# 7 Frailty

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## Contents



tilda
Staidéar Fadaimseartha na hÉireann um Dhul in Aois
The Irish Longitudinal Study on Ageing

# 7 Frailty

- Frailty is a common condition affecting 12.7% of adults aged 50 years and over and 21.5% of people aged 65 and over in Ireland.
- Frailty is a dynamic process that can change over time and people living with frailty can transition in either direction between the different states of frailty namely robustness, pre-frailty (an intermediate state) and frailty.
- The prevalence of frailty among women is twice that of men at Wave 4 (24.9% versus 12.6%) and increases with age in both sexes. Frailty is also more prevalent among people who are living alone, are widowed, and those with lower levels of educational attainment.
- Frailty is a risk factor for single and recurrent falls, fear of falling and disability among adults aged 50 and over.
- People living with frailty are more likely to experience declines in mental health including lower levels of cognitive function and higher levels of depressive symptoms.
- Frailty is not inevitable and can be avoided, delayed and reversed with timely and appropriate interventions.

## 7.1 Introduction

Frailty is described as a distinctive health state related to the ageing process in which multiple body systems gradually lose their in-built reserves. Older adults living with frailty are at an increased risk of unpredictable deterioration in their health following minor stressor events such as an infection, dehydration or adverse effects related to a new medication (1). Frailty is a common condition in older adults although it is not an inevitable part of the ageing process (2). Frailty can occur at any age but becomes more prevalent with advancing age, with the prevalence in community living older adults aged 65 years and older ranging from 4% to 59% (3). This association with increasing age has implications for Ireland which has an ageing population. Frailty is becoming a key concept in healthcare service planning, development and delivery for our ageing population (4).

Frailty is a dynamic process that changes over time and can be viewed on a continuum. An older person can transition in either direction between the different states of frailty namely robustness, pre-frailty (an intermediate state) and frailty (5). Robust older people may have some health problems but these problems are being managed well. Older people with pre-frailty are at an increased risk of adverse outcomes but are coping; and older people with frailty have complex health problems and functional limitations that put them at the highest risk of adverse health outcomes such as falls, disability, hospitalisation, nursing home admission and even death (6). Identification of frailty in older adults is important as it has modifiable risk factors for disability and death. Identifying people living with, or at risk for, frailty provides an opportunity to prevent or intervene in the development of subsequent adverse health consequences (7). Proactive and preventative health care responses can improve quality of life and reduce costs of healthcare for older adults.

Although frailty is a recognisable and common phenomenon in ageing, it is difficult to accurately define and diagnose. The gold standard for the assessment and management of frailty is the Comprehensive Geriatric Assessment (CGA). CGA is a holistic and interdisciplinary assessment of an individual and has been demonstrated to reduce adverse outcomes including disability, cognitive decline, long-term residential care and death (8). However, CGA is time consuming and must be carried out by trained clinicians so it is not feasible for everyone living with frailty to undergo a full multidisciplinary review. Despite a lack of agreement on an internationally accepted and easily administered consensus measure of frailty, two methods of screening are commonly used (9). One method is the Frailty Phenotype model which views frailty as the presence of three or more of the following characteristics: unintended weight loss, exhaustion, weakness, slow gait speed and low physical activity. A person is considered pre-frail if they have 1-2 characteristics and robust if they have none of these characteristics (6, 10).

The second method is the Cumulative Deficit or Frailty Index (FI) model which views frailty as a state of system breakdown due to the accumulation of physical, social and psychological health symptoms and conditions, described as health deficits. The FI measures the number of health deficits present as a proportion of the total number of potential health deficits tested to determine whether a person is in robust health, living with pre-frailty or living with frailty (11, 12).

Population based cohort studies such as TILDA commonly use the Frailty Phenotype and the FI to measure frailty in large population representative samples and to explore relationships between frailty and potential risk factors and health outcomes. Using the FI, this Chapter provides information on the prevalence, incidence and transitions of frailty in adults aged 50 and over, and examines the associations between frailty and sociodemographic factors, physical health outcomes and mental health outcomes. The information presented is based on cross-sectional analyses of the same 5,304 TILDA participants at each wave of data collection - Wave 1 (2009-2011), Wave 2 (2012-2013), Wave 3 (2014-2015) and Wave 4 (2016) of TILDA.

## 7.2 Frailty prevalence, incidence and transitions

### 7.2.1 Prevalence of frailty at Waves 1 to 4

A deficit accumulation FI was constructed using 32 self-reported health deficits identified during the TILDA home interview at Waves 1, 2, 3 and 4, following the previously published methodology (11-13). The 32 deficits were associated with poor health, were distributed across several health domains and were associated with advancing age. Each deficit was coded as present (1) or absent (0). Deficits with more than two categories were coded as a proportion of the number and order of responses (e.g. five answer categories – Excellent, Very Good, Good, Fair and Poor were coded as 0, 0.25, 0.5, 0.75 and 1.0). The 32 deficits included in the FI are listed in Appendix 7.1. The total was then summed and divided by 32. This produced FI scores between 0.0 and 1.0. Scores of <0.10, 0.10-0.24 and ≥0.25 were used to classify participants as robust, pre-frail and frail respectively.

The prevalence, or the proportion of the community-dwelling population aged 50 years and over, by frailty status at Waves 1 to 4 are provided in Table 7.1. The prevalence of frailty increased from 12.7% to 19.0% between Waves 1 and 4, while pre-frailty increased from 30.9% to 39.2%. Correspondingly the prevalence of robustness decreased from 56.4% at Wave 1 to 41.8% at Wave 4. These data indicated that frailty and pre-frailty were common among older adults in Ireland. The increasing prevalence of pre-frailty and frailty at each wave was mainly due to the ageing of the cohort between Waves 1 and 4.

*Table 7.1: Prevalence of frailty status (robust, pre-frail and frail) at Waves 1, 2, 3 and 4 using the FI measure.*

| Frailty Status | Wave 1 | Wave 2 | Wave 3 | Wave 4 |
|---|---|---|---|---|
| **N** | 5,304 | 5,304 | 5,304 | 5,304 |
| **Robust (%)** | 56.4 | 52.7 | 50.1 | 41.8 |
| **Pre-frail (%)** | 30.9 | 33.0 | 34.1 | 39.2 |
| **Frail (%)** | 12.7 | 14.3 | 15.8 | 19.0 |

### 7.2.2 Incidence of frailty at Waves 2 to 4

The incidence, or rate of occurrence of new cases, by frailty status is provided in Table 7.2. In this case, incidence refers to adults aged 50 and over who were robust at Wave 1 but transitioned to pre-frailty or frailty at Waves 2, 3 or 4. The incidence of frailty increased from 1.5% at Wave 2 to 5.4% at Wave 4 among the group who were robust at Wave 1, While the incidence of pre-frailty increased from 19.2% at Wave 2 to 30.9% at Wave 4. The majority of adults in the robust group at Wave 1 remained robust at Waves 2-4. These data suggest that the incidence of both frailty and pre-frailty was significant over time even among those who were considered to be healthy and robust at Wave 1.

*Table 7.2: Incidence of frailty status (robust, pre-frail and frail) at Waves 2, 3 and 4 if robust at Wave 1 using the FI measure.*

| Frailty Status | Wave 1 | Wave 2 | Wave 3 | Wave 4 |
|---|---|---|---|---|
| **N** | 3,069 | 3,069 | 3,069 | 3,069 |
| **Robust (%)** | 100.0 | 79.3 | 74.1 | 63.7 |
| **Pre-frail (%)** | - | 19.2 | 22.9 | 30.9 |
| **Frail (%)** | - | 1.5 | 3.0 | 5.4 |

### 7.2.3 Transitions of frailty status between Waves 1 and 4

The incidence of transitions between the three frailty states at Waves 1 and 4 are provided in Table 7.3. Among the robust group at Wave 1, 30.9% transitioned to pre-frailty and 5.4% to frailty with the majority remaining robust at Wave 4. Among the pre-frail group at Wave 1, the majority remained pre-frail at Wave 4 (57.7%) whilst the incidence of robustness and frailty was 18.1% and 24.2% respectively. Among the frail group at Wave 1, 66.9% remained frail at Wave 4 whilst the incidence of robustness and pre-frailty was 1.8% and 31.3% respectively. In summary, the overall incidence of stability (no transitions) was 6 in 10 participants, negative transitions (robust -> pre-frail -> frail) was 3 in 10 participants and

positive transitions (frail -> pre-frail -> robust) was 1 in 10 participants between Waves 1 and 4. These data indicate that frailty is a dynamic process and that an older person can transition between the different states of frailty over time. It also highlights that frailty is a modifiable and potentially reversible condition, amenable to prevention and intervention strategies to halt or ameliorate the development of frailty itself and related adverse health outcomes.

*Table 7.3: Incidence of transitions in frailty status (robust, pre-frail and frail) between Waves 1 and 4 using the FI measure (n = 5,304).*

| | | Wave 1 | | |
|---|---|---|---|---|
| | | Robust (%) | Pre-frail (%) | Frail (%) |
| Wave 4 | **Robust (%)** | 63.7 | 18.1 | 1.8 |
| | **Pre-frail (%)** | 30.9 | 57.7 | 31.3 |
| | **Frail (%)** | 5.4 | 24.2 | 66.9 |
| | **Total** | 100.0 | 100.0 | 100.0 |
| | **N** | 3,069 | 1,631 | 604 |

## 7.3 Sociodemographics of frailty

The development of frailty at older ages is related to demographic and social factors that are determined much earlier during the life-course. Here we examined the impact on frailty of self-reported demographic and social data regarding age, gender, highest level of educational attainment, marital status and living arrangements, provided by participants during the home interview.

### 7.3.1 Age and frailty

The prevalence of frailty and pre-frailty increased with increasing age in all age groups and at all waves as summarised in Table 7.4. There was a progressive increase in the prevalence of frailty in the 75+ age group from 30.2% to 39.1% between Waves 1 and 4, however this trend was not observed for pre-frailty. These data support the well documented relationship between increasing prevalence of frailty with advancing age.

*Table 7.4:. Age and frailty at Waves 1 - 4 using the FI measure (n = 5,304).*

| | Wave 1 | | | Wave 2 | | | Wave 3 | | | Wave 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Age | Robust | Pre-frail | Frail | Robust | Pre-frail | Frail | Robust | Pre-frail | Frail | Robust | Pre-frail | Frail |
| **50-64 (%)** | 67 | 25.5 | 7.5 | 67.1 | 25.0 | 7.9 | 66.6 | 25.9 | 7.5 | 60.1 | 31.2 | 8.7 |
| **65-74 (%)** | 46.7 | 37.1 | 16.2 | 43.0 | 40.5 | 16.5 | 45.4 | 39.9 | 14.7 | 40.7 | 44.4 | 14.9 |
| **>=75 (%)** | 25 | 44.8 | 30.2 | 21.4 | 46.9 | 31.7 | 21.9 | 42.8 | 35.3 | 17.2 | 43.7 | 39.1 |

### 7.3.2 Gender and frailty

The prevalence of frailty among women was higher at all waves and was approximately twice that of men at Waves 2-4 as summarised in Table 7.5. The change in prevalence of frailty between Waves 1 and 4 was three times higher for women compared to men (9.2% versus 3.2%). There is no statistical difference in the prevalence of pre-frailty among men and women at any wave. These data support the documented relationship between increasing prevalence of frailty among women compared to men.

*Table 7.5: Gender and frailty at Waves 1 - 4 using the FI measure (n = 5,304).*

| | Wave 1 | | | Wave 2 | | | Wave 3 | | | Wave 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gender | Robust | Pre-frail | Frail | Robust | Pre-frail | Frail | Robust | Pre-frail | Frail | Robust | Pre-frail | Frail |
| **Male (%)** | 61.3 | 29.3 | 9.4 | 58.5 | 32.1 | 9.4 | 56.1 | 33.0 | 10.9 | 48.0 | 39.4 | 12.6 |
| **Female (%)** | 51.9 | 32.4 | 15.7 | 47.2 | 33.9 | 18.8 | 44.4 | 35.1 | 20.5 | 36.0 | 39.1 | 24.9 |

### 7.3.3 Education and frailty

Among the older adult population, 46% attained a secondary education level, 29% attained a primary education level and 25% attained third level education as described in Table 7.6. Frailty was twice as prevalent among those who attained a primary level of education only compared to those who attained secondary level and over three-times more prevalent compared to those who attained third level education. The prevalence of frailty increased from 22.2% at Wave 1 to 30.6% at Wave 4 for participants who attained a primary level of education. The prevalence of pre-frailty follows a similar pattern with a smaller but still significant effect.

*Table 7.6: Highest level of educational attainment and frailty at Waves 1 - 4 using the FI measure (n = 5,304).*

| | Wave 1 | | | Wave 2 | | | Wave 3 | | | Wave 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Robust | Pre-frail | Frail | Robust | Pre-frail | Frail | Robust | Pre-frail | Frail | Robust | Pre-frail | Frail |
| **Primary (%)** | 43.5 | 36.3 | 22.2 | 38.8 | 38.6 | 22.6 | 34.8 | 38.6 | 26.6 | 27.0 | 42.4 | 30.6 |
| **Secondary (%)** | 59.7 | 29.0 | 11.3 | 54.7 | 32.4 | 12.9 | 52.9 | 33.2 | 13.9 | 44.3 | 38.4 | 17.3 |
| **Third level (%)** | 65.6 | 28.0 | 6.4 | 64.7 | 28.0 | 7.3 | 62.1 | 30.5 | 7.4 | 53.7 | 37.1 | 9.2 |

### 7.3.4 Marital status and frailty

During the home interview, participants were asked about their marital status and their responses were categorised as married (currently married or living with a partner as if married), single (never married), separated or divorced and widowed. The prevalence of frailty by marital status at Waves 1-4 is summarised in Table 7.7.

The prevalence of frailty was lowest in those who are married and highest in those who are widowed at all waves e.g. 10.1% and 25.2% respectively at Wave 1. A similar pattern was observed for pre-frailty (29.0% of married vs 39.3% of widowed participants at Wave 1). By Wave 4, the prevalence of frailty had increased in all groups but most notably from 25.2% to 37.2% in those who were widowed.

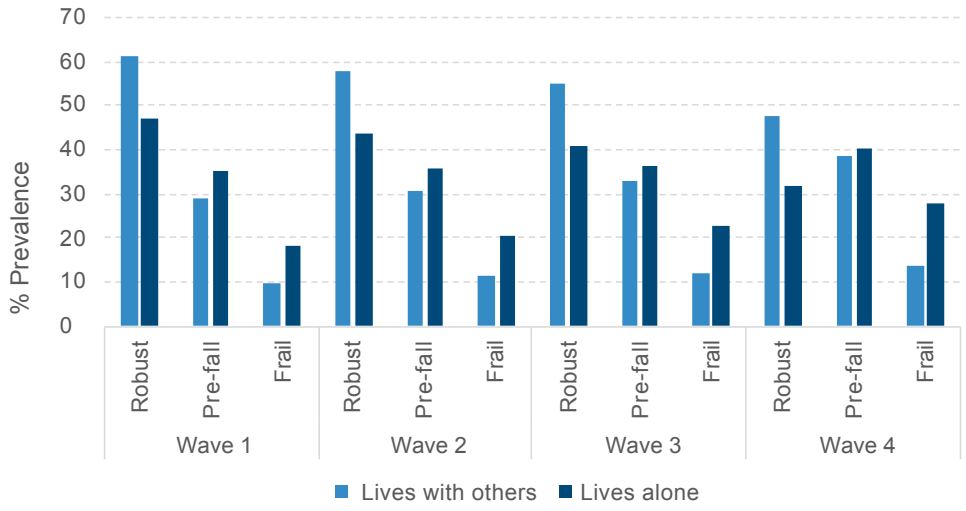
*Table 7.7: Marital status and frailty at Waves 1 - 4 using the FI measure (n = 5,304).*

| | Wave 1 | | | Wave 2 | | | Wave 3 | | | Wave 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Robust | Pre-frail | Frail | Robust | Pre-frail | Frail | Robust | Pre-frail | Frail | Robust | Pre-frail | Frail |
| **Married (%)** | 60.9 | 29.0 | 10.1 | 57.3 | 31.8 | 10.9 | 54.7 | 33.3 | 12.0 | 47.4 | 38.6 | 14.0 |
| **Single (%)** | 54.2 | 32.5 | 13.3 | 53.1 | 32.6 | 14.3 | 50.2 | 34.8 | 15.0 | 40.6 | 40.7 | 18.7 |
| **Separated/ Divorced (%)** | 52.8 | 32.4 | 14.8 | 49.9 | 31.3 | 18.8 | 48.8 | 34.2 | 17.0 | 38.9 | 39.6 | 21.5 |
| **Widowed (%)** | 35.5 | 39.3 | 25.2 | 31.6 | 40.5 | 27.9 | 31.3 | 36.7 | 32.0 | 22.4 | 40.4 | 37.2 |

### 7.3.5 Living arrangements and frailty

The prevalence of frailty by living arrangements at Waves 1-4 is summarised in Figure 7.1. The prevalence of frailty among adults aged 50 and over who lived alone was approximately twice that of older adults who lived with other people e.g. spouse/partner, child, relative or others. This finding was consistent across Waves 1-4 but the actual prevalence of frailty increase in both groups by Wave 4 (28% lived alone versus 13.7% lived with others). The prevalence of pre-frailty was also higher among those who live alone but the difference was smaller than for frailty.

*Figure 7.1: Living arrangement and frailty at Waves 1 - 4 using the FI measure (n = 5,304).*




## 7.4 Frailty, falls, fear of falling and disability

Frailty is a known risk factor for falls, fear of falling and disability. Self-reported information regarding the number of falls, whether participants had fear of falling and whether they had any disabilities in performing the basic and/or instrumental activities of daily living was provided by participants during the home interview.

### 7.4.1 Frailty and single and recurrent falls

During each interview, participants were asked if they had fallen in the past year. Falls reported at each Wave were used to define the falls outcomes i.e. no falls, single fall or recurrent falls (none, one or more than one fall in the past year). The prevalence of frailty by falls outcomes at Waves 1-4 is summarised in Table 7.8.

The prevalence of single falls was highest among people living with frailty compared to those with pre-frailty or those who were robust. This was consistent across Waves 1-4. The prevalence of recurrent falls also followed the same pattern with recurrent falls highest among adults living with frailty. Notably, those who were robust were much less likley to have recurrent falls compared to single falls across Waves 1-4. The higher prevalence of single falls could be the result of trips/slips among the robust rather than an underlying pathology among those who are living with pre-frailty or frailty.

*Table 7.8: Falls outcomes and frailty at Waves 1 - 4 using the FI measure (n = 5,304).*

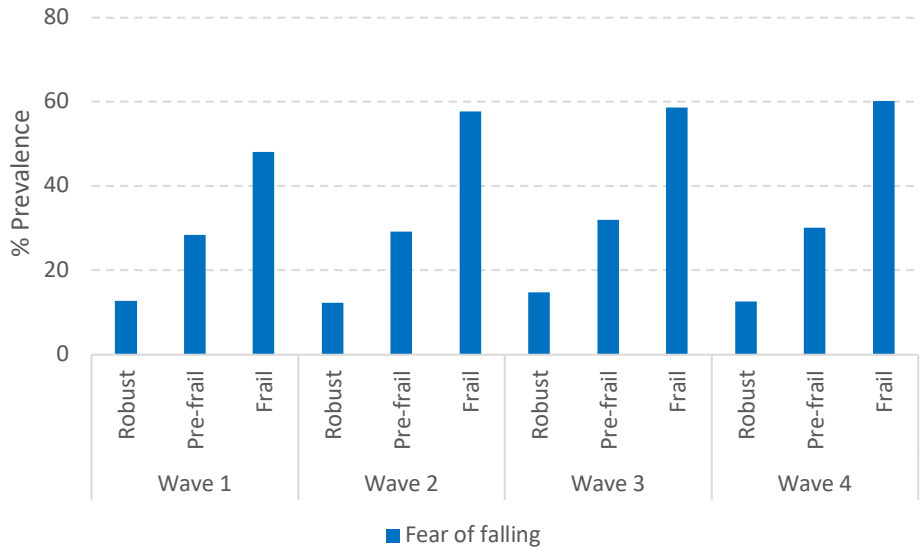
| | Wave 1 | | | Wave 2 | | | Wave 3 | | | Wave 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Robust | Pre-frail | Frail | Robust | Pre-frail | Frail | Robust | Pre-frail | Frail | Robust | Pre-frail | Frail |
| No falls (%) | 85 | 76.8 | 68.1 | 84.9 | 75.3 | 60.4 | 86.3 | 78.0 | 64.0 | 87.0 | 80.7 | 62.2 |
| 1 fall (%) | 10.4 | 14.4 | 16.3 | 11.1 | 14.1 | 18.3 | 10.7 | 14.1 | 19.4 | 10.5 | 12.6 | 18.1 |
| >=2 falls (%) | 4.5 | 8.9 | 15.6 | 4.0 | 10.6 | 21.3 | 3.0 | 6.9 | 16.4 | 2.5 | 6.6 | 19.7 |

### 7.4.2 Frailty and fear of falling

During each interview, fear of falling was identified by asking participants "Are you afraid of falling?" to which they responded "Yes" or "No". The prevalence of frailty by fear of falling at Waves 1-4 is summarised in Figure 7.2.

The prevalence of fear of falling was at least four times higher among people living with frailty and twice as high among people living with pre-frailty compared to those who were robust. This was consistent across Waves 1-4. The highest prevalence of fear of falling was at Wave 4 when 12.6%, 30.1% and 60.2% reported fear of falling among the robust, pre-frail and frail groups respectively.

*Figure 7.2: Fear of falling and frailty at Waves 1 - 4 using the FI measure (n = 5,304).*



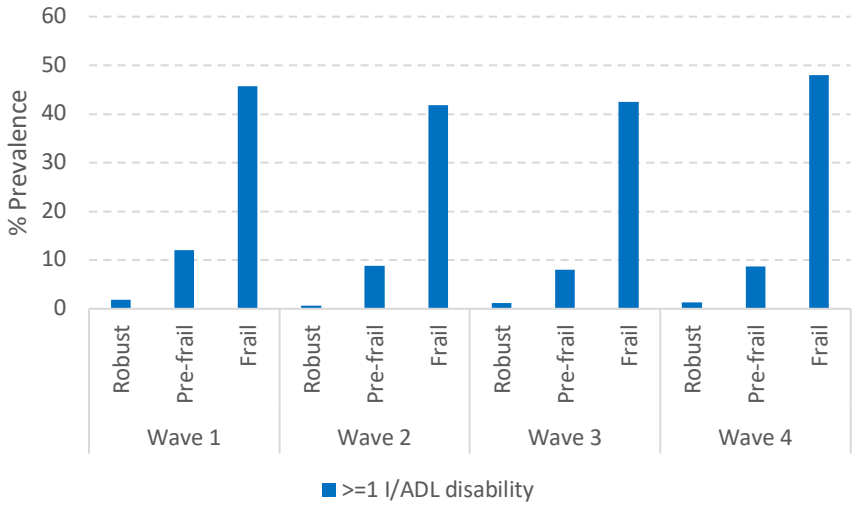

### 7.4.3 Frailty and disability

Participants were asked if they have any difficulties with basic activities of daily living (ADLs) or instrumental activities of daily living (IADLs), excluding any difficulties expected to last less than three months. ADLs included tasks such as walking, bathing, dressing

and eating, while IADLs included tasks such as preparing meals, shopping for groceries and managing medications, all tasks which help support an independent lifestyle. The prevalence of frailty by the presence of having at least one ADL or IADL disability at Waves 1-4 is summarised in Figure 7.3.

The prevalence of having at least one ADL or IADL disability was significantly higher among adults living with frailty compared to their counterparts living with pre-frailty or in robust health (45.7%, 12.1% and 1.8% respectively at Wave 1). This corresponds to almost one in two older adults with frailty having a disability, compared to one in eleven older people with pre-frailty and just one in fifty robust older adults having a disability. These findings were generally consistent across Waves 1-4.

*Figure 7.3: Disability and frailty at Waves 1 - 4 using the FI measure (n = 5,304).*




## 7.5 Frailty and mental health

Frailty has been shown to have a bi-directional relationship with mental health in older adults, thus frailty may be a risk factor for and a consequence of decline in cognitive function. Self-reported information regarding two aspects of mental health namely global cognitive function and depressive symptoms were gathered from participants during the home interview at Waves 1-4.

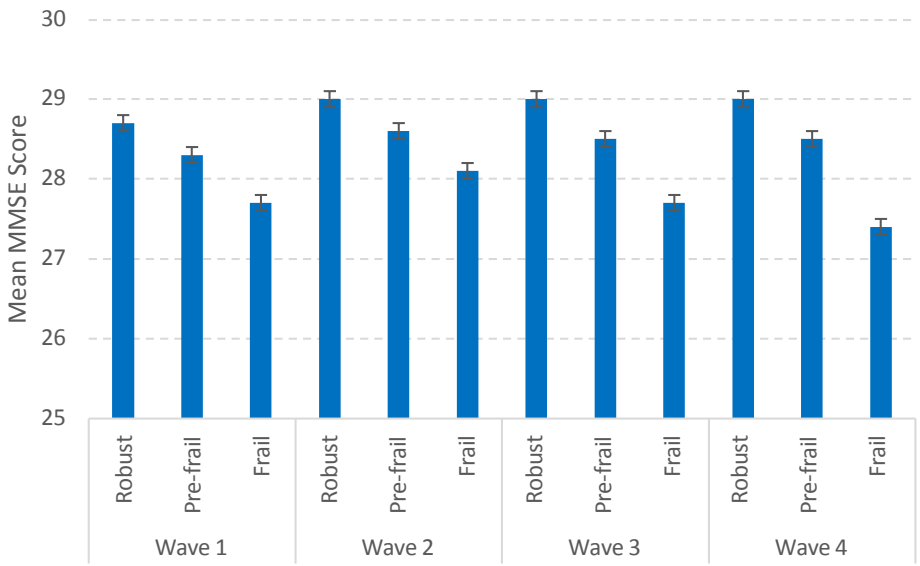
### 7.5.1 Frailty and global cognitive function

The mini–mental state examination (MMSE) is a 20-item test that was used to screen for cognitive impairment (14, 15). It is commonly used in clinical practice to screen for dementia. It is also used to estimate the severity of cognitive impairment at a given point in time and to follow the course of cognitive changes in an individual over time. It assesses

orientation, recall, attention, calculation, language abilities and visuospatial ability. The average score on the MMSE was 28.5-28.7 at each wave. The prevalence of frailty by global cognitive function (MMSE score) at Waves 1-4 is summarised in Figure 7.4.

Individuals living with frailty exhibited the lowest scores on the MMSE followed by those living with pre-frailty and robust individuals had the highest MMSE scores indicating better cognitive function. On average, adults with frailty and pre-frailty scored 0.9-1.4 and 0.4-0.5 points lower on the MMSE respectively across Waves 1-4 compared to robust older adults. On average, females scored 0.2-0.3 points higher than males and the 65-74 and >=75 years age groups scored 0.2-0.6 and 0.7-1.1 points lower than the 50-64 age group across Waves 1-4. After adjusting for the effect of age group and gender, adults with frailty and pre-frailty scored 0.6-1.1 and 0.2-0.4 points lower on the MMSE scale compared to the robust group. This indicates a progressive decline in global cognitive function among those living with pre-frailty and frailty.

*Figure 7.4: Global cognitive function (MMSE score, maximum score =30) by frailty at Waves 1 - 4 using the FI measure (n = 4,308).*

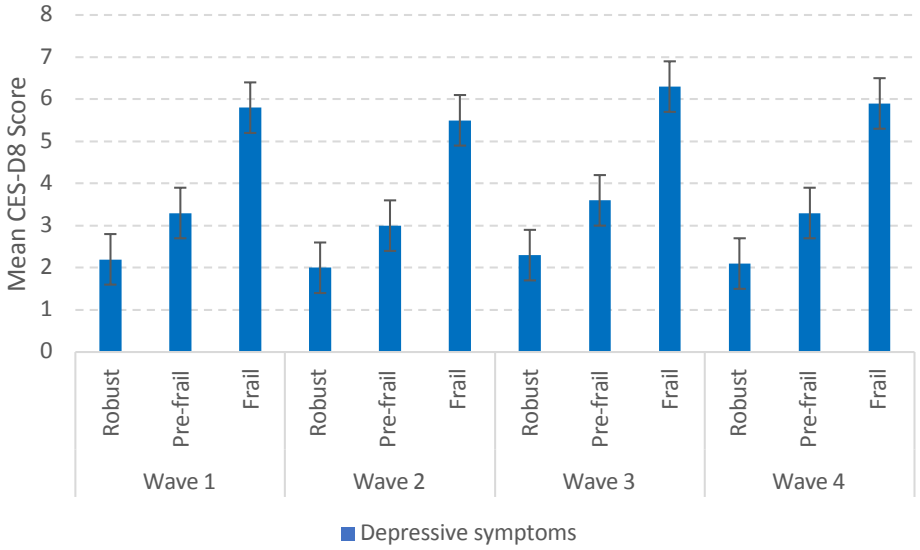



### 7.5.2 Frailty and depression

Depressive symptoms were assessed using the short 8-item version of the Centre for Epidemiological Studies-Depression (CES-D8) scale (16, 17). This scale measures the frequency that respondents have experienced a variety of depressive symptoms within the past week. It consists of 8 items and the total number of positive and negative responses are summed to give a total score ranging from 0 to 24 with higher scores indicating increased depressive symptomology. The average score on the CES-D8 depression scale was 3.0, 2.8, 3.3 and 3.3 at Waves 1-4 respectively. The prevalence of frailty by depressive symptoms (CES-D8 score) at Waves 1-4 is summarised in Figure 7.5.

At each wave, the group with frailty reported higher levels of depressive symptoms than the pre-frail and robust groups (a CES-D8 score of 6 in the frail group versus 2 in robust group at Wave 4). Depressive symptoms are higher in women and decreased with increasing age. When the effect of age group and gender was adjusted for older adults with frailty and pre-frailty still scored 4.0-4.5 and 1.3-1.6 points higher on the CES-D8 scale compared to the robust group – indicating progressively more depressive symptoms among those older adults with pre-frailty and frailty.

*Figure 7.5: Depressive symptoms (CES-D8 score, maximum score =24) by frailty at Waves 1 - 4 using the FI measure (N=5,217).*




## 7.6 Conclusion

The prevalence of frailty in community living adults aged 50 years and over in Ireland was 12.7% at Wave 1 which is equivalent to 160,000 adults. The prevalence of pre-frailty was 31%, equivalent to 370,000 adults. The prevalence increased to 21.5% for frailty and 40% for pre-frailty in those aged 65 and over. In Ireland, currently 13% of the population is 65 years or older and this number is expected to double by 2040 (Central Statistics Office, 2016); the burden of frailty may also double in that time. Indeed, at each successive waves of TILDA, the incidence of frailty almost doubled from 1.5% at Wave 2 to 3.0% at Wave 3 and 5.4% at Wave 4. This underscores the importance of targeting frailty to improve the health and well-being of older adults in Ireland. The impact of frailty on the Irish health and social care system is considerable (13) and will be covered in Chapter 9.

Frailty increases with age and the prevalence doubled with each successive age group from 50-64, 65-74 and 75+ years. Frailty is more common in women, those with lower education and those who are widowed or living alone. This highlights the need to provide social interventions and promote social engagement and connectedness in older adults to help them to remain robust, staving off the development of frailty.

Adults aged 50 and over in Ireland who live with frailty are more likely to experience falls and report fear of falling compared to their counterparts who are pre-frail or robust. Given falls have very serious consequences including hip and wrist fracture it is important to to reduce risk factors for falls through appropriate fall prevention programmes (18). A further consequence of living with frailty is disability. Almost half of people living with frailty report having at least one disability in basic and/or instrumental activities of daily living. For this reason, frailty is viewed as a transition between healthy ageing and disability and is considered a risk factor and intervention target for disability in older adults (1).

A bi-directional relationship between frailty and declines in cognitive function have been shown in the scientific and medical literature suggesting that frailty may be a risk factor for and a consequence of decline in cognitive function (19). Global cognitive function is lower while depressive symptoms are higher among adults with frailty in Ireland compared to those with pre-frailty or who are in robust health. Given the increasing prevalence and incidence of dementia and cognitive impairment as well as frailty among adults aged 50 and over in Ireland and worldwide, prevention and intervention strategies that can delay or halt progression of both frailty and cognitive decline are warranted.

An important finding in this Chapter is that the prevalence of frailty and the frailty-related sociodemographic physical health and mental health outcomes all increased over time moving from Wave 1 (2009-2011) to Wave 4 (2016). A significant proportion of this increase may be attributed to the ageing of the cohort but this too is important to note given current and projected ageing of the population of Ireland over the next thirty years (Central Statistics Office, 2016). As mentioned earlier, we are likely to see a doubling in the proportion of adults, particularly those aged 65 and older, presenting with frailty and related adverse health outcomes for which we must be prepared.

The significance of frailty as an impediment to healthy ageing was highlighted at a focus meeting on "Frailty and Intrinsic Capacity" by the World Health Organisation (WHO) Clinical Consortium on Healthy Ageing in December 2016. In particular, they stated that active case findings of older people with frailty is essential for the reorientation of health services to meet people's needs; that proactive identification of people in the community at risk of frailty provides opportunities to intervene and so prevent or delay functional decline

and disability (20). The significance of frailty to healthy ageing, health care planning and delivery in Ireland is recognised by the National Clinical Programme for Older People (NCPOP) and the Integrated Care Programme for Older People (ICPOP). A National Frailty Education Programme, in partnership with TILDA, was initiated in 2016 to train health professionals to understand the risk factors for frailty enabling them to implement programmes for early detection, prevention and management (21).

Frailty is not an inevitable consequence of ageing, three in five people aged 75+ and one in two people aged 80+ years are classified as robust or pre-frail. Frailty is a dynamic process and people can experience positive transitions reverting to pre-frailty from frailty and robustness from pre-frailty. Frailty is modifiable, it may be delayed, halted and even reversed with timely and appropriate prevention, detection and intervention strategies. With a concerted effort there is a very real opportunity to improve the lifespan and healthspan of older adults in Ireland by assertively targeting frailty as a condition that can be ameliorated.

## 7.7 References

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## Appendices

*Appendix 7.9: Components of 32-item FI based on TILDA CAPI variables from Waves 1-4.*

| | Variables in Tilda | Cut-points |
|---|---|---|
| 1. | Difficulty walking 100m | Yes = 1; No = 0 |
| 2. | Difficulty rising from a chair | Yes = 1; No = 0 |
| 3. | Difficulty climbing stairs | Yes = 1; No = 0 |
| 4. | Difficulty stooping, kneeling or crouching | Yes = 1; No = 0 |
| 5. | Difficulty reaching above shoulder height | Yes = 1; No = 0 |
| 6. | Difficulty pushing/pulling large objects | Yes = 1; No = 0 |
| 7. | Difficulty lifting/carrying weights ≥10lb | Yes = 1; No = 0 |
| 8. | Difficulty picking up a coin from a table | Yes = 1; No = 0 |
| 9. | Feeling lonely | Rarely or none of the time=0; Some or a little of the time=0.33; Occasionally or a moderate amount of time=0.66; All of the time=1. |
| 10. | Poor self-rated physical health | Excellent=0; Very good=0.25; Good=0.5; Fair=0.75; Poor=1. |
| 11. | Poor self-rated vision | Excellent=0; Very good=0.25; Good=0.5; Fair=0.75; Poor=1 |
| 12. | Poor self-rated hearing | Excellent=0; Very good=0.25; Good=0.5; Fair=0.75; Poor=1 |
| 13. | Poor self-rated memory | Excellent=0; Very good=0.25; Good=0.5; Fair=0.75; Poor=1. |
| 14. | Difficulty following a conversation | None=0; Some=0.5; Much/Impossible=1. |
| 15. | Daytime sleepiness | Would never doze=0; Slight chance of dozing=0.33; Moderate chance of dozing=0.66; High chance of dozing=1. |
| 16. | Polypharmacy | Yes = 1; No = 0 |
| 17. | Knee pain | Yes = 1; No = 0 |
| 18. | Hypertension | Yes = 1; No = 0 |
| 19. | Angina | Yes = 1; No = 0 |
| 20. | Heart attack | Yes = 1; No = 0 |
| 21. | Diabetes | Yes = 1; No = 0 |
| 22. | Stroke and transient ischemic attack | Yes = 1; No = 0 |
| 23. | High cholesterol | Yes = 1; No = 0 |
| 24. | Irregular heart rhythm | Yes = 1; No = 0 |
| 25. | Other CVD | Yes = 1; No = 0 |
| 26. | Cataracts | Yes = 1; No = 0 |
| 27. | Glaucoma and age-related macular degeneration | Yes = 1; No = 0 |
| 28. | Arthritis | Yes = 1; No = 0 |
| 29. | Osteoporosis | Yes = 1; No = 0 |
| 30. | Cancer | Yes = 1; No = 0 |
| 31. | Varicose ulcer | Yes = 1; No = 0 |
| 32. | Incontinence | Yes = 1; No = 0 |

Adapted from Roe et al, 2017 (13)