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Introduction

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The Irish Longitudinal Study on Ageing (TILDA) was designed to provide an evidence-base for addressing current and emerging issues associated with population ageing in Ireland across health, economic and social systems. Before the establishment of this study, only minimal national information was available on the prevalence and incidence of age-related disease, disability, health service utilisation or economic and social data. TILDA has changed this landscape, enabling both cross-sectional and longitudinal evidence-based research. Once the collected data has been thoroughly validated, it is archived for public access at two sites - the Irish Social Science Data Archive (ISSDA) at University College Dublin (<https://www.ucd.ie/issda/data/tilda/>) and the Inter-University Consortium of Political and Social Research at University of Michigan (<https://www.icpsr.umich.edu/icpsrweb/ICPSR/>), thereby maximising analyses in addition to affording opportunities for education and training of Irish and international researchers.

Given its comprehensive multi-domain, longitudinal design, TILDA provides the essential research evidence to inform policy and practice, advancements in technology and innovation, and tailored education and training through an enhanced ageing research infrastructure in Ireland.

1.1 TILDA data collection

The sampling frame is based on the Irish Geodirectory, a comprehensive and up-to-date listing and mapping of all residential addresses in the Republic of Ireland. Participants were randomly selected so that each residential address had an equal probability of selection. After 4 years of pilot studies to ensure that TILDA achieved highest quality research standards, baseline interviews with 8,504 participants commenced in 2009. Eligible participants were community-dwelling adults aged 50 years and over and their spouses (of any age) who were non-demented and able to provide informed consent. TILDA represents 1 in 156 people aged 50 and over in Ireland (at Wave 1). Further details about the study design and initial cohort are available elsewhere (1, 2). The initial cohort response rate was 62% and follow-up at consecutive waves (every two years) has maintained a response rate of over 84% (3). Replenishment of the sample aged 50-59 years will commence in 2020 (Wave 6).

There are three components to data collection (i) a computer-assisted personal interview (CAPI) administered by trained social interviewers in the participants' own homes (on average 1.5 hours) which includes detailed questions on socio-demographics, health, wealth, lifestyle and social support; (ii) a self-completion questionnaire (SCQ) completed privately by the participant and designed for the collection of more sensitive information such as alcohol use and relationships and (iii) a comprehensive health assessment carried out every second or third wave to allow an appropriate time interval to detect subtle

physical and cognitive changes. In Wave 4, the CAPI and SCQ were carried out but not the health assessment.

Although TILDA is nationally representative of the older community-dwelling population in Ireland, patterns of response to each component of the study (CAPI, SCQ) vary across certain subgroups of the sample. Participation in later waves of the study is also influenced by levels of participation at earlier waves and by sample attrition. To account for these systematic differences in responses and to ensure that the estimates derived from the sample remain representative of the target population, weights were calculated and applied to different analyses to ensure that subgroups within the sample are represented proportionate to the number of that subgroup present in the population of Ireland.

After each wave, TILDA provides a comprehensive research report (4-6). The Wave 4 report includes current status at Wave 4 and changes that occurred between Wave 1 (conducted in 2009-2011) and Wave 4 (conducted in 2016), in quality of life, social engagement, physical and brain health, living conditions, health care cover and utilisation. A consistent theme for this report is the benefit that social engagement, volunteering and friendships convey on quality of life, mental and physical health and wellbeing.

1.2 Larger social networks and positive supportive friendships help to maintain quality of life, even in the presence of increasing disability

Quality of life reflects the overall wellbeing of an individual. The average quality of life score in TILDA participants is high (27.3/36 in Wave 4) suggesting that they experience a good quality of life. It also did not decline linearly with age, but instead steadily increased to peak at age 68 and then gradually declined, reaching the value observed for 50 year olds at 80 years of age. Adults who have the highest levels of social integration, such as large social networks, and positive supportive friendships, reported highest quality of life, however women are twice as likely to report positive supportive friendships compared to men (31% versus 16% at Wave 4). Unsurprisingly, increases in chronic health conditions and disabilities negatively impact quality of life, however higher social integration and higher supportive friendships moderate the effect of increasing disability on quality of life between Waves 1 and 4, particularly in men. This highlights the importance of the quality of social relationships within social support networks for long-term health and wellbeing. Policies promoting and enabling continued social participation and engagement in older age could significantly improve health outcomes, enhance healthy and active ageing and maintain quality of life in ageing populations.

1.3 Volunteering and social participation, which are associated with higher quality of life and lower depressive symptoms, should be promoted for adults aged 75 years and over

Social participation, and particularly productive activities such as caregiving, volunteering, and informal caring, have huge benefits for the health and wellbeing of older adults (7-9). As previously highlighted by TILDA, volunteering is an important feature of Irish life - older adults in Ireland have the second highest volunteering rate among the 28 European Member States after Austria (10). At Wave 4, 18% of adults volunteer at least once per week while 56% volunteer at least occasionally; volunteering was highest among the 65-74 year olds. There was little change in the proportion of adults who volunteer between Waves 1 and 4. In addition, 74% of older adults participate weekly in active and social activities, although participation levels were lower in those aged 75 and older, while 52% participate in organised groups such as sports groups or book clubs. Both types of social participation are associated with better quality of life and fewer depressive symptoms. Among those who retired between Waves 1 and 4, there were trends for an increase in volunteering and social participation after retirement, but these were not significant suggesting that these patterns were established for most people before retirement. Given the clear benefits accrued from volunteering and social participation, not only to the participants themselves but to society more generally, it is important to identify enablers and barriers to these activities, particularly in those aged 75 and over.

1.4 High levels of neighbourhood social cohesion are associated with better mental and physical health, highlighting the need to target social isolation in older adults

Poor housing conditions, difficulties heating the home and low neighbourhood social cohesion are significant issues for many community-dwelling adults aged 56 and over in Ireland. The most prevalent housing problem was damp, mould or moisture, affecting 46.3% of adults. The reduction in reported heating difficulties (25.6% at Wave 3 to 21% at Wave 4) shows that these problems can be resolved and this can be positively impacted by intervention schemes and initiatives to improve housing conditions and energy efficiency. High levels of neighbourhood social cohesion, reflecting a network of trusting relationships within the area, are most prevalent for adults aged 65-74 years, those living in rural areas and adults who are more socially integrated. High social cohesion is associated with better quality of life, physical health and mental health, highlighting the need for policies and initiatives to combat loneliness and social isolation at a community level.

1.5 Prevalence of chronic conditions and outcomes such as falls and fracture increase over time due to advancing age but there are opportunities to improve health through modifying health behaviours

Self-rated health appears to be improving in those under 75 years, for example, the proportion of 65-74 year olds reporting fair or poor health declined from 23% to 16% between Waves 1 and 4. As expected with an ageing population, the same period saw an increase in the prevalence of many health conditions, including any falls (20% to 52%), arthritis (26% to 39%), osteoporosis (9% to 17%), cataracts (9% to 14%), hypertension (35% to 38%), diabetes (8% to 11%), wrist fractures (12% to 14%), heart attacks (4% to 6%), transient ischaemic attacks (2% to 4%), lung disease (4% to 5%) and strokes (1% to 2%). For some conditions, there was a spike in incidence at Wave 2, possibly due to the effects of feedback after the Wave 1 health assessment, however incidence was consistent thereafter. The number of current smokers declined, mostly driven by the reduction observed in women aged 50-64 years (from 24% at Wave 1 to 17% at Wave 4) while only 52% of adults at Wave 4 achieved the target of 150 minutes of brisk walking per week, down from 62% at Wave 1. Modifying these health behaviours would not only improve physical health but also psychological health, highlighting the importance of recent legislation and policy initiatives which target improvements in these areas.

1.6 Frailty, while common and often associated with negative consequences, is not an inevitable condition and early recognition of risk factors can help avoid, delay and reverse frailty.

The prevalence of frailty in adults aged 50 years and over in Ireland is almost 13% which is equivalent to 160,000 adults. The prevalence of pre-frailty is 31%, equivalent to 370,000 adults. However, frailty is not inevitable; it is a dynamic process in which a person can transition in both directions between the different states of frailty, namely robustness, pre-frailty (an intermediate state) and frailty – almost one third transitioned from frailty at Wave 1 to pre-frailty at Wave 4. In TILDA, adults most at risk of becoming frail are more likely to be older, female, widowed, living alone and with lower educational attainment. Of note, and consistent with the benefits to overall health and wellbeing, forms of social engagement such as emotional support and volunteering have been shown to be protective for the development of pre-frailty and frailty respectively (11, 12). TILDA is currently developing new research strategies for early identification of risk factors, thus allowing timely and appropriate interventions to help avoid, delay and reverse frailty. Since 2017, TILDA has delivered a one-day frailty education programme, run in conjunction with the National Clinical Programme for Older People (NCPOP). The purpose of this education day is to

train healthcare professionals to understand the risk factors for frailty enabling them to implement programmes for early detection, prevention and management.

1.7 Cognitive function is relatively consistent across the four waves indicating that participants continue to perform well at Wave 4

The majority of adults aged 50 and over in Ireland continue to perform well on the core cognitive tests, assessing global cognition, memory and executive function, at an average of six years follow-up. Where a decline did occur, the changes were small and predominantly evident in those aged 75 and older. For example, this age group recalled 1 word less at Wave 4 compared to Wave 1 in the delayed recall task; they named 4 fewer animals at Wave 4 in the verbal fluency test and the success rate in the prospective memory test dropped from 53% at Wave 1 to 40% at Wave 4. This is consistent with international evidence, which suggests acceleration in cognitive decline, at least in some domains, from age 75-80 years onwards (13, 14). Only 7% of adults felt that their memory was continuously declining at each wave and they had a slightly larger decrease in delayed word recall, verbal fluency and global cognitive scores over the four Waves.

1.8 Healthcare utilisation changed in line with changes in health policy

The period during which the first four waves of TILDA took place was a period of substantial change in healthcare spending and policy, the effects of which can be seen in the data. For example, the proportion of those 70 and over with a medical card dropped from 90% at Wave 1 to 74% at Wave 4 after a means testing system for this age group was introduced in January 2009 and the threshold decreased during subsequent Budgets. Similarly, the proportion with a GP visit card increased from 1% to 19%, likely attributable to the introduction of the universal GP visit card for the over 70s in 2015. The proportion of participants accessing dental care decreased at Wave 4 compared to Wave 1 (11% to 9%), most notably in those who were frail (17% to 11%); this followed a number of cuts to dental care entitlements. Overall, there was no change in the rate of purchasing private health insurance among older adults in Ireland (54-57% at each wave) with no difference in cover between age groups at Wave 4.

Medical care utilisation increased between Wave 1 and Wave 4 including GP visits (87% to 92%), Emergency Department visits (15% to 18%), outpatient clinic visits (41% to 44%) and overnight admissions (12% to 16%). The average number of nights spent in hospital also increased from 1 to 2 nights. These changes are mostly driven by changes observed for older adults with frailty (e.g. overnight admissions increased from 23% to 31%; average

number of nights more than doubled 2.7 to 6.5 nights) although the proportion with at least one outpatient visit fell from 69% to 59%).

Overall, the proportion accessing community services (e.g. respite, day centre, meals on wheels, occupational therapy or community nursing) is low at $\leq 6\%$ and shows minimal change across the waves although home help provision or personal care provision increased marginally (2% to 4%). However, the characteristics of users of the home help service changed – 19% of users had limitations in activities of daily living (ADL) and instrumental activities of daily living (IADL) at Wave 1 compared to 41% at Wave 4. This is most likely attributable to a 2012 policy change, where the HSE changed the criteria from providing ‘domestic help’ to providing ‘personal care’. Conversely, informal care (i.e. care from family or friend) increased substantially from 5% at Wave 1 to 9% at Wave 4. The reasons for this increase require further study but it suggests that the burden of care was transferred from the state to the families during this period.

1.9 Conclusion

In summary, Wave 4 underscores the benefits of social engagement, supportive friendships, volunteering and membership of organisations, on health and wellbeing. Quality of life continues to improve with age before gradually declining after age 68. Policies which enhance social engagement should enhance quality of life. Changes in cognitive health are minimal over the average follow-up of six years while timely and appropriate interventions can help delay, avoid or reverse the onset of frailty. Modifying health behaviours such as stopping smoking, reducing alcohol consumption and increasing physical activity can also help to improve both physical and mental health. Recent changes in healthcare policies and provision are reflected in health care access and utilisation.

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