia since 1980 (11). In 2005, 23% of the world's adult population were estimated to be overweight (24% of men, 22% of women), and 10% estimated to be obese (8% of men, 12% of women) (18). In Australia, the prevalence of adult obesity increased from 8% overall in 1980 to 16% in males and 19% in females two decades later (16). Furthermore, overweight and obesity in Australia accounted for approximately four percent of the total burden of disease in 1999 (12) rising to nine percent in 2006 (13). Colaguri et al (2010) estimated the total direct cost of BMI-defined obesity in Australia in 2005 was \$8.3 billion, with the average annual cost of government subsidies for the overweight and obese as \$3,917 per person (24). Combined direct and government subsidies resulted in an overall total annual cost of \$56.6 billion. In Western Australia, in 2009, 67% of adults were overweight or obese (25). Nationally, it is estimated that three in five adults (61%) are overweight or obese (26). The obesity epidemic is not only an adult issue, evidence suggests that overweight and obesity is high amongst children and adolescents and can result in chronic disease in later life (26-28).

## 1.2 Participation in physical activity

In response to the 1996 U.S. Surgeon General's report (10), the National Physical Activity Guidelines for Australian Adults, released in 1999, recommend that adults need to participate in at least 30 minutes of moderate-intensity physical activity on most, if not all days of the week, to accrue health benefits. The 30 minutes of activity does not need to be continuous and can be accumulated in 10-minute episodes. The guidelines note that 30 minutes of vigorous-intensity activity performed three to four times per week promotes additional health benefits (29).

The World Health Organization has reported that approximately 17% of adults worldwide are physically inactive, with an additional 41% estimated to participate in some physical activity, but at insufficient levels (11). In Australia, physical inactivity increased between 1997 and 2000 (13.4% to 15.3%), while participation in sufficient levels of physical activity decreased between 1997 and 1999, and plateaued between 1999 and 2000 (62% to 57%) (30). Findings from the 2004–2005 National Health Survey (31) suggested that 70% of Australians aged 15 years and over participated in no or low levels of recreational physical activity, while 30% participated in moderate-intensity to high levels during a two-week period. Comparisons with previous NHS surveys indicated that sedentary behaviour has remained relatively stable since 1995 (32).

From 1999 to 2006, between 54% and 59% of Western Australian adults participated in sufficient physical activity<sup>1</sup> (1-3). The same surveys indicated that approximately 12% to 14% of Western Australian adults were inactive i.e. they did not participate in any physical activity. Similar findings have been reported for adults in other states, including South Australia (33), Queensland (34) and New South Wales (35). These results provide a baseline for comparison for subsequent Western Australian physical activity surveys, including the findings presented in this report.

<sup>1</sup> Sufficient physical activity is defined as participation in 150 minutes of physical activity over five or more sessions per week.

## 1.3 Purpose of the study

The Physical Activity Taskforce (PATF) undertook this survey as part of their ongoing statewide surveillance and monitoring of physical activity levels in Western Australia. The main purpose was to collect physical activity data for comparison with previous state-wide surveys conducted in 1999, 2002 and 2006 (1-3). As in the previous surveys, information about the individual, social and physical environmental determinants of physical activity and levels of overweight and obesity were also collected.

Given that physical inactivity is one of the most important and modifiable risk factors contributing to ill health in Western Australian, it is important to:

- monitor physical activity related knowledge of the Western Australian population over time;
- monitor the prevalence of physical activity/inactivity over time; and
- monitor overweight/obesity over time

Doing so will provide useful information for (a) the identification of at-risk segments of the population and (b) the development of specific intervention strategies that target the physical activity behaviours of these groups. The results presented in this report will be used as a guide for reviewing, planning, developing and assessing initiatives aimed at increasing levels of physical activity and improving health amongst Western Australia adults.

## 2. METHOD

### 2.1 Sample framework

The target population was Western Australian adults aged 18 years and over, residing in private dwellings with a landline telephone. The Edith Cowan University Survey Research Centre undertook the sampling of respondents and administered the survey on behalf of the Physical Activity Taskforce. The sampling frame was stratified by geographical location (Perth metropolitan, South West, Midwest/Goldfields and Kimberley/Pilbara). Telephone numbers were randomly selected from the electronic White Pages directory. The Kimberley/Pilbara stratum was over-sampled to provide a more representative sample of the population residing in this region.

Data were collected between November and December 2009, via telephone interviews. The interviews were conducted by trained interviewers using a computer assisted telephone interview (CATI) system. To increase the response rate and to reduce non-response bias, approach letters (Appendix 1) were sent to respondents two weeks prior to the survey. Households were then contacted and the person with the most recent birthday, who was at least 18 years of age, was asked to participate in the survey. Surveys were conducted on weekdays and weekends, and a maximum of 10 callbacks made at different times and days to obtain a completed interview.

A total of 4,708 eligible respondents were telephoned with 3,363 completing the interview. The response fraction was 72% and was calculated by dividing completed interviews by completed interviews plus active refusals plus passive refusals<sup>2</sup>. Overall 69% of the sample resided in the Perth metropolitan area, 9% in the South West, 13% in the Midwest/Goldfields and 9% in the Kimberley/Pilbara region (Table 2.1). Of those respondents who completed the interview, 50% reported receiving the approach letter, 41% indicated they had not received the letter and 9% were unsure whether or not they had received the letter.

**Table 2.1: Response fraction by Western Australian region**

Region	Sample	Proportion of Sample (%)	Response Fraction (%)
Perth Metropolitan	2320	69.0	72.3
South West	300	8.9	64.7
Kimberley/Pilbara	313	9.3	72.4
Midwest/Goldfields	430	12.8	72.1
<b>Total</b>	<b>3363</b>	<b>100</b>	<b>71.7</b>

<sup>2</sup> Passive refusals refer to a situation where a respondent was contacted eight or more times and each time the respondent rescheduled the interview (i.e. they did not want to say no), whereas active refusals included respondents or households who indicated to the interviewer that they did not want to participate.

## 2.2 Demographic profile of questionnaire respondents

Overall, 3,363 Western Australian adults participated in this survey. The demographic characteristics of survey respondents are shown in Table 2.2. Population based distributions for gender and age are also shown, however, given the age of these data (i.e. collected during the 2006 Census), these estimates should only be considered as a guide. The sample included approximately equal numbers of men and women. The 18–29 year age group (9%) and the 30–44 year age group (22%) were under-represented, while other age groups were over-represented.

The majority of respondents were from the Perth metropolitan area (69%), with the smallest proportions from the South West (9%) and Kimberley/Pilbara (9%) regions. Most respondents were married (68%) and had completed the Tertiary Entrance Examination or higher in terms of their education (64%). To provide adequate sample size for comparisons, weekly household income was categorized into four groups (i.e. \$0–499, \$500–799, \$800–1,199, and  $\geq$  \$1,200/week). It should be noted that 34% ( $n=1,159$ ) of respondents refused to provide, or did not know their weekly household income.



**Table 2.2: Demographic profile of respondents**

Characteristic	n	%	*Population %
Gender			
Male	1674	49.8	50.1
Female	1689	50.2	49.9
Age group			
18 to 29 years	313	9.3	19.1
30 to 44 years	738	21.9	30.5
45 to 59 years	1073	31.9	28.0
60 years or more	1239	36.8	22.4
Location			
Perth metropolitan area	2320	69.0	72.8
South West	300	8.9	13.2
Kimberley/Pilbara	313	9.3	4.5
Midwest/Goldfields	430	12.8	9.5
Marital status			
Married/de facto	2286	68.0	
Single	461	13.7	
Separated/divorced	307	9.1	
Widowed	303	9.0	
Education			
Less than TEE	1144	34.0	
TEE/diploma	1242	36.9	
University	925	27.5	
Occupation			
Manager/professional	980	29.1	
White-collar	349	10.4	
Blue-collar	416	12.4	
Unemployed	46	1.4	
Home duty	217	6.5	
Student	75	2.2	
Retired	986	29.3	
Weekly household income (\$)			
0-499	378	11.2	
500-699	285	8.5	
700-1199	644	19.1	
≥1200	897	26.7	
Refused	1159	34.5	

\*Based on data from the Australian Bureau of Statistics 2006 Census

Note: Frequencies may not equal n = 3363 (or 100%) due to missing data; TEE =Tertiary Entrance Examination

## 2.3 Survey Instrument

The survey instrument consisted of 39 items. A copy of the survey is provided in Appendix 2. Most items included in the 2009 survey replicated those used in the 2006 and 2002 physical activity surveys. However, the 2009 instrument also included new items, which collected data on workplace physical activity opportunities and strength training.

The 2009 survey, included eight items that captured information about the frequency and duration of participation in walking, yard work/gardening, vigorous-intensity and moderate-intensity physical activities in the past week. Two items collected data on the types of activity and facilities used. Seven items collected information about habitual incidental physical activity (i.e. habitual activity undertaken for less than 10 minutes) (36). Four items captured frequency and duration of participation in transport-related cycling and walking in the past week. In 2009, a new item was introduced to measure the engagement in activities, designed to increase muscle strength or tone, such as lifting weights, pull ups, push ups or sit ups.

Information about factors that influence physical activity including physical activity readiness (i.e. stage of change), self-efficacy, knowledge about the number of minutes of moderate-intensity physical activity required for good health and awareness of various Western Australian physical activity campaign messages were also collected. Sedentary behaviour was captured by a single item that asked respondents to estimate time spent watching television or using a computer outside of the workplace. One item sought information amongst working respondents about the amount of physical exertion their job required, with a second item asking about workplace physical activity opportunities. One question asked respondents about perceived physical activity opportunities in their neighbourhood.

Height and weight data were collected for use in calculations of body mass index. Demographic data on age, gender, Aboriginality, marital status, education, occupation, geographical region, household income, household location, number of children (<5 years) and number of people less than 18 years living in that household were recorded.

## 2.4 Treatment of data

The dataset was cleaned and variables recoded where necessary. The data were weighted by age, gender and geographical region as per the 2006 Western Australian Census. Previous results from the 1999 and 2006 surveys presented in this report were also weighted by these same 2006 census data (i.e. by gender, age, and geographical location). However, corrections made to these weights since the 2006 report may have resulted in minor differences between the results presented in the current and previous reports. Nevertheless, these differences do not influence the inferences drawn from the 2006 report or the current report.

Self-reported physical activity is subject to measurement error due to over-reporting. In this dataset, values of greater than 840 minutes (14 hours) for each category of physical activity (i.e. walking, moderate-intensity, vigorous-intensity, and gardening or yard work) were replaced with the value of 14 hours. While 14 hours is somewhat arbitrary, this method of truncation is consistent with the 1999, 2002 and 2006 Western Australian surveys and National Active Australia recommendations (37, 38).

## 2.5 Calculation of physical activity levels

Frequency and duration data for vigorous-intensity physical activity, moderate-intensity physical activity and walking (for at least 10 minutes) are presented. The total time spent participating in physical activity in the past week (i.e. sum of time spent in each category of activity) is also shown. Frequency and duration data for gardening or yard work have been presented in some sections, but excluded from calculations of total or recommended levels of physical activity.

## 2.6 Calculation of recommended level of physical activity

Various measures of 'recommended level' of physical activity have been calculated based on public health recommendations and scientific evidence about the health and fitness benefits of exercise. The American College of Sports Medicine, endorsed 20 minutes of vigorous-intensity exercise three times a week for the improvement of cardio-respiratory fitness and this has been well accepted for over two decades (39). Research has shown health benefits can accrue from regular participation in moderate-intensity activity (10) and both America and Australia have adopted this focus for contemporary public health initiatives.

The Australian Department of Health and Ageing recommend that adults participate in at least 30 minutes of moderate-intensity physical activity on most, preferably all, days and if possible also enjoy some regular, vigorous activity for extra health and fitness (40). As shown below, the definition of 'sufficient physical activity' used in this report combines both moderate-intensity and vigorous levels of physical activity. For comparison purposes, the categories of 'insufficient physical activity' and 'inactive' were also created and are defined below.

<b>Sufficient physical activity</b>	150 minutes of moderate-intensity physical activity on five or more sessions OR 60 minutes of vigorous-intensity activity in the previous week.
<b>Insufficient physical activity</b>	Some activity but not enough to reach the levels required for 'sufficient'.
<b>Inactive</b>	No walking, moderate-intensity or vigorous-intensity physical activity in the previous week.

## 2.7 Data analyses

For the most part, descriptive statistics and cross-tabulation results have been presented in this report. Logistic regression analyses were undertaken to examine the associations between the correlates of physical activity and participation in sufficient physical activity and inactivity. For selected binary outcomes, logistic regression was also undertaken to compare 1999 to 2009 survey results. A forced-entry logistic regression model (all correlates entered into the model in a single step) was used to calculate adjusted odds ratios and 95% confidence intervals. For selected continuous outcomes, generalised linear models were used to compare 1999 to 2009 survey results. For statistically significant main effects, pair-wise comparisons were performed using Tukey's HSD (honestly significant difference) test.

All results presented in this report are based on weighted data, unless otherwise stated. Unweighted data were used in tests of statistical significance. All tests of statistical significance were adjusted for gender, age, and geographical location.

## 2.8 Limitations

This survey included Western Australian adults whose residence was listed in the electronic White Pages telephone directory. Thus, respondents who did not have a landline telephone at home, had an unlisted telephone number or were unavailable during the survey period were excluded. Participation in the survey was voluntary, resulting in self-selection by the respondents. People who choose to participate in physical activity are motivated to do so and it could be argued that those who agreed to participate in the survey were more highly motivated than those less active. Furthermore, the results in this report are based on cross-sectional data and hence relationships between variables are not necessarily causal. However, many of the associations found in this study are consistent with the findings of other published studies that have used study designs appropriate for detecting causal relationships (i.e. randomised control trials, longitudinal studies). In addition, seasonal variations in participation in physical activity are not accounted for in this cross-sectional study (i.e. only a 'spring' pattern of physical activity was captured).

Finally, the criteria used to classify respondents as 'sufficiently active' in this survey included only leisure-time physical activity performed in bouts of at least 10 minutes. The measures of sufficient physical activity did not include occupational activity and although incidental physical activity/ gardening or yard work were measured, they were not included in the calculation of sufficient physical activity as it was not possible to reliably measure duration.

### 3. PHYSICAL ACTIVITY BEHAVIOUR

#### 3.1 Overview of the 2009 data

This chapter reports on the level and pattern of participation in physical activity in the Western Australian adult population. Data are reported for various demographic variables, including age, gender, education, occupation, income, marital status and geographical region. The primary variable of interest was the proportion of Western Australian adults undertaking sufficient physical activity to gain a health benefit. Data regarding physical activity frequency, duration, type, places where people are active and habitual incidental physical activity are also presented. Selected comparisons with results from the 1999, 2002 and 2006 surveys are also shown.

#### 3.2 Physical activity guidelines

The Commonwealth Department of Health and Welfare defines sufficient physical activity for adults as 30 minutes of moderate-intensity physical activity on most, if not all, days of the week (29). Based on scientific evidence, it is recommended that physical activity can be accumulated throughout the day and does not necessarily need to be undertaken during a single bout of exercise (10).

For additional health benefits, the national physical activity guidelines for adults also promote participation in vigorous-intensity physical activity for at least 30 minutes on three to four sessions per week (29). International health bodies including the WHO (11) and the Centers for Disease Control and Prevention (10) recommend participation in 20 minutes of vigorous-intensity physical activity on three or more occasions per week, in addition to, or instead of, 30 minutes of moderate-intensity physical activity on most days. Based on the national guidelines and those recommended elsewhere, in this report, achieving a sufficient level of physical activity was defined as:

- The accumulation of 150 minutes of moderate-intensity physical activity on five or more sessions OR 60 minutes of vigorous-intensity activity per week.
- This definition of sufficient physical activity is consistent with definitions adopted in the 1999, 2002, 2006 and 2009 Western Australian adult physical activity surveys and reflects the national recommendations.

#### 3.3 Participation in recommended levels of physical activity

Table 3.3 presents the proportion of Western Australians participating in (1) sufficient physical activity; (2) those doing some activity, but not enough to meet the recommendations (insufficient); and (3) those who reported doing no walking, vigorous-intensity or other moderate-intensity physical activities in the past week (inactive). In addition Figure 3.3 shows the prevalence of sufficient physical activity, insufficient physical activity, and inactivity reported in the 1999, 2002, 2006 and 2009 surveys.

**Table 3.3 highlights**

- In 2009, 60% of Western Australian adults were sufficiently active, 28% were insufficiently active and 12% were inactive.

**Gender and Age**

- Slightly more men than women were sufficiently active (62% vs. 59%).
- Participation in sufficient physical activity decreased with advancing age from 73% amongst those 18–29 years to 51% amongst those 60 years and over.
- Inactivity increased with advancing age from 6% amongst those 18–29 years to 18% amongst those 60 years and over.

**Geographical Location**

- Participation in sufficient physical activity was highest among respondents from the Perth metropolitan area (62%) and the Midwest/Goldfields region (62%).
- Inactivity was lowest among respondents from the Perth metropolitan area (11%) and highest among those from the South West (16%).

**Marital Status and Children**

- Compared with all other marital status categories, people who were single were most likely to be sufficiently active (65%) and least likely to be inactive (9%).
- Compared with all other marital status categories, widowers were the least likely to be sufficiently active (47%) and the most likely to be inactive (24%).
- Respondents with 'no children under 5 years of age' were more likely to report being inactive versus those with at least one dependent under five (12% vs. 9%).

**Education, Employment, and Income**

- Participation in sufficient physical activity was highest amongst those with a University level education (66%) and those with weekly household incomes greater than \$1,200 (64%).
- Inactivity increased as level of education and weekly household income decreased. This trend reversed for participation in sufficient physical activity.
- In terms of occupation, students (76%) and managers/professionals (66%) were the most likely to report being sufficiently active. Respondents who had retired (19%) were the most likely to report being inactive.



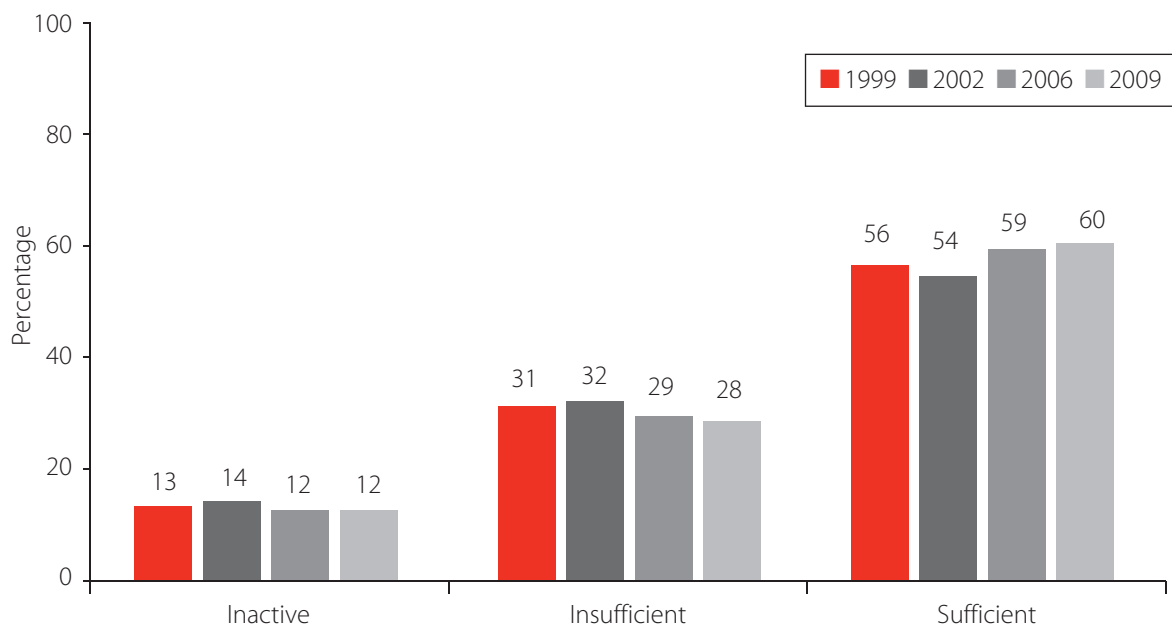
**Table 3.3: Prevalence of inactivity, insufficient activity and sufficient physical activity<sup>1</sup> by demographic characteristics**

Characteristic	Inactive (n=390) %	Insufficient activity (n=928) %	Sufficient activity (n=2019) %
Gender			
Male	11.1	26.6	62.3
Female	12.3	29.0	58.7
Age group			
18 to 29 years	6.2	21.2	72.6
30 to 44 years	8.8	29.2	62.0
45 to 59 years	13.7	28.1	58.2
60 years or more	17.9	31.4	50.8
Location			
Perth metropolitan area	11.0	27.1	62.0
South West	16.1	30.9	53.1
Kimberley/Pilbara	14.4	28.8	56.8
Midwest/Goldfields	9.4	28.7	61.8
Marital status			
Married/de facto	10.4	28.2	61.4
Single	9.4	25.5	65.1
Separated/divorced	18.9	28.9	52.2
Widowed	23.5	29.5	47.0
Education			
Less than TEE	18.7	29.3	52.0
TEE/diploma	10.2	27.1	62.6
University	6.9	27.1	66.0
Occupation			
Manager/professional	8.1	26.2	65.7
White-collar	8.8	29.6	61.6
Blue-collar	13.1	25.7	61.2
Unemployed	13.5	36.5	50.0
Home duty	10.1	36.7	53.2
Student	9.3	14.7	76.0
Retired	19.3	29.9	50.8
Weekly household income (\$)			
0-499	20.8	27.7	51.6
500-699	14.0	33.6	52.4
700-1199	12.6	31.6	55.8
≥1200	8.9	26.9	64.2
Children under 5 years			
Nil	12.2	26.7	61.2
One or more	9.0	33.9	57.1
People under 18 years			
Nil	13.6	27.0	59.4
One or more	8.9	29.0	62.1
<b>Overall</b>	<b>11.7</b>	<b>27.8</b>	<b>60.5</b>

<sup>1</sup> Sufficient activity is defined as 150 minutes of moderate-intensity physical activity on five or more sessions or 60 minutes of vigorous-intensity physical activity per week (excludes gardening and household chores).

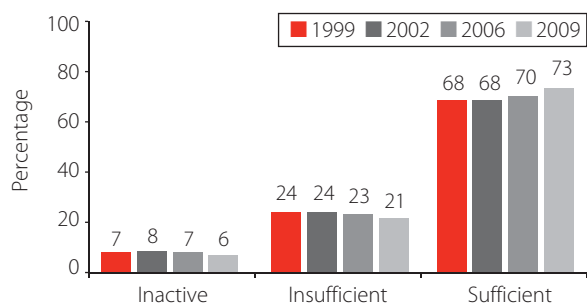
### **Figure 3.3 highlights**

- In 2009, the prevalence of sufficient activity increased compared to the levels measured amongst Western Australian adults in 1999. The decrease in participation in sufficient physical activity observed in 2002 appears to differ from the overall 10 year trend that participation in sufficient physical activity among Western Australian adults has increased from 56% in 1999 to 60% in 2009.
- The prevalence of physical activity between 1999 and 2009 was analysed by age group. Between 1999 and 2009, the prevalence of achieving sufficient physical activity for each age group increased.
- Overall, achieving sufficient levels of physical activity decreased as age group increased. This trend reversed for inactivity.
- The observed increase in the prevalence of participation in sufficient levels of physical activity between 1999 and 2009 (Figure 3.1), was supported by a subsequent logistic regression analysis. Adults who were inactive/insufficiently active were compared with sufficiently active adults. Results showed that after adjusting for gender, age and geographical location, respondents in 2006 (OR 1.11, 95%CI 1.01-1.23) and 2009 (OR 1.22, 95%CI 1.10-1.35) were significantly more likely to participate in sufficient levels of physical activity compared with the 1999 survey respondents. Participation in sufficient levels of physical activity in 2002 (OR 0.94, 95%CI 0.85-1.03) were not significantly different from levels of participation found in 1999.

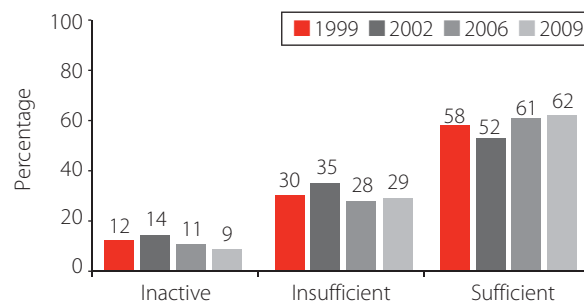


## all age groups

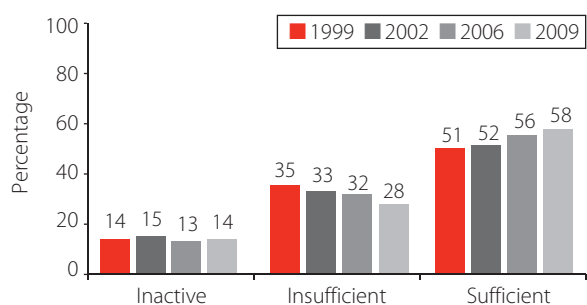
(1999 n=3169, 2002 n=3199, 2006 n=3350, 2009 n=3338)



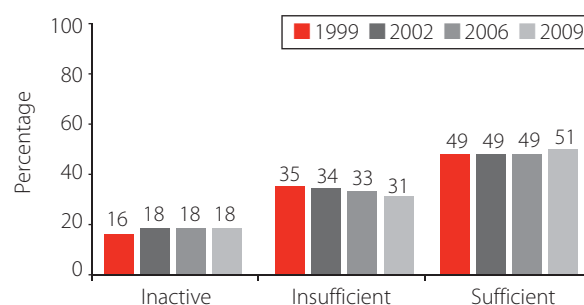
## 18 - 29 yrs of age



## 30 - 44 yrs of age



## 45 - 59 yrs of age



## 60 yrs or more

**Figure 3.3: Prevalence of inactivity, insufficient and sufficient physical activity by survey year and age group**

### 3.4 Demographic factors independently associated with achieving sufficient levels of physical activity and being inactive

Table 3.4 presents the results from two forced-entry logistic regression models undertaken to assess the independent associations between demographic characteristics and participation in sufficient physical activity (model 1) and inactivity (model 2).

#### **Table 3.4 highlights**

##### **Demographic associations by participation in sufficient physical activity**

- Females were less likely to reach sufficient levels of physical activity compared with males.
- The likelihood of participating in sufficient levels of physical activity decreased with advancing age. Compared with 18–29 year olds, older age groups were less likely to participate in sufficient physical activity.
- Compared with those in a married or de facto relationship, widowers and separated/divorced respondents were less likely to achieve sufficient levels of physical activity. Single respondents were more likely to achieve recommended levels of physical activity compared with those in a married or de facto relationship.
- The odds of participating in sufficient levels of physical activity increased with advancing education level and income, the strongest associations being for university education and household incomes  $\geq \$1,200$  per week.
- Respondents with at least one child under 18 years of age were more likely to achieve recommended levels of physical activity compared with respondent who did not have a child under 18 living at home.
- Managers/professionals, were more likely to engage in sufficient levels of physical activity than those who were retired, unemployed, engaged in home duties or in white/blue collar jobs. The only group more likely than managers/professionals to engage in sufficient physical activity was students.

### Demographic associations by inactivity

- Compared with 18–29 year olds, 30–44 year olds were 1.7 times more likely, 45–59 year olds twice as likely and  $\geq 60$  year olds 2.76 times more likely to be inactive.
- Compared with respondents from the Perth metropolitan area, those in the South West were 19% more likely, respondents in the Kimberley/Pilbara 34% more likely and those in the Midwest/goldfields 35% more likely to be inactive.
- Compared with respondents in a married or de facto relationships, widowers (90%) and those who were separated/divorced (24%) were more likely to be inactive, while those who were single were 26% less likely to be inactive. The odds of being inactive decreased with increasing levels of education. Compared with less educated respondents, those who had completed TEE/diploma and university level education were respectively 40% and 66% less likely to be inactive.
- The odds of being inactive decreased as levels of income increased. Respondents with household incomes  $< \$499/\text{wk}$  were more likely to be inactive than those in higher income brackets.
- Occupational status was associated with being inactive. Compared with respondents employed in professional or managerial occupations, blue collar workers and the unemployed were more likely to report being inactive in the past week. Students were 65% less likely to be inactive compared with those in professional or managerial occupations.

**Table 3.4: Adjusted odds ratios for factors associated with participation in sufficient physical activity and being inactive**

	Sufficient physical activity (n = 3340) <sup>1</sup>			Inactivity (n = 3340) <sup>1</sup>		
Characteristic	Odds ratio	95% CI	p-value	Odds ratio	95% CI	p-value
Gender						
Male	1.00			1.00		
Female	0.82	0.77-0.83	0.00	1.07	0.97-1.18	0.16
Age group						
18 to 29 years	1.00			1.00		
30 to 44 years	0.60	0.53-0.68	0.00	1.70	1.39-2.09	0.00
45 to 59 years	0.53	0.47-0.60	0.00	2.05	1.67-2.51	0.00
60 years or more	0.43	0.39-0.49	0.00	2.76	2.26-3.38	0.00
Location						
Perth metropolitan area	1.00			1.00		
South West	0.94	0.84-1.05	0.28	1.19	1.02-1.41	0.03
Kimberley/Pilbara	0.95	0.83-1.09	0.49	1.34	1.11-1.62	0.00
Midwest/Goldfields	0.87	0.77-0.97	0.02	1.35	1.16-1.59	0.00
Marital status						
Married/de facto	1.00			1.00		
Single	1.41	0.28-1.55	0.00	0.74	0.63-0.86	0.00
Separated/divorced	0.89	0.79-0.99	0.05	1.24	1.05-1.46	0.00
Widowed	0.59	0.52-0.68	0.00	1.90	1.62-2.23	0.00
Education						
Less than TEE	1.00			1.00		
TEE/diploma	1.48	1.36-1.60	0.00	0.60	0.54-0.68	0.00
University	2.00	1.82-2.19	0.00	0.34	0.29-0.39	0.00
Occupation						
Manager/professional	1.00			1.00		
White-collar	0.78	0.70-0.88	0.00	1.05	0.72-1.52	0.81
Blue-collar	0.76	0.68-0.85	0.00	1.41	1.00-1.99	0.05
Unemployed	0.70	0.54-0.91	0.00	2.01	1.03-3.91	0.04
Home duty	0.66	0.58-0.74	0.00	0.98	0.64-1.51	0.94
Student	1.48	1.21-1.82	0.00	0.35	0.10-1.18	0.09
Retired	0.62	0.57-0.69	0.00	0.84	0.56-1.27	0.41
Weekly household income (\$)						
0-499	1.00			1.00		
500-699	1.33	1.09-1.63	0.00	0.72	0.55-0.94	0.02
700-1199	1.59	1.34-1.88	0.00	0.55	0.44-0.70	0.00
≥1200	2.18	1.34-1.88	0.00	0.37	0.29-0.47	0.00
Children under 5 years						
Nil	1.00			1.00		
One or more	0.91	0.82-1.00	0.06	0.82	0.70-0.97	0.02
People under 18 years						
Nil	1.00			1.00		
One or more	1.09	1.01-1.18	0.02	0.78	0.69-0.87	0.00

<sup>1</sup> Excludes respondents with missing data. Sufficient activity is defined as 150 minutes of moderate-intensity physical activity on five or more sessions or 60 minutes of vigorous-intensity physical activity per week (excludes gardening and household chores).



### 3.5 A comparison of physical activity measures

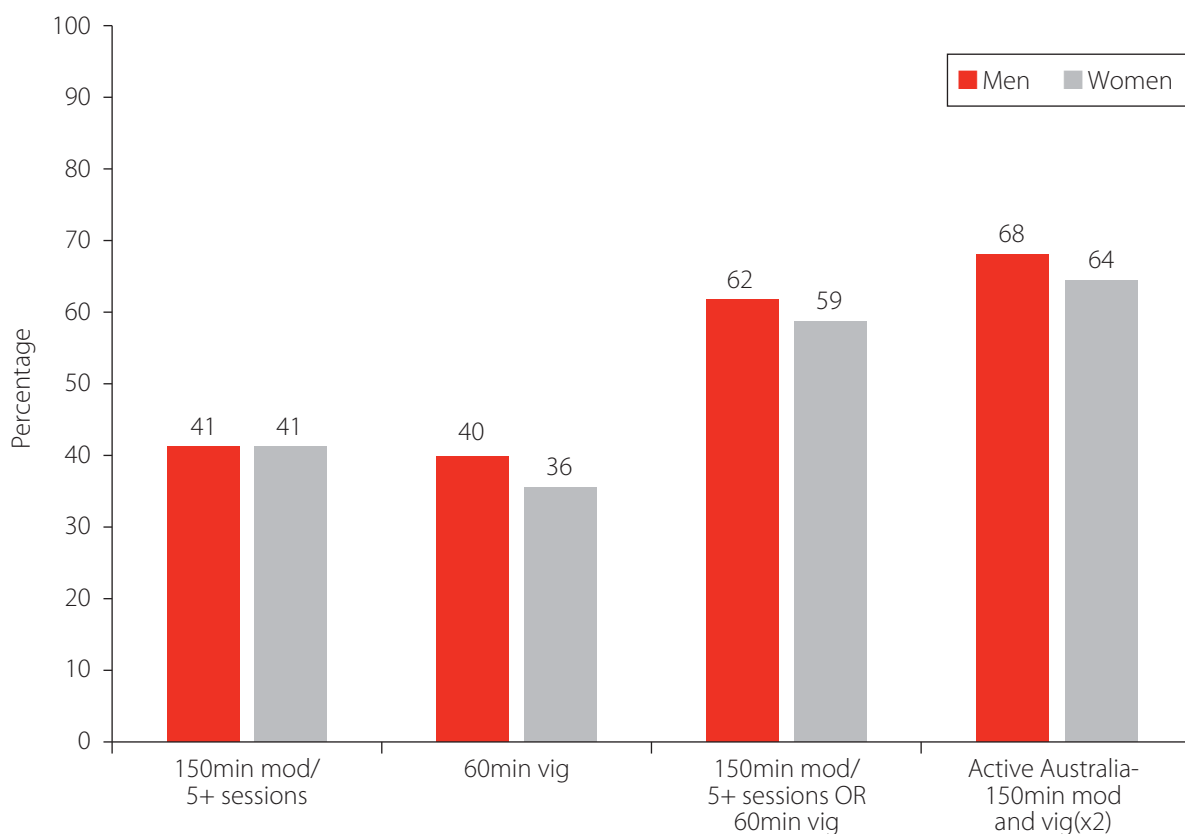
Definitions of sufficient physical activity can vary depending on the purpose and/or health benefit of interest. Variations generally involve establishing cut-off points for the desired type, intensity and/or duration of activity. The content of the indicator and the location of the cut-off point are decided in accordance with scientific evidence and public health recommendations. In particular, different measures of sufficient physical activity have been used in various state surveys (New South Wales, Victoria and South Australia), the 1997 and 1999 National Active Australia surveys (37), and the Western Australian adult physical activity surveys (1-3). The following indicators of sufficient physical activity were compared:

- a) 150 minutes of moderate-intensity physical activity on five sessions per week;
- b) 60 minutes of vigorous-intensity physical activity per week;
- c) 150 minutes of moderate-intensity physical activity on five sessions or 60 minutes of vigorous-intensity activity per week; and
- d) 150 minutes weighted per week (i.e. moderate-intensity minutes plus vigorous-intensity minutes x 2).

Each of the above measures produced slightly different estimates of the proportion of the Australian population achieving sufficient levels of physical activity to obtain a health benefit. Figures 3.5a through 3.5c present the prevalence of sufficient physical activity as determined by the above-mentioned definitions stratified by gender and age. Based on these definitions of sufficient physical activity, comparisons are also made between the 1999, 2002, 2006 and 2009 survey results (Figure 3.4).

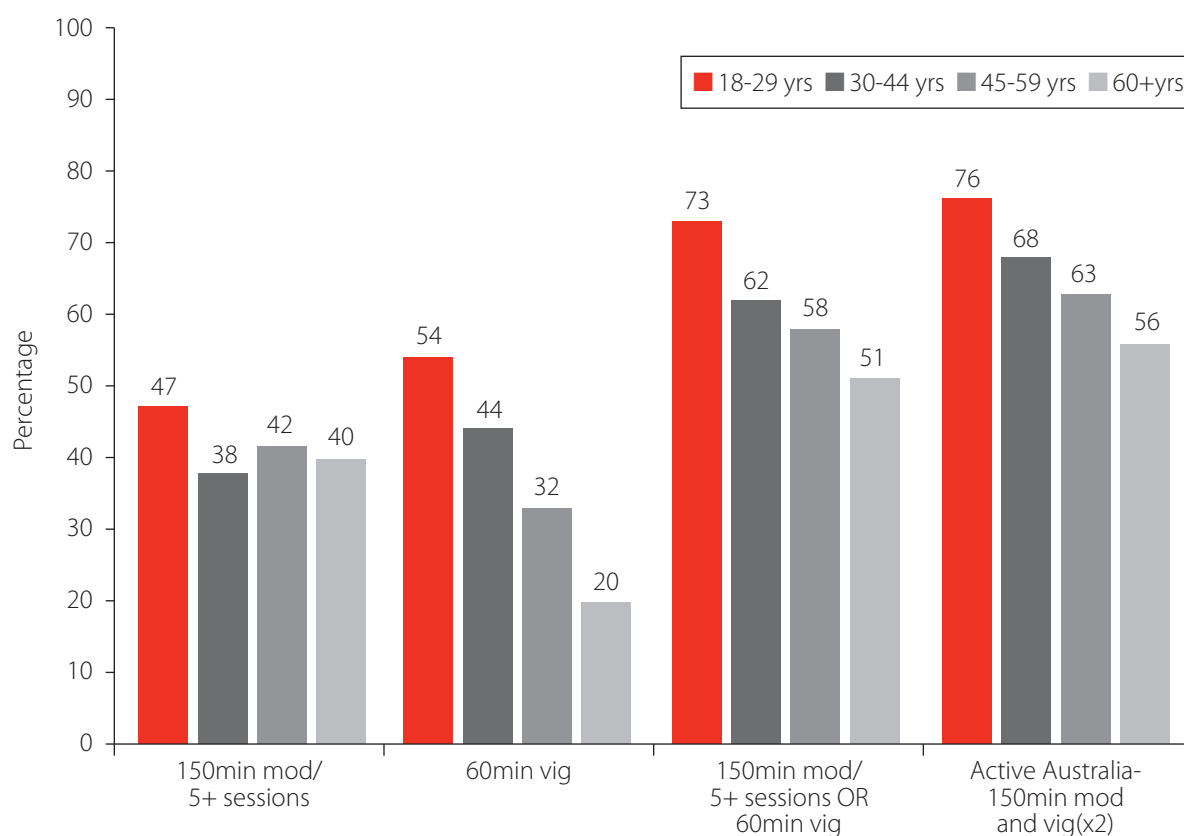
**Figure 3.5a highlights**

- Participation in moderate-intensity physical activity  $\geq 150$  minutes on five or more sessions per week was the same amongst males (41%) and females (41%).
- Compared with females, significantly more males participated in vigorous-intensity physical activity  $\geq 60$  minutes per week (40% vs. 36%;  $p < 0.05$ ).

**Figure 3.5a: Measures of sufficient physical activity by gender ( $n=3341$ )**

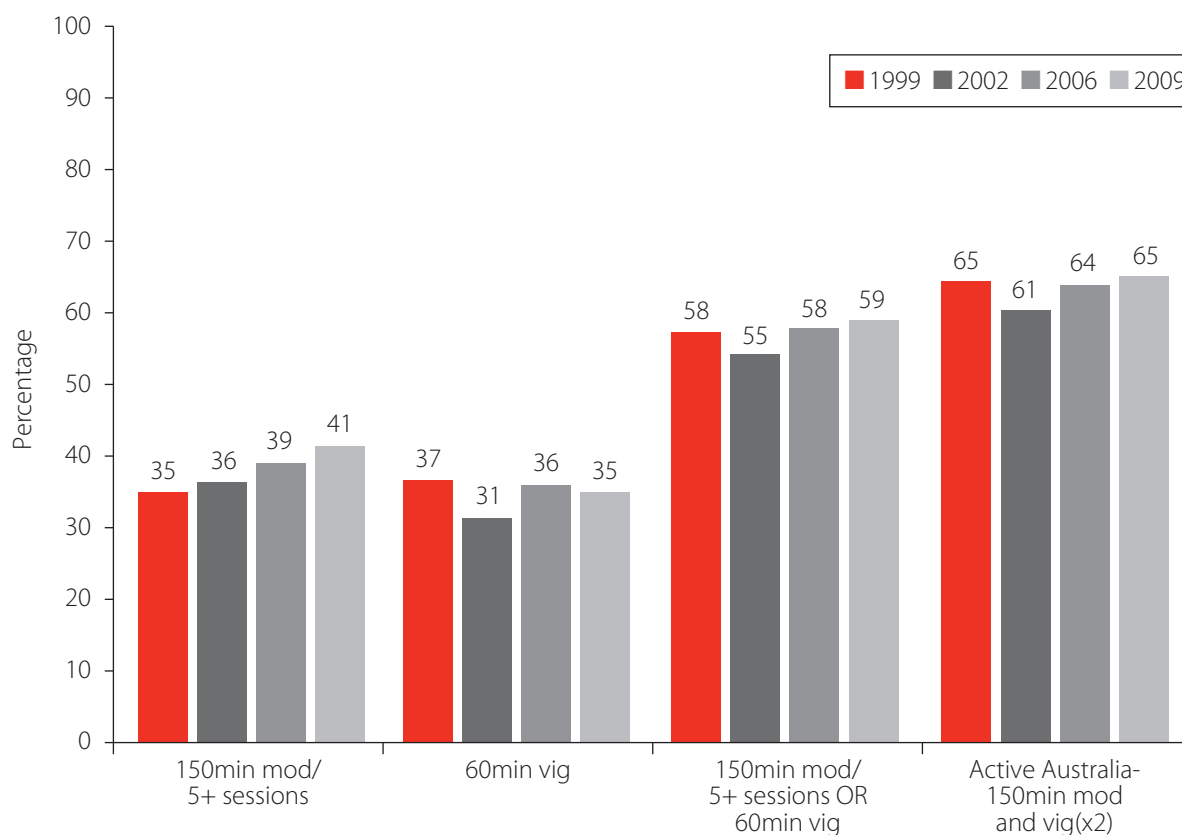
**Figure 3.5b highlights**

- Those aged 18-29 years (47%) were more likely to participate in moderate-intensity physical activity  $\geq 150$  minutes on five or more sessions per week than other age groups (30-44 years 38%, 45-59 years 42% and 60+ years 40%).
- Participation in sufficient vigorous-intensity physical activity ( $\geq 60$  minutes per week) decreased sharply with advancing age, with 54% of 18-29 year olds and 20% of those aged 60 years or older participating in this level of activity.
- Mainly due to their higher rates of participation in sufficient vigorous-intensity physical activity, 18-29 year olds were more likely than other age groups to participate in sufficient physical activity, where the definition included both vigorous-intensity and moderate-intensity physical activity.

**Figure 3.5b: Measures of sufficient physical activity by age**

**Figure 3.5c highlights**

- After adjusting for gender, age, and geographical location, 2006 (OR 1.18, 95%CI 1.07-1.31,  $p<0.01$ ) and 2009 (OR 1.28, 95%CI 1.16-1.42,  $p<0.01$ ) survey respondents were significantly more likely to participate in 150 minutes of moderate-intensity physical activity on five or more sessions compared with respondents in 1999. Difference in sufficient levels of participation was not observed between the 2006 and 2009 survey periods. However, respondents in 2009 were more likely to participate in 150 minutes of moderate-intensity physical activity over five or more sessions compared with respondents in 2002 (OR 1.20, 95%CI 1.08-1.35,  $p<0.01$ ) and 1999 (OR 1.22, 95%CI 1.10-1.35,  $p<0.01$ ).
- After adjusting for age, gender and location differences, 2006 (OR 1.21, 95%CI 1.09-1.34,  $p<0.01$ ) and 2009 (OR 1.23, 95%CI 1.09-1.37,  $p<0.01$ ) survey respondents were significantly more likely to participate in vigorous intensity physical activity ( $\geq 60$  minutes per week) compared with respondents in 1999. Respondents in 2002 were significantly less likely to participation in vigorous-intensity physical activity ( $\geq 60$  minutes/week) compared with respondents in 1999 (OR 0.85, 95%CI 0.778-0.95,  $p<0.01$ ).

**Figure 3.5c: Measures of sufficient physical activity by survey year**

### 3.6 Patterns of participation in physical activity

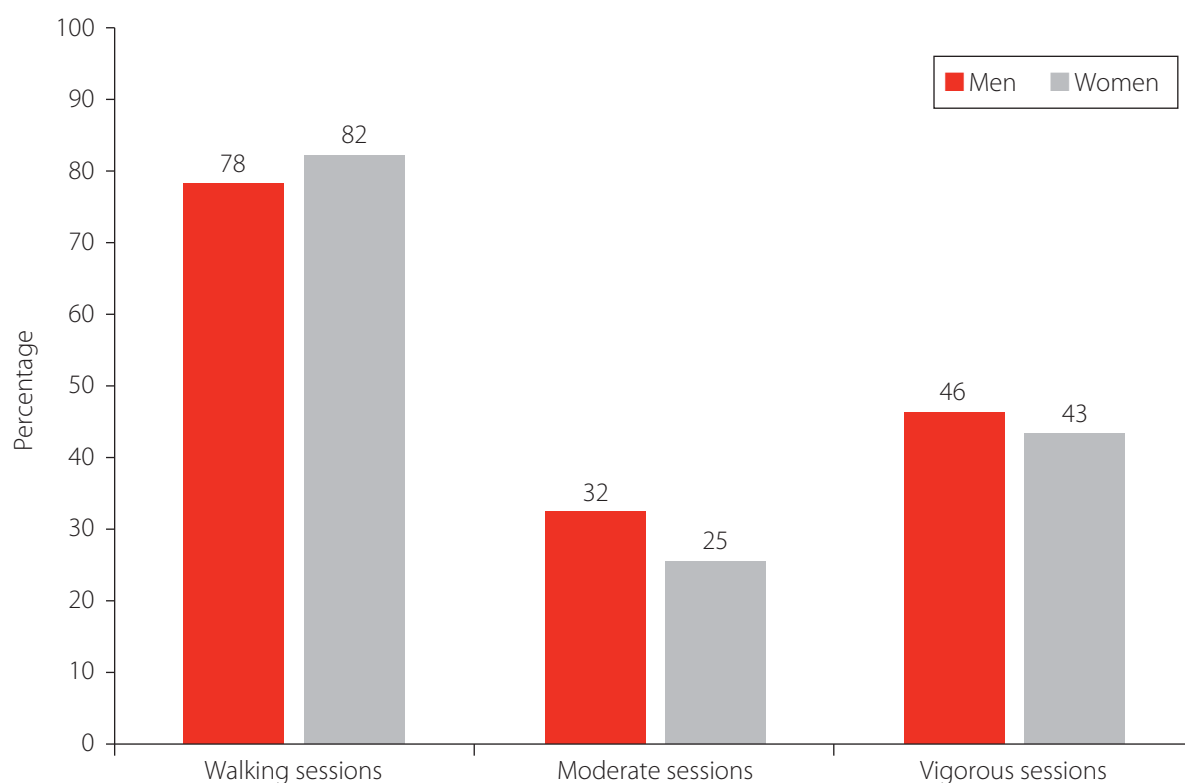
Data on participation in different types of physical activity, the number of sessions of activity and the amount of time spent doing different types of activity, are often of interest to those designing programs and planning communication messages on physical activity.

Figures 3.6.1a and 3.6.1b present the prevalence of participation in walking, moderate-intensity and vigorous-intensity activities by gender and age group respectively. Figure 3.6.1c shows participation for the 1999, 2002, 2006 and 2009 surveys. Table 3.6.2 presents the average weekly time spent in selected physical activities. Figure 3.6.2 shows the average weekly minutes spent in physical activity for the 1999, 2002, 2006 and 2009 surveys.

#### 3.6.1 Participation in walking, moderate-intensity, and vigorous-intensity physical activity

##### **Figure 3.6.1a highlights**

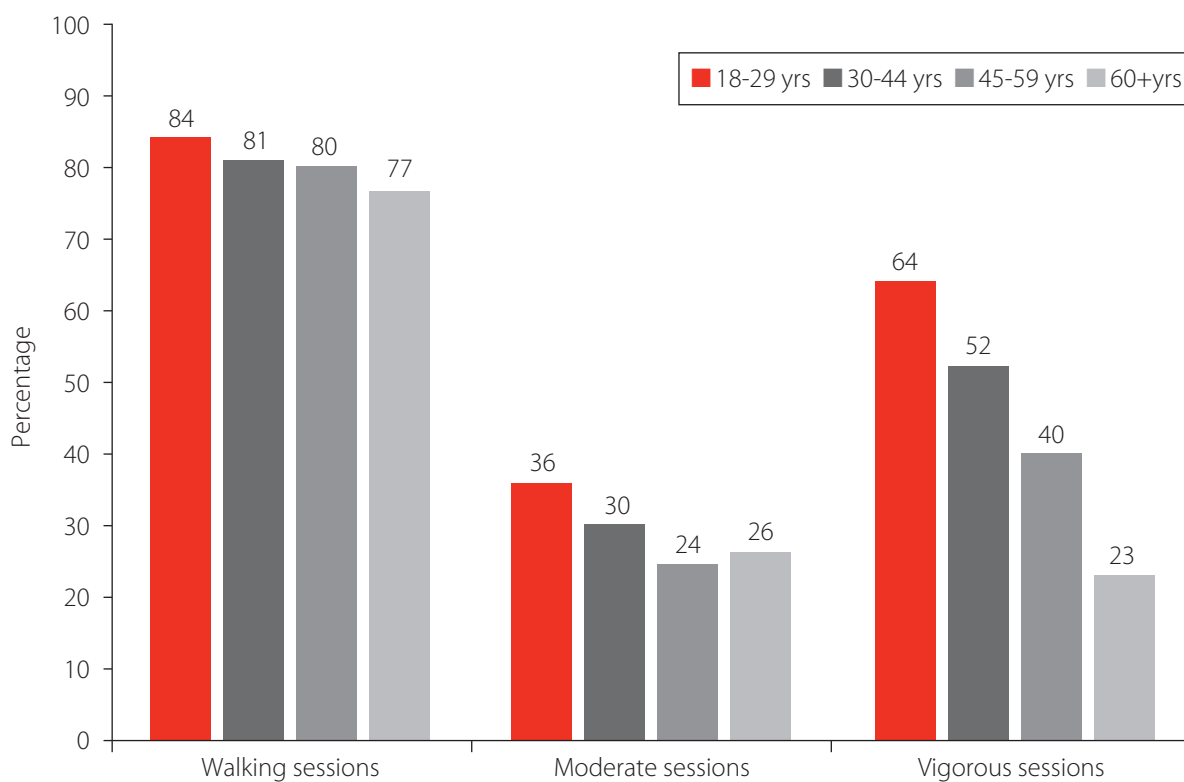
- Slightly more women than men walked in the past week (82% vs. 78%).
- More men than women participated in vigorous-intensity (46% vs. 43%) and moderate-intensity (32% vs. 25%) physical activity in the past week.



**Figure 3.6.1a: Sessions of walking, moderate-intensity and vigorous-intensity physical activity by gender**

**Figure 3.6.1b highlights**

- Compared with all other age groups, a higher proportion of adults 18-29 years participated in walking (84%), moderate-intensity (36%) and vigorous-intensity activities (64%).
- Participation in the three types of physical activity declined with age. The steepest decline was observed for vigorous-intensity physical activity.

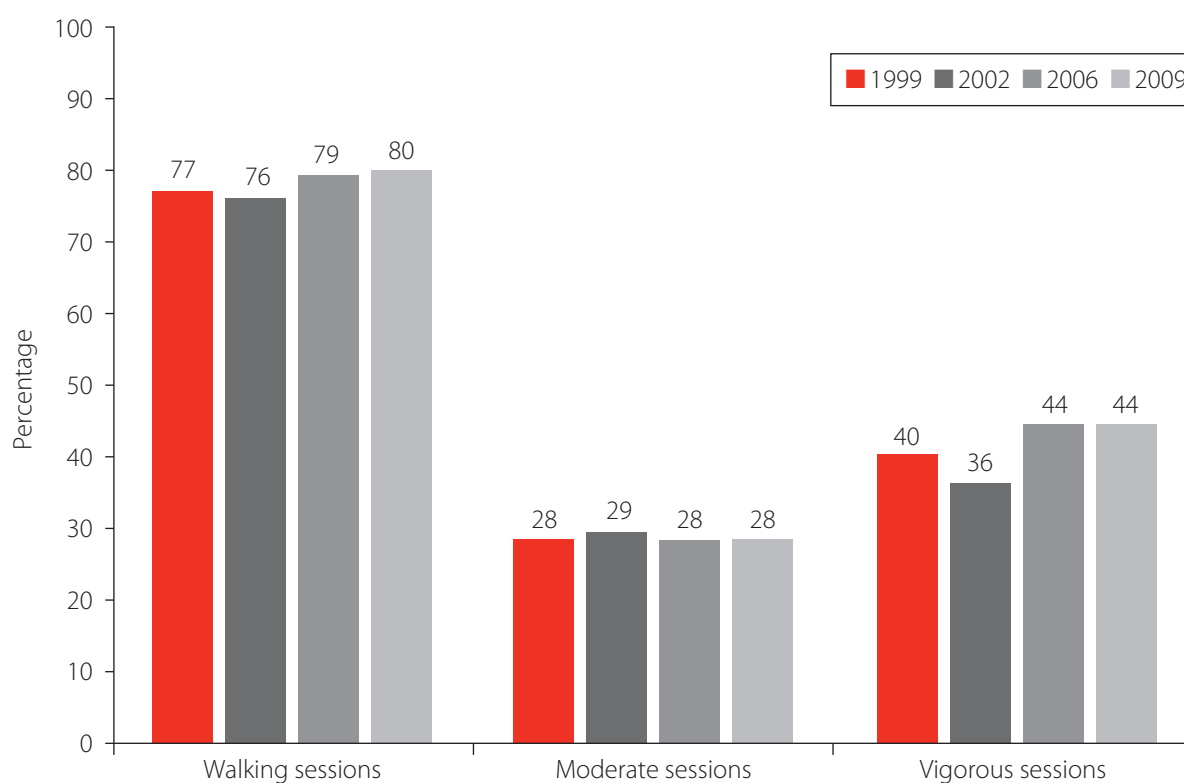


**Figure 3.6.1b: Sessions of walking, moderate-intensity and vigorous-intensity physical activity by age**



**Figure 3.6.1c highlights**

- Participation in walking, moderate-intensity and vigorous-intensity physical activity remained fairly stable between the 1999 and 2009 surveys.
- After adjusting for gender, age, and geographical location, respondents in 2009 were more likely to report walking in the past week compared with 1999 (OR 1.32, 95%CI 1.17-1.49,  $p < 0.01$ ) and 2002 respondents (OR 1.20, 95%CI 1.07-1.73,  $p < 0.01$ ). Furthermore, respondents in the 2009 survey were more likely to report participating in vigorous-intensity activities in the past week compared with 1999 respondents (OR 1.20, 95%CI 1.07-1.33,  $p < 0.01$ ) and 2002 respondents (OR 1.43, 95%CI 1.30-1.58,  $p < 0.01$ ).



**Figure 3.6.1c: Sessions of walking, moderate-intensity and vigorous-intensity physical activity by survey year**

### 3.6.2 Average frequency and time spent participating in physical activity

#### Table 3.6.2 highlights

- On average, walking was undertaken more frequently in the past week (6.3 times) than moderate-intensity physical activity (2.7 times), vigorous physical activity (3.5 times) or vigorous gardening (2.4 times).
- On average, more time was spent in the past week participating in gardening (233 minutes) and walking (214 minutes) compared with other activities.

**Table 3.6.2: Average frequency and time spent in selected physical activities in the past week**

Frequency of Activity	n	Mean (number of times)	SD <sup>1</sup>	Median
Walking	2448	6.3	5.8	5.0
Moderate-intensity activity	860	2.7	3.0	2.0
Vigorous activity	1273	3.5	3.0	3.0
Vigorous gardening	1539	2.4	2.1	2.0
All physical activity <sup>2</sup>	2708	9.3	7.4	8.0
Duration of Activity	n	Mean (minutes)	SD <sup>1</sup>	Median
Walking	2424	2424	205.0	150.0
Moderate-intensity activity	859	859	190.1	120.0
Vigorous activity	1273	1273	185.2	120.0
Vigorous gardening	1539	1539	230.0	120.0
All physical activity <sup>2</sup>	2708	2708	387.7	360.0

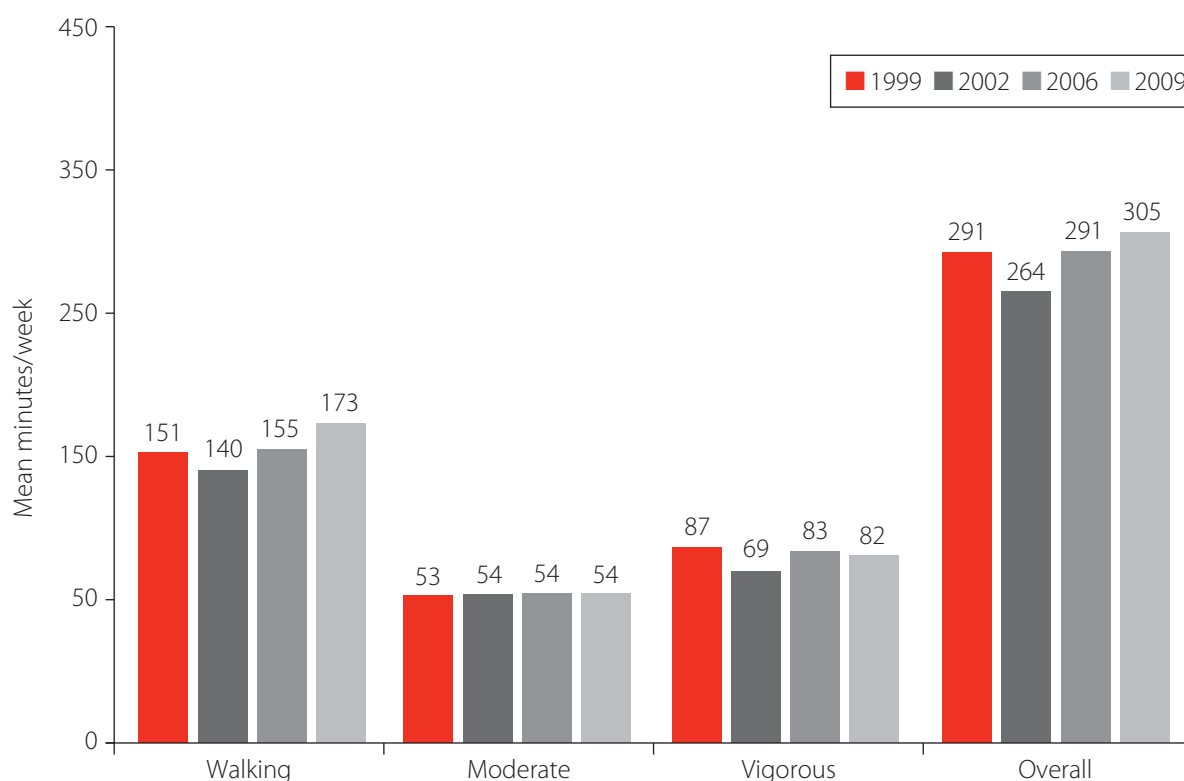
<sup>1</sup> Standard deviation.

<sup>2</sup> Excludes gardening and vigorous-intensity yard work.

Note: To reduce measurement error resulting from over reporting minutes of walking, moderate-intensity and vigorous-intensity gardening are truncated to 840 minutes (14 hours). Includes only those respondents who reported participating in activity in past week.

**Figure 3.6.2 highlights**

- Amongst those respondents reporting participation, minutes of walking and overall physical activity (excluding gardening and vigorous-intensity yard work) increased slightly between the 1999 and 2009 surveys.
- After adjusting for gender, age, and geographical location, average time spent walking ( $p<0.01$ ) and in vigorous-intensity activity ( $p<0.01$ ) were significantly higher in 2009 compared with 1999, among those respondents reporting participation.



**Figure 3.6.2: Mean minutes of walking, moderate-intensity and vigorous-intensity physical activity by survey year**

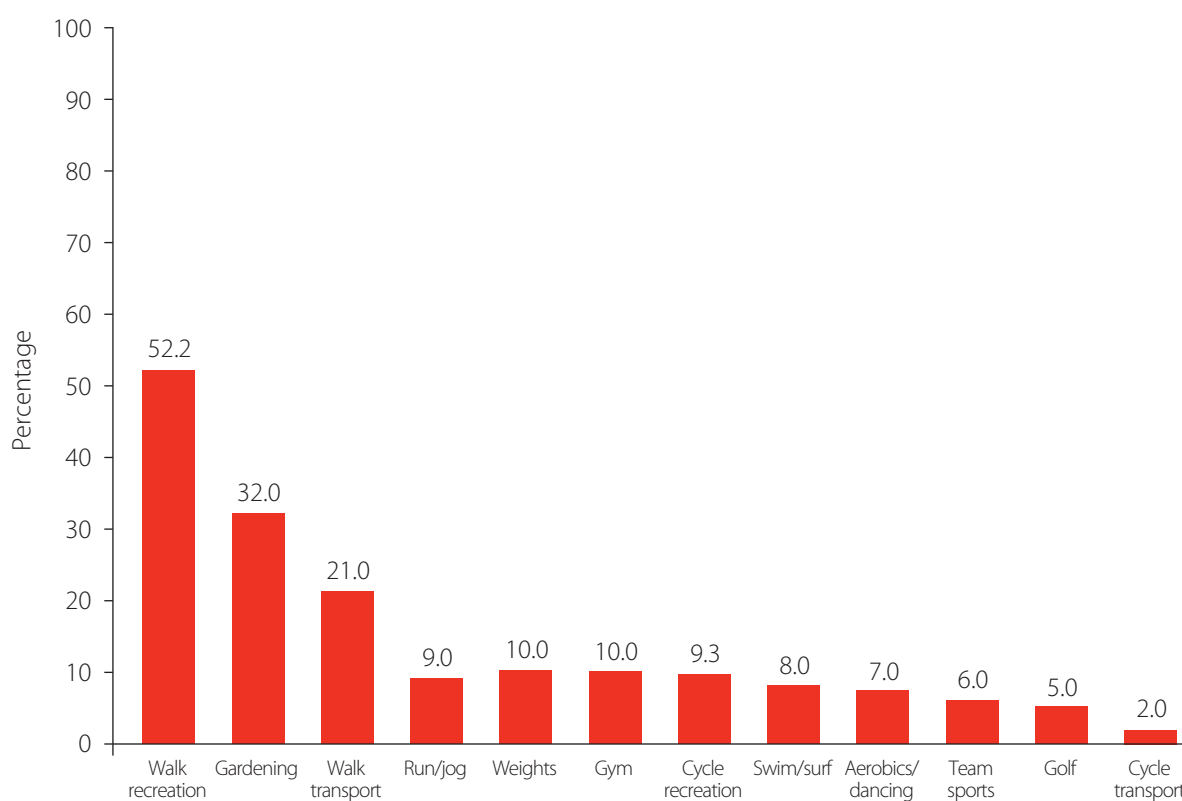
### 3.7 Participation in different types of activity and use of facilities

Planning for facilities and community programs requires information on the specific types of physical activity that individuals undertake, as well as the places or facilities they use to be active. Figure 3.7.1a presents the prevalence of the most reported types of physical activities undertaken by physically active respondents in 2009. Table 3.7.1 presents the prevalence of the most reported types of physical activity stratified by age and gender. The results presented include only those who reported being active in the past week (i.e. those completely inactive were excluded). Figure 3.7.1b shows the most reported physical activities undertaken in the 1999, 2002, 2006 and 2009 surveys.

#### 3.7.1 Participation in different physical activities

##### Figure 3.7.1a highlights

- Walking for recreation (52%) followed by gardening (32%) and walking for transport (21%) were the most reported types of physical activities engaged in by active respondents.



**Figure 3.7.1a: Prevalence of specific types of physical activity** (*Multiple response question; n = 2948*)

**Table 3.7.1 highlights**

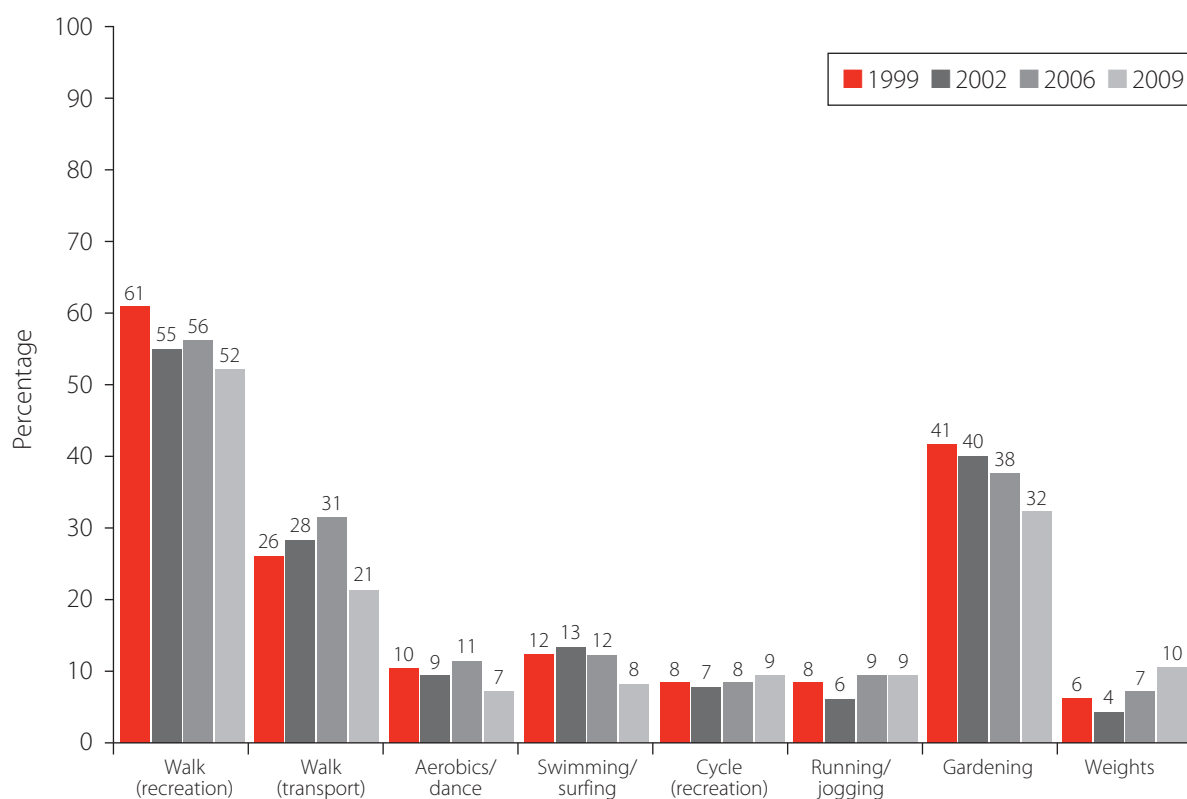
- Overall, a higher proportion of females compared to males walked for recreation (65% vs. 53%) and participated in aerobics/dancing (12% vs. 3%).
- Male participation in walking for recreation increased with advancing age (18–29 years 42%; 60 years and over 62%).
- For men and women, participation in running/jogging, team sports and the gym decreased with advancing age.

**Table 3.7.1: Average frequency and time spent in selected physical activities in the past week**

Activity Type	Gender by age groups (%)									
	18-29 yrs n=603		30-44 yrs n=931		45-59 yrs n=811		≥60 yrs n=602		Total n=2947	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Walking - Recreation	42.2	58.2	45.4	67.5	57.3	67.3	62.3	61.2	53.4	64.5
Walking - Transport	27.1	23.6	20.6	17.2	19.5	20.9	20.7	27.1	21.3	21.9
Swimming/surfing	8.7	11.5	9.5	13.7	8.7	8.7	3.7	6.8	7.5	10.0
Aerobics/dancing	3.2	11.5	1.7	14.5	3.7	10.7	3.9	10.9	3.2	12.0
Running/jogging	20.3	18.1	16.3	6.5	10.4	4.0	2.1	1.2	11.2	5.9
Team sports	27.5	5.5	10.9	4.6	3.7	1.7	1.0	1.2	8.4	2.9
Cycling - Recreation	12.0	11.5	14.0	9.4	13.7	7.2	9.4	5.0	12.4	7.9
Cycling - Transport	4.6	2.8	4.6	2.4	3.3	1.2	1.0	0.6	3.2	1.6
Gardening	17.4	12.1	32.5	29.8	35.8	34.3	47.6	43.4	35.3	32.3
Golf	4.8	0.0	7.8	1.9	5.9	1.3	10.2	3.0	7.4	1.8
Weights	21.2	10.5	13.2	9.9	9.3	10.7	7.6	4.7	7.6	4.7
Gym	19.8	13.7	11.5	15.1	7.8	10.4	5.5	5.6	9.9	11.0

**Figure 3.7.1b highlights**

- Participation in walking for recreation was higher in the 1999 survey (61%) compared to the 2009 survey (52%).
- Walking for transport was lowest in 2009 compared to all previous survey years.

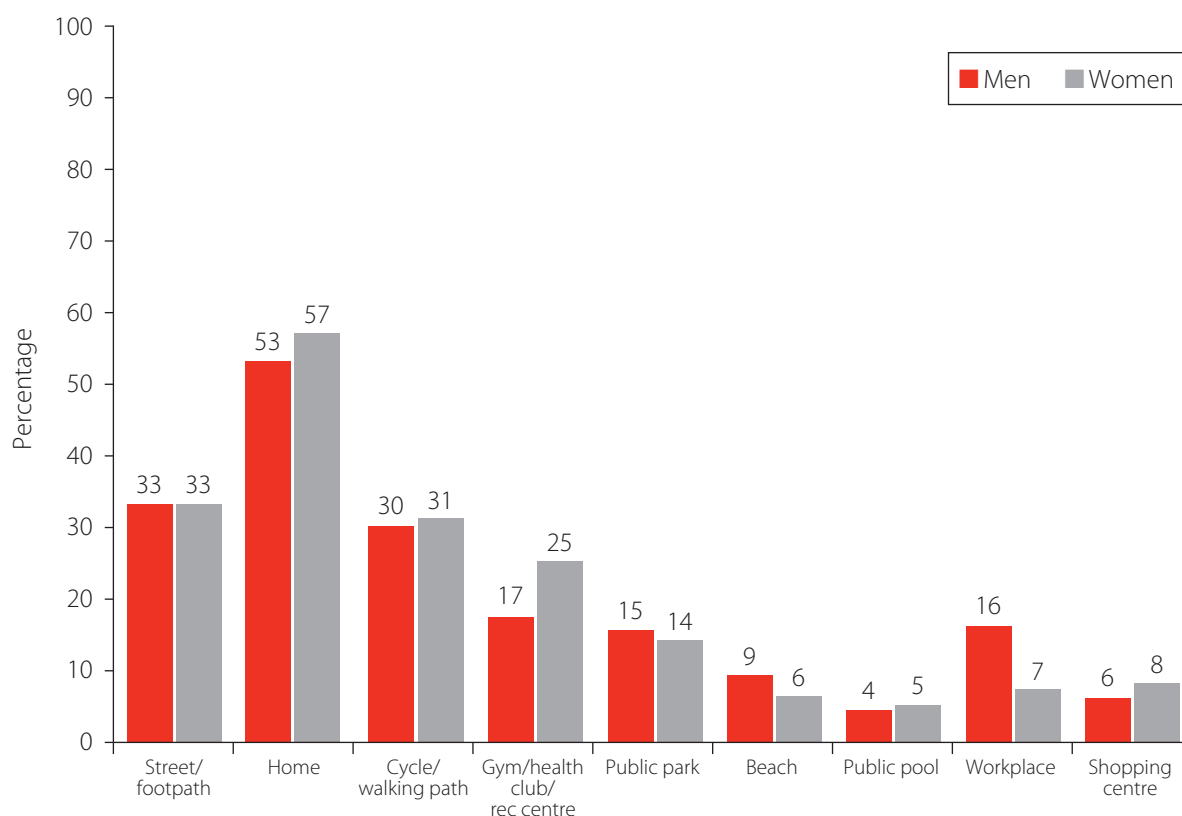
**Figure 3.7.1b: Prevalence of the most reported physical activities by survey year***(1999 n=2770, 2002 n=2761, 2006 n=2938, 2009 n=2948)*

### 3.7.2 Places/facilities used for physical activity

Respondents who were physically active in the past week were asked to identify which places or facilities they used. Figures 3.7.2a, 3.7.2b, and 3.7.2c present the reported places/facilities used to undertake physical activity by gender, age, and survey year.

#### Figure 3.7.2a highlights

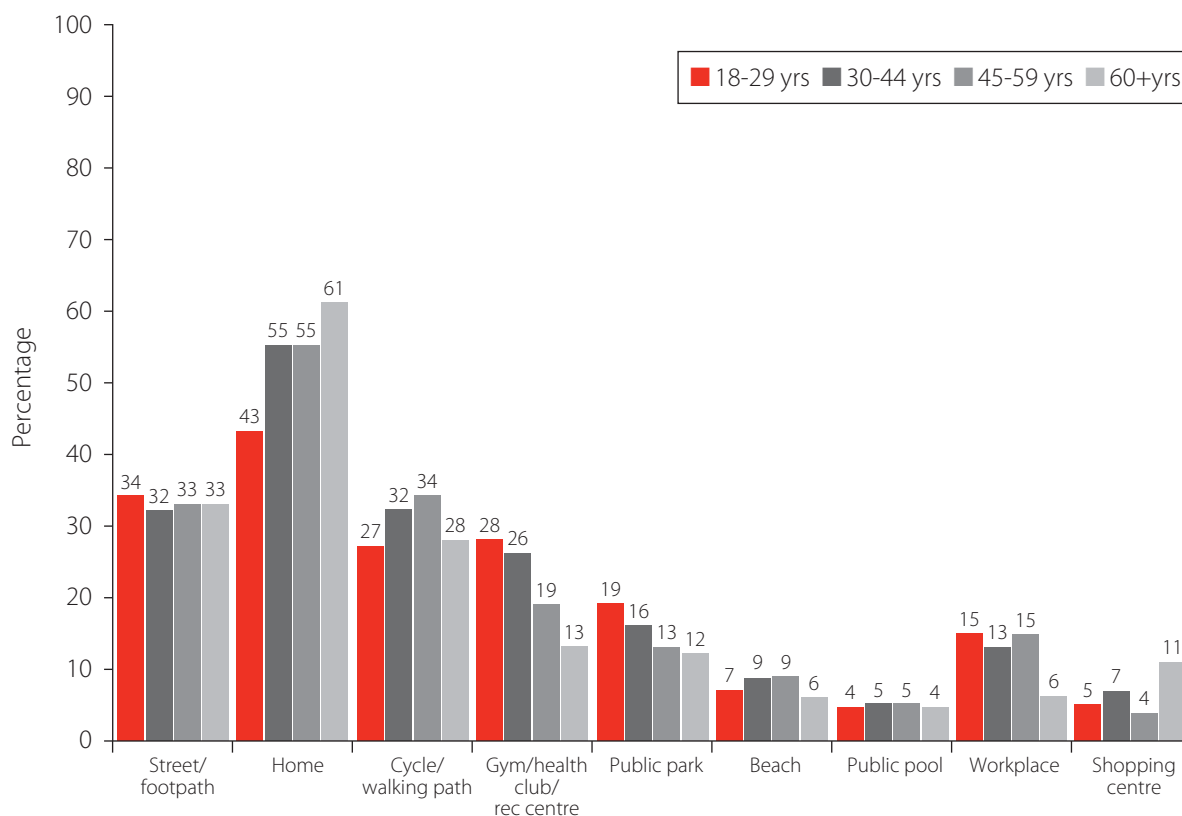
- The home was the most popular place for both men (53%) and women (57%) to be physically active.
- Compared with females (7%), a higher proportion of males used workplace facilities to exercise (16%).
- Shopping malls were used by 6% of males and 8% of females as a place to be physically active.
- Compared with men (17%), a higher proportion of women used a gym/health club or recreation centre (25%) to be physically active.



**Figure 3.7.2a: Most reported facilities used for physical activity by gender**

**Figure 3.7.2b highlights**

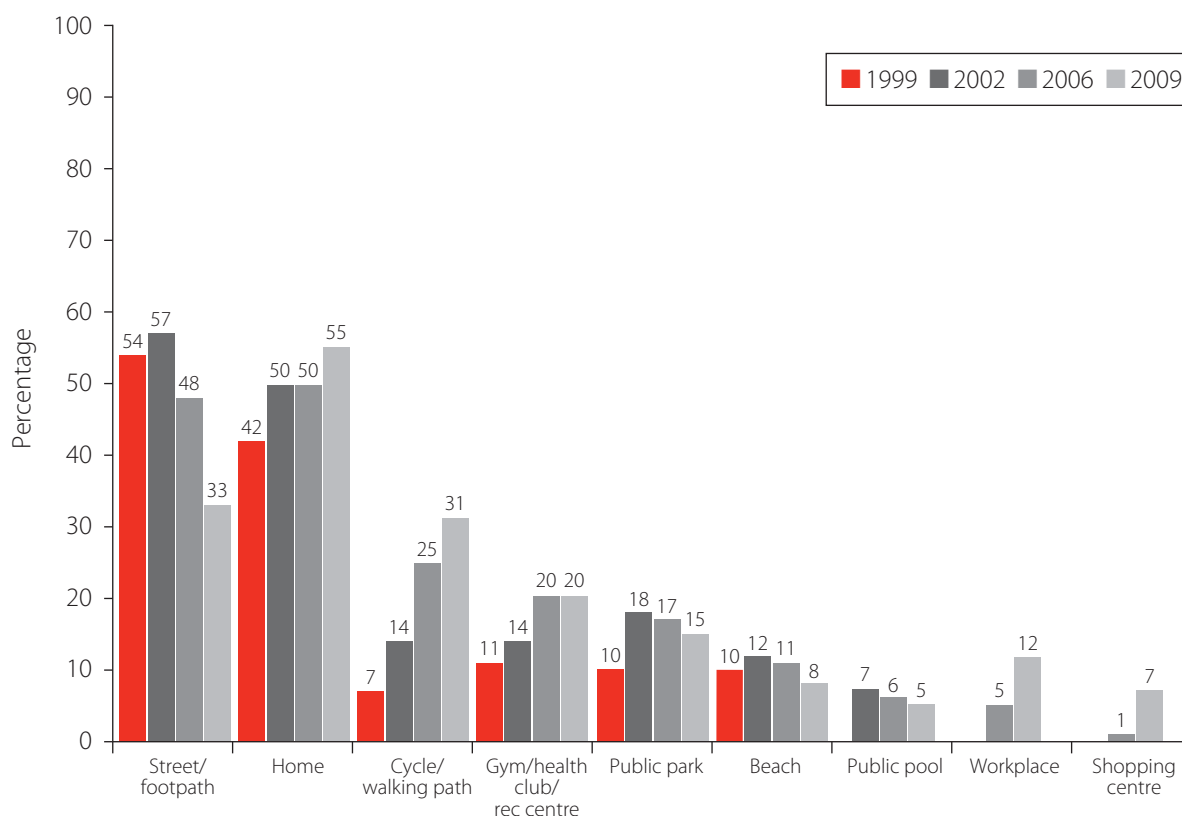
- The proportion of adults being physically active at home increased with advancing age (18–29 years 43%; 60 years and over 61%).
- The use of public open space and gymnasia/health clubs/recreation centres for physical activity declined with advancing age.

**Figure 3.7.2b: Most reported facilities used for physical activity by age**



**Figure 3.7.2c highlights**

- The use of streets/footpaths for physical activity was lower in 2009 (33%) compared with previous survey years (48% in 2006, 57% in 2002 and 54% in 1999).
- Since the 1999 survey, there has been a steady increase in the proportion of adults using cycle/walking paths (7% in 1999; 31% in 2009). This may reflect an increase in transport-related walking, cycling, jogging and running.
- The use of gymnasias, health clubs, and recreation doubled between the 1999 and 2006 surveys (11% to 20%) and remained steady in 2009 (20%).
- The use of workplaces and shopping malls for physical activity increased between 2006 and 2009.

**Figure 3.7.2c: Most reported facilities used for physical activity by survey year**

### 3.8 Levels of habitual incidental physical activity

The measurement of habitual incidental physical activity was introduced in the 2002 survey and was continued in the 2006 and 2009 surveys. Habitual incidental physical activity is activity performed while undertaking other activities or chores (i.e. undertaken incidentally) and is important as current physical activity guidelines indicate that all activity is beneficial to health, including exercise accumulated throughout the day (29).

The 2002, 2006 and 2009 surveys included items that measured the frequency of habitual incidental physical activity on weekdays, Saturdays and Sundays. Specifically, the level of habitual incidental physical activity was captured by asking respondents to report daily activities including habitual walking and cycling they had performed for fewer than 10 minutes. The frequency of habitual incidental physical activity can be reliably measured for adults (3).

Table 3.8.1 presents the prevalence of habitual incidental physical activity undertaken on weekdays, Saturdays and Sundays in 2009 by demographic characteristics. Figure 3.8.1 presents the prevalence of incidental physical activity by survey year. Figures 3.8.2a to 3.8.2d illustrate total weekly sessions of habitual incidental physical activity by gender, age group, location and level of physical activity.

#### 3.8.1 Prevalence of habitual incidental physical activity in 2009

##### ***Table 3.8.1 highlights***

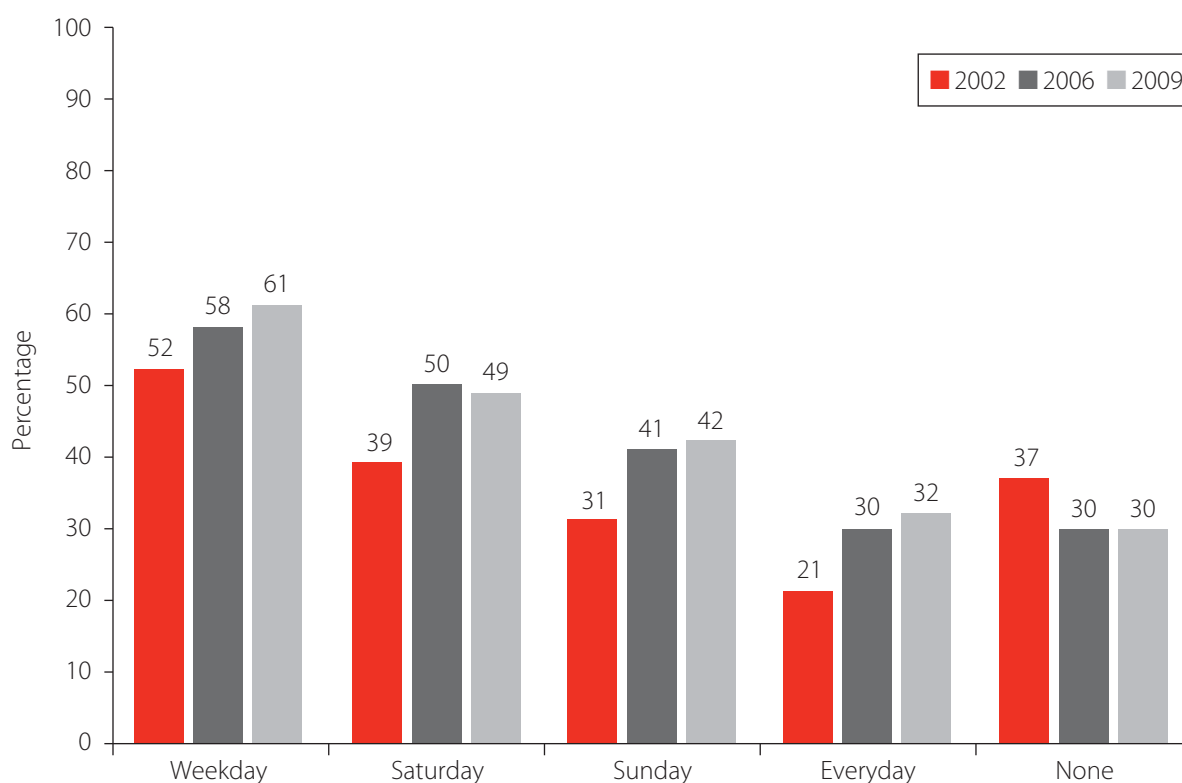
- In 2009, participation in incidental physical activity was highest on weekdays (61%), followed by Saturdays (49%) then Sundays (42%) (n=3348).
- Overall, 32% of respondents participated in incidental physical activity every day. The proportion of respondents participating in incidental physical activity on all days decreased with advancing age and increased with higher levels of education.
- Compared with other occupation categories, a higher proportion of students (49%) and a lower proportion of retirees (24%) participated in incidental physical activity every day.

**Table 3.8.1: Prevalence of habitual incidental physical activity on weekdays, Saturdays and Sundays by demographic Characteristics (n=3348)**

Characteristic	Weekday %	Saturday %	Sunday %	Every day %
Gender				
Male	59.4	48.9	42.8	31.8
Female	62.7	48.8	41.5	31.4
Age group				
18 to 29 years	69.8	59.1	50.5	41.1
30 to 44 years	65.2	53.6	47.0	35.2
45 to 59 years	54.9	44.6	38.0	27.1
60 years or more	55.2	38.8	33.5	24.3
Location				
Perth metropolitan area	62.1	50.3	43.7	32.9
South West	55.8	40.8	34.9	24.5
Kimberley/Pilbara	63.2	48.7	39.3	32.5
Midwest/Goldfields	58.7	49.8	42.0	32.3
Education				
Less than TEE	55.1	43.0	34.8	25.7
TEE/diploma	61.6	49.8	43.8	31.7
University	65.7	53.3	47.1	37.2
Occupation				
Manager/professional	63.2	54.2	46.9	33.9
White-collar	64.3	52.7	45.9	36.9
Blue-collar	55.3	45.5	38.1	28.7
Unemployed	59.6	28.8	32.1	26.4
Home duty	64.3	49.8	40.8	29.4
Student	80.0	63.3	61.3	49.3
Retired	56.4	38.0	32.2	24.1
Weekly household income (\$)				
0-499	59.7	40.0	34.9	26.6
500-699	59.7	45.5	41.1	30.3
700-1199	61.1	49.2	41.3	29.9
≥1200	60.9	52.8	45.2	34.1
Refuse/don't know	60.0	48.5	42.2	30.9
Overall	61.0	48.8	42.2	31.6

**Figure 3.8.1 highlights**

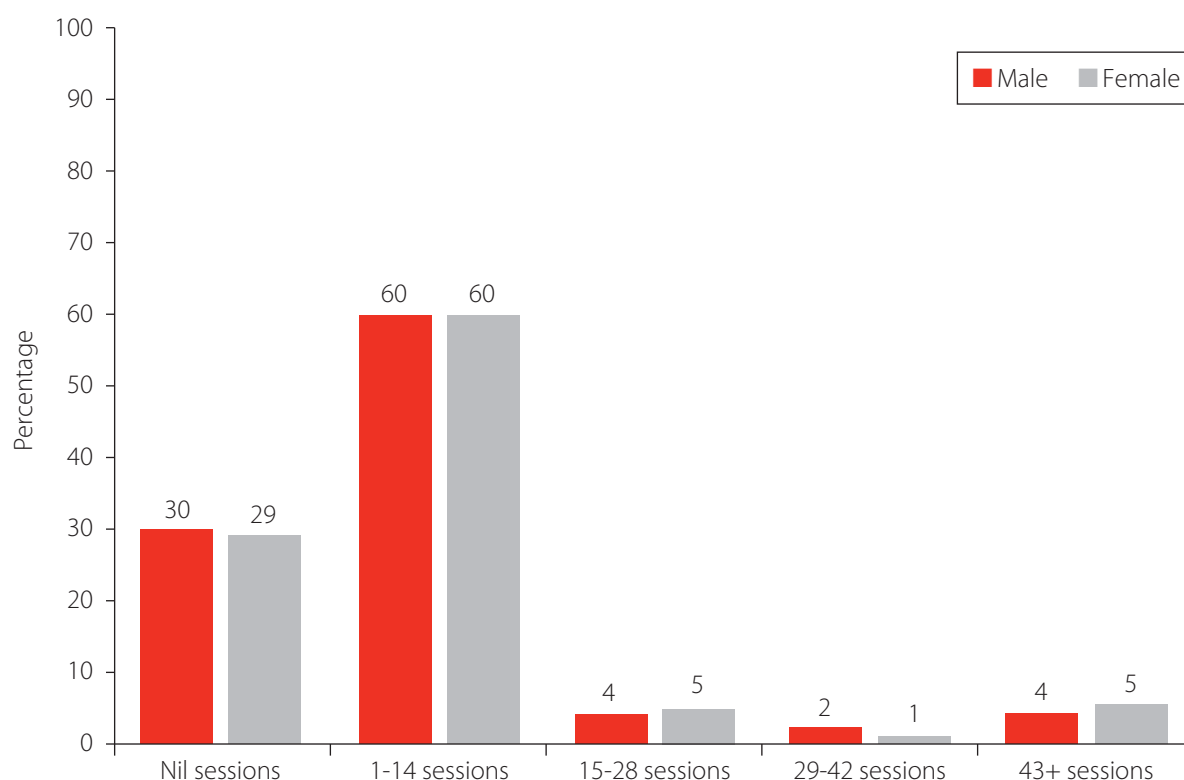
- The prevalence of habitual incidental physical activity (weekdays, Saturdays, Sundays, every day) was higher in the 2009 survey compared with the 2002 survey.
- After adjusting for gender, age, and geographical location, 2009 survey respondents were significantly more likely to participate in incidental physical activity on weekdays (OR 1.49, 95%CI 1.35-1.67,  $p < 0.001$ ), Saturdays (OR 1.53, 95%CI 1.38-1.69,  $p < 0.001$ ), and Sundays (OR 1.69, 95%CI 1.53-1.89,  $p < 0.001$ ) compared with 2002 respondents.
- After adjusting for gender, age, and geographical location, 2009 respondents were significantly more likely to participate in incidental physical activity every day (OR 1.72, 95%CI 1.53-1.92,  $p < 0.001$ ), and less likely to report no incidental physical activity compared (OR 0.67, 95%CI 0.63-0.77,  $p < 0.001$ ) with 2002 respondents.

**Figure 3.8.1: Prevalence of habitual incidental physical activity by survey year**

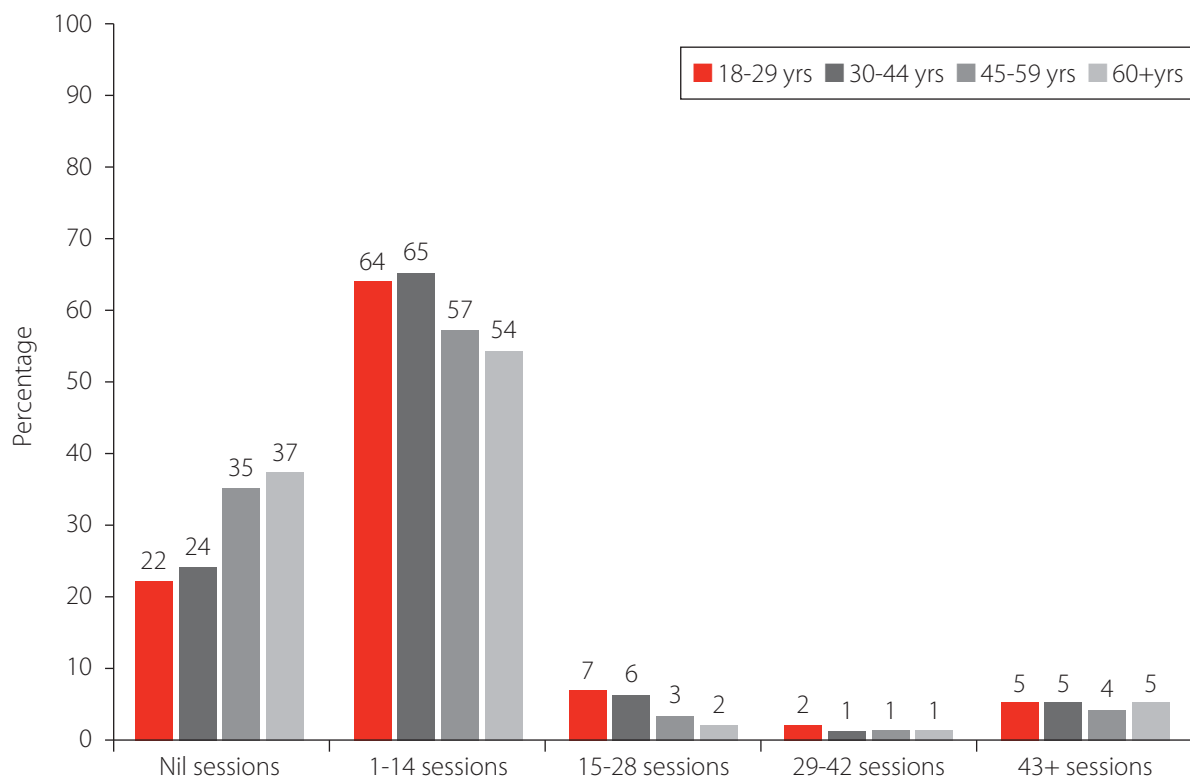
### 3.8.2 Sessions of habitual incidental physical activity

#### Figure 3.8.2a, 3.8.2b, 3.8.2c and 3.8.2d highlights

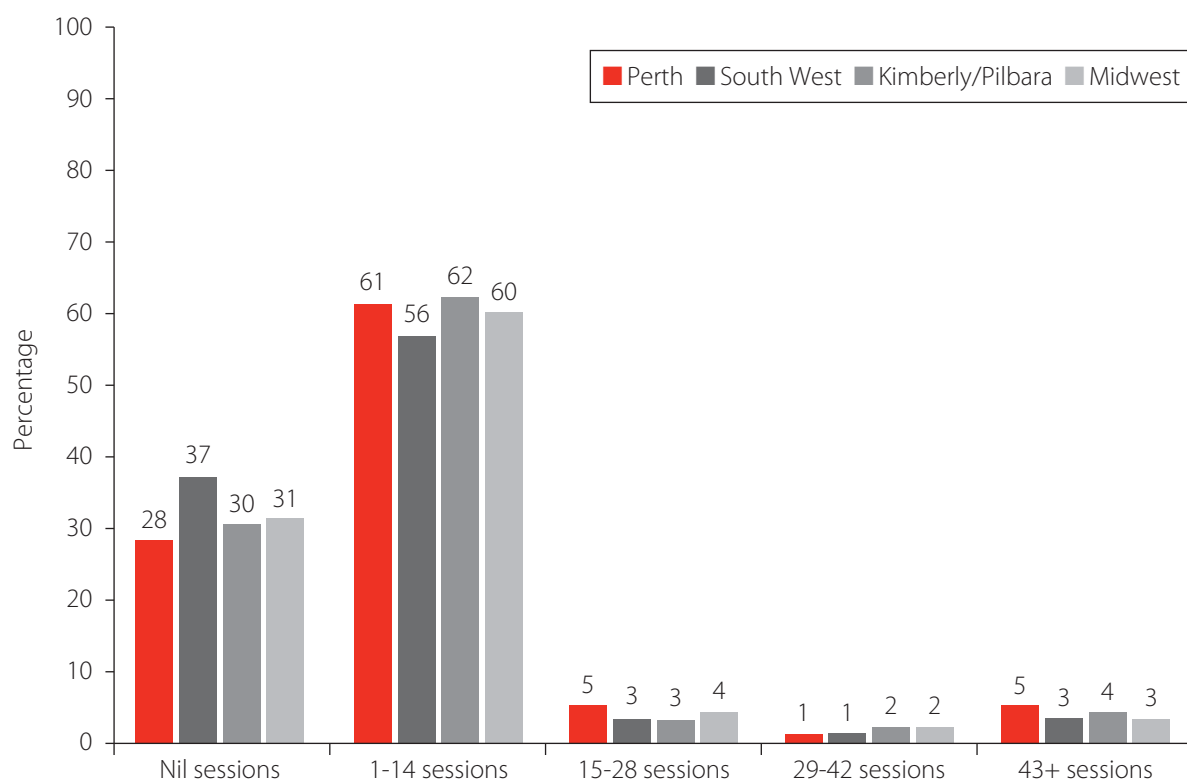
- Participation in habitual incidental physical activity was similar for both males and females (Figure 3.8.2a).
- In general, participation in habitual incidental physical activity sessions decreased with age. Adults aged 60 years and older were more likely to report no participation in incidental physical activity than younger age groups (Figure 3.8.2b).
- Compared with other locations, fewer Perth metropolitan respondents reported no participation in sessions of habitual incidental physical activity (Figure 3.8.2c).
- Generally, there was a positive relationship between sufficient levels of physical activity and sessions of habitual incidental physical activity (Figure 3.8.2d).



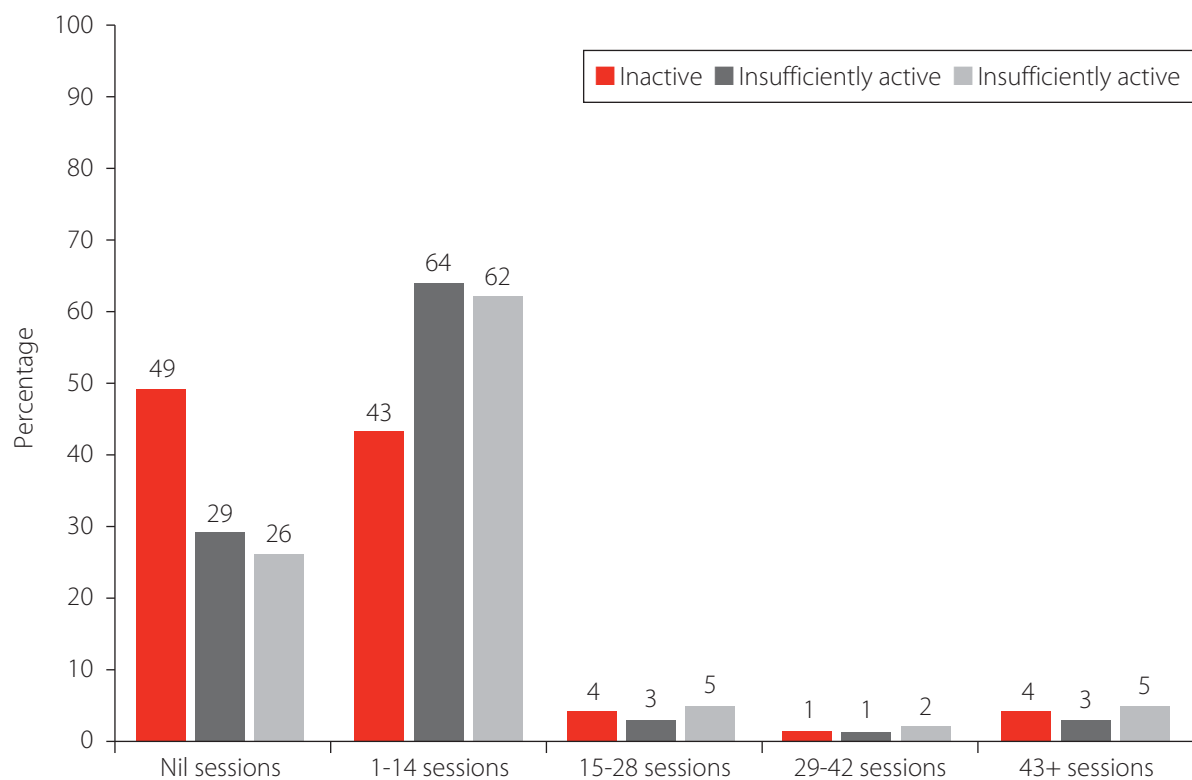
**Figure 3.8.2a: Total weekly sessions of habitual incidental physical activity by gender**



**Figure 3.8.2b: Total weekly sessions of habitual incidental physical activity by age**



**Figure 3.8.2c: Total weekly sessions of habitual incidental physical activity by location**



**Figure 3.8.2d: Total weekly sessions of habitual incidental physical activity by level of physical activity**

## 4. STRENGTH TRAINING

Strength is a key physiological component of health and is recommended by major health organisations as being an important part of a complete fitness program (41, 42). Strength training has been shown to reduce body fat and increase basal metabolic rate. In older adults, strength training helps to offset the loss of muscle mass and strength typically associated with ageing and in turn reduces the risk of osteoporosis, improves postural stability and reduces the risk of falls (7, 43). Twenty minutes of training twice per week has been shown to be adequate for musculoskeletal benefits (44), and sufficient to develop and maintain muscle mass, endurance and strength to contribute to overall health and fitness (45).

In 2009, two new items were introduced to measure the engagement in activities designed to increase muscle strength or tone. The first item asked about the number of times in the past week participants engaged in activities such as lifting weights, pull ups, push ups or sit ups. The second item asked participants to estimate the total time spent doing these activities in the past week.

### **Table 4a highlights**

- In 2009, 33% of respondents engaged in at least one weekly exercise session designed to increase muscle strength or tone.
- A similar proportion of males (32%) and females (34%) participated in at least one weekly exercise session designed to increase muscle strength or tone. The average weekly time spent in strength training was higher for males (119 minutes/wk) than females (96 minutes/wk).
- Engagement in at least one session of exercise to increase muscle strength/tone was inversely related to the age of respondents, with 43% of 18-29 year olds participating in strength training compared to 23% of those aged 60 years or older.
- A greater proportion of respondents with an education less than TEE level (73%) engaged in no sessions to increase muscle strength or tone compared with respondents who had completed the TEE/diploma (66%) or a university degree (62%).
- Retired respondents (78%) were the least likely to have engaged in exercises to increase muscle strength or tone, compared with all other work classification.

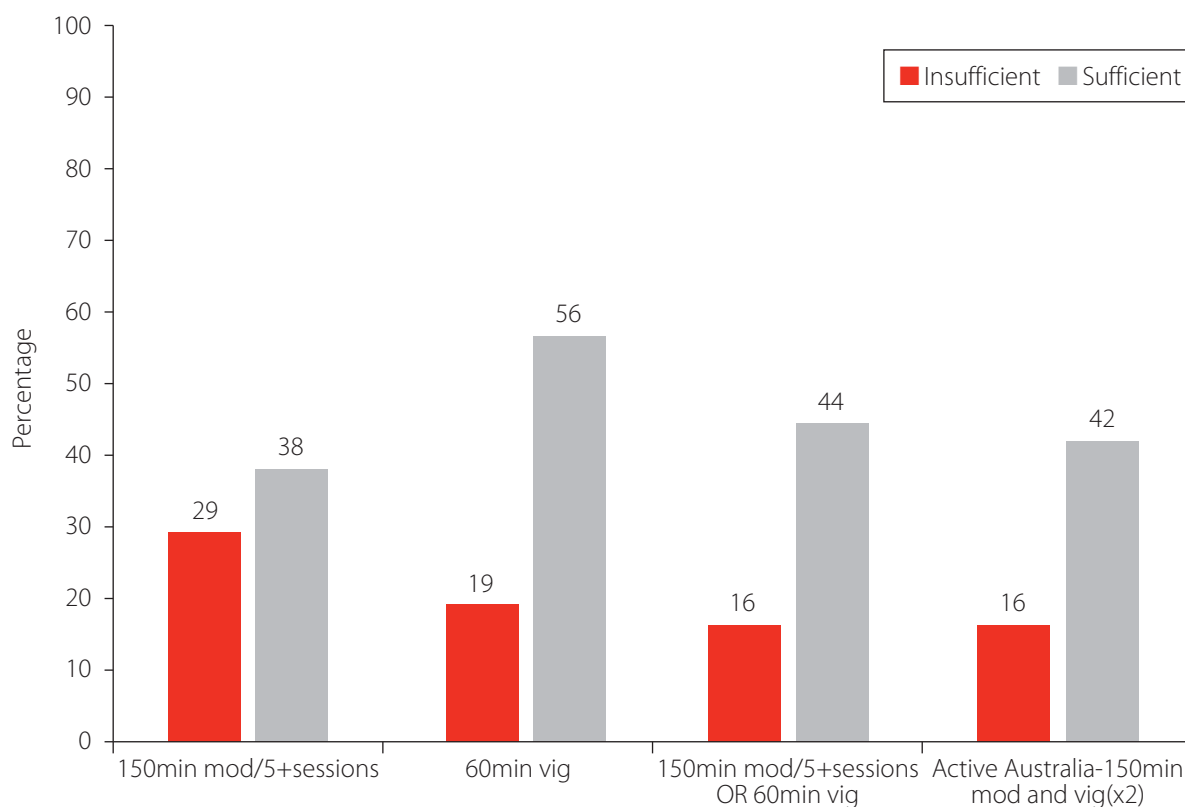


**Table 4a: Weekly muscle strength/tone sessions by demographic variables**

Characteristic	No sessions	At least one session	Average time (minutes/wk)	95% CI (Lower)	95% CI (Upper)
<b>Gender</b>					
Male	67.8	32.2	118.8	109.2	128.4
Female	65.9	34.1	96.0	95.8	112.9
<b>Age group</b>					
18 to 29 years	56.9	43.1	135.5	120.7	150.3
30 to 44 years	61.9	38.1	108.4	96.8	120.2
45 to 59 years	70.8	29.2	103.7	92.2	115.2
60 years or more	77.3	22.7	105.5	90.7	120.2
<b>Location</b>					
Perth metropolitan area	65.4	34.6	104.4	106.8	121.9
South West	71.7	28.3	100.7	83.5	117.9
Kimberley/Pilbara	69.2	30.8	132.6	97.5	167.8
Midwest/Goldfields	70.6	29.4	90.0	71.1	108.9
<b>Marital status</b>					
Married/de facto	68.2	31.8	107.4	99.7	115.2
Single	58.5	41.5	127.8	113.0	142.6
Separated/divorced	68.4	31.6	94.8	75.4	114.0
Widowed	79.7	20.3	126.8	89.6	163.9
<b>Education</b>					
Less than TEE	73.2	26.8	127.6	113.2	142.1
TEE/diploma	66.1	33.9	104.1	94.3	113.8
University	62.1	37.9	107.2	96.6	117.7
<b>Occupation</b>					
Manager/professional	62.4	37.6	100.6	91.1	110.1
White-collar	64.0	36.0	116.6	98.2	135.0
Blue-collar	70.4	29.6	147.1	125.9	168.3
Unemployed	69.8	30.2	134.6	62.6	206.5
Home duty	67.2	32.8	111.3	85.3	137.3
Retired	78.4	21.6	129.8	129.8	105.0
Student	45.3	54.7	91.9	76.8	107.1
<b>Overall</b>	<b>66.7</b>	<b>33.3</b>	<b>110.9</b>	<b>104.3</b>	<b>117.6</b>

**Figure 4a highlights**

- A greater proportion of respondents who were sufficiently active participated in exercises to increase muscle strength or tone compared with insufficiently active participants.
- More than one half (56%) of sufficiently active respondents who completed 60 minutes of vigorous activity also engaged in at least one weekly session of strength training.



**Figure 4a: Participation in strength training (weekly) by measures of sufficient physical activity**

5. WORKPLACE PHYSICAL ACTIVITY

This chapter presents data on workplace related physical activity. Overall, 30% of respondents reported that their work was mainly sedentary, 26% reported their work involved mostly standing, 16% were in manual work and 5% heavy manual work (in addition 24% responded this question was not applicable).

5.1 Workplace physical activity by demographic characteristics

Table 5.1 highlights

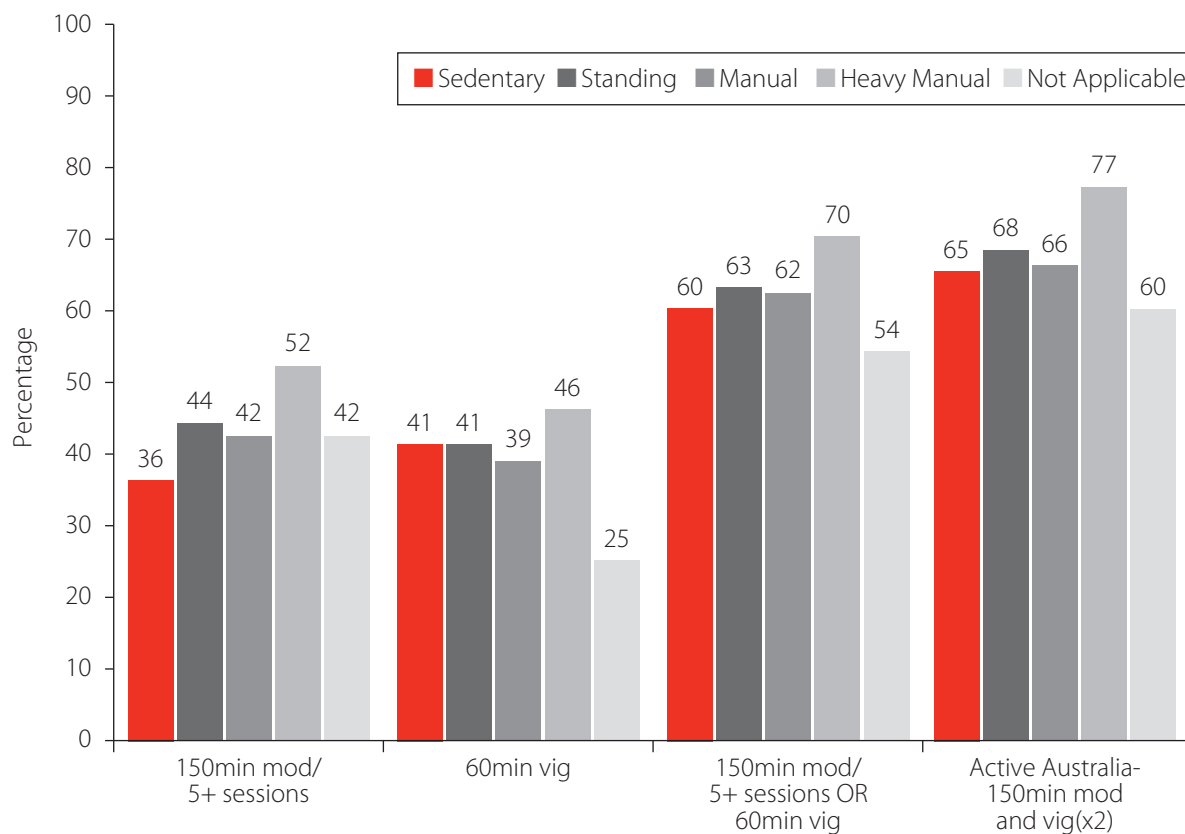
- Overall, 39% of males and 38% of females reported their work was mainly sedentary.
- Compared with other age groups, respondents aged 18 -24 years were most likely to report that their work was mostly 'standing'.
- A greater proportion of respondents with a tertiary qualification worked in sedentary jobs compared with respondents with less than a TEE qualification.
- A greater proportion of respondents in professional/managerial jobs were in sedentary jobs compared with other job classifications. In contrast, blue collar workers most commonly reported working in jobs that required manual (46%) or heavy manual (26%) work.

**Table 5.1: Workplace physical activity by demographic variables (n=2661)**

Characteristic	Sedentary	Standing	Manual	Heavy Manual
Gender				
Male	39.3	22.6	27.4	10.7
Female	38.5	48.5	11.9	1.1
Age group				
18 to 29 years	25.1	44.3	22.8	7.8
30 to 44 years	43.3	30.7	18.7	7.4
45 to 59 years	42.4	33.1	18.8	5.6
60 years or more	41.6	32.1	23.7	2.6
Location				
Perth metropolitan area	41.6	34.1	18.3	6.0
South West	35.1	34.3	26.0	4.7
Kimberley/Pilbara	26.5	33.7	25.5	14.3
Midwest/Goldfields	25.9	39.6	26.9	7.6
Marital status				
Married/de facto	41.3	32.8	19.4	6.4
Single	29.9	39.2	24.0	6.9
Separated/divorced	41.0	37.1	16.6	5.4
Widowed	48.4	31.9	19.8	0.0
Education				
Less than TEE	31.5	33.2	26.3	9.1
TEE/diploma	33.9	34.6	24.1	7.4
University	51.9	36.0	9.3	2.9
Occupation				
Manager/professional	56.2	33.3	8.9	1.6
White-collar	36.6	45.7	16.7	1.0
Blue-collar	10.1	17.9	46.1	26.0
Home duty	38.1	38.1	23.8	0.0
Retired	41.3	8.8	6.9	0.6
Student	33.3	51.7	11.7	3.3
Overall	39.8	34.8	18.9	6.5

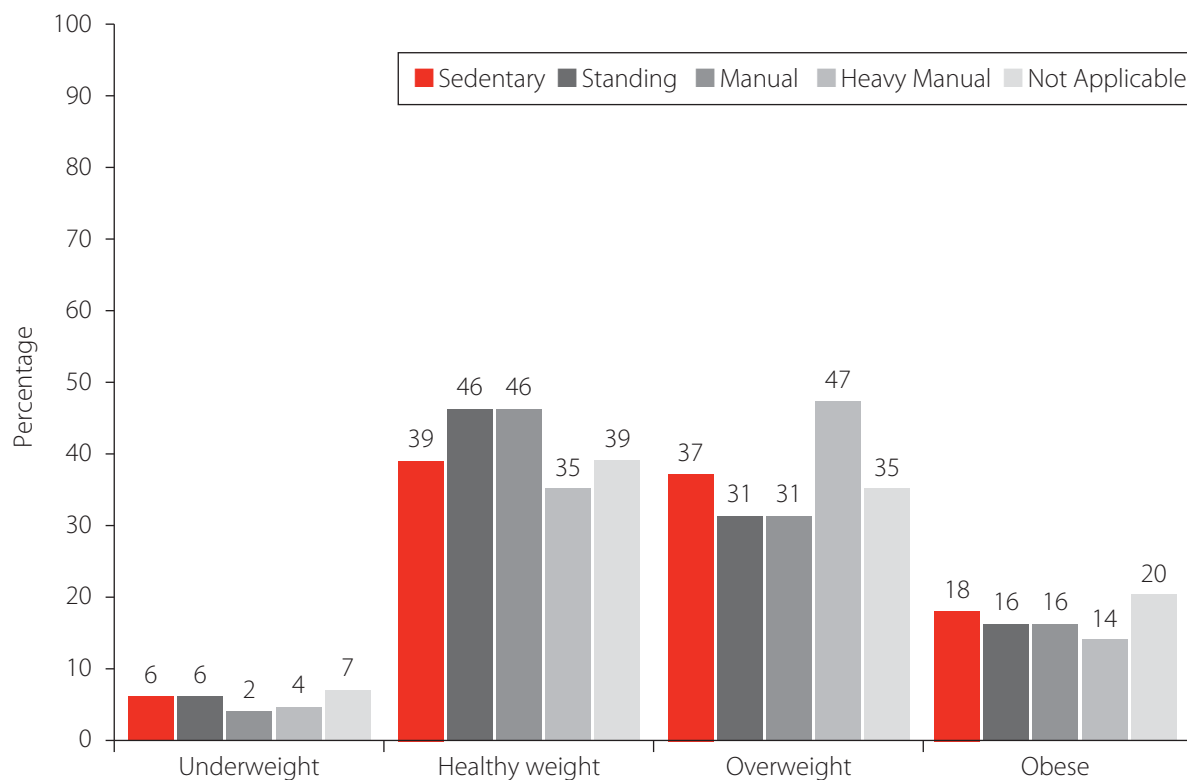
**Figure 5.1a highlights**

- The highest proportion of respondents to achieve sufficient levels of physical activity reported their job required heavy manual work.
- Small differences in the proportion of respondents achieving sufficient levels of physical activity were observed between respondents who were in sedentary, standing or manual jobs.

**Figure 5.1a: Work place physical exertion by measures of sufficient physical activity**

**Figure 5.1b highlights**

- Respondents in heavy manual work were the most prevalent overweight group (47%).
- Respondents who were standing (46%) or in manual work (46%) represented the highest proportion of healthy weight respondents.

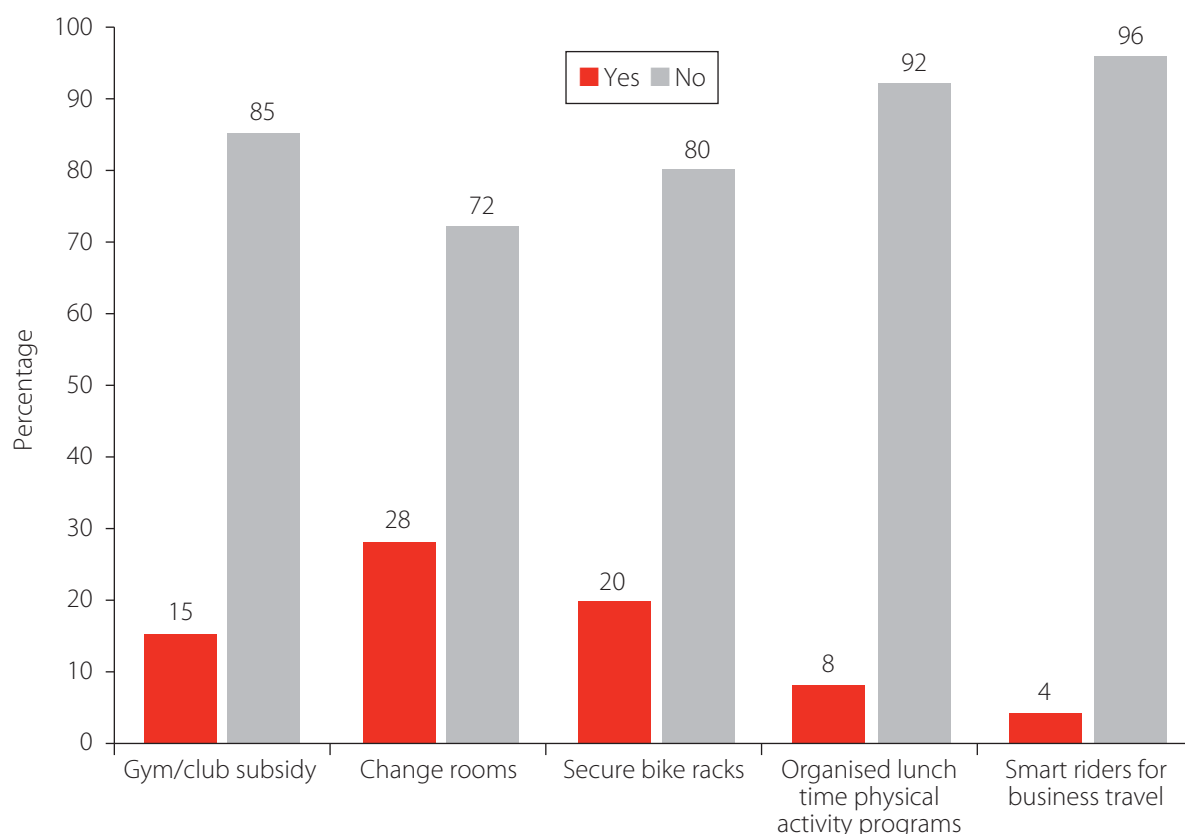
**Figure 5.1b: Workplace physical exertion by BMI group**

(Underweight n=166, Healthy weight n=1315, Overweight n=1118, Obese n=544)

## 5.2 Physical activity related workplace facilities

### Figure 5.2a highlights

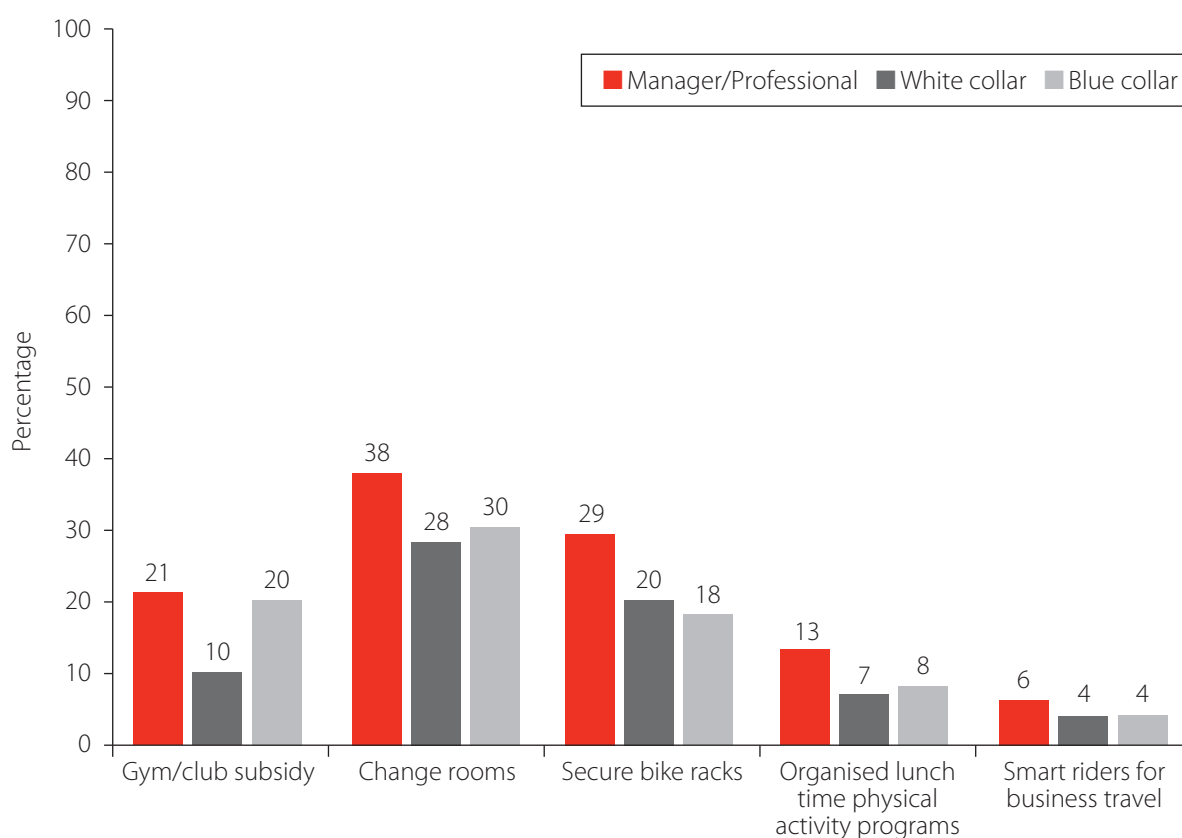
- The provision of change rooms (28%) were the most frequently reported used facility.
- Few participants reported the provision of organised lunchtime physical activity programs (8%) or smart riders for business travel (4%).
- One in five respondents (20%) reported their workplace provided secure bike racks.



**Figure 5.2a: Provision of workplace facilities** ( $n=2656$ )

**Figure 5.2b highlights**

- Figure 5.2b includes managers/professionals, white collar and blue collar workers who reported that their workplace provided facilities. Overall, managers/professionals were most likely to report that their workplace provided change rooms, secure bike racks and organised lunch time physical activity programs.
- Subsidies for gym/club were most prevalent for managers/professionals (21%) and blue collar workers (20%).



**Figure 5.2b: Workplace facilities by job type** (*n* = 1748; Managers/Professionals, White collar and Blue collar only)



## 6. INFLUENCES ON PHYSICAL ACTIVITY IN WESTERN AUSTRALIA

This chapter presents data on factors important for influencing levels of physical activity in the Western Australian adult population. Contemporary approaches to increasing physical activity are guided by theories from psychology, sociology and social marketing, and use planning frameworks such as the precede/proceed model to guide their development and implementation. The 2009 survey included items to assess key aspects of these theories and approaches.

The survey sought to collect information on 'readiness' to be physically active according to Prochaska's 'stage of change' model (46). The results are presented in Section 6.1. Section 6.2 provides information on comprehension of major physical activity campaign messages that have been promoted in Western Australia during the past few years. Section 6.3 reports on awareness of particular marketing logos as a measure of target audience reach.

Other survey items assessed respondents' confidence to participate in moderate-intensity physical activity on five or more days in a typical week, which is a strong predictor of participation in physical activity (Section 6.4). Sedentary behaviour was also investigated via measurement of television watching and computer use (Table 4.4). Finally, one survey question asked if respondents had received advice on physical activity participation during their last visit to a doctor/general practitioner (Table 4.5).

### 6.1 Readiness to be more physically active

Readiness to increase physical activity was measured as described in the 'stage of change' model (46). Respondents were classified using the categories of pre-contemplation (not intending to change), contemplation (intending to be active in the next six months), preparation (intending to be active in the next week), action (becoming more active at the present time) and maintenance (maintaining their raised level of activity).

**Table 6.1 highlights**

- Overall, 4.2% of 2009 survey respondents were pre-contemplating, 10% contemplating and 24% in preparation to become physically active, while 9% were taking action to become more active and 53% maintaining their level of activity.
- A higher proportion of males (56%) than females (49%) were in the maintenance stage of physical activity.
- Compared to other age groups, respondents aged 60 years and over were least likely to be taking action to be more active (5%) and most likely to have no intention of increasing their physical activity level (9%).
- Twenty percent of inactive respondents were in the pre-contemplation stage of physical activity compared with 4% of those who were insufficiently active and 1% of sufficiently active adults.
- Respondents who were insufficiently active were more likely to describe themselves as contemplating or preparing to become physically active in the next few weeks, compared with sufficiently active respondents.
- Most sufficiently active adults (68%) considered themselves to be in the maintenance stage compared to 32% of insufficiently active and 23% of inactive adults.

**Table 6.1: Physical activity stage of behaviour by Demographics and activity level (2009)**

	Stage of Change (%)				
	Pre-Contemplation	Contemplation	Preparation	Action	Maintenance
<b>Gender</b>					
Male	4.3	9.0	23.7	7.0	56.0
Female	4.2	11.5	24.7	10.4	49.2
<b>Age group</b>					
18 to 29 years	2.6	6.8	27.2	13.5	49.8
30 to 44 years	1.9	11.6	25.0	10.8	50.6
45 to 59 years	3.8	11.6	24.7	6.3	53.7
60 years or more	9.4	9.6	19.7	4.6	56.7
<b>Location</b>					
Perth metropolitan	4.2	10.6	23.9	8.5	52.8
South West	4.7	8.5	27.5	11.0	48.4
Kimberley/Pilbara	4.2	10.2	21.2	7.6	56.8
Midwest/Goldfields	3.5	10.2	22.0	7.5	56.9
<b>Physical activity level</b>					
Inactive	20.3	26.7	24.6	5.1	23.1
Insufficiently active	4.1	18.0	39.2	6.7	32.0
Sufficiently active	1.2	3.4	17.3	10.2	67.9
<b>Overall</b>	4.2	10.2	24.2	8.7	52.7

<sup>1</sup> Participating in less than 150 minutes of moderate on five or more sessions and 60 minutes of vigorous physical activity per week.

## 6.2 Comprehension of physical activity messages

### Table 6.2 highlights

- Overall, 61% of respondents were aware that 30 minutes of moderate-intensity physical activity is required on most days for good health. Most incorrect responses over-estimated rather than under-estimated the correct number of minutes of recommended physical activity.
- The proportion giving the correct response was higher amongst women than men and those aged 18–44 years compared to other age groups.

**Table 6.2: Proportion of respondents correctly answering '30 minutes' of moderate-intensity physical activity is required on most days for good health by Demographics, activity level and BMI**

	%
<b>Gender</b>	
Male	56.9
Female	65.0
<b>Age group</b>	
18 to 29 years	69.5
30 to 44 years	64.9
45 to 59 years	59.7
60 years or more	49.4
<b>Location</b>	
Perth metropolitan	60.8
South West	60.7
Kimberley/Pilbara	59.3
Midwest/Goldfields	63.8
<b>Activity level<sup>1</sup></b>	
Inactive	59.4
Insufficiently active	67.8
Sufficiently active	58.1
<b>BMI category</b>	
Underweight	67.1
Normal weight	61.6
Overweight	59.1
Obese	62.6
<b>Overall</b>	<b>61.2</b>

<sup>1</sup> Sufficient activity is defined as 150 minutes of moderate physical activity on five or more sessions or 60 minutes of vigorous physical activity per week (excludes gardening and household chores).

### 6.3 Awareness of physical activity messages

#### Table 6.3a and 6.3b highlights

- Respondents were most aware of the 'Find 30' (79%) and 'Be Active' (78%) message. A higher proportion of sufficiently active respondents were aware of these messages compared with those who were inactive or insufficiently active.
- 'Walk There Today' (19%) and 'Unplug and Play' (22%) were recalled by the lowest proportion of respondents.

**Table 6.3a: Prompted awareness of physical activity messages by activity level<sup>1</sup>**

	Inactive (%)	Insufficiently active (%)	Sufficiently active (%)	Overall (%)
Find thirty	70.5	76.7	81.8	78.9
Be Active	69.2	77.8	80.3	78.2
Be Active WA	47.8	51.4	50.3	50.3
Travel Smart	40.9	41.7	47.2	44.9
Draw the Line	43.1	44.9	44.4	44.4
Unplug and Play	19.7	21.6	21.8	21.5
Walk there today	20.7	17.6	18.4	18.5

<sup>1</sup> Sufficient activity is defined as 150 minutes of moderate physical activity over five or more sessions or 60 minutes of vigorous physical activity per week (excludes gardening and household chores).

**Table 6.3b: Prompted awareness of physical activity messages by year**

	2002 %	2006 %	2009 %
Find thirty (P > 0.01)	70.2	77.8	78.9
Be Active (p > 0.01)	73.8	79.8	78.2
Be Active WA	-	50.0	50.3
Travel Smart (p > 0.01)	32.3	45.2	44.9
Draw the Line	-	-	44.4
Unplug and Play	-	-	21.5
Walk there today	20.9	21.8	18.5

## 6.4 Television viewing and computer use

Participation in sedentary activities as well as physical activities can provide important information towards the planning and implementation of programs. The number of hours spent watching television or (non-work) computer use are indicators of sedentary activity.

### Table 6.4 highlights

- On average, respondents spent 19.2 hours per week watching television and/or using a computer for non-work purposes.
- The sedentary activities of television viewing and computer use were similar for males and females. Viewing/use increased as age increased.
- Sufficiently active adults reported lower levels of television viewing/computer use (18hrs/wk) than those who were insufficiently active (20hrs/wk) or inactive (22 hrs/wk).

**Table 6.4: Television and computer use per week (hrs) by demographics and activity level**

	Average time per week (hrs)	95% CI (lower) (hrs)	95%CI (upper) (hrs)
Gender			
Male	19.4	18.7	20.0
Female	18.9	18.2	19.6
Age group			
18 to 29 years	13.7	13.2	14.2
30 to 44 years	13.6	13.2	13.9
45 to 59 years	15.9	15.5	16.4
60 years or more	20.7	20.1	21.3
Location			
Perth metropolitan	19.7	19.1	20.2
South West	16.7	15.4	17.9
Kimberley/Pilbara	17.4	15.5	19.4
Midwest/Goldfields	19.6	18.1	21.0
Activity level			
Inactive	22.0	20.2	23.9
Insufficiently active	19.8	18.9	20.7
Sufficiently active	18.2	17.7	18.8
Overall	19.2	18.7	19.7

## 6.5 Doctor/GP advice about physical activity

Respondents were asked about advice they may have received about physical activity during their last visit to their doctor or general practitioner. Table 6.5 shows the proportion of adults who reported receiving physical activity advice from their general practitioner.

### Table 6.5 highlights

- Overall, 21% of respondents reported receiving advice about physical activity during their last visit to their doctor/general practitioner.
- A similar proportion of men and women reported having received advice. Adults aged 45 to 59 years (26%) were most likely to have received advice compared to other age groups.
- There was little difference in the proportion of people given advice across the state.
- Those who were insufficiently active (28%) or inactive (25%) were more likely to report receiving physical activity advice from their doctor/GP than sufficiently active adults (17%).
- Compared to other BMI groups, obese adults were most likely (42%) to report receiving advice about physical activity from their doctor/GP.

**Table 6.5: Received advice about physical activity on their last visit to the physician**

	Yes (%)
<b>Gender</b>	
Male	20.8
Female	21.2
<b>Age group</b>	
18 to 29 years	13.9
30 to 44 years	18.1
45 to 59 years	26.0
60 years or more	21.5
<b>Location</b>	
Perth metropolitan	20.1
South West	24.2
Kimberley/Pilbara	22.9
Midwest/Goldfields	23.1
<b>Activity level<sup>1</sup></b>	
Inactive	24.6
Insufficient	27.9
Sufficient	17.0
<b>BMI category</b>	
Underweight	10.6
Acceptable	9.6
Overweight	23.7
Obese	42.0
<b>Overall</b>	20.8

<sup>1</sup>Sufficient activity is defined as 150 minutes of moderate physical activity on five or more sessions or 60 minutes of vigorous physical activity per week(excludes gardening and household chores).

## 7. BODY MASS INDEX AND PHYSICAL ACTIVITY

Physical activity, together with the regulation of dietary energy intake, is vital in the prevention of overweight and obesity. Globally, the prevalence of both overweight and obesity is rapidly increasing (15). In 2009, 67% of Western Australian adults were overweight or obese (25). Nationally, it is estimated that three in five adults (61%) are overweight or obese (26). Overweight and obesity in Australia accounted for approximately four percent of the total burden of disease in 1999 (12) rising to nine percent in 2006 (13). It is estimated that the total direct cost of BMI-defined obesity in Australia in 2005 was \$8.3 billion, with the average annual cost of government subsidies for the overweight and obese as \$3,917 per person (24).

There are several known causes of overweight and obesity, of which energy imbalance is the most common. This imbalance is the consequence of a higher consumption of energy from food than that being expended and may be the product of over-consumption, lack of physical activity or both (47). Both excessive energy consumption and physical inactivity are partly the result of an increasingly 'obesogenic' environment (48-50). Environmental factors such as increases in the availability of fast foods, increased portion size, increased energy content of foods, increased automation in the workplace and in everyday living and increased participation in inactive pastimes (e.g. watching television, computer use) appear to be contributing to the overweight/obesity epidemic. The risk of various negative health consequences (e.g. diabetes, hypertension, cardiovascular disease, certain cancers, sleep apnoea and osteoarthritis) increase as body mass index increases from the healthy weight range through to overweight into obesity. Obesity has also been associated with an increased likelihood of injury, including car crashes, workplace injuries and absenteeism. Obesity is considered by the World Health Organization to be a worldwide epidemic (15).

Healthy/unhealthy weight can be calculated via the body mass index (BMI) i.e. weight in kilograms divided by height in metres squared ( $\text{kg}/\text{m}^2$ ). To calculate BMI for this report, respondent self-reported their body weight and height. The following definitions of BMI were used (15):

Classification	BMI ( $\text{kg}/\text{m}^2$ )
Underweight	< 18.50
Healthy weight	18.50 to 24.99
Overweight	25.00 to 29.99
Obese	$\geq 30.00$

## 7.1 The proportion of Western Australian adults in each BMI category

Table 7.1 shows the proportion of adult respondents in each category of body mass index. The level of overweight and obesity in the population was approximately one in every two people. Analysis by demographic factors shows that there were particular subgroups where the proportion that was overweight or obese was much higher than one in two.

### **Table 7.1 highlights**

- Over one-half of all respondents were categorised as either overweight (37%) or obese (18%), with 39% in a healthy BMI weight range and 5% categorised as underweight (5%).
- Although a significantly higher proportion of males (45%) than females (29%) were overweight, the proportion of obese adults for each gender category was similar (18% males and 18% females).
- More females than males were a healthy weight (45% vs. 34%) or underweight (8% vs. 2%).
- The prevalence of overweight and obesity ranged from 32% of 18 to 29 year olds to 65% of 45 to 59 year olds.
- Although high, people living in the Perth metropolitan area had a lower prevalence of overweight and obesity (53%) compared with respondents in other regions (South West 65%, Kimberley/Pilbara 62%, Midwest/Goldfields 63%).
- Widowed (61%), married/de facto (58%) or separated/divorced (57%) respondents showed the highest levels of overweight or obesity. Single respondents had the highest proportion of adults in the healthy BMI range (50%).
- As education level increased, the proportion of overweight and obese adults decreased (university level education 48%; education less than TEE 63%).
- While 77% of students had healthy BMI levels, 73% of unemployed people had BMI's in the overweight or obese range. Blue-collar occupations had higher proportions of overweight and obesity (64%) than white-collar occupations (55%) or people in the manager/professional roles (54%).



**Table 7.1: Body mass index by demographic characteristics**

Characteristic	BMI Category			
	Underweight n=166 %	Healthy n=1315 %	Overweight n=1118 %	Obese n=544 %
Gender				
Male	2.5	34.2	45.2	18.1
Female	8.0	45.1	28.7	18.2
Age group				
18 to 29 years	10.8	57.0	23.0	9.2
30 to 44 years	3.7	44.5	34.3	17.6
45 to 59 years	3.4	31.8	43.3	21.6
60 years or more	5.9	35.0	39.8	19.3
Location				
Perth metropolitan area	5.2	42.2	36.5	16.2
South West	4.6	30.8	39.5	25.1
Kimberley/Pilbara	5.2	33.3	38.5	23.0
Midwest/Goldfields	5.1	32.2	40.3	22.3
Marital status				
Married/de facto	3.9	37.6	39.7	18.8
Single	10.0	50.2	24.9	14.9
Separated/divorced	3.9	39.5	37.5	19.1
Widowed	7.2	31.6	42.6	18.7
Education				
Less than TEE	5.2	32.0	38.0	24.8
TEE/diploma	4.7	40.2	37.9	17.2
University	5.6	46.2	35.7	12.6
Occupation				
Manager/professional	4.8	41.2	38.8	15.2
White-collar	5.6	39.8	34.8	19.8
Blue-collar	1.9	34.1	45.3	18.7
Unemployed	2.3	25.0	38.6	34.1
Home duty	6.3	45.0	29.1	19.6
Retired	5.8	35.0	37.6	21.6
Student	14.0	77.4	5.4	3.2
Overall	5.2	39.4	37.3	18.2

## 7.2 Level of physical activity and body mass index

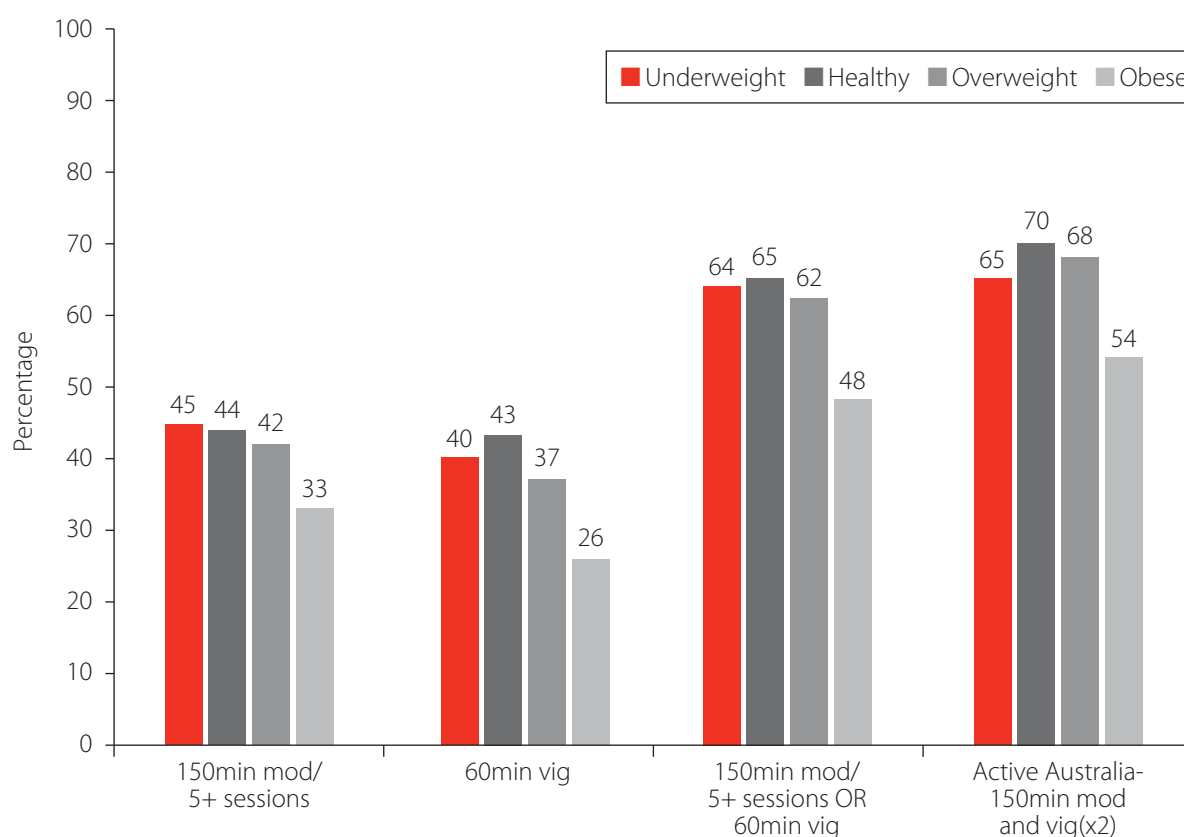
The National Physical Activity Guidelines for Australians (29) recommend 30 minutes of moderate-intensity activity on most, preferably all, days of the week. However, several definitions of sufficient physical activity exist, all of which have strengths and limitations. Hence, as presented in earlier chapters of this report, the following section presents BMI related to attainment of sufficient levels of physical activity based on several definitions often used in surveys and reports nationally (3, 30, 38).

The proportion of adults undertaking sufficient physical activity in each BMI category is presented in Figure 7.2.1 and Table 7.2.2. Note that the definitions of sufficient physical activity only include vigorous-intensity, walking and other moderate-intensity physical activities. Gardening, household chores and occupation were not included.

### 7.2.1 Measures of physical activity by BMI

#### **Figure 7.2.1 highlights**

- Adults in the healthy BMI range were more likely than overweight or obese adults to undertake sufficient levels of physical activity. With the exception of the underweight category, for each definition of sufficient physical activity an inverse relationship between sufficient physical activity and increasing BMI was observed.
- The strongest trend was found in the measurement of vigorous physical activity. Overall, 60 minutes or more of vigorous physical activity was reported by 43% of healthy BMI adults. This dropped to 37% of overweight adults and 26% of obese adults.
- With all measures of physical activity, the differential between healthy and overweight adults was not as marked as the differential between overweight and obese adults. For example, according to the Active Australia definition of sufficient physical activity, there was a 2% difference in the proportion meeting the guideline between healthy weight and overweight adults (70% vs. 68%), but a 14% difference in the proportion meeting the guideline between overweight and obese adults (68% vs. 54%).



**Figure 7.2.1: Measures of sufficient physical activity by BMI**

### 7.2.2 Level of physical activity by BMI

Table 7.2.2 presents the proportion of adults undertaking sufficient physical activity (at least 150 minutes of moderate-intensity physical activity on five or more sessions or 60 minutes of vigorous-intensity activity in the previous week), insufficient activity and those who were inactive by level of BMI.

#### Table 7.2.2 highlights

- Obese adults (52%) were more likely to be inactive or insufficiently active compared to other BMI categories (overweight 38%, healthy weight 35%, underweight 36%).

**Table 7.2.2: Prevalence of inactivity, insufficient activity and sufficient physical activity\* by body mass index**

BMI category	Inactive (n=390) (%)	Insufficient activity (n=928) (%)
Underweight	13.9	22.4
Healthy	9.1	25.7
Overweight	11.9	26.0
Obese	15.6	36.0
Overall	11.5	27.4

\*Participation in 150 minutes of moderate on five or more sessions or 60 minutes of vigorous physical activity per week.

### 7.3 Television viewing and computer use by level of physical activity and BMI category

Participation in sedentary activities such as television viewing and recreational computer use has been linked with overweight and obesity as an independent risk factor. Table 7.3 presents the average time spent per week in sedentary behaviour (i.e. television viewing and computer use) by level of physical activity and BMI.

#### Table 7.3 highlights

- Television viewing and computer use were associated with overweight and obesity independent of physical activity levels, which were also independently associated with hours of television and computer use.
- Compared to other BMI/physical activity categories, inactive obese adults (25.5 hrs/wk) reported the highest number of hours per week of television viewing/recreational computer use.

**Table 7.3: Average hours per week television viewing and recreational computer use by physical activity and body mass index**

BMI category	Inactive (hrs)	Insufficient activity (hrs)	Sufficient activity* (hrs)	Total (Av hrs/wk)
Underweight	18.2	22.6	19.2	19.8
Healthy	19.4	17.2	16.6	17.0
Overweight	20.7	19.5	18.4	19.0
Obese	25.5	20.9	19.2	20.8

*\*Participation in 150 minutes of moderate on five or more sessions or 60 minutes of vigorous physical activity per week.*

## 7.4 Prevalence of incidental physical activity and BMI

Table 7.4 reports on the proportion of people who participated in habitual incidental physical activity by BMI category.

### Table 7.4 highlights

- Participation in habitual incidental physical activity was highest on weekdays and declined from weekday to Saturday, then further from Saturday to Sunday regardless of BMI. Underweight people represented the highest proportion of incidental activity on weekdays, Saturdays and Sundays.
- In general, the proportion of people who engaged in incidental activity was lower in the overweight and obese compared with the healthy BMI range. This was consistent across weekdays, Saturdays and Sundays.
- Thirty five percent of healthy weight respondents participated in habitual incidental activity everyday, which was 7% higher than overweight adults and 6% higher than those classified as obese.

**Table 7.4: Frequency of incidental physical activity on weekdays, Saturday, Sunday, every day and any day of the week by body mass index**

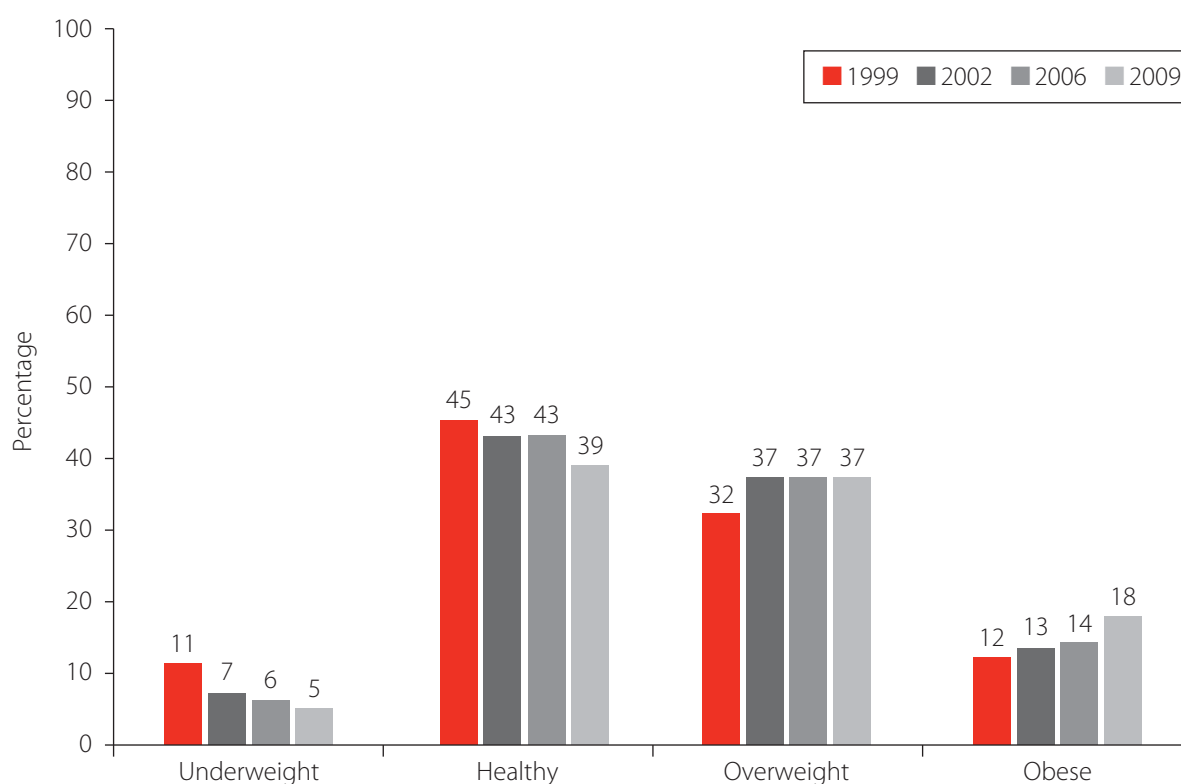
Sessions	Underweight (%)	Healthy (%)	Overweight (%)	Obese (%)
Weekday	68.8	62.6	58.1	58.7
Saturday	54.3	52.4	46.6	45.0
Sunday	46.8	45.6	40.2	38.4
Every Day (typical week)	35.3	35.2	28.4	29.2
No Days (typical week)	21.4	28.2	31.3	32.1

## 7.5 Overweight and obesity trends by survey year

Trend data should be interpreted with caution due to methodological variations in sampling between the four surveys. However, trend data may give a general indication as to whether or not overweight/obesity is increasing, decreasing or stable over time in the Western Australian adult population.

### Figure 7.5 highlights

- The proportion of people in the healthy BMI range decreased by 6% from 1999 to 2009.
- Overweight increased by 5% from 1999 to 2002, then stabilised between 2002 (37%) and 2009 (37%).
- Obesity showed a more consistent rise of 1% for each survey year from 1999 to 2006 and a 6% rise between 1999 and 2009.
- Statistically significant increases in overweight and obesity were found between 1999 and 2009.



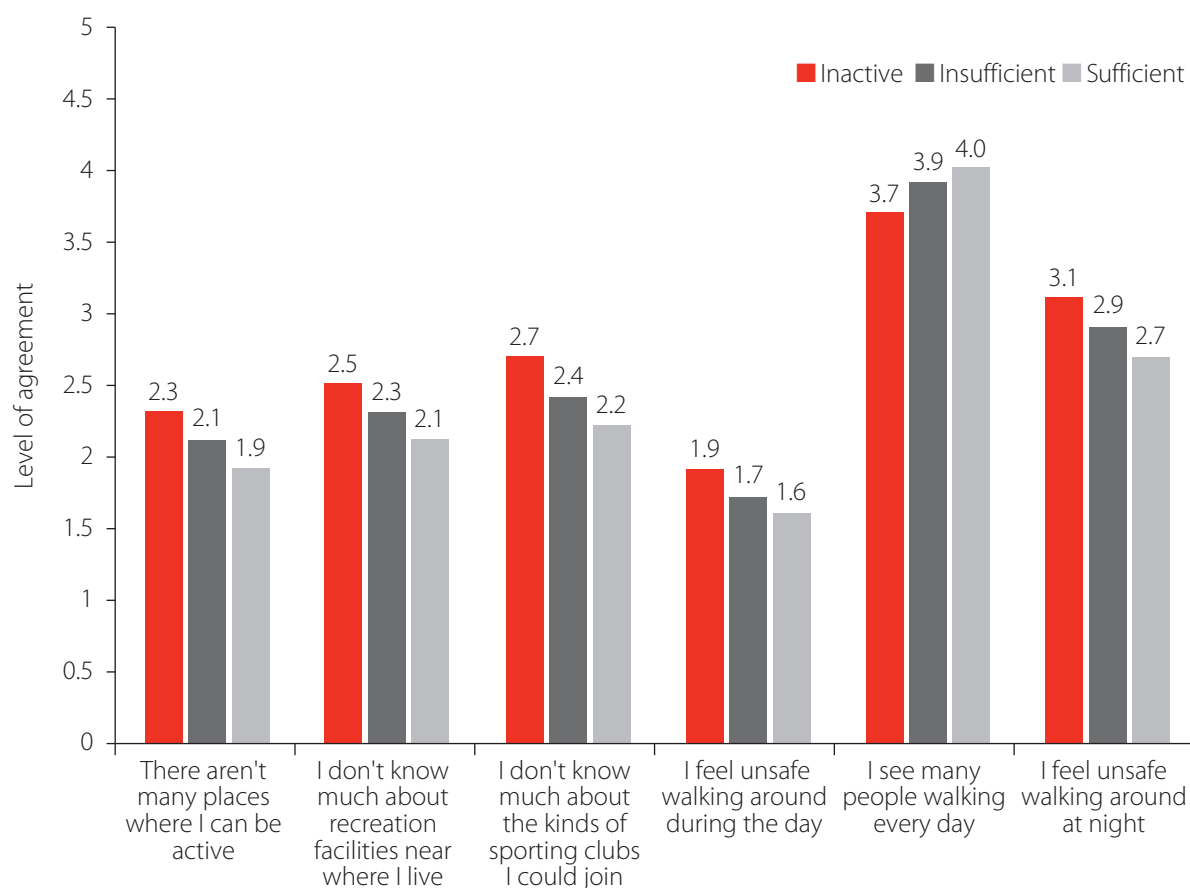
**Figure 7.5: Trends in body mass index by survey year**

## 8. ENVIRONMENTAL SUPPORTS OF PHYSICAL ACTIVITY

The 2009 physical activity survey included items about respondent perceptions of their local neighbourhood to support physical activity. For each of six statements relating to their neighbourhood, participants were asked how strongly they agreed or disagreed with each statement, where 5 was strongly agree and 1 was strongly disagree.

### Figure 8a highlights

- Sufficiently active respondents had more positive attitudes towards their local neighbourhood in relation to physical activity environmental supports compared with inactive and insufficiently active respondents.

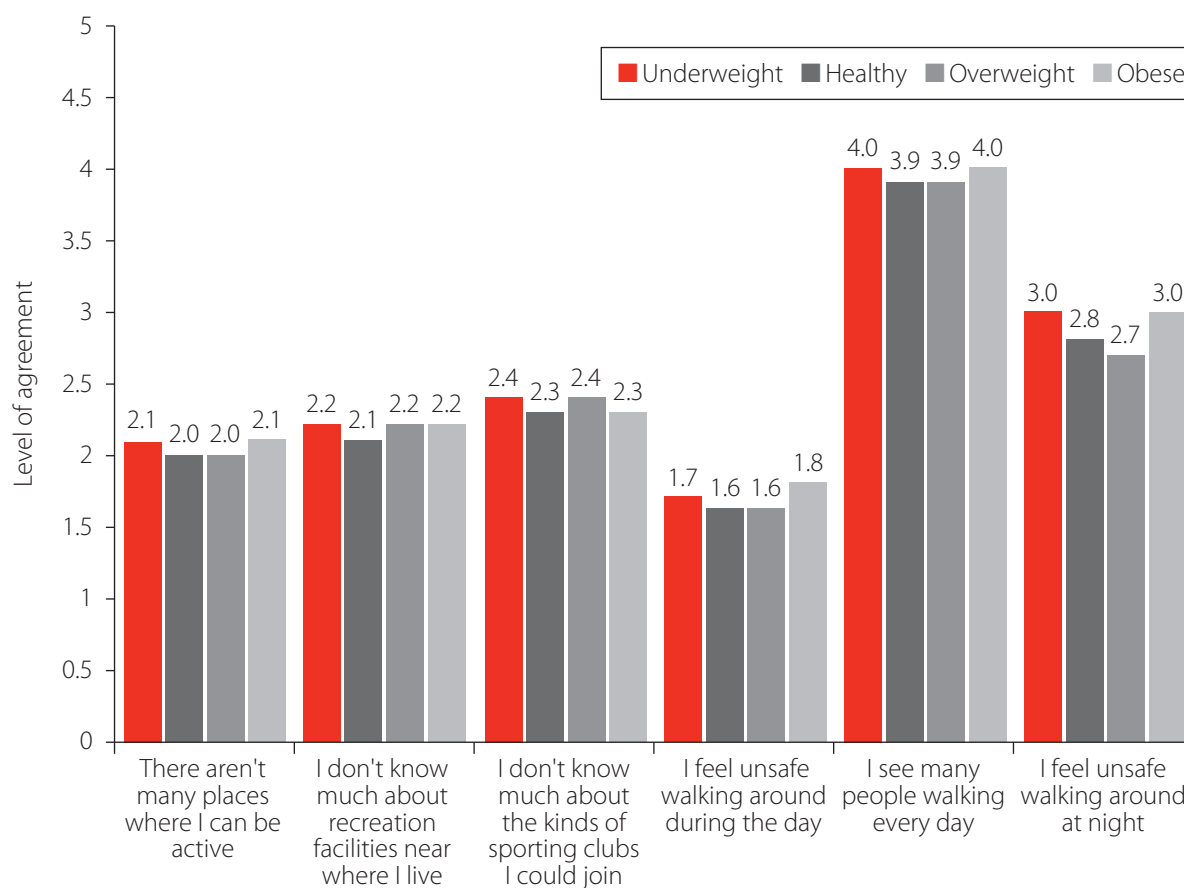


**Figure 8a: Physical activity environmental supports by level of physical activity**

*(Average level of agreement) (Inactive n=380, Insufficiently active n=913, Sufficiently active n=1998)*

**Figure 8b highlights**

- Regardless of their BMI classification, most respondents disagreed with the statement 'there aren't many places to be active'; 'I don't know much about recreation facilities near where they lived' and 'I feel unsafe walking around during the day'.



**Figure 8b: Physical activity environmental supports by BMI (Average level of agreement)**

(Underweight n=166, Healthy weight n=1315, Overweight n=1118, Obese n=544)



## 9. PEDOMETER STUDY

This chapter presents the pedometer data collected in 2002 and 2009. Pedometers provide an objective assessment of physical activity, particularly for activities involving walking or running. The pedometer cannot be assumed to measure all types of physical activity because activities such as swimming and cycling cannot be measured using this instrument. However, given that walking is the most commonly performed physical activity by adults, nationally and in Western Australia (1, 37), and that many other types of physical activity involve some form of walking or running (e.g. most team sports, golf, tennis, aerobics, etc.), the counting of steps should provide an approximation of the general physical activity levels of adults. In addition to walking and jogging/running for recreation and transport, the pedometer will also capture any changes in habitual incidental physical activity.

Presently, the optimum number of daily steps required to confer a health benefit is not known. However, recent studies have reported that performing 10,000 steps or more per day may result in health benefits (51, 52). Furthermore, various physical activity campaigns and interventions both overseas (53, 54) and in Australia (55) are promoting the target of 10,000 steps per day. Therefore the proportion of participants undertaking above or below 10,000 steps per day by demographic characteristics and physical activity levels are presented in this report. To provide additional information about the distribution of daily steps performed, the proportion of participants performing more or less than 15,000 steps per day is also presented.

**Table 9a highlights**

Comparison of 2002 and 2009 pedometer study participants:

- In terms of gender, age group, location and marital status, a similar proportion of respondents participated in the 2002 and 2009 pedometer study. However, significant differences were observed by education level and occupation ( $p < 0.01$ ).
- A similar proportion of participants in each physical activity level participated in the 2002 and 2009 pedometer study.

**Table 9a: Demographic profile of pedometer study respondents**

	2002 (n=434)	2009 (n=406)
Gender		
Male	47.5	51.3
Female	52.5	48.7
Age group		
18 to 29 years	10.7	7.8
30 to 44 years	32.0	26.8
45 to 59 years	32.2	34.7
60 years or more	25.1	30.6
Location		
Perth metropolitan area	76.9	71.7
South West	9.4	4.3
Kimberley/Pilbara	3.7	9.5
Midwest/Goldfields	10.0	14.5
Marital status		
Married/de facto	72.1	76.4
Single	11.4	10.3
Separated/divorced	11.2	8.4
Widowed	5.3	5.0
Education**		
Less than TEE	34.2	23.7
TEE/diploma	38.6	44.1
University	27.3	32.1
Physical Activity		
Inactive	9.4	7.4
Insufficient	33.1	29.9
Sufficient	57.5	62.7
Occupation**		
Manager/professional	27.9	37.2
White-collar	14.3	9.5
Blue-collar	16.7	14.4
Unemployed	1.9	1.0
Home duty	15.7	9.0
Student	5.4	2.3
Retired	18.1	26.7

\* $p < 0.05$  \*\* $p < 0.01$

**Table 9b highlights**

- Average pedometer steps by demographic variables for 2009 study participants:
- On average, females accumulated significantly more steps than males ( $p < 0.05$ ).
- Participants aged 60 years and older recorded significantly fewer steps than younger respondents ( $p < 0.01$ ).
- Sufficiently active respondents recorded significantly more steps than insufficient or inactive participants ( $p < 0.01$ ). No significant differences were observed in the pedometer steps between inactive and insufficiently active participants.

**Table 9b: Average pedometer steps by demographic variables**

	Average Steps 2009 (n = 406)
<b>Gender*</b>	
Male	8235 ± 4002
Female	9094 ± 3526
<b>Age group**</b>	
18 to 29 years	8992 ± 3755
30 to 44 years	9398 ± 3278
45 to 59 years	8659 ± 3561
60 years or more*	7243 ± 4490
<b>Location</b>	
Perth metropolitan area	8695 ± 3991
South West	7825 ± 2654
Kimberley/Pilbara	9937 ± 2711
Midwest/Goldfields	8884 ± 3554
<b>Marital status**</b>	
Married/de facto	8937 ± 3437
Single	8620 ± 3756
Separated/divorced	7765 ± 6732
Widowed	6170 ± 2865
<b>Physical Activity**</b>	
Inactive	6407 ± 2564
Insufficient	8061 ± 4231
Sufficient	9153 ± 3571
<b>Education</b>	
Less than TEE	7696 ± 3446
TEE/diploma	8803 ± 4201
University	8872 ± 3330

**Table 9b: continued**

	Average Steps 2009 (n = 406)
Occupation**	
Manager/professional	9156 ± 4035
White-collar	8914 ± 4429
Blue-collar	8891 ± 3619
Unemployed	10736 ± 4055
Home duty	9054 ± 3059
Retired	6699 ± 2760
Student	9352 ± 5079
Overall	8654 ± 3797

\* $p < 0.05$  \*\* $p < 0.01$

**Table 9c highlights**

- Pedometer steps accumulated by participants in 2009 compared with 2002.
- On average, pedometer study participants recorded significantly fewer steps in 2009 (8,654 steps), compared with 2002 (9,538 steps).
- Males in 2009 recorded significantly fewer steps than males in 2002.
- Respondents in 2009 aged 30 to 59 years recorded significantly fewer steps compared with 2002 respondents.
- In 2009, participants in the Perth metropolitan area and the South West recorded fewer steps than their 2002 counterparts.
- Inactive and sufficiently active participants in 2009 recorded significantly fewer steps than inactive and sufficiently active participants in 2002.
- Blue collar and retired respondents reported significantly fewer steps in 2009 compared with 2002 participants.

**Table 9c: Average pedometer steps by demographic variables and survey year**

	Average Steps 2002 (n = 434)	Average Steps 2009 (n=406)	P-value
<b>Gender</b>			
Male	9968 ± 3770	8235 ± 4002	0.00
Female	9100 ± 3875	9094 ± 3526	0.98
<b>Age group</b>			
18 to 29 years	9229 ± 1888	8992 ± 3755	0.68
30 to 44 years	10599 ± 3683	9398 ± 3278	0.06
45 to 59 years	9696 ± 4034	8659 ± 3561	0.00
60 years or more	8132 ± 7243	7243 ± 4490	0.15
<b>Location</b>			
Perth metropolitan area	9431 ± 3837	8695 ± 3991	0.02
South West	9504 ± 4223	7825 ± 2654	0.02
Kimberley/Pilbara	10455 ± 2669	9937 ± 2711	0.61
Midwest/Goldfields	10201 ± 3675	8884 ± 3554	0.15
<b>Marital status</b>			
Married/de facto	9704 ± 3823	8937 ± 3437	0.01
Single	9349 ± 8620	8620 ± 3756	0.25
Separated/divorced	10003 ± 3887	7765 ± 6732	0.08
Widowed	6805 ± 4017	6170 ± 2865	0.57
<b>Physical Activity</b>			
Inactive	9329 ± 3850	6407 ± 2564	0.00
Insufficient	8913 ± 3693	8061 ± 4231	0.08
Sufficient	9910 ± 3890	9153 ± 3571	0.02
<b>Education</b>			
Less than TEE	9352 ± 4005	7696 ± 3446	0.01
TEE/diploma	9817 ± 3990	8803 ± 4201	0.02
University	9360 ± 3419	8872 ± 3330	0.25
<b>Occupation</b>			
Manager/professional	9902 ± 3626	9156 ± 4035	0.13
White-collar	9802 ± 3587	8914 ± 4429	0.29
Blue-collar	11302 ± 4072	8891 ± 3619	0.00
Unemployed	10649 ± 3201	10736 ± 4055	0.97
Home duty	8724 ± 3933	9054 ± 3059	0.64
Retired	8131 ± 3733	6699 ± 2760	0.01
Student	8625 ± 3234	9352 ± 5079	0.53
<b>Overall</b>	<b>9538 ± 3843</b>	<b>8654 ± 3797</b>	<b>0.00</b>

**Table 9d highlights :**

- A significantly smaller proportion of people over 60 years of age accumulated 10,000 steps compared with all other age groups.
- A sufficiently greater proportion of active participants accumulated at least 10,000 steps compared with inactive participants.

**Table 9d: Achieving 10,000 and 15,000 steps by demographic variables**

Characteristic	10,000 Steps 2009 (%)	15,000 Steps 2009 (%)
Gender		
Male	27	3
Female	36	6
Age group**		
18 to 29 years	34	4
30 to 44 years	41	6
45 to 59 years	31	4
60 years or more	16	2
Location		
Perth metropolitan area	33	5
South West	17	2
Kimberley/Pilbara	47	0
Midwest/Goldfields	29	6
Marital status **		
Married/de facto	37	5
Single	22	4
Separated/divorced	19	4
Widowed	10	0
Education		
Less than TEE	23	1
TEE/diploma	34	6
University	34	3

\*  $p < 0.05$  \*\*  $p < 0.01$

**Table 9d: continued**

Characteristic	10,000 Steps 2009 (%)	15,000 Steps 2009 (%)
Occupation**		
Manager/professional	34	6
White-collar	40	6
Blue-collar	34	5
Unemployed	67	0
Home duty	39	2
Retired*	10	0
Student	32	17
PA Level**		
Inactive	15	0
Insufficient	24	2
Sufficient	36	6
BMI Group		
Underweight	38	14
Acceptable	37	6
Overweight	26	2
Obese	22	3
Overall	32	4

\* $p < 0.05$  \*\* $p < 0.01$

**Table 9e highlights**

- In 2009, approximately one third (32%) of respondents performed 10,000 steps or more per day. This was significantly lower than the 46% of respondents who performed 10,000 or more steps per day in 2002.
- In 2002, a significantly greater proportion of males accumulated 10,000 steps and 15,000 steps compared with males in 2009.
- A significantly greater proportion of 30-44 year olds in 2002 accumulated at least 10,000 steps compared with 2009 participants.
- A significantly greater proportion of 45-59 year olds in 2002 accumulated 10,000 steps and 15,000 steps compared with 2009 participants.
- A significantly greater proportion of participants in the Perth metropolitan area and in the South West accumulated at least 10,000 steps in 2002 compared with 2009.
- In 2002, a significantly greater proportion of respondents with a TEE or less level of education accumulated at least 10,000 steps compared with respondents in 2009.
- A significantly greater proportion of blue collar and retired participants in 2002 accumulated at least 10,000 steps compared with 2009 participants.
- A significantly smaller proportion of inactive participants in 2009 accumulated at least 10,000 steps compared with 2002 inactive participants. A similar trend was observed for sufficiently active participants, although no significant difference in the proportion accumulating 10,000 steps was observed amongst insufficiently active participants.
- A significantly smaller proportion of respondents of a healthy weight or who were overweight accumulated at least 10,000 steps in 2009 compared with 2002 participants.



Table 9e: Achieving 10,000 and 15,000 steps by demographic variables by survey year

Characteristic	10,000 Steps %		15,000 Steps %	
	2002	2009	2002	2009
Gender				
Male	51(0.00)	27	12(0.00)	3
Female	41	36	6	6
Age group				
18 to 29 years	47	34	1	4
30 to 44 years	59(0.00)	41	12	6
45 to 59 years	45(0.04)	31	12(0.03)	4
60 years or more	29	16	6	2
Location				
Perth metropolitan area	45(0.00)	33	9(0.03)	5
South West	46(0.00)	17	9	2
Kimberley/Pilbara	53	47	0	0
Midwest/Goldfields	46	29	14	6
Marital status				
Married/de facto	46 (0.02)	37	10(0.01)	5
Single	51(0.00)	22	4	4
Separated/divorced	48(0.02)	19	9	4
Widowed	19(0.66)	10	9	0
Education				
Less than TEE	45(0.00)	23	9(0.02)	1
TEE/diploma	49(0.00)	34	12	6
University	43	34	5	3
Occupation				
Manager/professional	46	34	9	6
White-collar	43	40	10	6
Blue-collar	74(0.00)	34	17	5
Unemployed	50	67	14	0
Home duty	37	39	4	2
Retired	27(0.00)	10	8	0
Student	44	32	0	17
PA Level				
Inactive	54(0.00)	15	8	0
Insufficient	36	24	6	2
Sufficient	50(0.00)	36	11	6
BMI Group				
Underweight	42	38	3	14
Healthy weight	51(0.01)	37	9	6
Overweight	44(0.00)	26	12 (0.00)	2
Obese	40	22	5	3
Overall	46 (0.00)	32	9(0.00)	4

## 10. DISCUSSION

This report forms part of an ongoing surveillance and monitoring of physical activity levels in Western Australia. The main purpose of this study was to collect physical activity data about Western Australian adults for comparison with previous state-wide surveys conducted in 1999, 2002 and 2006 (1-3). As in the previous surveys, information about participation, determinants of/factors influencing physical activity and levels of overweight and obesity were reported.

### 10.1 Physical activity levels

#### Survey results

There are important health and economic benefits associated with increasing the proportion of the population who are physically active at levels sufficient to benefit health. Furthermore, there are significant health benefits for the community as a whole if the proportion of people who are inactive can be reduced (23). In 2009, 60% of Western Australian respondents were sufficiently active to accrue health benefits; 28% were insufficiently active and 12% were inactive. Slightly more women than men walked in the week previous to the survey (82% vs. 78%). Slightly more men than women participated in vigorous-intensity (46% vs. 43%) and moderate-intensity (32% vs. 25%) physical activity. Men were also more likely than women to undertake sufficient levels of physical activity (62% vs. 59%). Participation in sufficient physical activity was higher in 2009 compared with the 1999 and 2002 surveys, and similar to the 2006 survey. Physical inactivity in the 2009 survey was similar to levels found in 1999 and 2006 and slightly lower compared with levels found in 2002.

### **Pedometer results**

In 2009, 32% of pedometer study participants accumulated a daily average of at least 10,000 steps; 4% of participants accumulated at least 15,000 steps. The accumulation of 10,000 steps per day has been considered equivalent to 30 minutes of moderate-intensity walking (56) and is used as a measure of achieving sufficient physical activity levels. De Cocker et al (56), suggest large differences between the proportion of participants who accumulate 10,000 pedometer steps and the proportion who self report sufficient levels of physical activity through short form physical activity surveys. Their findings suggest that this difference might be twice as high for self report compared with pedometer steps. Results from the present study, reflect these observations with an almost two fold difference in self reported sufficient level of physical activity and accumulation of 10,000 steps. De Cocker et al and Bravata (56, 57) in their systematic review also point out that sub population patterns of achieving sufficient levels of physical activity are most likely similar (57) between self report and accumulation of 10,000 pedometer steps, a finding replicated with patterns of pedometer counts in this study. Compared to the 2002 pedometer study, 2009 participants accumulated significantly fewer pedometer steps. This observation may in part be explained by significantly different characteristics of participants in 2002 compared with 2009 with regard to education and occupation. With consideration for sample differences between the two survey years, in 2009, male respondents, respondents aged 30 to 59 years, Perth metropolitan respondents, South West respondents, those who were inactive or sufficiently active, retired respondents and those in blue collar occupations recorded significantly fewer steps compared with 2002 participants.

Overall, the results of the pedometer study support observed disparities between at risk populations found in the self-report data, as well as a reduction in the average number of steps accumulated between 2002 and 2009.

## 10.2 Participation in physical activity and use of facilities

This study confirmed previous surveys showing that walking for recreation and for transport are popular forms of physical activity for both men and women (32), as well as providing similar findings to the 2006 survey. Gardening remained the second most popular physical activity in 2009. However, limited published research to establish the health benefits associated with gardening exists (58) therefore caution should be made regarding the interpretation of these findings. Given that gardening is popular, particularly among older adults, research on the physical and mental health benefits associated with gardening should be encouraged.

As walking was found to be the most popular physical activity engaged in by respondents, streets/footpaths were a frequently reported facility used for undertaking physical activity, although compared with 2006 (48%), fewer participants reported using them in 2009 (33%). Continuing a trend observed in the 2006 survey was the increased use of cycle or walking paths since the 1999 survey (7 to 31%). The decrease in use of streets and footpaths and increase in use of walking and cycling paths during the same period may correspond to improvements in the walking and cycle path network. Since 1999, an increase in the use of the home as a place to exercise was also observed (42% in 1999 to 55% in 2009). In 2009, workplace facilities (12%) and shopping malls (7%) were more commonly reported as exercise facilities compared with 2006 (5% and 1% respectively), suggesting an expansion of facilities for exercising. Importantly, six out of the nine (streets/footpaths, home, cycle/walking paths, public parks, the beach and shopping malls) most used physical activity facilities can be accessed without incurring a direct fee for use, suggesting that public infrastructure is important to provide opportunities to facilitate regular physical activity.

The Department of Planning has developed guidelines to create more 'Liveable Neighbourhoods' that encourage walking and cycling (59). The results of this survey support this type of initiative, as walking is popular and most people undertake this activity in streets and parks. Given the importance of streets for walking and for other activities including cycling and running, efforts to increase the supportiveness of the streetscapes for these activities is to be encouraged. Promoting walking and cycling as forms of (environmentally friendly) sustainable transport, as well as a healthy activity, is consistent with the State Sustainability Strategy (59).

Traditionally, aerobic endurance exercise has been advocated for health promotion purposes. Since the late 1990s, progressive whole strength training has been recommended (60). Evidence for the independent benefits of strength training on health has been advocated due to the mechanism of greater fat-oxidation during and following strength training that differs from the metabolic actions related to aerobic exercise (61). Strength training appears to induce cardiovascular benefits similar to that associated with moderate-intensity aerobic exercise. Several studies have also showed that strength training is effective for developing and maintaining muscular strength, power and muscle mass in older people (60).

In 2009, two items were introduced to measure the engagement in activities designed to increase muscle strength or tone such as lifting weights, pull ups or sit ups. Overall, one third of respondents participated in at least one weekly exercise session designed to increase muscle strength or tone. A similar proportion of males (32%) and females (34%) participated in strength training.

Strength training has been reported to be beneficial to people with chronic disease, such as diabetes, as well as amongst older adults (60). In this study however, respondents least likely to engage in weekly sessions of strength training were aged 60 years or over, retired, or had an education less than TEE level. Overall, fewer respondents who were insufficiently active also participated in exercises to increase muscle strength or tone compared with sufficiently active participants.

### 10.3 Habitual incidental physical activity

The National Physical Activity Guidelines promote the accumulation of physical activity through the day and encourages adults to be active in as many ways as possible. Hence, these recommendations reflect a change from promoting structured exercise to promoting unstructured physical activity that can be incorporated into one's lifestyle. For some individuals, participating in incidental physical activity may be a way in which sufficient daily physical activity can be accumulated. In the 2009 survey, participation in incidental physical activity was highest on weekdays (61%), followed by Saturdays (49%) then Sundays (42%). Overall, 32% of respondents participated in incidental physical activity every day. The proportion of respondents participating in incidental physical activity on all days decreased with advancing age and increased with higher levels of education. Overall, the prevalence of habitual incidental physical activity (weekdays, Saturdays, Sundays, every day) was higher in 2009 compared with the 2002 survey.

Western Australian adults most commonly cite a 'lack of time' as a barrier to being more active. Given that the time demands of work and family life are reducing leisure time, making adults more aware that accumulating physical activity in shorter bouts throughout the day should be considered as a strategy for achieving sufficient physical activity. Moreover, creating supportive environments has the potential to influence large segments of the population, and can act passively on a person's behaviour, such that the individual is unaware that the built environment is causing them to be more active (e.g. providing stairwells that are more accessible and lifts or escalators that are less accessible).

## 10.4 Factors influencing physical activity in Western Australia

The level of physical activity engaged in by a person is influenced by every component of human life, from genetics to individual characteristics such as gender, age, ethnic background, socioeconomic status and education to environmental aspects such as geographic location and the built environment. This survey attempted to measure those characteristics known to be important influences, triggers and mediators of physical activity in the Western Australian population.

Determining the 'stage of change' profile (46) of the community with respect to physical activity can be useful in guiding campaigns aiming at increasing participation. It can also be used to monitor changes in the preparedness of the community to respond to physical activity messages. For example, 4% of 2009 survey respondents were pre-contemplating, 10% contemplating and 24% in preparation to become physically active, while 9% were taking action to become more active and 53% maintaining their level of activity. Overall, half of all inactive people (in the 2009 survey) identified themselves as contemplating or preparing to increase their level of physical activity; this group would be particularly amenable to physical activity promotion. It should be noted however that one in four inactive people and one in three insufficiently active people considered themselves to be in the maintenance phase of physical activity.

Overall, 61% of respondents were aware that 30 minutes of moderate-intensity physical activity is required on most days for good health. Most incorrect responses over-estimated rather than under-estimated the correct number of minutes of recommended physical activity. These findings were similar to the 2006 survey, in which 40% of the sample were unable to identify the number of minutes of physical activity recommended for good health. While more public education might be required, in 2009, most inactive or insufficiently active respondents were able to recall the 'Find 30' (71% inactive; 77% insufficiently active) and the 'Be Active' (69% inactive; 78% insufficiently active) physical activity messages, suggesting that most were aware of the amount of exercise required for good health. The 2009 survey found that the 'Find thirty', 'Be active/WA', 'Travelsmart' and 'Draw the Line' messages have been successful in terms of message awareness, however, the challenge is to turn message recognition/awareness into substantial lifestyle behavioural change.

General practitioners (GPs) are an important source of health information for many people (62). While information about the primary reason for their last visit to their GP was not collected, 21% of respondents reported receiving advice about physical activity (during their last visit). Obese (42%) and overweight (24%) adults were most likely to receive physical activity advice from their GP during their last visit compared to other BMI groups. A greater proportion of respondents in these groups reported receiving advice from their GP in 2009 compared with 2006, suggesting greater emphasis by GPs to promote physical activity. Opportunities for general practitioners to promote physical activity could possibly lead to better targeting of at risk individuals.

### Television viewing and computer use

In 2009, respondents engaged in television and computer use for an average of 19 hrs/wk. The sedentary activities of television viewing and computer use was similar by gender but increased as age increased. Sufficiently active adults reported lower levels of television viewing/computer use (18hrs/wk) than those who were insufficiently active (20hrs/wk) or inactive (22 hrs/wk). Compared to other BMI/physical activity groups, inactive obese adults reported the highest number of hours per week of television viewing and computer use (25.5 hrs/wk). The results of the 2009 survey found that as inactivity increased so too did the number of hours spent in television viewing and recreational computer use.

### Workplace physical activity

The 2009 survey included an item on work related physical exertion. Over one half of respondents reported mainly sitting (30%) or standing (26%) as part of their job. As expected, respondents in management/professional/white collar jobs and higher education levels were most likely to report that their job was largely sedentary, while blue collar workers were more likely to be engaged in light or heavy manual physical exertion. Respondents who mainly stood (46%) or who were engaged in manual work (46%) represented the highest proportion of healthy weight respondents. It was unclear from this survey, whether workplace exertion was independent from or added to respondents' recall of recreational physical activity. Of interest was the 47% of heavy manual workers who were classified as overweight, despite having the greatest proportion of sufficiently active respondents.

Workplace facilities for physical activity, or to support physical activity, were largely non-existent with the exception of changing rooms (28%) and secure bike racks (20%). Respondents who were managers/professionals reported the highest number of workplace facilities for physical activity. The prevalence of workplace facilities for physical activity may reflect the duration of intervention activities that have focused more commonly on 'end of trip' facilities.

## 10.5 Physical activity and body weight

'There is probably no better – certainly there is no simpler – sign of the condition of an ordinary individual's health up to middle life than his weight' (63).

In 2009, over one-half of Western Australian respondents were categorised as either overweight (37%) or obese (18%). These results are similar to findings in the 2004-05 National Health Survey (64). Increases in overweight and obesity were found from 1999 to 2009. This trend is disturbing, but consistent with national (32, 65) and international (15) trends. Overweight and obesity was highest amongst males, those aged 45-59 years, those living in the South West, with lower education levels and lower incomes (i.e. the unemployed and the retired). Self-perception may be a problem for some of these groups, with National Health Survey data (64) showing that only 32% of males considered themselves to be overweight compared with 63% classified as overweight or obese based on BMI calculations.

Adults in the healthy weight BMI group were more likely than those who were classified as overweight or obese adults to undertake sufficient levels of physical activity. Obese adults were much more likely to be inactive, or insufficiently active, compared with overweight adults who in turn were more likely to be inactive or insufficiently active than healthy weight adults. This is consistent with numerous other studies, including the 2004–05 National Health Survey (64). While it is logical to infer that when observing an association between a health behaviour and a health condition, it is the behaviour that is likely to be causative of the condition, there is inconsistent evidence to support this causal link (66). This may be at least partly due to the difficulty in accurately measuring physical activity levels across the population. However, there is also evidence in this survey that being overweight or obese can negatively impact on confidence to achieve moderate amounts of physical activity.

This survey showed a clear and consistent inverse relationship between habitual incidental physical activity and overweight and obesity. Although this is an area that is often hard to measure accurately, it would appear to be an important piece of the jigsaw puzzle and give insights into more effective strategies to promote physical activity and reduce negative outcomes such as obesity.



Compared with other BMI/physical activity categories, inactive obese adults reported the highest number of hours per week spent television viewing and recreational computer use. Overweight and obesity was clearly associated with higher rates of television watching, with inactivity having an additive effect on the relationship. This survey can only highlight the association between these three variables rather than a causal link. However, evidence is accumulating that sedentary activities such as television watching, increase the risk of obesity, independent of physical activity levels (67-69). An investigation of 'sitting time', of which television watching is a major component, found a strong positive association with obesity independent of physical activity (70). People of low socioeconomic status and people who study or work long hours were particularly at risk.

These studies and the results of this survey indicate that sedentary time needs to be included as a separate measure in future surveys and examined more closely for its impact on the health of the community. Finally, some research has hypothesised that there exists a 'sedentary syndrome' that includes unhealthy eating habits and leads to negative health consequences that include overweight and obesity. Strategies to reduce obesity may need to think more holistically at converting an 'obesogenic' environment (48, 50) that discourages physical activity and encourages over-consumption of food, into one that encourages a healthy lifestyle (71).

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## 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. A BMI of 20-25kg/m<sup>2</sup> is considered ideal.

**Duration** is the length of time (hours/minutes) spent participating in physical activity.

**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 fitness.

**Fitness** is a set of attributes that people have or achieve that relates to their ability to perform physical activity. It is most often used to refer to the cardio-respiratory capacity of an individual to perform physical activity.

**Frequency** is the number of times a person participates in physical activity within a given period.

**Health** The World Health Organization defines health as 'a state of complete physical, mental and social well being and not merely the absence of disease.'

**Inactive** is used to describe individuals who reported no participation in any walking, moderate-intensity, or vigorous-intensity physical activity in the past week.

**Habitual incidental physical activity** in this report is defined as physical activity, which is performed for less than 10 minutes and is undertaken as part of carrying out normal daily chores. Examples include walking/cycling to the shop for a newspaper, or walking to a bus stop.

**Habitual incidental activity behaviour** in this report is defined as specific physical activities that are carried out either as deliberate or non-deliberate acts and often can be performed as part of undertaking normal daily chores. Examples include climbing stairs instead of using an elevator/escalator; parking the car further away from the shop in order to walk further; or taking the dog for a walk.

**Intensity** is the perceived or self-reported intensity at which an activity is performed, e.g. vigorous, moderate-intensity, or light.

**Moderate-intensity physical activity** is physical activity requiring 3-4 METS (i.e. 3-4 times as much energy as at rest). In questionnaires, this is often described as activity that causes some increase in breathing and heart rate. National Physical Activity Guidelines released in May 2000 recommend 30 minutes of moderate-intensity physical activity on most, preferably all, days of the week.

**Participation** is taking part in a sport or activity.

**Pedometers** are small motion sensor devices, which count the number of steps performed during upright ambulatory behaviours such as walking or running.

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

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

**Sport** is a human activity capable of achieving a result requiring exertion and/or physical skill that, by its nature and organisation, is competitive and is generally accepted as being a sport and/or physical involvement within an accepted set of rules.

**Sufficient level of physical activity** is presented in two ways in this report:

- 1)** undertaking 150 minutes of moderate-intensity physical activity on five or more days per week or undertaking 60 minutes of vigorous-intensity physical activity per week; and
- 2)** undertaking 150 minutes of total physical activity where moderate-intensity and vigorous-intensity activity (weighted by two) are summated.

**Vigorous activity** is physical activity requiring 7+ METS (i.e. over 7 times as much energy as at rest). In questionnaires this is often described as activity that causes some 'huffing and puffing.'



## APPENDIX 1: SURVEY APPROACH LETTER



Dear Householder

I am writing to ask you to take part in an important initiative of the Physical Activity Taskforce. The Health Promotion Evaluation Unit at the University of Western Australia will be conducting a survey on our behalf.

We have randomly selected households to be part of the survey by using the most recent electronic version of the telephone book. Your household has been selected to take part.

In the next few weeks, an interviewer from the Edith Cowan University Survey Research Centre may telephone your house. The interviewer will ask to speak with a person in the household who is 18 years of age or older.

The interviewer will ask the chosen person to take part in an interview over the telephone that will last ten to fifteen minutes. All information collected will be strictly confidential.

We want to be more responsive to local needs and it is your response that will help us form a picture about the current needs of the community.

If you have any queries about the survey, please call \_\_\_\_\_ or the supervisor on duty on \_\_\_\_\_, or on \_\_\_\_\_ if you are calling from outside Perth. Staff at the \_\_\_\_\_ will be happy to answer your questions.

I would like to thank you in advance for your support and participation in this important initiative.

Yours sincerely

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## APPENDIX 2: QUESTIONNAIRE

### WESTERN AUSTRALIAN PHYSICAL ACTIVITY SURVEY 2009

#### INTRODUCTION

Good afternoon/evening, I am calling on behalf of the Edith Cowan University Survey Research Centre and my name is (name). We are conducting a statewide survey, which is a follow-up to similar surveys completed in 1999, 2002 and 2006. We are tracking changes in the physical activity levels of Western Australian adults. Your telephone number has been selected randomly from the White Pages.

Could I speak to the person AGED 18 years or older and who had the last birthday?

Would that be yourself? (IF NOT – when required person is on the phone repeat introduction)

**Q1.** We recently sent you a letter telling you about the survey. Did you receive the letter we sent you?

[1 yes 2 no 8 Don't know]

<b>Yes</b>	<b>1</b>
<b>No</b>	<b>2</b>
<b>Don't Know</b>	<b>8</b>

**We would like to ask you about the physical activity you did last week.**

**Q2.** In the past week how many times have you walked continuously, for at least 10 minutes, for recreation/exercise, or to get to and from places?

[99=don't know, use only as an absolute last resort]

Skip to Q4 if no walking

<b>Number of times</b>	
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**Q3.** What do you estimate was the total time that you spent walking in this way in the past week?

[Interviewer: this is continuous walking  
(walking for 10 minutes or more)]

Don't know = 998 in BOTH

<b>Hours:</b>	
<b>Minutes:</b>	

**Q4.** In the past 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?

[99=don't know, use only as an absolute last resort]

Skip to Q6 if no gardening or yard work

<b>Number of times</b>	
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- Q5.** What do you estimate was the total time you spent doing vigorous gardening or heavy work around the yard in the past week?

*Don't know = 998 in BOTH*

<b>Hours:</b>	
<b>Minutes:</b>	

**The next questions exclude household chores, gardening or yard work.**

- Q6.** In the **past 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)

*[99=don't know, use only as an absolute last resort]*

*Skip to Q8 if no vigorous PA*

<b>Number of times</b>	
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- Q7.** What do you estimate was the total time that you spent doing this vigorous physical activity in the past week?

<b>Hours:</b>	
<b>Minutes:</b>	

- Q8.** In the past week how many times did you do any other more moderate-intensity physical activities that you have not already mentioned? (e.g. gentle swimming, social tennis, golf, etc.)

*[99=don't know, use only as an absolute last resort]*

*Skip to Q10 if no moderate-intensity activities*

<b>Number of times</b>	
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- Q9.** What do you estimate was the total time that you spent doing these activities in the past week?

<b>Hours:</b>	
<b>Minutes:</b>	

- Q10.** In the past week how many times did you do any exercise to strengthen or tone your muscles such as push ups, sit ups or weightlifting?

*[99=don't know, use only as an absolute last resort]*

*Skip to Q12 if no strength training*

<b>Number of times</b>	
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- Q11.** What do you estimate was the total time that you spent doing these activities in the past week?

<b>Hours:</b>	
<b>Minutes:</b>	

**Q12.** If you have been physically active in the past week, can you list those activities that you have done continuously for ten minutes or more? (do not read out)

[DON'T READ OUT]

MR

Aerobics/step/dancing/circuit class	1
Cycling for recreation or exercise	2
Cycling for transport	3
Gardening	4
Golf	5
Jogging/running	6
Walked for recreation or exercise	7
Lawn bowls	8
Sailing	9
Swimming (pool)	20
Swimming (beach/ocean/river)	21
Squash	11
Surfing	22
Table tennis	12
Team sports	13
Tennis	14
Walked for transport, i.e. to get to and from places	15
Lifting weights, strength training, resistance training to build muscle strength	16
Other 1 [specify]	17
Other 2 [specify]	18
Other 3 [specify]	19
Pilates	20
Yoga	21
Badminton	22
Housework	23
Exercise equipment	24

*Continued next page*

## Q12. CONTINUED

[DON'T READ OUT]

MR

Calisthenics	25
Lawn/tenpin bowling	26
Martial Arts (incl. boxing)	27
Tai Chi	28
Fishing	29
Gym	30
Horse riding	31
Skating/blading	32
Walked AT work	33
Heavy lifting at work	34
Other PA at work	35
Swimming (pool)	36
Swimming (beach/ocean/river)	37
Surfing	38
Haven't been active in the past week	97
Don't know	98
Refused	99

**Q13.** What facilities or areas did you use for the activities you just mentioned?

[DON'T READ OUT]

MR

Beach	01
Cycle or walking paths, not a beach, river or park	02
Golf course	03
Gymnasium, health club or recreation centre	04
Home	05
Natural bushland	06
Public park or oval	07
Public swimming pool	08
River	09
Sailing or boat club	10
Squash courts	11
Streets/footpath	12
Team sport facilities	13
Tennis courts	14
Signed trail and/or track eg. Bibbulmun track	15
Other (specify)	16
Bowling Club/alley	17
Workplace	18
Shopping Mall/shops	19
Place of worship	20
Farm	21
Hospital	21
School	24
Physiotherapy premises	25
Other person's home	26
Private swimming pool	27
Roller skating rink/park	28
Retirement Village	29
Don't know	99

**Q14.** What facilities or areas did you use for the activities you just mentioned?

[DON'T READ OUT]

MR

Beach	01
Cycle or walking paths, not a beach, river or park	02
Golf course	03
Gymnasium, health club or recreation centre	04
Home	05
Natural bushland	06
Public park or oval	07
Public swimming pool	08
River	09
Sailing or boat club	10
Squash courts	11
Streets/footpath	12
Team sport facilities	13
Tennis courts	14
Signed trail and/or track eg. Bibbulmun track	15
Other (specify)	16
Bowling Club/alley	17
Workplace	18
Shopping Mall/shops	19
Place of worship	20
Farm	21
Hospital	21
School	24
Physiotherapy premises	25
Other person's home	26
Private swimming pool	27
Roller skating rink/park	28
Retirement Village	29
Don't know	99

**The following questions are about short walking or cycling trips that you do daily.**

**By short, I mean 10 minutes or less of continuous duration:**

- Q15a.** Excluding what you do as part of your work, on a typical weekday how many times per day do you usually walk or cycle for less than 10 minutes on trips for errands (for example to the shops, to buy your lunch) to public transport, to school, to and from work or for recreation?

*Prompt: Think about trips you do every day in the morning, in the middle of the day and in the afternoon and evening*

<b>Number of times</b>	
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- Q15b.** Excluding what you do as part of your work, on a typical Saturday how many times do you usually walk or cycle for less than 10 minutes on trips for errands (for example to the shops to buy a paper), to public transport, to and from work, or for recreation?

<b>Number of times</b>	
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- Q15c.** Excluding what you do as part of your work, on a typical Sunday how many times do you usually walk or cycle for less than 10 minutes on trips for errands (for example to the shops to buy a paper), to public transport, to and from work or for recreation?

<b>Number of times</b>	
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**The following questions are about short walking or cycling trips that you do daily.**

**By short, I mean 10 minutes or less of continuous duration:**

- Q16a.** During the past 7 days, on how many days did you bicycle to go from place to place?

*[Interviewer clarification: Think about only the bicycling that you did for at least 10 minutes at a time.]*

<b>Number of times</b>	
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*[Interviewer: If respondent answers zero, refuses or does not know, skip to Question 16a.]*

8. Refused

9. Don't know



**Q16b.** How much time in total did you usually spend on one of those days to bicycle from place to place?

*(NOTE: multiply hours by 60 and add to minutes for total moderate PA time)*

*Don't know = 998 in BOTH*

*[Interviewer clarification: Think about only the bicycling that you did for at least 10 minutes at a time.]*

<b>Hours:</b>	
<b>Minutes:</b>	

**Skip to Q17a if Q16b was not answered "Don't know"**

*[Interviewer probe: An average time per day is being sought. If the respondent can't answer because the pattern of time spent varies widely from day to day, ask*

**Q16c.** What is the total amount of time you spent bicycling over the past seven days to travel from place to place?

*(NOTE: multiply hours by 60 and add to minutes for total moderate PA time)*

*Don't know = 998 in BOTH*

*[Interviewer clarification: Think about only the bicycling that you did for at least 10 minutes at a time.]*

<b>Hours:</b>	
<b>Minutes:</b>	

**Now think only about the walking you did to travel to and from work, to do errands or to go from place to place. Only include walking that you did for at least 10 minutes at a time.**

**Q17a.** During the past seven days, on how many days did you walk to go from place to place?

*(Do not read out)*

*[Interviewer clarification: Think about only the walking that you did for at least 10 minutes at a time.]*

*8. Refused*

*9. Don't know*

*[Interviewer: If respondent answers zero, refuses or does not know, skip to Question 17a]*

<b>Number days in past week:</b>	
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**Q17b.** How much time in total did you usually spend on one of those days walking from place to place?

*(NOTE: multiply hours by 60 and add to minutes for total moderate PA time)*

*Don't know = 998 in BOTH*

*[Interviewer clarification: Think about only the walking that you did for at least 10 minutes at a time.]*

<b>Hours:</b>	
<b>Minutes:</b>	

**Skip to Q19 if Q17b was not answered "Don't know"**

*[Interviewer probe: An average time per day is being sought. If the respondent can't answer because the pattern of time spent varies widely from day to day, ask*

**Q17c.** What is the total amount of time you spent walking over the past seven days to travel from place to place?

*(NOTE: multiply hours by 60 and add to minutes for total moderate PA time)*

*Don't know = 998 in BOTH*

*[Interviewer clarification: Think about only the walking that you did for at least 10 minutes at a time.]*

<b>Hours:</b>	
<b>Minutes:</b>	

**Q18.** What is the total amount of time you spent walking over the past seven days to travel from place to place?

<b>Minutes:</b>	
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**Q19a.** When you think of physical activity, do any messages come to mind??

<b>Yes</b>	<b>1</b>
<b>No</b>	<b>2</b>
<b>Don't Know</b>	<b>9</b>

**Q19b.** IF YES, What messages come to mind? Anything else?

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**Q20.** I am going to read you a short list of messages. Just tell me which of these, if any, you recall hearing recently.

*[Rotate order of messages]*

<b>Find Thirty</b>	<b>1</b>
<b>be active</b>	<b>2</b>
<b>be active wa</b>	<b>3</b>
<b>TravelSmart</b>	<b>4</b>
<b>Walk There Today</b>	<b>5</b>
<b>Draw the Line</b>	<b>6</b>
<b>NONE – DO NOT READ OUT</b>	<b>9</b>

**Q21.** Which of these categories best describes you?

<b>I am not physically active and I do not intend to become physically active in the next 6 months?</b>	<b>1</b>
<b>I am not physically active but I am thinking about starting to become physically active in the next 6 months</b> <i>[PAUSE]</i>	<b>2</b>
<b>I currently do some physical activity but not regularly.</b>	<b>3</b>
<b>I am physically active regularly but I have only become so within the past 6 months.</b>	<b>4</b>
<b>I am physically active regularly and have been so for longer than 6 months</b>	<b>5</b>

**Q22.** On average how many hours per week do you spend using a computer (outside of your workplace), watching television or engaging in other sedentary activities, such as reading, knitting or listening to music?

<b>Hours per week:</b>	
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- Q23.** We would like to know the type and amount of physical activity involved in your work.  
Please tick the option that best corresponds with your occupation(s) in the last 4 weeks  
from the following four possibilities

Tick one only

<b>A. Sedentary occupation</b> You spend most of your time sitting (such as in an office)	
<b>B. Standing occupation</b> You spend most of your time standing or walking. However, your work does not require intense physical effort (e.g. shop assistant, hairdresser, guard)	
<b>C. Manual work</b> This involves some physical effort including handling of heavy objects and use of tools (e.g. plumber, electrician, carpenter)	
<b>D. Heavy manual work</b> This implies very vigorous physical activity including handling of very heavy objects (e.g. dock worker, miner, bricklayer, construction worker)	

- Q24.** Does your workplace provide any of the following:

<b>Subsidy for gym/club membership</b>	<b>1</b>
<b>Changing rooms</b>	<b>2</b>
<b>Secure Bike racks</b>	<b>3</b>
<b>Organised lunchtime physical activity programs</b>	<b>4</b>
<b>Smart Riders to use public transport for business travel</b>	<b>5</b>
<b>Education seminars on physical activity and wellbeing</b>	<b>6</b>
<b>Other</b>	
<b>None</b>	<b>98</b>
<b>Don't know</b>	<b>99</b>

- Q25.** In the last 12 months when you saw your doctor or GP, did he or she give you any advice about doing more physical activity or exercise?

<b>Yes</b>	<b>1</b>
<b>No</b>	<b>2</b>
<b>Don't Know</b>	<b>9</b>

**Q26.** How strongly do you agree or disagree with the following statements?

(ROTATE)

	Strongly Agree			Strongly Disagree	
	1	2	3	4	5
There aren't many places in my neighbourhood where I can be active	1	2	3	4	5
I don't know much about the recreation facilities that are available near where I live	1	2	3	4	5
I don't know very much about the kinds of sporting clubs I could join in the area where I live	1	2	3	4	5
I feel unsafe walking in my neighborhoods during the day	1	2	3	4	5
In my neighborhood I see many people walking every day	1	2	3	4	5
I feel unsafe walking around my neighborhood at night	1	2	3	4	5

## DEMOGRAPHICS

**Q27.** Sex [Interviewer do not ask]

Male	1
Female	2

**Q28.** Could I ask your age please?

Age	
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0-999 [refused=999]

**Q29.** Marital status

Married	1
De Facto	2
Never married	3
Separated	4
Divorced	5
Widowed	6
Refused	7

**Q30.** What is your approximate weight in kilograms?

0-999 [Don't know=998, Refused=999]

<b>Weight</b> (Kilograms)	
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**If they don't know kilograms ask:**

What is your approximate weight in stones?

0-99 stone, 0-14 pounds

[Don't know=98 in both, Refused=99 in both]

<b>Weight</b> (Stone)	
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What is your approximate weight in pounds?

0-999 [Don't know=998, Refused=999]

<b>Weight</b> (Pounds)	
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**Q31.** What is your approximate height in centimetres?

0-999 [Don't know=998, Refused=999]

<b>Height</b> (Centimetres)	
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**If they don't know centimetres ask:**

What is your approximate height in feet and inches?

0-9 feet [Don't know=8, Refused=9], 0-12 inches [Don't know=98, refused=99]

<b>Height</b> (Feet/Inches)	
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**Q32.** Do you consider yourself to be:

If BOTH ask 'which do you identify most strongly with?

<b>Aboriginal</b>	<b>1</b>
<b>Torres Straight Islander</b>	<b>2</b>
<b>Both</b>	<b>4</b>
<b>Neither</b>	<b>3</b>

**Q33.** How many people under 18 reside at your home?

<b>Number</b>	
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**Q34.** How many children aged five and under reside at your home?

<b>Number</b>	
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**Q35.** What is the highest level of education you have completed?

Never attended school/some primary school	1
Completed primary school	2
Some high school	3
School certificate/intermediate/year 10/4th form	4
TEE/TAE/HSC/leaving/year 12/6th form	5
TAFE certificate/diploma	6
University/CAE or other tertiary institution degree	7
Other	8
Refused	9

**Q36.** What is your current occupation?

Manager/administrator	1
Professional/para professional	2
Tradesperson	3
Clerk	4
Salesperson or personal service worker	5
Plant and machine operator driver	6
Labourer	7
Unemployed	8
Home duties	9
Retired	10
Student	11
Other (specify)	12
Pensioner	13
Self employed/area not specified	14
Refused	99

**Q37a.** What are your suburb/town  
and your postcode?

<b>Suburb</b>	
<b>Postcode</b>	

**Q37b.** How long have you lived in this suburb

<b>Years:</b>	
<b>Months:</b>	

**Q38.** What is your weekly net household  
income?

*Read out: 'net' means  
income AFTER tax.*

<b>Less than \$199</b>	<b>01</b>
<b>\$200 - \$299</b>	<b>02</b>
<b>\$300 - \$399</b>	<b>03</b>
<b>\$400 - \$499</b>	<b>04</b>
<b>\$500 - \$599</b>	<b>05</b>
<b>\$600-699</b>	<b>06</b>
<b>\$700 - \$799</b>	<b>07</b>
<b>\$800-\$999</b>	<b>08</b>
<b>\$1,000 - \$1,199</b>	<b>09</b>
<b>\$1,200 - \$1,499</b>	<b>10</b>
<b>\$1,500 - \$1,999</b>	<b>11</b>
<b>\$2,000 or more</b>	<b>12</b>
<b>(Don't read) Don't know</b>	<b>13</b>
<b>(Don't read) Refused</b>	<b>14</b>
<b>Refused</b>	<b>99</b>

**Q39.** What are the names of the streets  
or roads that form the closest  
intersection to your home?




## Notes

[illegible]

## Physical Activity Taskforce

The Physical Activity Taskforce was established in 2001 to oversee the development and delivery of a whole of government and whole of community approach to increasing physical activity levels in Western Australians. It comprises government, non-government, academic and local government agencies.

Contact us for more information:

The logo for 'be active wa' features the words 'be active' in a bold, lowercase sans-serif font, with 'wa' in a larger, bold, lowercase sans-serif font. Above the text is a stylized graphic of a person's arms raised in a 'V' shape, with a small red dot above the right arm.

**Physical Activity Taskforce**

Physical Activity Taskforce Secretariat

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**No single agency or organisation will be able to increase physical activity levels on its own.**



Government of **Western Australia**

Department of **Education**

Department of **Health**

Department of **Planning**

Department of **Sport and Recreation**

Department of **Transport**

