

# The 45 and Up Study: an investment in healthy ageing

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## Key points

- The 45 and Up Study has been following changes in people's circumstances, conditions, functional abilities, support and wellbeing throughout later life to understand factors affecting healthy ageing for more than 15 years
- Key life transitions, including retirement from work, chronic disease diagnosis, and entry into aged care, are opportune moments to help people be healthier and age well
- Linked data provide rich information on people's use of health and aged care, following individuals over time and across different services

## Abstract

**Objectives and importance of the study:** To identify the value and contribution of the 45 and Up Study toward understanding and advancing healthy ageing.

**Study type:** Narrative review

**Methods:** A review of the purpose, process, and output of the 45 and Up Study in relation to the World Health Organization's Healthy Ageing Framework.

**Results:** The Sax Institute's 45 and Up Study (the Study) is Australia's largest longitudinal study of healthy ageing, with participants aged from 45 years to over 100 years followed over time through surveys and linked health and aged care data. The study is a powerful resource for understanding healthy ageing for the Australian population, identifying the factors that enable people to age well, widening inequities as people age, and prospects for healthy ageing for current and subsequent generations. To date, the participants have been followed for more than 15 years, providing information on the foundations of health in mid and later-life, factors affecting work, impacts of retirement, and the importance of housing, care, and aged services in improving the lives of people as they age. Moreover, since the Study cohort covers a wide age range, it is possible to divide the cohort into sequences, allowing comparisons of people in their 80s now (for example) with people who were aged in their 80s five, 10 or 15 years ago. Adding genetic and other biological and clinical data for some participants will further enhance the value of the project as a comprehensive study of healthy ageing.

**Conclusions:** The Study provides a clear view of factors affecting healthy ageing within population, healthcare, environmental and policy contexts. Over time, the Study will increase in value with the capacity to inform health services, policy, and aged care and to contribute to an ongoing cycle of evaluation and reform to continue to meet the needs of successive generations of people in the later stages of their lives.

## Introduction

Healthy ageing represents a personal and a public health goal, enabling people to live long and with the best possible wellbeing. According to the World Health Organization (WHO), healthy ageing is the process of “developing and maintaining the functional ability that enables well-being in older age” so people can be and do what they have reason to value.<sup>1</sup> The concept goes beyond the prevention of disease and disability, recognising that, given enough years, many people will develop health concerns and experience a decline in their intrinsic capacity. However, these effects can be optimised, compensated for and supported. In late life, goals shift from ageing without disease or disability to an focus on overall wellbeing. The concern is for the person’s quality of life and for their capacity for community participation, social interaction, and enjoyment. As Australia’s largest longitudinal study of healthy ageing, the Sax Institute’s 45 and Up Study (the Study) is a powerful resource for understanding healthy ageing for the Australian population in identifying the factors that enable people to age well, widening inequities as people age, and prospects for healthy ageing for current and subsequent generations.

## Methods

### A study of healthy ageing

The 45 and Up Study was developed as a long-term collaborative resource to investigate healthy ageing. Baseline data collection for the study began in 2005 and continued to 2009, with over 267 153 people aged 45 or older recruited from across New South Wales (NSW). These participants completed a baseline questionnaire and consented to be followed-up over time through regular surveys and linkage to other health data. Recruitment was deliberately designed to oversample people aged over 80 years and those living in rural and remote areas. By deliberately oversampling people 80 years and older, the study allowed for analysis of the health of people at the very oldest ages, the ‘young old’ and those in mid-life.

Of the people completing the baseline survey, 46% were men, and 54% were women; 45% were from major cities, 35% were from inner regional areas, 18% were from outer regional, and 2% were from remote/very remote areas. In terms of age, 28% were aged 45–54 years, 32% were aged 55–64 years, 29% were aged 65–79 years, and 11% were 80 years or older. The oldest participant was 110 years. As of 2020, the youngest participants were 56 years, and the oldest was over 100 years, with 2305 (2%) aged 90 years or older.<sup>2</sup>

The response rate to the baseline survey was modest at 18%, but there was a high level of diversity in the cohort allowing robust comparisons of different groups.

The cohort included significant numbers of participants from diverse cultural and economic backgrounds, including Aboriginal and Torres Strait Islander peoples, people living in rural and remote areas, people living in various types of housing, and people with of varying health status, ranging from excellent health to those with multiple complex and chronic conditions.

The data collected by the 45 and Up Study are made available to researchers through an expression of interest process and subject to study and ethics approvals, and a licensing fee. Publications from the Study are published on the Sax Institute website and searchable by key words and topics with 114 articles tagged as “ageing” up to December 2021. All these articles were reviewed for this paper.

## Findings and discussion

### Measuring healthy ageing

While the goal of healthy ageing is now widely accepted, the measurement of healthy ageing has been harder to settle on. WHO’s Healthy Ageing Framework considers optimal trajectories of functional ability in later life including abilities to move around, meet basic needs, learn, grow, and make decisions, build and maintain relationships, and contribute.<sup>1</sup> This considers the dynamic interaction between the individual’s intrinsic capacity – their physical and mental attributes – together with the influence of physical and social environments that can either enable or limit their ability to achieve the goals of value to them. A review of markers for healthy ageing identified chronic conditions, cognitive decline, obesity, sarcopenia (low muscle mass), dynapenia (muscle weakness), pain, diet and nutrition, physical activity, sleep, environmental stress, and biological markers of cellular function and stress.<sup>3</sup> Recently, it has been agreed that five domains are necessary to capture levels of intrinsic capacity: locomotion, vitality, sensory (in particular, vision and hearing), cognition, and psychological state.<sup>4</sup>

In relation to these measures of healthy ageing, 78% of participants in the baseline survey of the Study had no difficulty walking 1 km, and 85% could walk at least 0.5 km; 10% had difficulty walking 100 m, with 6.4% limited a little, and 3.7% limited a lot.<sup>4</sup> Eyesight was rated as excellent or very good by 43%, good by 41%, and fair or poor by 17%; 41% had hearing loss. Most people rated their memory as excellent/very good (44%) or good (38%). People also rated their overall health as excellent/very good (52%) or good (34%) and their quality of life as excellent/very good (61%) or good (28%).<sup>2</sup>

Of course, these ratings vary according to age and gender. Looking specifically at men aged 70 years and older who were not living in residential care, physical functioning scores decreased substantially with age from 80.5 ( $\pm$  standard deviation [SD] 23.4) at age 70–74 to

57.7 ( $\pm$  SD 31.3) at ages 85 years and older for men who were still living with a spouse. Scores were lower for men who were not living with a spouse, decreasing from 77.6 ( $\pm$  SD 25.9) at age 70–74 to 56.2 ( $\pm$  SD 31.9) at ages 85 years and older.<sup>5</sup> Note that the standard deviation (SD) increases with age, partly reflecting smaller sample size but also reflecting increased variability in functional capacity at oldest ages.

In terms of psychological state, the overall prevalence of psychological distress declines from age 45 years to 80 years. However, distress begins to increase again after age 80 years, and is particularly associated with physical disabilities and multiple comorbid health conditions. Higher education, married status, and higher income were associated with a lower risk of psychological distress.<sup>6</sup>

Six lifestyle clusters were identified in another analysis of Study data (Table 1). Cluster membership was significantly related to biological health status (Body Mass Index (BMI) and Short-Form-36 physical functioning (SF-36 PF) scores) and psychological health status (self-reported health related quality of life and Kessler Psychological Distress Scale (K10) variables).<sup>7</sup> The ‘ideal’ cluster of active non-smokers had better outcomes on all indicators, with the lowest BMI, highest physical function, best self-rated quality of life, and lowest psychological distress scores. Worse outcomes were among the higher risk ex-smokers, and current smokers had the highest psychological distress and lowest quality of life. People in the higher risk clusters were more likely to be male, living alone, low-income earners, and in a deprived neighbourhood. Note also that smokers have a higher mortality rate.<sup>8</sup>

## A life course approach to healthy ageing

Healthy ageing starts in utero and continues throughout life and will therefore be affected by genetic factors, childhood conditions, risks in adult life, as well as the management of disease and support for disability in later years. As seen from the baseline data, Study participants are already on different paths with different levels of capacity as they enter older age, experiencing various health threats, and levels of intrinsic reserve. Social position and personal resources across the life course also affect how people can adapt to change and be supported in their older age. In turn, appropriate care, support, or intervention may alter the future trajectory. Consequently, since healthy ageing refers to a process of change over time, healthy ageing cannot be estimated from a single measure. The focus is on change, prediction and prevention.

Longitudinal studies, such as the 45 and Up Study, that follow the same individuals over time with repeated measures, are imperative to identify different paths. While the Study picked up on peoples’ lives from mid-life onwards, we have been able to use some techniques to look back at peoples’ early life and examine the effect that early years might have on peoples’ health in older age. The Life History and Health project, funded by the Australian Research Council, included people aged 60–64 (born between 1947 and 1951) who had completed the baseline 45 and Up Study questionnaire in 2008. These people were invited to answer interview questions about different stages of their lives.<sup>9</sup> (Table 2) This retrospective information was used to model the impacts of factors across the life course on wellbeing at age 60–64 years. There were correlations between early life

**Table 1. Lifestyle clusters associated with physical function and psychological health**

Cluster (% of baseline participants)	Smoking	Exercise <sup>a</sup>	Screening <sup>b</sup>	Alcohol (standard drinks per week)	Fruit/vegetables (serves/day)
Active non-smokers (20%)	Non-smoker 100%	100%	100%	5.6	6.4
Sedentary non-smokers (29%)	Non-smoker 100%	0%	100%	4.6	5.8
Lower risk ex-smokers (14%)	Ex-smoker 100%	100%	100%	9.7	6.0
Higher risk ex-smokers (18%)	Ex-smoker 100%	0%	100%	8.7	5.5
Non-screener <sup>b</sup> (12%)	Ex-smoker 41%	40%	0%	7.0	5.1
Current smokers (7%)	100%	42%	75%	8.6	4.7

<sup>a</sup> Proportion who met recommended guidelines for exercise for the age range

<sup>b</sup> Proportion who had been screened at any time for bowel (all participants), prostate (males only) or breast cancer (females only)

Source: Adapted from: Griffin B, Sherman K, Jones M, Bayl-Smith P. The clustering of health behaviours in older Australians and its association with physical and psychological status, and sociodemographic indicators.<sup>7</sup>

**Table 2.** Examples of information collected in the Life History and Health Survey

Parents	Birth	Childhood	Adult life	Age 60–64 years
<ul style="list-style-type: none"> <li>Parental socioeconomic status<sup>a</sup></li> <li>Mother's work status</li> <li>Relationship with parents</li> <li>Family composition</li> </ul>	<ul style="list-style-type: none"> <li>Birthweight</li> </ul>	<ul style="list-style-type: none"> <li>Traumatic events</li> <li>Number of books in household</li> <li>Age left school</li> <li>Self-rated health</li> </ul>	<ul style="list-style-type: none"> <li>Marriage(s)/relationships</li> <li>Paid and unpaid work</li> <li>Residential locations/housing</li> </ul>	<ul style="list-style-type: none"> <li>Self-rated health</li> <li>BMI</li> <li>Wellbeing (CASP-19)</li> <li>Life satisfaction</li> </ul>

<sup>a</sup> Parental socioeconomic status was based on the highest occupation score of either parent

BMI= Body Mass Index; CASP-19 = Control, Autonomy, Self Realisation and Pleasure scale to measure quality of life.

Source: Adapted from: Kendig H, Byles JE, O'Loughlin K, et al. Adapting data collection methods in the Australian Life Histories and Health Survey: a retrospective life course study.<sup>9</sup>

factors, including parental socioeconomic status, number of books, leaving school before age 16, and childhood ill health. The number of books in the childhood home indicates childhood socioeconomic status, reflecting educational level, cultural capital, and educational culture of adults in the household. Staying in school was related to the highest academic achievement, occupational status, income and adult health. Childhood health was also associated with adult health. In turn, adult health had the main effect on adult wellbeing (as measured by the quality of life scale CASP-19) and life satisfaction at age 60–64.<sup>10</sup>

### Development of chronic disease in mid-life

Shang et al.<sup>11</sup> identified factors associated with remaining free of chronic conditions from age 45–64 at baseline (2006–2009) to follow-up in 2016. Of almost 270,000 people recruited at baseline, around 52,000 had no chronic conditions. About half of these Study participants remained disease-free at 2016, with modifiable protective factors including lower BMI, not smoking (active or passive), alcohol within recommended limits, physical activity, diet (lower red meat/chicken intake/higher vegetables), more physical activity, and less psychological distress. Participants having six or more of these modifiable health risk factors were 1.63–8.76 times more likely to remain disease-free and had 0.60–2.49 more disease-free years than those having two or fewer factors. Lower education and income and higher relative socioeconomic disadvantage increased disease risk. Better self-rated health and self-rated quality of life at baseline were also related to remaining-disease free at follow-up.<sup>11</sup>

Other researchers have explored the effects of diet on healthy ageing in greater depth using the Study. In these analyses, higher vegetable consumption was associated with lower odds of memory loss and lower odds of comorbid heart disease in people with memory loss.<sup>12</sup> Men and women with long-term consumption of adequate fruits, high grains, or a variety of foods were also less likely to become frail.<sup>13</sup>

### Healthy ageing and work

Almost half (47%) of the Study participants aged 60-64 years at baseline were not in paid work; 20% were in full time paid work (more than 36 hours/week), and 11% were self-employed (39% full-time). Of the 15% working part-time paid work, 74% were working more than 15 hours. Most of the 7% of participants classified as 'disabled/sick' worked 7 hours or fewer each week. Most chronic conditions were more prevalent among those who were not in full-time paid work and with fewer work hours.<sup>14</sup> Also, the mean age at diagnosis for any given condition was generally younger for those who were classified as 'disabled/sick' work status.

Exploring the impact of three common conditions (asthma, arthritis, diabetes), Majeed et al.<sup>15</sup> found significant associations between arthritis and diabetes and employment between ages 60–64 years. Notably, almost 22% of people in the sick/disabled category reported diabetes (compared to 8% of those working full-time), and 21% reported arthritis (compared to 4%). Asthma was not associated with employment status among men but was significant for women classified as disabled/sick and mostly accounted for by functional capacity. Other studies have found associations between cardiovascular disease<sup>16</sup> and cancer<sup>17</sup> and reduced rates of work for people aged 45–64 years.

Looking back at people's work histories, it was evident that workforce participation began to decrease from about the age of 50 years for many men and women. It also noted that around 17% of women had not been in paid work for most of their adult lives. Some men showed a pattern of temporarily taking time out of their work in their 40s, associated with caring for another person with illness or disability. Women's workforce participation was positively associated with books in childhood, post-school education, and being partnered. Caregiving was not associated with patterns of work for women.<sup>18</sup>

Some people work beyond age 65, with potential benefits for individuals in terms of income and capacity to save for a better standard of living in retirement, and for the overall economy. For people in the Study, the odds of doing paid work after age 65 increased with



higher education level and decreased with time (Study wave), baseline age, poorer physical function and health conditions (high blood pressure, diabetes, stroke and breast cancer). At this life stage, un-partnered women were more likely to work in later life than partnered women.<sup>19</sup>

## Healthy ageing and retirement

Retirement is an important life transition that can occur due to positive and negative events and circumstances. Among people in the Study aged 45–79 years at baseline, retirement after age 65 years was mostly attributed to having “reached usual retirement age”. Before the age of 65 years, the most common reasons for retirement were “lifestyle” and “ill health”<sup>20</sup>. Among retirees of both sexes, retirement due to ill health, being made redundant, or caregiving was associated with higher levels of psychological distress compared to having ‘reached usual retirement age’.<sup>20</sup> Analysis of data from baseline and the first follow-up (average 2.7 years follow-up) found an association between retirement transitions and increased psychological distress among men aged 55–69, especially those with a high level of physical dysfunction.<sup>21</sup> Retirement was also associated with a 25% relative increase in mean physical dysfunction score for men and a 17% increase for women. However, retirement also provides an opportunity for individuals to change their lives and engineer a better future. In another analysis of baseline and follow-up data, Ding et al.<sup>22</sup> found that retirement was significantly associated with reduced odds of smoking (in women), physical inactivity, excessive sitting, and poor sleep patterns. Compared to those who continued to work, retirees spent more time walking (33 vs 16 minutes/week) and undertaking moderate-intensity physical activity (59 vs 24 minutes/week). They had a statistically significantly greater decrease in sitting time (–67 vs –27 minutes/day) and an increase in sleep duration compared to those who continued to work.

## Healthy ageing, housing and neighbourhood environment

Housing is essential for healthy ageing, providing shelter, purpose, and identity. Supportive housing and neighbourhood environments can help mitigate changes in intrinsic capacities, helping to maintain independence. The Housing and Independent Living Study (HAIL) was a sub-study of 45 and Up that assessed how well older people’s homes fit with their current and future needs.<sup>23</sup> Participants were aged 75–79 years and resided in seven selected suburbs in the greater Sydney metropolitan area. These people mostly rated their homes as very suitable to their needs, particularly for activities of daily living, socialising, hobbies and relaxation. However, people living in apartments generally had less satisfaction with most of the usability items (which rate how well the home was designed to support activities of dressing

and toileting, cooking, cleaning, washing clothes and for socialising, hobbies and relaxation). Generally, people in the HAIL study with higher satisfaction scores for home and neighbourhood had better subjective and objective scores of their functional wellbeing.<sup>23</sup>

Objective ratings of the homes in the HAIL study revealed many potential problems, including access and clearance spaces, which may not be an issue while the people were currently mobile but could prove to be a significant barrier should they develop the need for mobility aids. Bathroom design was particularly poor, although many issues could be rectified through simple home modifications, including grab rails and non-slip surfaces. More than one-quarter of the people scored in the ‘high falls risk’ range on the Home Falls and Accident Screening Tool<sup>24</sup>, with ‘higher falls risk’ scores associated with higher levels of disability, indicating that those with greatest physical vulnerability also had the most home hazards and the most need for modifications.

People were mostly satisfied with their neighbourhoods, having a lot in common with their neighbours, trusting their neighbours to look out for their property, and rating their community as safe. Neighbourhood walkability scores were high for most domains except for parking in local shopping areas, and there were limitations in access to shops and services. People lamented the loss of local shops, libraries and other facilities, including social outlets such as clubs, churches and sporting amenities.<sup>25</sup> In other research, Study participants who reported that there were no local amenities and that crime rates made walking unsafe in their neighbourhood had higher odds of developing incident type 2 diabetes.<sup>26</sup>

Other analyses using Study data have identified significant effects of the environment on older people’s health, including reduced risk of diabetes, hypertension and cardiovascular disease in areas with more green space and tree canopy.<sup>27</sup> It is thought that greener surroundings and shade may motivate people to engage in more physical activity.<sup>28</sup> The incidence of psychological distress and poor general health was also lower when there was more green space and tree canopy.<sup>29</sup>

## Healthy ageing and community care

Healthy ageing is inclusive of people with different levels of need. Even a frail older person who needs long-term care and support can still experience healthy ageing with support for their participation and enjoyment of life. With links to aged care data, the Study has strength in being able to examine the supports people receive and how these benefit them. Analysing home care data for study participants who used community services, Kendig et al.<sup>30</sup> identified three main groups: those with minimal needs (the basic group, 47% of service users), those who used one main service type (transport 14%, domestic assistance 14%, meals 7%, nursing 8%, and social support 3%), and small proportions with broader

and more complex needs. The 45 and Up survey data revealed that community care use was associated with increasing age, female sex, not having a partner, lower household income, not being in paid work, Indigenous background and living in a regional or remote location. People born overseas and those speaking languages other than English at home were less likely to access community care. However, greater use of services was found among people with more chronic health conditions, lower levels of physical functioning, higher levels of psychological distress, and poorer self-rated health, eyesight and memory. The data also revealed many opportunities for a preventive approach to aged care, with people being significantly more likely to use community aged care services if they were underweight, obese, sedentary, reported falling in the past year, were current smokers, or ate little fruit or vegetables.<sup>31</sup>

A more recent study followed the participants through linked records for hospital stays, aged care service and deaths for the period 2006–14.<sup>32</sup> Over this time, 14% of participants used community care services and 3% used residential care services. This study found that people who used aged care had more cardiovascular disease than those who did not use aged care. On entry to community care, 12% had atrial fibrillation, 6% had heart failure, and 11% had a past history of stroke. On entry to residential care, 22% had atrial fibrillation, 16% had heart failure, and 20% had a past history of stroke. Men had higher rates of cardiovascular disease on entry into aged care compared to women. These findings underscore the importance of primary and tertiary prevention and the need for high-quality integrated medical care for people receiving aged care services.

### Further prospects for understanding healthy ageing using the 45 and Up Study

The Study has collected genetic data from some participants, enabling research into genetic factors that contribute to healthy ageing.<sup>33</sup> These data are stored in the Medical Genome Reference Bank, which includes entire genetic sequences for 4000 Australians aged over 70 years who have no major illnesses such as cardiovascular disease, dementia or cancer.<sup>34</sup> The Sax Institute also plans to collect blood samples from Study participants, which will be able to be used by researchers to explore early markers of chronic conditions such as cancer, heart disease or neurological disorders.

While Study participants can report these conditions on the survey, in some cases, more reliable information on disease onset can be obtained through administrative health data. This is particularly true when the participants may not recall or relate to the technical name of their condition and where affected participants may be less likely to return follow-up surveys. An example is the onset of dementia, with the potential to use data from multiple health and aged care data sets to ascertain dementia

diagnosis, including date of the first record, type and treatments.<sup>35</sup>

Ongoing linkage of Study data to other health and aged care data will allow an understanding of how people move through and between different acute and long-term care settings and how care fits within the trajectory of peoples later lives to support them as they age. Moreover, since the 45 and Up cohort covers a wide age range, it is possible to divide the cohort into sequences, allowing comparisons of people aged in their 80s now (for example) with people who were aged in their 80s five, 10 or 15 years ago. Such comparisons are useful in ongoing aged care review and reform. The geographical coverage of the study also allows for ecological analysis of contextual factors affecting healthy ageing, including healthcare setting and supply and environmental factors.

### Follow-up in longitudinal studies of ageing

The value of longitudinal studies is in accumulating data from repeated measures of the same participants. The 45 and Up Study has been through two cycles of follow-up: 2012–2015, 142 548 participants (58%) and 2018–2020, 97 302 (47% of those invited) and will begin another survey in 2023. The nonrespondents at each wave will be attributable to death (ascertained from Births, Deaths and Marriages data) and non-death attrition. In a study involving older people, death will be a common outcome and remembering that the cohort is constantly ageing, deaths will accumulate rapidly. It was estimated that of 9173 participants who were aged 85 years or over at the time of completing the 45 and Up baseline survey, 3145 had died by 31 December 2011.<sup>36</sup> In another study, all-cause mortality to June 2017 was ascertained for 149 077 participants who had exposure data on sitting time and who did not have cardiovascular disease at baseline. There were 8689 deaths among these participants over a median follow-up time for all-cause mortality of 8.9 years.<sup>37</sup> Any analyses of health outcomes in the Study will need to account for death as a competing risk for other outcomes (e.g. incident cardiovascular disease or dementia). The same applies to analyses of the use of any healthcare or aged care.

Non-death attrition can introduce bias into longitudinal studies. People who drop out of a longitudinal study are more likely to have poor health status, poor education and lower socioeconomic status. Such losses may lead to underestimating the relative risk of exposures, if those who develop disease leave the study and those who do not develop illness remain in the study.<sup>38</sup> However, unlike many longitudinal studies, the 45 and Up Study has the advantage of follow-up of non-participants through linked data. These can include pharmaceutical, medical benefits scheme, hospital data, disease registries (such as cancer registries), and death registers. Data can also be linked to clinical data held by laboratory service providers through the EXTEND45 Study (EXamining ouTcomEs in chroNic Disease in the 45 and Up Study).<sup>39</sup>

## Conclusion

The 45 and Up Study provides a clear view of factors affecting healthy ageing within a population, healthcare, environmental and policy contexts. The data provided by many people across a broad age range, and linked to administrative data and clinical data, provides an almost complete capture of health events and aged care use. The ongoing surveys monitor change in the context of people's lives and changes in their intrinsic capacities and functional abilities as they age. The addition of biological samples to the Study further increases its usefulness as a comprehensive study of healthy ageing.

So far, the Study has revealed a diversity of experiences of ageing, the potential for people to remain healthy in later life, and many opportunities to help people age well. These opportunities include retirement from work, when people adopt new lifestyles, and a chance to encourage healthier habits and activities. Paradoxically, the onset of chronic disease can also be a point where good health can be encouraged, by activating people to manage their conditions to prevent complications, balance comorbidities, and optimise other opportunities for healthy lives. Entry into residential aged care is another point where peoples' needs can be evaluated, with plenty of opportunities for further prevention, health promotion and support right through to the last stages of life. As time goes by, the Study will increase in value with the capacity to inform health services, policy, and aged care and to contribute to an ongoing cycle of evaluation and reform to continue to meet the needs of successive generations of people in the later stages of their lives.

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## Peer review and provenance

Externally peer reviewed, invited.

## Competing interests

None declared.

## Author contributions

JB is the sole author of this manuscript and was on the original steering committee for the baseline study.

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