

## COHORT PROFILE

# Cohort Profile: The Melbourne Longitudinal Studies on Healthy Ageing Program

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## How did the Melbourne Longitudinal Studies on Healthy Ageing Program come about?

The Melbourne Longitudinal Studies on Healthy Ageing Program (MELSHA) has evolved along with Australia's increasing recognition of the value of promoting the health of older people and the need for an evidence base to inform these efforts. MELSHA's development and continuation has reflected the complex interplay between health promotion policies and the availability of research funding. It takes an age-specific approach that focuses on the life goals and actions of older people themselves, health issues of particular importance for them and the health system, and the multiple vulnerabilities and resources faced in later life. It recognizes that health promotion is a priority for individuals at all points along the life span. The study includes investigators from a range of disciplines including medicine, sociology and psychology, as well as health services researchers. Our methodological expertise includes epidemiology, biostatistics and qualitative methodologies. Our measures include both objective and subjective measures from a range of perspectives including clinical, psychosocial and environmental that contribute to the health of older people. By 2010 we will have followed the sample for 17 years, becoming one of the longest-running longitudinal studies on ageing in Australia.

When MELSHA was conceived in the early 1990s, Australian research on ageing was only beginning to move beyond a preoccupation with service needs and dependency to also consider health promotion and positive dimensions to ageing.<sup>1</sup> Over the past decade there has been increasing recognition of the value in promoting the health of older people, and research

suggests that much can be done to maintain and enhance health and well-being in later life. There is mounting evidence that independence and well-being in later life can be maintained or improved through physical activity, social involvement, adequate eating patterns and other individual and social actions. Healthy ageing is now firmly on the policy agenda both in Australia and internationally. The key policy priority for older Australians is to facilitate their health, independence and participation in social and economic life and reduce their reliance on government support.<sup>2</sup>

Planning for the surveys that were to form MELSHA commenced when the Victorian Health Promotion Foundation (VicHealth) sought to establish a knowledge base to guide community-based health promotion for older people. VicHealth provided seed funds for a Health Status of Older People (HSOP) Working Group of researchers, practitioners and programme planners to jointly establish directions and purposes for a planned programme grant. The Working Group set a research brief to focus on health issues that were (i) important for the independence and well-being of older people; (ii) potentially preventable or changeable and (iii) which had implications for health services. A comprehensive literature review was published on the international research evidence.<sup>3</sup> A subsequent VicHealth programme grant, along with funds from the Australian Research Council, supported the baseline HSOP survey in 1994 and a first follow-up survey in 1996. The first rounds of research were conducted at La Trobe University, in collaboration with medical researchers from the University of Melbourne; recent rounds have been led by Monash and Sydney Universities and funded by the National Health and Medical Research Council for the past 12 years.

The focus of the research has evolved along with successive teams of Chief Investigators and Associate Investigators (see Acknowledgements section), the ageing of the sample and emergent funding opportunities. Monash and Sydney Universities provided bridging funding in 2002 and 2006. Supplementary work has been conducted on particular sub-studies. For example, research is now underway on veterans' health for the Australian Department of Veterans Affairs and on the long-term effects of medication use supported by the Alzheimer's and Ageing Research Foundation.

The methodology, measures and results from the baseline 1994 survey for the Health Status of Older People project are available from Kendig *et al.*<sup>4</sup> and on the MELSHA website (<http://www.med.monash.edu.au/sphc/haru/MELSHA/index.html>).

## What does MELSHA cover?

MELSHA is an ongoing in-depth longitudinal study of  $n = 1000$  older Australians aged  $\geq 65$  years at baseline. We have applied a multi-disciplinary perspective (sociology, psychology, medicine and public health) and multi-method approaches (quantitative and qualitative) to understanding priority health conditions, behaviours, social and physical environments, and how they interact across the later part of the life span to impact on healthy ageing. Topics at baseline were set on the basis of potential for improvement, significance for functioning and well-being, and impacts on demand for health and aged care services.

The primary domains captured in the data collections include:

- Health-related actions, perceptions and health histories
- Functional health and prevalence of health conditions
- Quality of life
- Social support and interaction
- Service use
- Transport and neighbourhood

Table 1 shows the key characteristics of the sample at baseline (1994) Wave 1, and at Wave 7 (2008). In comparison with the data from the Australian Census (1991)<sup>5</sup> and the Australian National Health Survey (1989–1990),<sup>6</sup> the baseline sample slightly over-represented men and people aged 65–74 years compared with the population. The sample was somewhat healthier than the population, as indicated by lower Instrumental Activities of Daily Living (IADL) dependence, while representative in terms of health service use. Interestingly men were more likely than women to continue in the community sample to Wave 7. At Wave 7, participants were more likely to be living alone and had more medical conditions than at Wave 1.

**Table 1** Demographic and health characteristics of MELSHA sample 1994 and 2008

	1994 (Wave 1)		2008 (Wave 7)	
	<i>n</i>	%	<i>n</i>	%
Gender				
Male	467	47	103	52
Female	533	53	94	48
Age, years				
65–69	310	31		
70–74	332	33		
75–79	183	18	13	7
>80	175	18	184	93
Marital status				
Never married	46	5	5	3
Married/living together	578	58	106	54
Divorced/separated	51	5	14	7
Widowed	325	32	73	37
Education				
Left school at age $\leq 14$ years (no qualifications)	355	36	55	28
Left school at age $\geq 15$ years (no qualifications)	237	24	45	23
Trade/apprenticeship	124	12	21	11
Certificate/diploma	223	22	57	29
Bachelor degree or higher	61	2	18	9
Living alone				
Yes	335	34	86	57
No	665	66	112	43
Mean number of medical conditions	3.84		4.56	
Self-rated health				
Excellent	181	18	20	10
Very good	305	31	64	32
Good	334	33	62	31
Fair	144	14	39	20
Poor	36	4	9	5

## How often are participants followed up?

Participants were interviewed face-to-face by trained interviewers in their homes using a structured recording tool and questionnaire at the initial data collection in 1994. They also filled in a self-completion questionnaire and brief physical tests were administered. In 2004 and 2008, they were also interviewed face-to-face using a structured questionnaire in their homes.

During the intervening period 1994–2004, every 2 years (1996, 1998, 2000 and 2002) participants were interviewed using a Computer Assisted Telephone Interviewing method (CATI). In 1995, 1997, 1999, 2001 and 2005 participants completed a mail-out questionnaire. During each round, key informants were approached for information on non-respondents and the death records were checked.

In 2005–06, we completed an intensive telephone tracing study to gather data from informants about those lost to follow-up over the previous 12-year period. In the current funding round (2008–10), we are seeking permission from the remaining participants to access and link their health records, including prescription medicine use and general practitioner visits, from routinely collected data available from population databases such as Medicare Australia. By 2010, we will have collected data for a 17-year period.

### Who is in the sample?

The survey population for the 1994 baseline survey was defined as all residents of private dwellings in metropolitan Melbourne, aged  $\geq 65$  years. Melbourne is the second largest city in Australia with a current population of 3.9 million people.<sup>7</sup> With assistance from the Australian Bureau of Statistics, the Victorian electoral roll was used to develop a clustered sample of 1422 potentially eligible participants. Individuals defined as ‘out of scope’ included those who were no longer living in metropolitan Melbourne (1.7%), those living in non-private accommodation (3.3%), deceased persons (2.0%), people with incorrect date of birth (0.2%), residents absent for the duration of the survey (1.3%), those who could not speak basic English (11.3%) and people who could not be interviewed for health reasons (3.7%). Excluding the ‘out of scope’ categories, the response rate for the initial interview was 70%, yielding a sample of  $n=1000$ . Comparisons with the Australian Census (1991)<sup>5</sup> show that the delivered sample was representative of older people in Melbourne, apart from those too ill to be interviewed and non-English-speaking people.

The sample is urban and predominantly from English-speaking backgrounds, which may limit applicability to the broader culturally and linguistically diverse Australian population. However, in order to conduct population studies that adequately sample from a range of older cultural groups, large-scale language resources are needed. There has been a reluctance to fund such studies in Australia. A sample size target was set at  $n=1000$  to ensure sufficient power for the main outcome variables. This sample size is somewhat smaller than comparable studies, such as the Australian Longitudinal Study on Ageing.<sup>8</sup> Our loss to follow-up has been  $<10\%$  in each of Waves 2–6 of the study.

Over the 15-year period 1994–2008, outcome data have been collected for 1000 participants. Table 2

describes the retention and attrition of MELSHA participants over Waves 2 (1995) to 7 (2008). The retention rate—including those known to have entered residential care or to have died—remained at  $>90\%$  for each of Waves 2–6. In Wave 7, a larger proportion of potential participants either refused or we had lost contact with them, reducing the retention rate to 60%. Over the 15-year period, we have final outcomes (either still alive and interviewed in 2008, or dead, or living in residential care) for  $n=844$  participants or 84.4% of the baseline survey.

### What has been measured?

A comprehensive battery of measures including medical conditions, functional and social health, health behaviours, mental health, pain, falls, continence, medication use, caregiving, spirituality, sexuality, neighbourhood satisfaction and health and community service use were included in the 1994 baseline (Wave 1) face-to-face interview, and the 2004 (Wave 6) and 2008 (Wave 7) follow-up face-to-face interviews.

Measures identifying perceptions of good health and its benefits and actions taken to maintain health were adapted and refined from the UK Health and Lifestyle Survey<sup>9</sup> and the US Self-Care Assessment Project.<sup>10</sup> Medical conditions questions were adapted from the Established Populations for Epidemiological Surveys, USA.<sup>11</sup> Questions examining how structural forces influence promotion of health were adapted from the Philadelphia Multi-Level Assessment Instrument.<sup>12</sup> New measures were developed based on qualitative interviews carried out in a related project conducted in 1992<sup>13</sup> and included questions examining:

- motivations, inducements and constraints influencing the start, stop or persistence of health-promoting or health-risking practices;
- influences of earlier life experiences and significant life transitions on health and well-being in later life; and
- durations of behaviours and exposures.

Table 3 shows the variables surveyed in MELSHA. For all waves, both pre-coded and open-ended questions were used. For the open-ended questions, responses were recorded verbatim for qualitative analysis.

### What has been found?

A full list of publications, theses and conference presentations from MELSHA can be found at <http://www.med.monash.edu.au/sphc/haru/MELSHA/index.html>.

As noted above, the 1994 baseline sample for MELSHA was a relatively healthy group of older people. Kendig *et al.*<sup>4</sup> provides a full description of

**Table 2** Retention and attrition of MELSHA participants Waves 2–7 and known outcomes

Respondents at Baseline	Wave 2 (1996)	Wave 3 (1998)	Wave 4 (2000)	Wave 5 (2002)	Wave 6 (2004)	Wave 7 (2008)
Respondents						
Completed survey	796	649	542	398	424	197
Non-respondents						
Died or entered nursing home	98	77	88	61	138	51
Refused	45	34	27	27	13	61
Unable to contact participant	6	4	0	0	0	59
Unable to complete interview (dementia, stroke, etc)	55	134	168	251	101	36
Cumulated deaths/entered nursing home from prior waves		98	175	263	324	375
Total eligible <sup>a</sup>	847	691	569	425	437	337

<sup>a</sup>Number eligible at previous interview minus those who died/entered nursing home since last interview or were unable to complete the interview for health reasons.

the baseline data. Most had engaged in physical activity in the 2 weeks prior to interview although most had engaged in light activity ('activities that do not make you huff and puff'), which may not accrue cardiovascular health benefits. Nearly one-third of the sample felt they did not get enough exercise. The sample was socially active, with more women engaging in social activities than men. About 20% of the sample thought they did not engage in enough social activity. Respondents had high levels of positive mood and life satisfaction and low levels of negative mood. Very few were current smokers, and nearly half rated their health as excellent or very good. However, less than one-third had an acceptable body mass index (BMI). A notable concern is that 15% of respondents had taken five or more prescribed medications in the 2 weeks prior to interview. Some urinary continence problems were reported by 30% of the older people. Forty percent of older people reported pain at least once or twice a month over the previous year, and more than half of these people reported the pain to be severe. The most prevalent medical conditions were osteoarthritis, conditions of the legs and feet, varicose veins, intestinal problems including dyspeptic symptoms, cataract and, for men, prostatic symptoms.

Our early focus was on examining the role of gender and socio-economic status (SES) on health and health behaviours, predictors of well-being and the influence of families, caregivers and widowhood on health and health actions. We found that older people with lower SES were less likely to engage in energetic physical activity, higher occupational status was associated with social activity, and women were more likely to eat fruit, vegetable and milk products everyday and were more likely to be a safe drinker.<sup>14</sup> Examining predictors of well-being as measured by mood, we found that medical conditions impacted negatively on mood if they interfered with abilities to engage in activities.<sup>15</sup> Social ties (family and friends) were

found to be enablers of social activity and physical activity.<sup>16</sup> Older people were more likely to engage in energetic activity if they held positive health beliefs, had high educational status and felt secure in their neighbourhood.<sup>17</sup> However, the health consequences of spouse caregiving were far less severe than had been reported from self-selected samples of people seeking help.<sup>18</sup> Overall, our findings provided a more positive picture of the life of older people than did government reports.

We now have a robust longitudinal data set with sufficient numbers in terms of key outcomes to model trajectories of healthy ageing, entry to residential care and mortality, and to examine the role of key life transitions such as becoming a caregiver or widow or giving up driving in healthy ageing. The value of these longitudinal analyses is that we are able to determine the impacts of modifiable risk factors that can be incorporated into health-promoting programmes for older people. As our sample is now moving into the old-old age category we are able to examine influences on health in the context of earlier life experiences. Based on these longitudinal analyses, our publications have reported that:

- (i) Older age, IADL dependence, cognitive impairment, underweight BMI and low social activity are the most important factors associated with entry to residential aged care. For men, the risk of entry to residential aged care facilities was associated mainly with disease burden, whereas for women social vulnerability and functional capacities were more important.
- (ii) Being underweight was the only BMI category associated with elevated mortality risk in our sample, and weight loss was a protective factor for mortality among overweight and obese participants compared with stable weight.
- (iii) Depression and use of anti-depressants at baseline were not associated with subsequent



**Table 3** Data collected in MELSHA

Socio-demographic characteristics	Subjective health data and health behaviours	General measures of well being	Life transitions	Service use and Environment	Objective health data	Open-ended questions
Age	Self-rated health	Psychological well-being	Caregiving	Health and community service use	Timed 'Get-Up and Go' test	What is the secret to long and healthy life?
Gender	Functional capacity	Life satisfaction	Driving status	and satisfaction	Visual acuity	What makes it worthwhile to get up in the morning?
Marital status	Self-rated vision and hearing	Spirituality	Widowhood	Neighbourhood satisfaction	Weight	What is it like when you are healthy?
Education	Cardiovascular risk factors	Self-efficacy		Transport	Height	What would you like to tell us about what it is like to grow older?
Occupational status	Other medical conditions	Sexuality		Housing	Grip strength	What has been important to you? And why?
Income	such as cancer, arthritis	Social interaction				
Country of birth	Oral health	Sense of coherence				
Number of children and grandchildren	Depressive symptoms	Boredom				
Social support	Falls, fear of falling	Loneliness				
Socio-demographic variables of parents	Cognition					
	Medication use					
	Urinary incontinence					
	Pain					
	Sleep problems					
	Stress					
	Physical activity					
	Smoking					
	Nutritional risk					
	Alcohol risk					

- cardiovascular disease (CVD) incidence after accounting for confounding mostly by CVD, diabetes, and poor functional health covariates.
- (iv) Older drivers modify their driving habits to drive under safer conditions and were more likely to modify their driving habits if they were older, dependent in IADL and rated their eyesight as poor. Women were three times more likely to relinquish driving than men (even when health and disability were taken into account) and people who rated their incomes as 'comfortable' were more likely to relinquish driving than those with lower incomes.
  - (v) For women, physical activity and being underweight predicted healthy ageing (those with no IADL dependence and with high scores on self-rated health and psychological well-being), whereas for men low strain, high social activity and high social support predicted healthy ageing.

## What are the main strengths and weaknesses of the study?

The main strengths of the study are the frequent data collections, and the length of the study that makes it one of the longest continuously running studies on ageing with relatively low rates of loss to follow-up. Furthermore, we have collected data across a range of domains pertinent to healthy ageing, including, medical conditions, health behaviours and social and structural environments. The measures, however, reflect the dilemma inherent in longitudinal studies whereby longitudinal analyses require consistency in measurement over time notwithstanding new and better measures becoming available in the literature.

The multi-disciplinary and multi-methodological nature of MELSHA has provided and continues to provide a sound evidence base to inform practice and policy in the area of healthy ageing.<sup>19</sup> Our findings have informed the Prime Minister's Science, Engineering and Innovation Council paper on healthy ageing<sup>20</sup> and the Parliament of Victoria Inquiry into Planning for Positive Ageing.<sup>21</sup> MELSHA is also one of the studies contributing to the DYNOPTA data set, a pooled file from nine Australian longitudinal studies on ageing.<sup>22</sup> These data have been harmonized to provide a unique and new data resource to examine ways of optimizing ageing and reducing morbidity (see <http://dynopta.anu.edu.au/>).

## Can I get hold of the data? Where can I find out more?

Data collected by the Chief Investigators of MELSHA are held in trust by Monash University and the University of Sydney. Policy and procedures for data access and publication and other information about

MELSHA can be found at <http://www.med.monash.edu.au/sphc/haru/MELSHA/index.html>).

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**Conflict of interest:** None declared.

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