The Exercise Recreation And Sport Survey (ERASS)

Using the ERASS surveillance system to estimate "health-related" levels of regular physical activity among New South Wales adults

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Note: ERASS is used as an abbreviation for the "**Exercise Recreation And Sport Survey"**

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Executive Summary

Background

There is a public health need to monitor changes in population levels of physical activity (PA) participation. This document re-analyses the Exercise Recreation and Sport Survey (ERASS) for the year 2001, with a focus on NSW, to derive health related estimates of PA and to assess the usefulness of the ERASS as another source of public health surveillance information[i].

Methods

The ERASS collects information, from Australians aged 15 years and older, on participation in any type of PA done for exercise, recreation or sport purposes, recalled during the previous 12 months. Information about type and frequency of activity is provided. Approximately 3,400 respondents are randomly sampled each quarter (February, May, August and November), and data is collected using computer assisted telephone interview system (CATI). For 2001 there were 164 activities recorded on the CATI system. Activities were classified as Health Enhancing Physical Activities (HEPA) if their assigned metabolic equivalent was =3.5 METs. 'Sufficiently active' people were those that reported HEPA ≥5 days/week over the whole 12 month period. Sedentary adults were defined as those who reported <0.5 days/week of HEPA in the previous12 month period. Using an epidemiological approach, each adult contributes 'units of time' of participation (person days) to the total HEPA. The total person- days of HEPA were calculated for the ERASS 2001 samples, and activities that contributed more than 1% to HEPA were highlighted.

Results

During 2001, 13,659 adults (aged 15 and over) were interviewed for the ERASS of those, 2,171 were NSW residents. In NSW, walking accounted for 59.6% of HEPA days, swimming (6.9%), gym activities (4.2%) jogging (3.9%), cycling (3.7%), football (3.0%) and aerobics (2.6%) together accounted for 24% of the days. A comparison between NSW and the Australian population (including NSW) indicated that the 'share' (%) of walking was about the same as well as some leading MVPA types. However cycling had a greater share of HEPA (5.2%) for all Australia than for NSW. This was consistent for both males and females and across all age groups. This may suggest that the environment in NSW is less conducive to regular cycling. For those aged 60+ walking accounted for more than three quarters of their HEPA days, in NSW as well as all Australia.

The mean number of days per week of walking was 2.2 (95% CI: 2.1-2.3). Only 16.8% of NSW adults walked on average =5 days per week over the previous 12-month period (classified as 'frequent walkers'). The mean number of days per week for moderate- vigorous activities, other than walking, was 1.41 (95% CI: 1.3-1.5). Overall, the mean days per week of HEPA participation for NSW was 3.6, which was significantly lower than all other States and Territories (3.8 days/week, p=0.04). The long-term prevalence of sufficiently active adults in NSW was 30.4% (95% CI: 28.5 – 32.4) compared with 31.5% (95% CI: 30.7 – 32.4) all other States and Territory. In NSW 19.1% were defined as sedentary.

[i] This is consistent with the request made by the NSW Physical Activity Taskforce in 2001, regarding consideration of alternative physical activity data systems, in order to better understand physical activity levels and monitoring trends in the NSW population.

This sedentary rate was significantly higher than in all other States and Territories (17.2%, p=0.008). In NSW, long-term sedentary lifestyle was independently associated with being older than 45, not having tertiary education, and workload (working more than 42 hours per week) after adjustment for the NSW age-sex distribution. The likelihood of being regularly sufficiently active increased significantly by 40% for people with tertiary education, and decreased significantly with increasing hours of working.

Conclusion

The ERASS surveillance system provides useful health-related information about physical activity among NSW adults, supplementary to other PA surveys. It may be more useful than previously thought for PA surveillance purposes, as long as it is consistent in its measurement over time. It provides estimates for 'habitual [12 month period prevalence] of at least moderately active adults', as well as estimates of 'long-term inactivity' and highlights specific activities that contribute to the HEPA for NSW adults. The variety of activities that are routinely recorded can inform policy makers on the success of state-wide PA programs related to health, such as tracking changes in cycling or walking in NSW.

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1. Background

1.1. About this report

Tracking population levels of physical activity (PA) should now be considered as important as the measurement of dietary habits or tobacco use (Bauman, 1999). A strong public health PA surveillance system should produce data not only for tracking changes in prevalence but also should be used to plan, guide and evaluate progress towards public health national goals (Macera, 2000). Thus, there is an advantage in identifying a broader range of datasets that might be used in the measurement and monitoring of community health (Saunders et al, 2001).

Between 1993 and November 2000, the Australian Bureau of Statistics (ABS) had been collecting information regarding participation in sport and physical activity data via the Population Survey Monitor (PSM). When the ABS ceased the PSM in November 2000, the Australian Sports Commission (ASC) and the State/Territory Departments of Sport and Recreation initiated the collection of similar data via the 'Exercise, Recreation and Sport Survey' (ERASS).

These data on physical activity participation have been used by the sport and recreation industry to document the number of participants in specific activities and to monitor trends so that funding and resources allocations can be based on reliable evidence (Dale and Ford, 2000). However, these datasets have not been used by health agencies for health policy purposes to date.

The impetus for this report originated with The NSW Physical Activity Taskforce. It had suggested the need for careful and systematic exploration of datasets other than routine health-related surveys, to assess their usefulness for monitoring and understanding physical activity from a public health perspective.

This document re-analyses the ERASS data collection for the year 2001 for New South Wales, to derive innovative, but epidemiologically interpretable, health related estimates of PA and to assess its usefulness as an additional source of information for PA surveillance.

1.2. Objectives of this analysis

A. To determine the long-term (12 months) prevalence for participation in Health Enhancing Physical Activities (HEPA) in NSW and to compare participation to all other states combined.

B. To obtain an estimate of the prevalence of habitual and sufficient participation in health enhancing physical activities (HEPA) and the prevalence of sedentariness.

C. To describe the main types of activities that contributed more than 1% to the total person-days of HEPA in NSW.

2. Methods

2.1 Exercise Recreation and Sport Survey methods

The Australian Sports Commission and the State/Territory Departments of Sport and Recreation, commissioned AC Nielsen to conduct a telephone survey of sport and physical activity participation, using a population sample of 3400 adults each quarter from all states and territories with samples proportional to state size. All surveys during 2001 used the same questionnaire, methods of sampling and procedure for computing response rates. All interviews were conducted using computer assisted telephone interview (CATI) system.

2.2 Data collection

The first set of questions asked about participation in any physical activities for exercise recreation or sport in the previous 12 months. Interviewers were instructed to record up to a maximum of 10 activities (out of 164 activity types that were coded on the CATI system). For each activity mentioned, respondents were asked to report if the activity was organised or not, what type of club or association organised the activity and how many times during the last 12 months they participated in the activity mentioned.

The second set of questions were about walking for exercise, recreation or sport during the past 12 months using the same questions about being organised or not, type of organisation and frequency in the previous 12 months.

There were also demographic questions asked, which related to gender, age, marital status, the presence of children under age 18 in the household, educational qualifications, employment status, number of hours spent in all jobs, and postcode.

2.3 ERASS sample

All persons aged 15 years and over were eligible for each survey. A random sample of telephone numbers, stratified by State and Territory, was selected from the Electronic White Pages (EWP). From each household one respondent was randomly selected for the interview, using the last birthday as a random selection technique. The overall response rate was around 48% and calculated by the percentage of completed interviews divided by all the number of contacts plus those with no answer after 6 calls. It is important to note that other research may present higher response rate due to lenient rules in calculating response rates, such as defining 'no answer after 6 calls' or answering machine contacts as ineligible and excluding them from the denominator[1].

2.4 Health Enhancing Physical Activity (HEPA) measures

The conceptual definition of PA in this survey was activity undertaken for the purpose of 'exercise, recreation or sport' as understood by the respondent, but no examples were given. Thus, it primarily

[1] Additional methodological work to appraise ERAS response rate compared to other survey companies using the same criteria for eligibility is planned.

covers leisure time PA. The common dimensions of measures of HEPA are intensity, frequency and duration. To obtain health benefits, a minimum of at least moderate intensity activity is required. This is usually activity that results in energy expenditure of at least three metabolic equivalents (3 METs), which represents the ratio of work metabolic rate to a standard resting metabolic of 1 MET obtained during quite sitting. Participation in vigorous-intensity activities confers even greater health benefits. The ERASS questionnaire allows us to derive estimate of health related PA (HEPA) based only on intensity and frequency. Duration of each session or per day was not asked in this survey series.

The way the questions were asked did not allow us to classify individuals according to the level of intensity which was reported, but rather to group individuals into two main categories of intensity. Using the energy expenditure compendium of Ainsworth[2], each of the 164-activity types was assigned to either Recreation and Light Physical Activities (RLPA) which were activities that require less than 3.5 METs, or to moderate-vigorous physical activities (MVPA), which were activities that required at least 3.5 METs or more. Since the same type of MVPA could be undertaken both at a moderate or at a vigorous intensity (e.g. walking, cycling, swimming, golf) and respondents were not asked or offered any prompt to indicate the level of intensity (e.g. asked about participating in activities that resulted in increased heart rate or sweating[3]), we could not assess vigorous intensity alone. Therefore, we assumed only one level of HEPA, which was at least moderate, though vigorous types of activities would have been included (e.g. running, aerobics, etc.) within the broad MVPA category.

Since there is no evidence for direct health benefits of Recreational And Light Physical Activities (RLPA), we excluded these from being classified as HEPA. The activity types that were classified as MVPA and under RLPA categories are described in Appendix 2.

2.5 Specific outcome measures

12 month prevalence of participation

1. Walking prevalence – the percentage of respondents that participated in walking, any type, in the past 12 months.
2. Participation in RLPA – the percentage of respondents that participated in any type of activity in the past 12 months that was classified as 'recreational or light'.
3. Participation in MVPA – the percentage of respondents that participated in any type of activity in the past 12 months that was classified as 'moderate or vigorous'.
4. Prevalent activities – the most prevalent activities in the population, defined as those reported by more than 4% of the population.

Individual-based health related measures

A. Regular walkers – percentage of respondents who reported walking at least 5 days a week on average in the past year. This measure was based on the number of times each respondent participated in walking during the last 12 months divided by 52 weeks to create a 'weekly' measure.

[2] Ainsworth BE, Haskell WL, Whitt MC, Irwin ML et al. Compendium of physical Activities: an update of activity codes and MET intensities. Med Sci in Sports Exerc, 2000:S498-S516.

[3] A commonly used indicator to assess level of intensities

B. Sufficiently active – percentage of respondents who did any type of HEPA for at least 5 days a week during the past year. The number of times each respondent participated in either walking and/ or any MVPA in the last 12 months was summarised and divided by 52 weeks. Participation in RLPA was not included.
C. Sedentariness - the percentage of respondents who reported less than 0.5 days a week of any HEPA, even if they participated in RLPA, and they did not do any moderate-intensity activity or walking at least 0.5 day per week during the past year, were defined as 'sedentary' individuals.

The estimates of sedentariness and 'sufficiently active' are presented when different cut-points are utilized and these differences are discussed.

Population-based measures:

Total person-days of physical activity (Total_PDPA) - was derived by first calculating the sum of days contributed by all persons that participated in each type of activity and then summing all these person-days across all types to represent the total 'person-days of physical activity' (PDPA) for the population in 2001.

The Total _PDPA was broken down into its different components; the sum of total person-days of walking and total person-days of MVPA represent the total person-days of HEPA performed by Australian adults in the previous 12-month period. Activities that contributed more than 1% to the total PD_ HEPA, were highlighted and listed for different population sub-groups.

This measure of 'person –days' of exposure is a concept derived from epidemiological studies, and attempts to define the total burden of a problem, or the total contribution of different dimensions to an overall issue. This measure describes HEPA 'participation rate' when both the prevalence and frequency were taken into account.

3. Results

3.1 Sample characteristics

Table 1 describes the two samples (NSW and 'all other states combined') by socio-demographic characteristics. The two samples were similar in age, sex and marital status, but the NSW sample had a significantly lower proportion of employed respondents (full or part time, p=0.004) than all other states, and a slightly lower proportion of respondents with tertiary education (p=0.02).

Table 1. The socio-demographic characteristics of NSW sample compared with the rest of Australia (n=13,659)

		NSW (N=2,171)		Other States (N=11,488)	
Sex	Males	941	43.3	5125	44.6
	Females	1230	56.7	6363	55.4
Age	15-29	456	21.0	2395	20.8
	30-44	649	29.9	3548	30.9
	45-59	539	24.8	3012	26.2
	60+	527	24.3	2533	22.1
Education	<12 yrs	724	33.8	3871	34.1
	HSC, TAFE	850	39.7	4208	37.1
	Tertiary	567	26.5	3263	28.8
Marital status	Married	1274	58.7	6779	59.0
	All other	897	41.3	4709	41.0
Employment	Employed F/P	1299	59.8	7239	63.0
	Other	872	40.2	4249	37.0

3.2 Sample representativeness and implication for data analysis

The whole ERASS sample was compared to the Australian age-sex distribution. As with many surveys, females were over-represented among ERASS respondents, comprising 56.7% of the sample, compared with 50.6% of the population. Overall, people aged less than 30 years were under-represented, making up 20.9% of the sample compared with 27.5% in the population, while people aged 45 –59 years were over-represented by about 3 % compared to the population. For older people the sample proportions were similar to those in the general population.

We also compared the NSW sample to the NSW age-sex distribution based on the 2001 Census. The same pattern as with the whole sample was observed, females were over-represented and younger ages under-represented. Thus, when we compared NSW estimates to other states we used unadjusted estimates as both populations were not different by age and sex and the sample errors were in the same direction. To establish HEPA estimates for NSW we adjusted the sample to the NSW age-sex distribution. All multivariate analysis included sample weights to adjust to the population of interest.

3.3 The 12-month prevalence of any physical activity

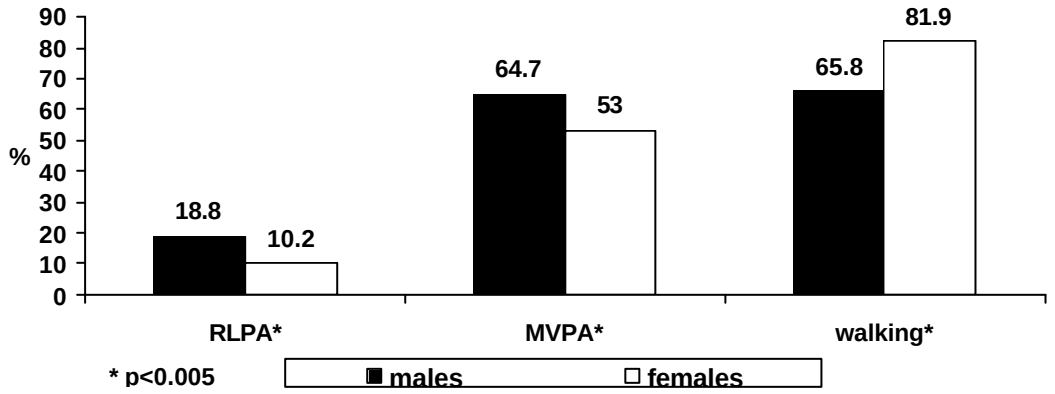
Table 2 describes the prevalence of participation in any physical activity done for recreation exercise or sport purposes in the past 12 months, after grouping activity types into three main categories. Respondents who said 'yes' to any type of activity were included in these estimates. The 12-month prevalence of recreational and light activities (RLPA) and moderate and vigorous PA (MVPA) in NSW was slightly higher but not significantly different to other states. The prevalence of any walking was significantly lower in NSW than in all other states (χ^2 =12.3 p=0.0004). In NSW, of those doing MVPA, only 13.7% did not include walking among their choices of physical activities.

Table 2. The prevalence (95% CI) of 12-months participation in various types of physical activity based on ERASS 2001 (n=13,659)

	NSW (N=2,171)		Other states (N=11,488)	
	%	(95% CI)	%	(95% CI)
RLPA	13.9	(12.5 – 15.4)	12.5	(11.9 - 13.1)
Walking	74.9	(73.0 – 76.7)	77.5	(77.5 – 79.1)
MVPA	58.1	(56.0 – 60.2)	57.1	(56.2 – 58.0)

Gender differences in the prevalence of these categories of physical activity were examined for walking, MVPA and recreational activities in NSW and in all other states. Higher proportions of males than females participated in MVPA other than walking (64.7% vs. 53.0%) while more females than males participated in walking (81.9% vs. 65.8%). These differences in proportions were significant (p<0.005). Recreational and light activities were more prevalent among males than females (18.8% vs. 10.2%). The differences between genders were observed both for activities classified under 'recreational activities', such as hunting, shooting, gliding, billiards, motor cycling etc (7.9% for males and 2.4% for females), as well as in participation in light-intensity physical activities (12.4% for males and 8.4% for females).

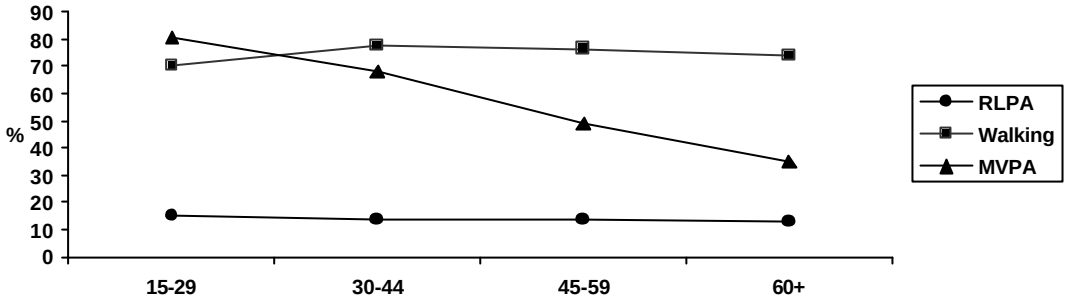
Figure 1. Gender differences in the prevalence of participation in various types of physical activity NSW 2001, n=2,171



The prevalence of participation in the main categories of physical activity by age group is shown in Figure 2. Participation in MVPA decreased with age, from 80.7% among 15-29 year olds to the 35.1% among those aged 60 and over. The prevalence of walking was lowest among the youngest

respondents (70.4%), higher for respondents aged 30-59 (77.5%, 76.6%) and slightly lower (73.8%) among respondents aged 60 and over. The prevalence of RLPA was highest (15.3%) among respondents under age 30 and gradually decreased with age. In all other states the same age pattern was observed for MVPA and for walking, while the prevalence of RLPA in other states was higher for respondents aged 60 and over (14.7%) and lower and stable (11.7%-12.3%) for respondents under age 60.

Figure 2. The prevalence of 12 month participation in walking, MVPA and RLPA by age groups - NSW, 2001



3.4 Walking frequency

Walking was the most prevalent physical activity in NSW as well as in other states, and was reported more frequently than any other activity. About 95% of the population reported a weekly value which ranged between 0 to 7, indicating that most respondent counted days of walking, and the remainder (5%) had values greater than 7 up to 18, which could represents number of weekly walking sessions. Table 3 presents the population estimates of means, the 95% confidence limits and the median for weekly walking days averaged over a 12 months period for NSW respondents, by age groups and gender.

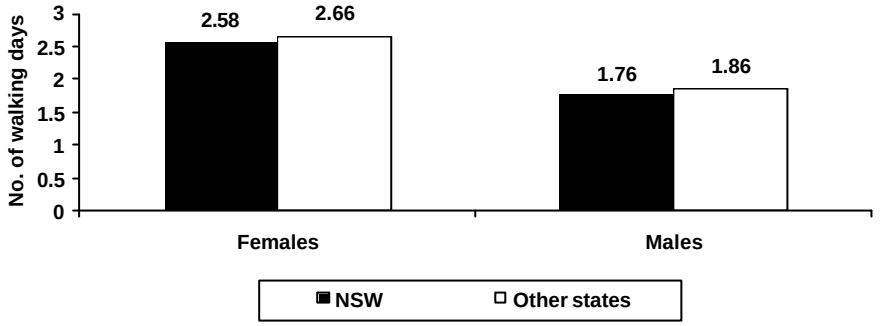
Table 3. Means and median weekly walking days over 12 month period, by gender and age in NSW

	All			Males			Females		
Age	Mean	(95% CI)	median	mean	(95% CI)	median	mean	(95% CI)	median
15-29	1.7	(1.5-1.9)	0.5	1.1	(0.8-1.3)	0.1	2.2	(1.9-2.5)	1.0
30-44	2.0	(1.8-2.2)	1.0	1.4	(1.1-1.6)	0.4	2.5	(2.2-2.7)	2.0
45-59	2.4	(2.2-2.6)	1.9	2.1	(1.8-2.5)	1.0	2.7	(2.4-3.0)	2.0
60 +	2.8	(2.5-3.1)	2.0	2.6	(2.2-3.0)	1.9	2.9	(2.6-3.3)	2.0
All	2.2	(2.1-2.3)	1.0	1.8	(1.6-1.9)	0.5	2.6	(2.4-2.7)	2.0

The frequency of walking increased as age increased with significant differences between those aged 45, compared to those younger than this. The highest mean was observed for those aged 60 and over (mean 2.8, 95% CI: 2.5-3.1) but was not significantly different to younger ages (2.4, 95% CI: 2.2-2.6). Females walked significantly more often than males (2.6 and 1.8 accordingly) but the difference between genders was only significant for the younger age groups (16-44 years old).

Compared to all other states, the mean weekly walking days for NSW were slightly lower than in all other states, (2.22, 95% CI: 2.11-2.34 vs. 2.31, 95% CI: 2.26-2.35) but within overlapping confidence limits. When stratified by gender and age, no differences between NSW and other states were observed.

Figure 3. The mean weekly walking days in NSW and other states by gender



3.5 Prevalent activities other than walking

Table 4 describes and ranks the ten most prevalent types of activities, besides walking, in NSW and compares these to the prevalence of activities in all other states.

Table 4. Participation in PA for exercise, recreation or sport other than walking by activity types (unweighted prevalence)– NSW and all other states, 2001

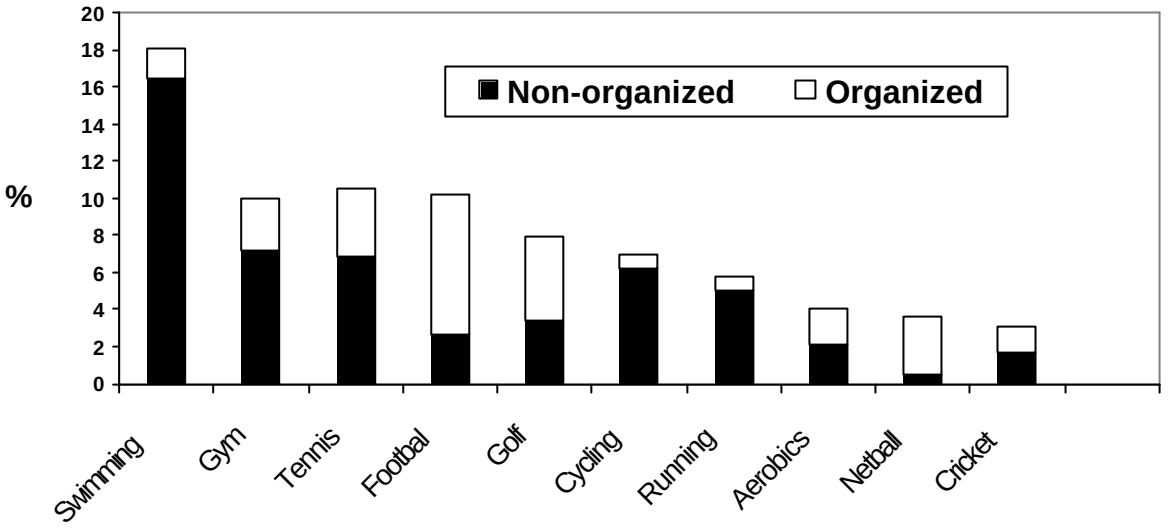
	NSW (N=2171)		Other states (N=11,488)	
Type of activity	**n**	**%**	**n**	**%**
Swimming	392	18.1	1641	14.3
Gym workout	139	11.0	864	7.5
Tennis (includes indoors)	229	10.5	846	7.4
Football (all types)	221	10.2	1073	9.3
Golf	179	7.9	841	7.3
Cycling/mountain biking	152	7.0	1165	10.1
Running /jogging	127	5.8	726	6.3
Aerobics	88	4.1	520	4.5
Netball (out or indoors)	79	3.6	512	4.4
Cricket	68	3.1	399	3.5

The most prevalent activity, besides walking, in NSW as well as in other states was swimming (18.1% and 14.3% accordingly). While cycling was ranked only at the sixth place in NSW this activity was more prevalent, ranked after swimming and walking, in all other states. The second most prevalent activity in NSW was gym workouts (11.0%). Tennis was the third most prevalent activity in NSW but ranked fifth place in all other states (10.5%, 7.4%). Slightly higher rates in NSW were observed also for football (10.2% vs 9.3%) and for golf (7.9% vs. 7.3%). Cricket was ranked in the tenth place both in NSW and in all other states (3.1% vs. 3.5%).

The following figure presents the most prevalent activities in NSW according to the forms they were taken; organised activity was defined as one that was all or partially-organised by a club, association

or other type of organisation. Swimming, cycling and running could be characterised as non-organised activities, as less than one fifth of those who participated in these activities reported an organised form of the activity. A third of those who participated in tennis and 43% of those who participated in gym workouts reported an organised form of this activity. In all other types, at least 50% or more of participants reported that the activity was undertaken in organised forms, with netball being the most prevalent organised activity (86% organized).

Figure 4. Proportions participating in organised and non-organised modes among the most prevalent activity types in NSW (N=2,171).



It is important to note that these estimates are based on the number of adults who reported participating in any activity at least once a year. This does not indicate the rate of participation, as some of the more prevalent activities could contribute only a little to the overall population participation (energy expenditure) and others which are less prevalent may contribute much more. This issue is discussed in Part B of the report.

4. Part A: Individual-based measures of Health Enhancing Physical Activity (HEPA)

4.1 HEPA descriptive statistics

In this section, only activities that were classified as at least moderate-intensity were included in the 'health related' prevalence estimates. The means, the medians and the inter-quartile range of weekly times of participation in walking, MVPA are presented in table 5 for NSW and for all other states.

Table 5. Means, medians and inter quartile range (Q_1-Q_3) of weekly days of participation in walking, HEPA (unadjusted), NSW, 2001

	NSW (n=2,171)			Other states (n=11,488)		
	Mean	Median	$Q_1 - Q_3$	Mean	Median	$Q_1 - Q_3$
Walking	2.22	1.00	0.0 – 3.27	2.30	1.15	0.09 – 3.85
MVPA	1.41	0.35	0.00 – 2.00	1.49	0.35	0.00 – 2.00
Total HEPA	3.63	2.88	0.96 – 5.77	3.80	3.00	1.00 – 5.92

As noted earlier walking was reported most frequently in the previous 12 month period compared to other MVPA, with 50% of respondents in NSW reporting that they walked at least one day per week. The mean for walking days in all other states was slightly higher than the mean for NSW (2.30 vs. 2.22 respectively), but within the same confidence limits.

Other MVPAs were reported less frequently, on average 1.4 times per week with no difference between NSW and all other states. The mean sessions of HEPA in NSW was lower than all other states (3.63 vs 3.80 respectively), (p=0.04). Half of the Australian population participated in 3 days per week of HEPA, one quarter did almost 6 days a week and one quarter participated in less than one day a week.

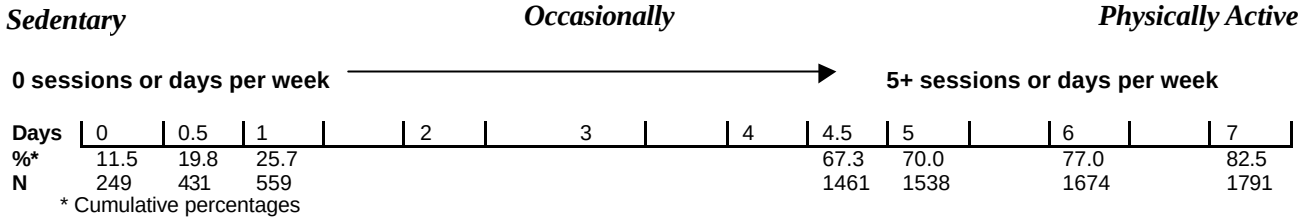
It is important to note that the population mean weekly day of activity when both MVPA and RLPA were counted (1.6 days per week, table in Appendix 2), was different than the mean when only MVPA were counted (1.41, days per week, table 5). This suggests that the population prevalence of sufficiently active or sedentariness might be changed had we included all activities in our analysis, but RLPA were excluded as they were below usual health enhancing thresholds.

4.2 Defining the cut-off point for 'sufficiently active' and the sedentary population

As noted before only the total number of sessions of HEPA were used to estimate PA levels. The weekly measure produced a continuous variable with value range from zero to the upper limit that was greater than 7 days. This measure was most likely to represent days of weekly activity, but for a minority it would be considered as sessions, as those people probably engaged in many types of activity throughout the year with some taken on a weekly basis. This is important for the definition of 'sufficiently active' as it is recommended to participate regularly in moderate activity on 'most days of the week' and we can examine the proportions of regular active by employing different definitions for 'most days'. Similarly, sedentariness could be defined as zero, that is not even one day of HEPA in

the year or if the cut-off point exceeds zero, this means that over a year on some days HEPA was preformed but this was not reached to a point of regularly engaged in at least one day a week. The next figure illustrates the difference in the proportion of 'sedentary' and 'sufficiently active' when different cut-off points were employed.

Figure 5. Categories of physical activity in the population [derived for NSW]



The sedentary population could be defined at zero (11.5%) representing respondents who reported no HEPA in the past year. Sedentary could also be defined at cut-off level of less than half a day on average per week (19.8%), which would describe respondents who did none or minimal HEPA in the past year. If we stretch the cut-off further, to less than one day a week, the estimate for 'sedentariness' would be 25.7%.

Similarly, if a threshold of 'sufficiently active' is 5 or more days a week of HEPA, based on the current recommendation of moderate activity 'on most days of the week', there would be 30% who reached this cut-off point. If more than 4.5 days a week is enough, the population estimates of sufficiently active would be 33%. If 6 days are required then only 23% would achieve this goal and only 17.5% would be defined as active on all days of the week (7 days).

4.3 The prevalence of long-term 'sufficient activity' and sedentariness

This analysis indicates that the weekly measures represents days rather than sessions for most people (95% of the population fall between the values 0-7). Thus, we defined those who did less than half a day as sedentary while those who engaged in HEPA for 5 weekly days or more defined as 'sufficiently active'. Table 6 presents the population estimates of 'frequent walkers', 'sufficiently active' and 'sedentariness' for NSW and all other states.

Table 6. The proportion (95% CI) of 'frequent walkers', sufficiently active and sedentariness for NSW and all other states, 2001)

	NSW		Other states	
	%	95% CI	%	95% CI
Frequent walkers (≥ 5 days/wk)	16.8	15.2 – 18.4	17.7	17.0 – 18.4
Sufficiently active (≥ 5 days/wk HEPA)	30.4	28.5 – 32.4	31.5	30.7 – 32.4
Sedentary (< 0.5 days/wk HEPA)	19.8*	18.2 – 21.6	17.2	16.5 – 17.9

* P=0.008

In NSW, there were slightly lower proportions of 'frequent walkers' and 'sufficiently active' than in other states, but the differences were not significant. However, in NSW, a significantly higher prevalence of sedentariness was noted than in other states (19.8% vs. 17.2% p=0.008).

Stratification by gender (table 7) indicates significant differences between genders for walking both in NSW and other states. The prevalence of 'frequent walkers' was slightly lower among NSW females (19%) than females in other states (20.5%) but this was not significant (p=0.20). Significant differences between genders were observed for sufficient activity only in other states, where a higher proportion of females than males were regularly sufficiently active (33.7% vs. 28.7%, p<0.001) but in NSW the difference between genders were not significant though the same pattern was observed. Lower proportions of NSW females were 'sufficiently active' compared to other states, but the difference did not reach significance (p=0.194). In NSW, higher rates of 'sedentariness' were seen than in other states for both genders, but the differences were significant for females (p=0.011).

Table 7. The prevalence (95% CI) of 'frequent walking', sufficient activity and sedentariness, by gender in NSW and in other states, 2001

	NSW		Other states	
	Male N=941	Female N=1230	Male N=5125	Female N=6365
Frequent walkers (≥ 5 days /wk)	13.8 % (11.8 - 16.1)	19.0 (16.9 - 21.3)	14.2 (13.2 - 15.2)	20.5 (19.5 - 21.5)
Sufficiently active (≥ 5days/wk)	28.6 (25.7 - 31.6)	31.8 (29.2 - 34.5)	28.7 (27.5 – 30.0)	33.7* (32.6 - 34.9)
Sedentary (< 0.5 days/wk)	21.8 (19.2 – 24.5)	18.4 (16.3 – 20.6)	19.3 (18.2 – 20.4)	15.5 (14.6 - 16.4)

* p <0.001

4.4 NSW adjusted estimates for the prevalence of long-term sufficient activity and sedentariness

The adjusted proportions for all NSW data were similar to the unadjusted rates (see table 6); 16.3% for 'frequent walkers', 30.3% for sufficiently active and 19.9% for 'sedentariness'.

Table 8 presents the prevalence of habitually active and sedentary adults and frequent walker weighted to the total NSW age-sex distribution.

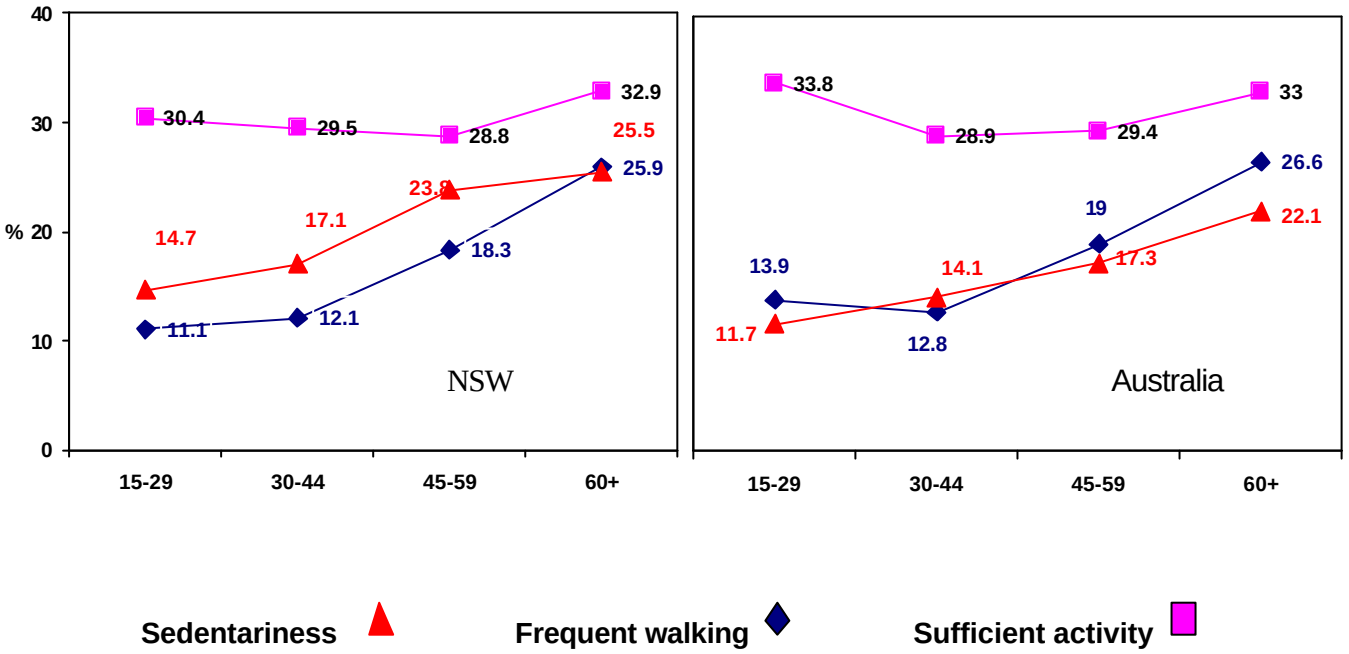
Table 8. The adjusted prevalence (95% CI) of 'frequent walking', sufficient activity and sedentariness by gender in NSW, 2001

	Males		Females	
Frequent walkers (≥ 5 days/wk)	14.2	12.1 – 16.4	18.4%	16.2 – 20.8
Sufficiently active (≥ 5 days/wk)	28.8	26.1 – 31.7	31.8%	29.0 – 34.6
Sedentary (< 0.5 days/wk)	20.9	18.6 – 23.5	18.9%	16.5 – 21.2

The prevalence of sufficient activity has a U shape distribution, with the lowest rates (29%) among people in the 30-59 year age bracket.

The adjusted prevalence of these measures across age groups for NSW and all of Australia for the year 2001, are presented in figure 6.

Figure 6. The adjusted prevalence of frequent walking, sufficient activity and sedentariness by age group in NSW and all of Australia, 2001



The rates of sedentariness increase as age increases; in NSW from 14.7% among the youngest group to 25.5% among the oldest. The higher prevalence of sedentariness in NSW compared with other states was apparent at all ages but only reached significance among those aged 45-59 (23.8% vs.17.3%, p=0.003).

The rates of walking also increase as age increase; in NSW lower proportions (11.1%-12.1%) among those under age 44 years to 18.3% among people aged 45-59 years and 25.9% among the oldest people. No significant differences were evident between NSW and other states in the proportions of frequent walkers across all age groups.

The 'middle aged slump' (U shape) for the prevalence of sufficient activity appears to be present in all other states but to lesser extend in NSW. This is because of the higher proportions in the extremes of age that were observed in all other states compared to NSW. However the difference between the proportions of NSW and other states were not significant (p=0.20).

5. Factors associated with HEPA participation

5.1 Variables that are independently associated with HEPA in NSW

Logistic regression was used to identify the socio-demographic factors that were independently associated with sufficient activity and sedentariness (< 0.5 day per week). Table 9 presents the prevalence and the adjusted odds ratio (AOR), 95% confidence intervals of sedentariness and sufficient activity among different socio-demographic segments of the NSW sample.

Table 9. Prevalence and adjusted odds ratios (AOR) of sedentariness and sufficient activity among socio-demographic groups in NSW, 2001

	'Sedentariness' * (<0.5 days/wk)			'Sufficiently active'* (≥5 days/wk)		
	%	**AOR**	**95% CI**	**%**	**AOR**	**95% CI**
Sex						
Men	20.9	1		28.8	1	
Women	18.9	0.99	0.79 – 1.26	31.7	1.1	0.87 – 1.29
Age group (years)						
16-29	14.7	1		30.4	1	
30-44	17.1	1.41	0.95 – 2.08	29.5	1.14	0.83 – 1.57
45-59	23.8	**2.07**	**1.40 – 3.06**	28.8	1.07	0.77 – 1.48
60 +	25.5	**2.56**	**1.63 – 4.02**	32.9	1.01	0.69 – 1.48
Education						
Less than 12 yrs	23.1	1		29.7	1	
HSC or equivalent	20.2	0.85	0.66 – 1.09	28.6	1.02	0.82 – 1.28
Tertiary	14.7	**0.56**	**0.41 – 0.76**	34.0	**1.42**	**1.11 – 1.82**
Family Status						
Married/defacto	19.6	1		28.7	1	
Widow/divorced	24.5	1.11	0.82 – 1.51	32.8	1.13	0.86 – 1.49
Never married/single	17.9	1.30	0.91 – 1.86	32.1	1.22	0.90 – 1.65
Children under 18 yrs						
Yes	17.8	1		28.2	1	
No	21.4	1.02	0.75 – 1.41	31.3	1.08	0.82 – 1.43
Hours spent at work						
Nil	20.9	1		34.6	1	
1-25 hrs	15.0	0.95	0.65 – 1.40	29.6	0.74	0.55 – 1.01
26-42 hrs	18.3	1.30	0.93 – 1.81	30.2	**0.76**	**0.58 – 1.00**
> 42	23.3	**1.69**	**1.20 – 2.37**	23.8	**0.55**	**0.41 – 0.74**

* Adjusted to NSW age-sex distribution based on the 2001 census

The variables found to be positively and independently associated with sedentariness were age, and workload; people over 45 years are 2-2.5 times more likely to be sedentary compared with those under 45 years, and people who work over 42 hours a week were 70% greater likelihood of being sedentary compared with those who do not work at all. Having tertiary education reduced the odds of being sedentary by 45%.

Educational attainment was positively and independently associated with being sufficiently active; those with tertiary level of education were 50% more likely to be engaged in sufficient activity. People

who worked more than 42 hours each week were half as likely to be 'sufficiently active' compared with those who do not work at all.

5.2 Is NSW different to other states in participation in HEPA?

Logistic regression was used to compare 'all other states and territories with NSW indicating the relative likelihood of sedentariness and sufficient activity in socio-demographic sub-groups within the total Australian population and in NSW compared with other states and territories. Table 10 presents the adjusted odds ratio (AOR) with 95% confidence intervals (CI), weighted for the Australian age and sex distribution.

Table 10: The percentages, adjusted odds-ratios (AOR) and 95% confidence intervals (CI) of the variables associated with regular sedentariness and 'sufficiently active' in Australia – ERASS 2001 (n=13,483)

	Sedentariness * (<0.5 days/wk)			Sufficiently Active* (≥5 days/wk)		
	%	AOR	95% CI	%	AOR	95% CI
Sex						
Men	16.7	**1**		28.9	**1**	
Women	14.8	**0.90**	**0.81 – 0.99**	33.5	**1.21**	**1.12 – 1.30**
Age group (years)						
16-29	11.7	**1**		33.8	**1**	
30-44	14.1	**1.22**	**1.04 – 1.44**	28.9	0.95	0.86 – 1.07
45-59	17.3	**1.58**	**1.34 – 1.87**	29.4	**0.86**	**0.76 – 0.97**
60 +	22.0	**1.88**	**1.55 – 2.28**	33.0	0.89	0.77 – 1.03
Education						
Less than 12 yrs	20.7	**1**		29.5	1	
HSC or equivalent	15.6	**0.74**	**0.67 – 0.83**	30.7	**1.17**	**1.03 – 1.23**
Tertiary	9.6	**0.41**	**0.36 – 0.47**	34.4	**1.39**	**1.27 – 1.54**
Family Status						
Married/defacto	15.7	1		29.6	1	
Widow/divorced	20.8	**1.18**	**1.03 – 1.34**	32.3	1.09	0.96 – 1.20
Never married/single	13.2	1.08	0.93 – 1.26	33.9	1.05	0.94 – 1.83
Children under 18 yrs						
Yes	15.2	**1**		27.0	**1**	
No	16.1	**0.86**	**0.75 – 0.99**	33.2	**1.35**	**1.21 – 1.50**
Hours spent at work						
Nil	19.0	**1**		33.3	1	
1-25 hrs	10.8	**0.70**	**0.59 – 0.83**	33.1	0.96	0.85 – 1.08
26-42	12.9	0.89	0.77 – 1.02	30.2	**0.84**	**0.76 – 0.94**
> 42	17.5	**1.26**	**1.09 – 1.46**	27.8	**0.79**	**0.70 – 0.89**
State						
NSW	17.7	**1**		**30.2**	1	
Victoria	14.7	**0.86**	**0.70 – 0.99**	**32.4**	1.10	0.96 - 1.26
Queensland	18.3	1.00	0.85 – 1.89	**30.2**	1.02	0.89 – 1.18
South Australia	18.8	1.01	0.86 – 1.20	**28.2**	0.91	0.79 – 1.05
Western Australia	12.7	**0.69**	**0.54 – 0.82**	**31.6**	1.06	0.92 – 1.22
Tasmania	14.8	**0.77**	**0.64 – 0.92**	**31.2**	1.07	0.93 – 1.23
ACT	14.0	0.87	0.72 – 1.05	**33.5**	**1.16**	**1.01 – 1.34**
Northern Territory	14.4	**0.84**	**0.69 – 1.03**	**33.1**	**1.20**	**1.04 – 1.40**

* Estimates are adjusted to the Australian age-sex distribution base on ABS mid-year population estimates for 2000.

5.3 Implications of the multivariate analysis results

1. The large sample enabled estimation of the prevalence of activity within narrow 95% confidence limits. In Victoria, Western Australia, Tasmania and the Northern Territory the prevalence of sedentariness was significantly lower than in NSW. Only South Australia had a lower prevalence of sufficient activity than NSW.

2. The differences between genders for both sedentariness and sufficient activity were significant when respondents from the whole of Australia were included as the large sample size had the power to detect small differences. The odds ratios were, however, closer to 1, (1.2 or 0.9) and indicated only a modest association. These difference may reflect the true situation, that is females are more likely to be regularly active, or it may reflects differential recall bias, with females tending to overestimate their activity or males underestimate it, or the fact that this ERASS analysis could not account for the greater vigorous activity rates that are usually more prevalent among males [ii].

3. The multivariate analyses demonstrated that sedentariness was associated with age, level of education and time spent at work. Interestingly, those who worked part time were less likely to be sedentary than those who did not work at all, but if the workload was very high (>42 hours per week) it was associated with a greater likelihood of sedentariness. This might indicate that 'being employed' may be 'protective' for inactivity (e.g. by providing opportunities to be an active commuter), but beyond a certain point, it may not allow enough time for activity due to high work demands.

4. If sedentariness was defined as zero time, such as no HEPA at all over 12 month period, (to exclude any possibility of measurement error due to long recall period) the associations between gender, age, education, being divorced / widowed and workload and sedentariness were even stronger but the presence of children was not a significant factor. If this threshold is adopted only Western Australia and the Northern Territory had significantly lower levels of sedentariness than NSW.

5. The 'middle aged slump' pattern with 'sufficiently active' was significant only for the 45-59 years group. Education level and not having children were positively associated with sufficient activity while workload (>26 hrs) demonstrated an inverse association.

[ii] In previous PA surveys, minutes of vigorous activities were weighted by a factor of two to account for its greater intensity; consequently more males than females could reach the recommended threshold due to their vigorous activities.

6. Part B: Population-based measures of HEPA

6.1 The relative importance of each physical activity category to the NSW total participation days

Overall in the whole year, the NSW sample participated in 431,759 person-days of any physical activity (PDPA). Walking accounted for more than a half (58.2%) of these days and MVPA other than walking accounted for 37% of these person days. The RLVA contributed only a small proportion (4.8%) to the total person days (Table 1). Compared with other states, the proportions undertaking walking were similar. The shaded areas are the HEPA, which accounted for 95.2% of the total person-days of PA in NSW and in all other states HEPA accounted for 96% of the days. Since the choice of activity is highly dependent on gender and age (e.g dancing, football), it is important to adjust to population age–sex distribution, thus for each table we presented age-sex adjusted measures for NSW.

Table 11. The total person-days of activity broken down by activity types, in NSW and all other states and territories, 2001

	NSW		Other states/ Territories		NSW Adjusted rates*	
	No.	%	No.	%	No	%
Walking	251,511	58.2	1,379,327	58.2	242,836	56.4
MVPA (>=3.5 MET)	159,608	37.0	895,903	37.8	164,871	38.3
RL PA (<3.5 MET)	20,640	4.8	95,379	4.0	22,905	5.3
Total_PDPA	431,759	100.0	2,370,609	100.0	430,613	100.0

* Adjusted to NSW age-sex distribution-ABS 2001 census

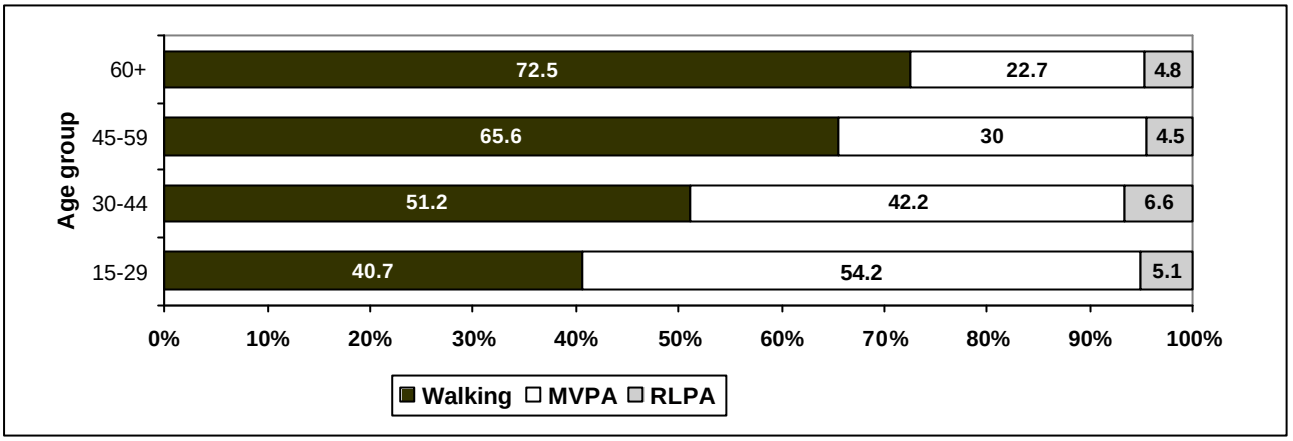
Table 12 presents the different components of the total person-days of PA by gender. Walking contributes a greater share of the total_PDPA among females as compared to males (adjusted rates 64.6% vs 47.4%). In contrast, the proportion of RLPA of the total person-days among males was much higher than females (adjusted proportion 7.3% and 3.5% respectively). The proportion of MVPA of the total person-days was much higher for males (45.3%) than for females (31.9%).

Table 12. Adjusted and unadjusted person-days of activity broken down by activity type and gender in NSW, 2001

	Unadjusted				Adjusted rates	
	Male		Female		Males	Females
	No.	%	No.	%	%	%
Walking	86,192	47.7	165,319	65.8	47.4	64.6
MVPA (>=3.5 MET)	81,941	45.4	77,667	30.9	45.3	31.9
RL PA (<3.5 MET)	12,411	6.9	8,229	3.3	7.3	3.5
Total_PDPA	180,544	100.0	251,215	100.0	100.0	100.0

The different components of 'total person-days' for each age group are presented in Figure 8. The contribution made by walking to PDPA during a 12 months period increased with age which offset by a decline in MVPA with age while RLPA remained relatively low across all age groups (ranging between 4.5% to 6.6%).

Figure 7. The different components of the total person-days of activity by age group adjusted to NSW 2001 population



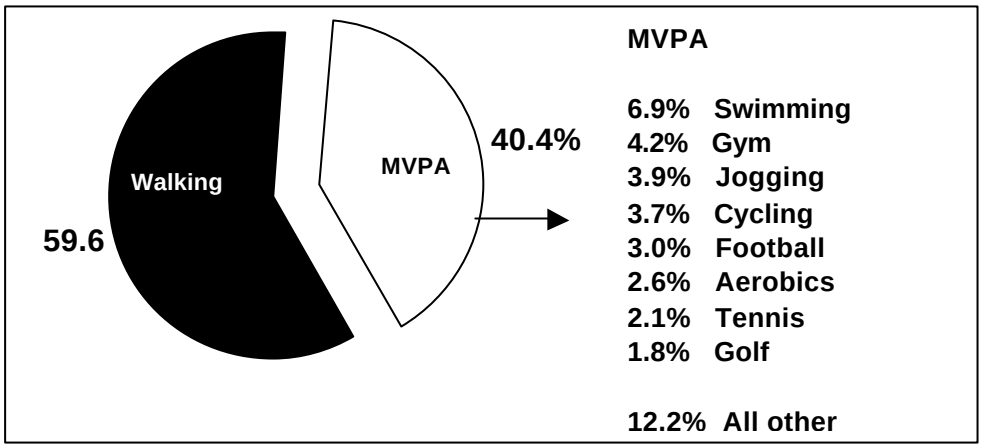
6.2. The different components of population Health Enhancing Physical Activities (HEPA)

The next series of Figures (9-14) relate to the contribution (%) of each type of moderate-intensity to the total person-days of HEPA reported during 12 months period in 2001[1]. This highlights the relative importance of the specific type of activity to population health based on this survey. It is worth noting that besides walking, some types of activities appeared consistently in all figures but their proportion of the total HEPA person-days changed for different population sub-groups. These activities were swimming, gym activities, jogging, cycling and aerobics. In most figures these activities together with walking explained 80% or more of the total person-days of HEPA. For certain age groups other specific types emerged; for young people (age 15-29) it was football while for older people (age 60+) it was exercise bikes and golf.

Figure 9 shows the different components of the total person-days of HEPA activity in NSW. Of the total 411,119 person–days of HEPA in the 2001 surveys, walking accounted for 59.6% of the total person-days; swimming (6.9%), gym (4.2%) jogging (3.9%), cycling (3.7%), football (3.0%), aerobics (2.6) tennis (2.1) and golf (1.8%) together accounted for 28.2% of the days. All other MVPA accounted for less than 12.2% of the days. Walking, jogging, swimming and cycling are also reported to be mainly non-organised activities.

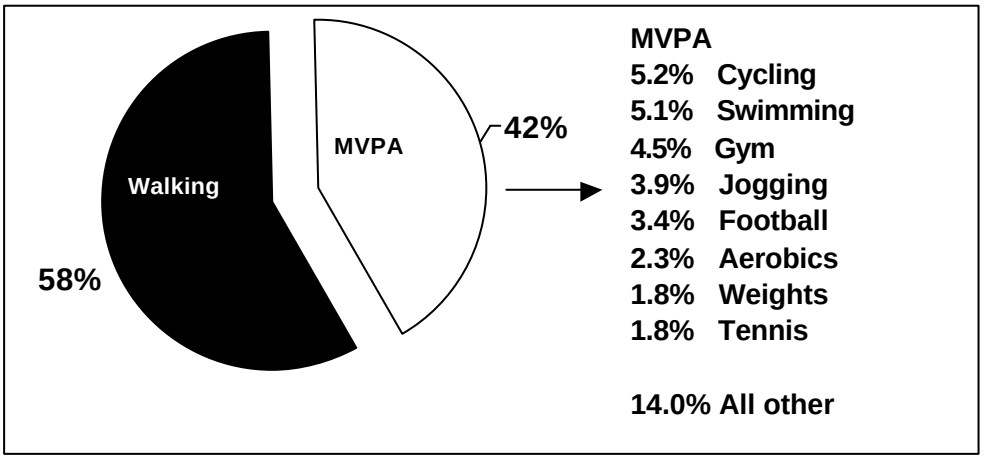
[1] For these figures we summarised only the person-days of walking and MVPA for the total population and for specific population sub-groups.

Figure 8. The 'share' (%) of walking and other types of MVPA of the total person-days of HEPA during 12 months period in NSW, 2001 (Adjusted N = 407,708).



The 'share' of walking of the total days of HEPA in NSW was slightly higher than in all Australia (all states and Territories) after adjusting to the Australian population distribution by age-sex (59.6% vs. 58.0% respectively). However there are some differences in the contribution of other types of activity to the overall HEPA; cycling contributes a small proportion of time in NSW than all Australia (3.7% vs. 5.2%) while the contribution of swimming is much higher in NSW than all Australia (6.9% vs. 5.1%). Apart from these differences, gym activities, jogging and aerobics, each contributes a similar 'share' to the overall HEPA in both NSW and all states. In NSW all other activities accounted for 12.2% of HEPA while in all of Australia it was 14.0%. This is because the 'share' of MVPA of HEPA was slightly lower in NSW due to the greater share of walking. Consequently, after listing 8 top activities, all other activities take a smaller proportion out of total HEPA.

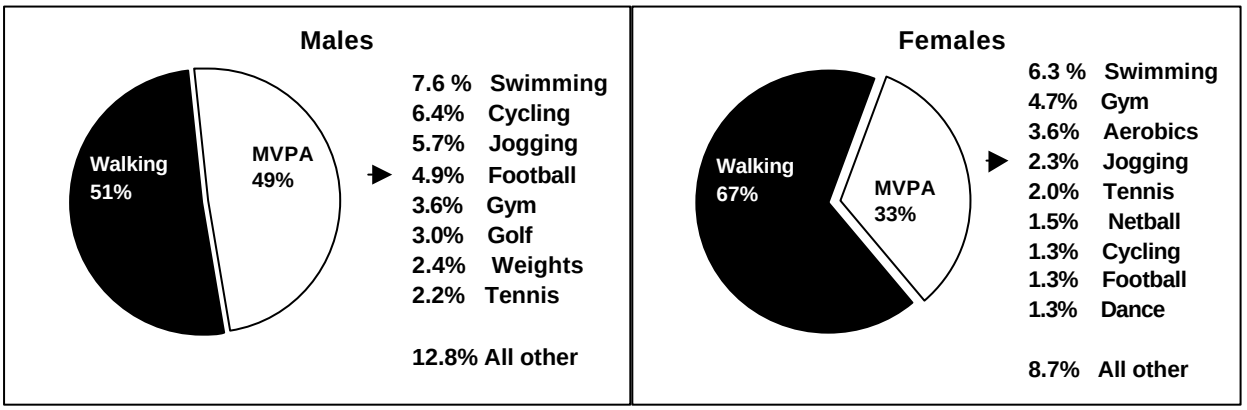
Figure 9. The 'share' (%) of walking and other types of MVPA to the adjusted total person-days of HEPA in Australia 2001



It is worth noting that while tennis was the third most prevalent activity (see Part A, table 4), its contribution to HEPA was only 2.1%. Similarly, golf ranked in fifth place (prevalence of 7.5%), but contributed only 1.8% to HEPA. This indicates that the benefit of activity to public health depends not only on the numbers which take it up but also the potential for it to be undertaken on a regular basis.

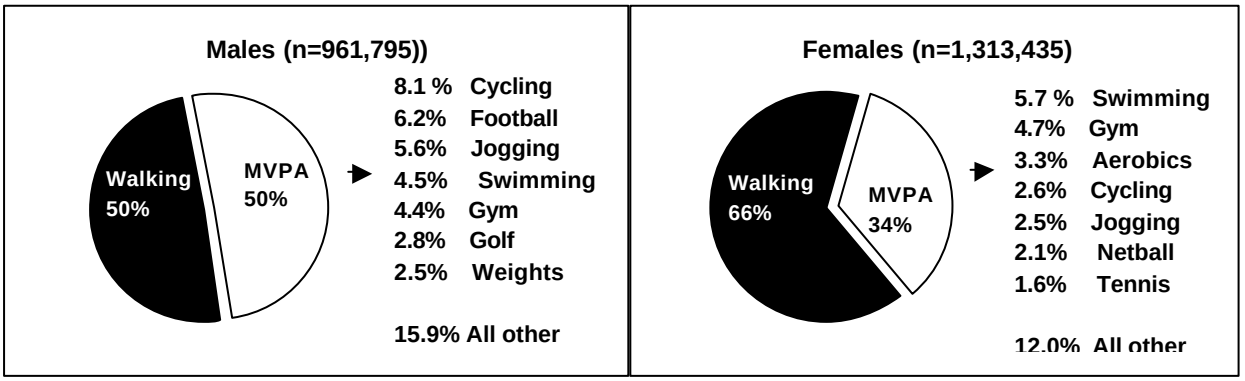
Figure 11 shows the differences between males and females in the 'share' of walking and other types of activity to the total 12 months person-days of HEPA in NSW. For females, walking, swimming and gym activities accounted for 78% of the total days of activity. For males, 78% of HEPA was gained by walking, swimming, cycling, jogging and football. It is worth noting that in NSW, besides walking and swimming which accounted for the greatest share of HEPA for both genders, cycling contributes a higher amount to male HEPA, but very little to females total HEPA (6.4% vs. 1.3%).

Figure 10. The share (%) of walking and other types of moderate and vigorous physical activity (MVPA) of the adjusted total person-days of HEPA during 12 months period among males and females in NSW 2001



A comparison between males and females in the total Australian population indicates that the share of walking was about the same for NSW males and females as in Australia generally (Figures 11 and 12).

Figure 11. The share (%) of walking and other types of moderate and vigorous physical activity (MVPA) of the total person-days of HEPA during 12 months period among males and females in all Australian states 2001 (adjusted to population)



In addition, the leading MVPA types of activity for NSW females were similar to Australian females, but cycling contributed a greater 'share' among Australian females (2.6%) than among NSW females (1.3%). For males, apart from walking, there were some major difference in the leading activities in NSW males compared to Australian males; in NSW swimming had a greater share of male HEPA than in Australia (7.6% vs. 4.5%) and cycling had a greater share in Australia (8.1%) than in NSW males (6.4%). Football contributed a greater share in Australian males than in NSW (6.2% vs. 4.9%).

The next figure describes the 'share' of walking and other MVPA for each age group in NSW. In NSW, walking had the lowest 'share' (43%) among people under age 30 but a greater share for those aged 30 and over (55%, 69%, 76%). After walking, swimming contributed the greatest amount of HEPA, among people aged 30 years and over. Among people aged 60 and over, walking, swimming, aerobics and golf contributed about 90% of the HEPA days (Figure 13). Football ranked among the top activities in NSW (Figure 9) because of its popularity among the youngest group.

Figure 12. The share (%) of walking and other types of moderate and vigorous physical activity (MVPA) of the adjusted total person-days of HEPA during 12 months period for each age group in NSW 2001

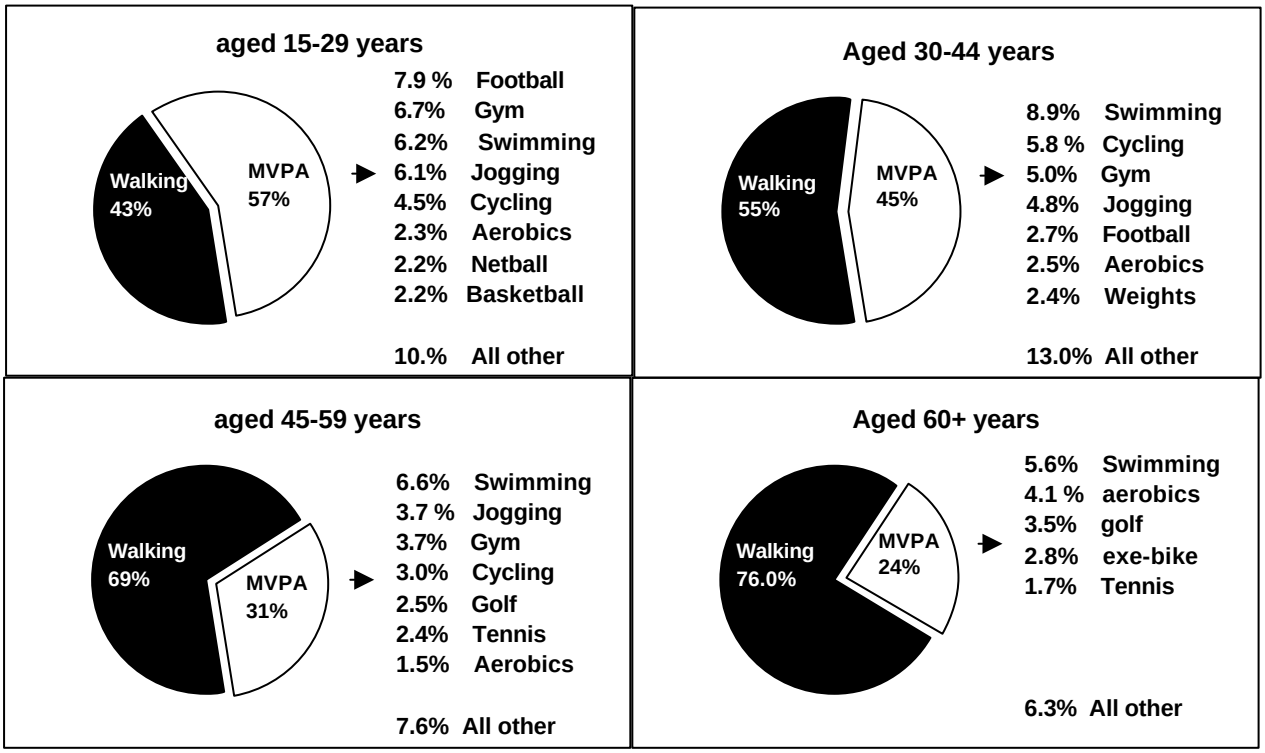
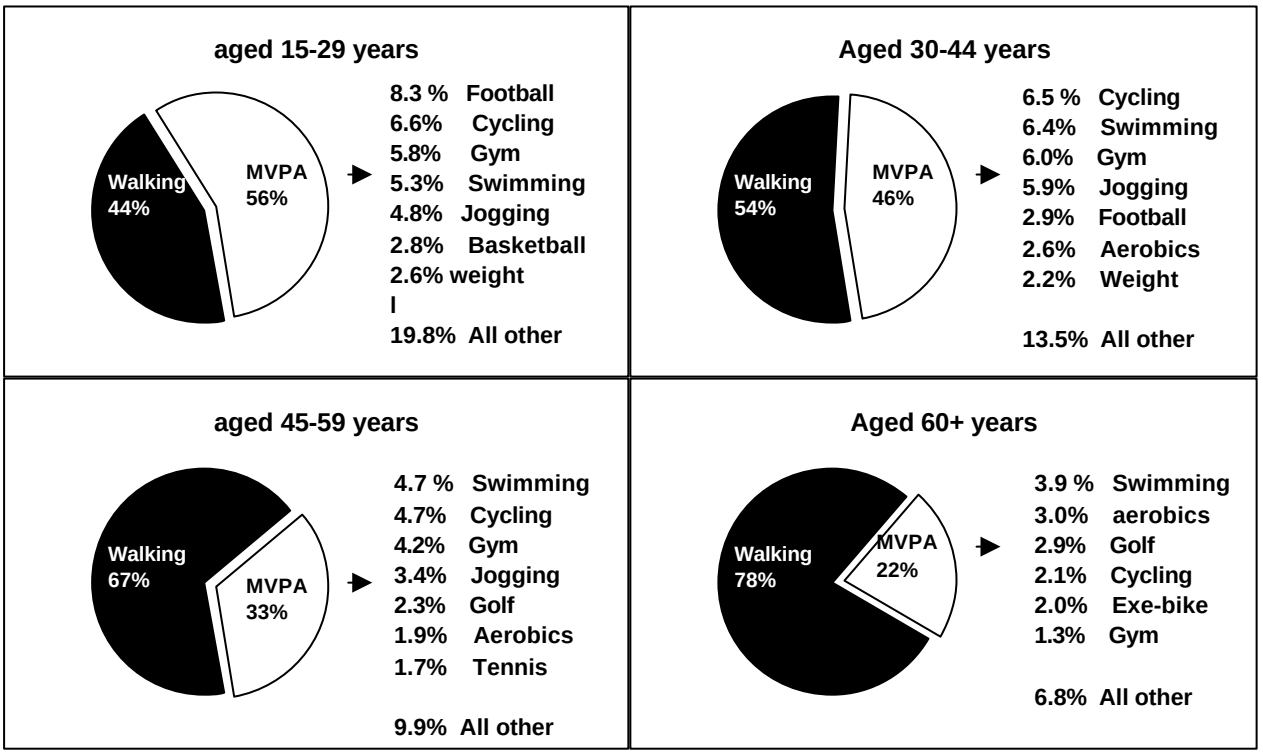


Figure 14 shows the adjusted 'share' of walking and other MVPA for each age group in all Australian states and territories other than NSW. Walking accounts for a lower 'share' of HEPA days among people over 60 years in NSW than in the rest of Australia while for those aged (45-59 years) it is the other way around. In states and territories other than NSW, cycling contributed almost the same 'share' to HEPA as swimming for people under aged 60, whereas in NSW swimming had a greater share than cycling across all age groups. Among people aged 60 years and over, in NSW the greater

'share' of exercise-bike (machine) replaces the share of cycling; in other states cycling still retains its place even for older people.

Figure 13. The share (%) of walking and other types of moderate and vigorous physical activity (MVPA) of the total person-days of HEPA during 12 months period for each age group in all other Australian states, 2001



7. Summary

7.1 Implications of ERASS findings and comparison to other population survey

1. The prevalence of walking in NSW was slightly lower than in other states and territories in Australia. The slightly lower prevalence of 'frequent walking' in NSW than in other states, might explain the lower percentage of 'sufficiently active' among NSW females compared to females in all other states and the higher proportion of 'sedentariness' found for both genders.

2. Victoria, Western Australia, Tasmania and the Northern Territory had significantly lower levels of sedentariness than in NSW. Only South Australia had a lower proportion of people who were sufficiently active.

3. In the 1999 National 'Active Australia' (AA) physical activity surveys, which used similar sampling methods and interviewing techniques, Armstrong et al (2000) reported slightly lower estimate (14.6%) for sedentariness than the ERASS estimate (15.8%), but the same pattern was present with age. However, ERASS estimates for 'sufficiently active' and 'frequent walking' (31.3%, 18% respectively) were much lower than the estimates reported in the recent National 1999 AA survey (45%, 35% respectively).

4. ERASS lower estimates for 'sufficiently active' and 'frequent walkers' reflect the 'recall period' (12-months) compared to the 'past 7 days' in the AA surveys. Though the longer time frame may be less well recalled, the ERASS estimation may be a better reflection of habitual activity [which is health enhancing] than the short period of the previous week, which may not reflect regular PA habit.

5. Inactivity may be less affected by the recall period. People who did not do any PA in the past week might not engage in regular activity over a longer period. Therefore, both measures identify similar proportions of sedentariness.

6. The National AA survey identified similar patterns with age as the ERASS data; that is, the prevalence of sufficient activity was greatest at the extremes of age. This has been previously described as 'the middle aged slump'. Also similar associations with education level and the presence of children under 18 were found with both measures in AA survey. The concordance of this phenomenon, suggests that it is likely to be true, irrespective of the way we measure PA, and gives credibility to the public health utility of these ERASS data.

7. The National AA surveys derived its measures based on the number of sessions and the duration each individual engaged in walking, moderate and vigorous activity. The duration of vigorous activities was weighted by a factor of two to account for its greater intensity; consequently more adults could reach the recommended threshold due to their vigorous activities, and more males than females could reach this level as they reported more vigorous activity. Though the ERASS CATI system included many types of vigorous activities (7-9 METs) some of these types could be performed at either a moderate or at a vigorous intensity (e.g. cycling, and swimming). With no indication of the individual level of intensity, HEPA measures could not assess intensity, and combined moderate and vigorous activities into HEPA.

8. Both surveys reflect only part of the National Physical Activity guidelines (DHAC 1999) of 'accumulation of 30 minutes of at least moderate PA on most days of the week'. In the AA surveys this was interpreted as the accrual of 150 minutes over at least five sessions, assuming that each session would be undertaken on a separate day. The ERASS measure defines those who are active on most days of the week, but collects no data on duration (so assumptions must be made that each day the individual is active, he or she accrues at least 30 minutes).

9. Walking accounted for about 59% of HEPA days in NSW and Australia for both males and females and for people aged over 30 years. For those aged 60 years and over walking accounted for more than three quarters of their HEPA days, in Australia as well as in NSW. This may reinforce the notion that walking is a very important component of overall health related PA promotion, and is especially so as it does not vary across age groups, so has accessibility and equity dimensions.
10. Across gender and for age groups (>29), in NSW swimming was second to walking while for all of Australia cycling and swimming contribute about the same 'share'.
11. Cycling had a greater share of HEPA for all of Australia than for NSW. This was consistent for both males and females and across all age groups. This may suggest that the environment in NSW is less conducive to regular cycling.
12. Besides walking, males and females are different in what constitutes most of their HEPA days. For males greater proportions of HEPA days were due to jogging and football while for females it was swimming and gym activities. This was true for NSW and for all of Australia.

7.2 Conclusion

The necessity of tracking trends in the prevalence of PA and inactivity over time are well recognised. The existing data collections, such as ERASS, are a potentially useful source of population health information, and complement existing physical activity questions in health–initiated surveys.

This analysis did not suggest that ERASS and other PA surveys are comparable, but rather that ERASS datasets may be more useful than previously thought for PA surveillance purposes, as long as it is consistently measured over time. In other countries, [e.g the Canadian PA instrument, or the Minnesota PA questionnaire], the assessments of 12 month recalled leisure time activity are accepted PA measurements used for surveillance.

Since the mid 90s, all instruments used in population surveys in Australia measured the past 7 days or past two weeks physical activity (Bauman, 2002), thus missing information about long-term habits. The landmark document of the United States Surgeon General's Report on Physical Activity and Health (USDHHS, 1996) provided a scientific basis for health benefits from participation in regular moderate PA. In this respect ERASS datasets qualify as potentially useful for PA surveillance as they provide data on regular and 'at least moderate' physical activity.

None of the Australian PA population surveys (since the DASETT surveys in the 1980s and the PFSA 1991) have recorded specific types of activity. If a public health strategy were to recommend more vigorous activity, or promoting specific activities as part of its strategy, such as cycling or other sport, changes over time could be tracked using this method. Thus, ERASS datasets could inform policy makers on the success or failure of specific programs that aimed to achieve new public health goals.

Appendix 1

Activities that were classified as HEPA:

callisthenic
chinese-exercise
ex-bike
gym-workouts
military-ex
prime movers
step Reebok
Aerobics
Aerobatics
Athletics
Badminton
Baseball
Basketball
Boxing
Canoeing
Kayaking
cricket-(indoor and outdoor)
cycling (including bmx mountain bike)
football (all types)
Golf
Gymnastics
hockey-indoor and outdoor
blade skating
ice hockey
ice skating
snow skiing
snow/ice sport
lacross-outdoor
chi kung
eastern judo
Judo
Karate
Kickboxing
Taekwondo
tai chi
martial arts
netball indoor and outdoor
Orienteering
Rogaining
inline hockey
roller-blading
skateboarding
roller sports
rowing
jogging and running-cross country
softball
squash
swimming
table tennis
tennis (outdoor and indoors)
tenpin bowling
triathlons
volleyball-indoor outdoors
newcombe ball
water-skiing
wrestling
lacross-indoor
canoe polo
weight training (including bodybuilding, circuit and power team)
dancing (including boot scooting and ballet)
electric light cricket
wheelchair hockey
scuba diving
water polo
abseiling
caving
rock climbing
handball
fencing
gorila ball
racquet ball
ultimate frisbee
gaelic football
horse racing
tee ball
boomerang
wood chopping
winter olympic
marching
aquarobics
korf ball
underwater hockey
soft cross
royal tennis
commonwealth games
broom ball
polo cross
leader ball
weight lifting competition
grockey

Activities that were classified as recreation and light physical activity (RLPA)

Ballooning
Gliding
Gyroplane flying
Hang gliding
Model aeroplane flying
Ultra light flying
Air sports – other
Archery
Bow hunting
Billiards
Pool
Snooker
Bocce
Carpet bowls
Croquet
Darts
Trampolining
Horse riding
Lawn bowls
Yoga
Motor sports (all types)
Rodeo
Sailing
Hunting
Shooting (all types)
Surfing (all types)
Sailboarding
Windsurfing
Diving (board)
Jet skiing
Power boarding
Fishing
Dog racing
Sheepdog trail
Water volleyball
Pigeon racing
Putt-putt golf
Play

Appendix 2

The frequency of participation in all other types of physical activities

The number of times in the past 12 months of participation in any leisure activities apart from walking (that is, MVPA and RLPA) was summarised for each individual and then divided by 52 to get the weekly frequency in which each individual engaged in other activities. As with walking, 95% reported on a range of 0-7 days per week, and less than 0.5% exceeds 14, which would be more than 2 sessions a day.

Table A presents the population means (95% confidence limits) and the medians for weekly days of other PA in NSW, by age groups and gender. The frequency of participation in all other types of activity demonstrates significant inverse association with age. The mean days of activity was significantly lower for females than males up to age 59, and at age 60 or over the difference between females and males was not significant.

Table A. Means (95% CI) and medians of weekly days of all leisure activities (other than walking MVPA and RLPA) by gender and age – NSW, 2001

Age	All (n=2,171)			Males (n=941)			Females (n=1,230)		
	mean	(95% CI)	median	Mean	(95% CI)	median	mean	(95% CI)	median
15-29	2.4	(2.1- 2.6)	1.5	2.6	(2.2- 3.0)	1.9	2.2	(1.8- 2.5)	1.2
30-44	1.7	(1.5- 1.9)	1.0	2.1	(1.8- 2.4)	1.2	1.4	(1.2- 1.6)	0.6
45-59	1.2	(1.0- 1.4)	0.1	1.5	(1.2- 1.9)	0.5	0.9	(0.7- 1.1)	0.0
60 +	1.1	(1.0- 1.3)	0.0	1.3	(1.0- 1.6)	0.0	1.0	(0.8- 1.3)	0.0
All	1.6	(1.5- 1.7)	0.6	1.9	(1.7- 2.1)	1.0	1.3	(1.2- 1.5)	0.3

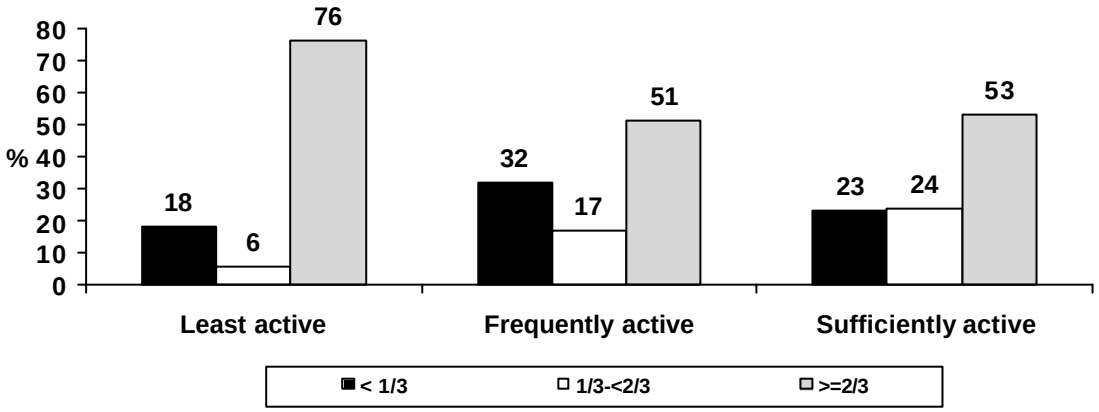
The mean days of other leisure activity for NSW were very similar to all other states, (1.59, 95% CI: 1.49-1.68 vs. 1.65, 95% CI: 1.60-1.69), with 50% of the NSW respondents doing less than 0.6 days a week of any leisure activity that is other than walking.

Appendix 3

The importance of walking to the individual's total level of weekly HEPA

Since walking had a substantial impact on the individuals' level of HEPA we calculated the proportion of walking of the total HEPA each individual engaged in a week and describe these proportion for three population subgroups: the least active (<1 days a week of HEPA), those who were frequently active (1 to 4.9 days per week) and those who were sufficiently active (5+ days per week). Overall 58% of the population accrued two thirds of their HEPA by walking. The following figure describes the proportion of walking for different level of activity groups.

Figure A. The proportion of walking of the individual total-HEPA, by population sub-group of level of activity



The majority of the least active population (76%) gets more than two-thirds of their HEPA from walking, and more than a half (51%-53%) of those who are frequently active or sufficiently active gets two-thirds or more of their HEPA. That is to say that for every level of activity the individuals is being classified, walking contributes the most part of the individuals' level of activity, and this is especially true for the least active.

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