The webinar, “Mobility in Older Irish Adults: Evidence from TILDA”, will begin shortly.

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CLSA Webinar Series

Mobility in Older Irish Adults: Evidence from The Irish Longitudinal Study on Ageing (TILDA)

Orna Donoghue, PhD

11 a.m. - Noon ET | March 28, 2017

Dr. Orna Donoghue is project manager for The Irish Longitudinal Study on Ageing (TILDA) based in Trinity College in Dublin. She is responsible for the overall planning, execution, and management of the TILDA data collection process to facilitate TILDA research and policy objectives. Her current research interests focus on the factors influencing walking and mobility in older Irish adults, with a particular focus on how these can predict adverse outcomes such as falls, disability and cognitive decline. Prior to joining TILDA, Orna lectured at University of Limerick and University of Edinburgh.

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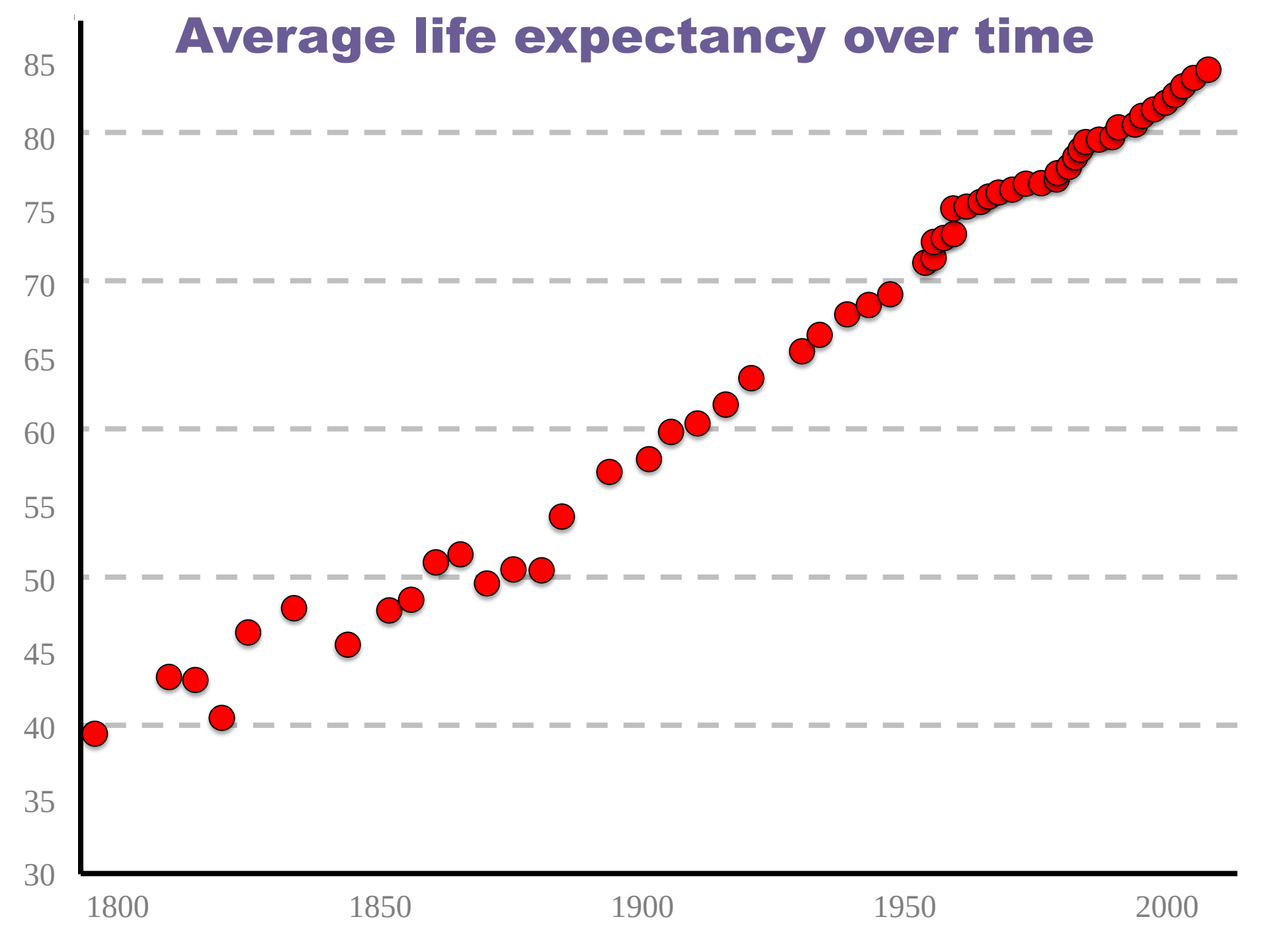
The Irish Longitudinal Study on Ageing

Trinity College Dublin
The University of Dublin

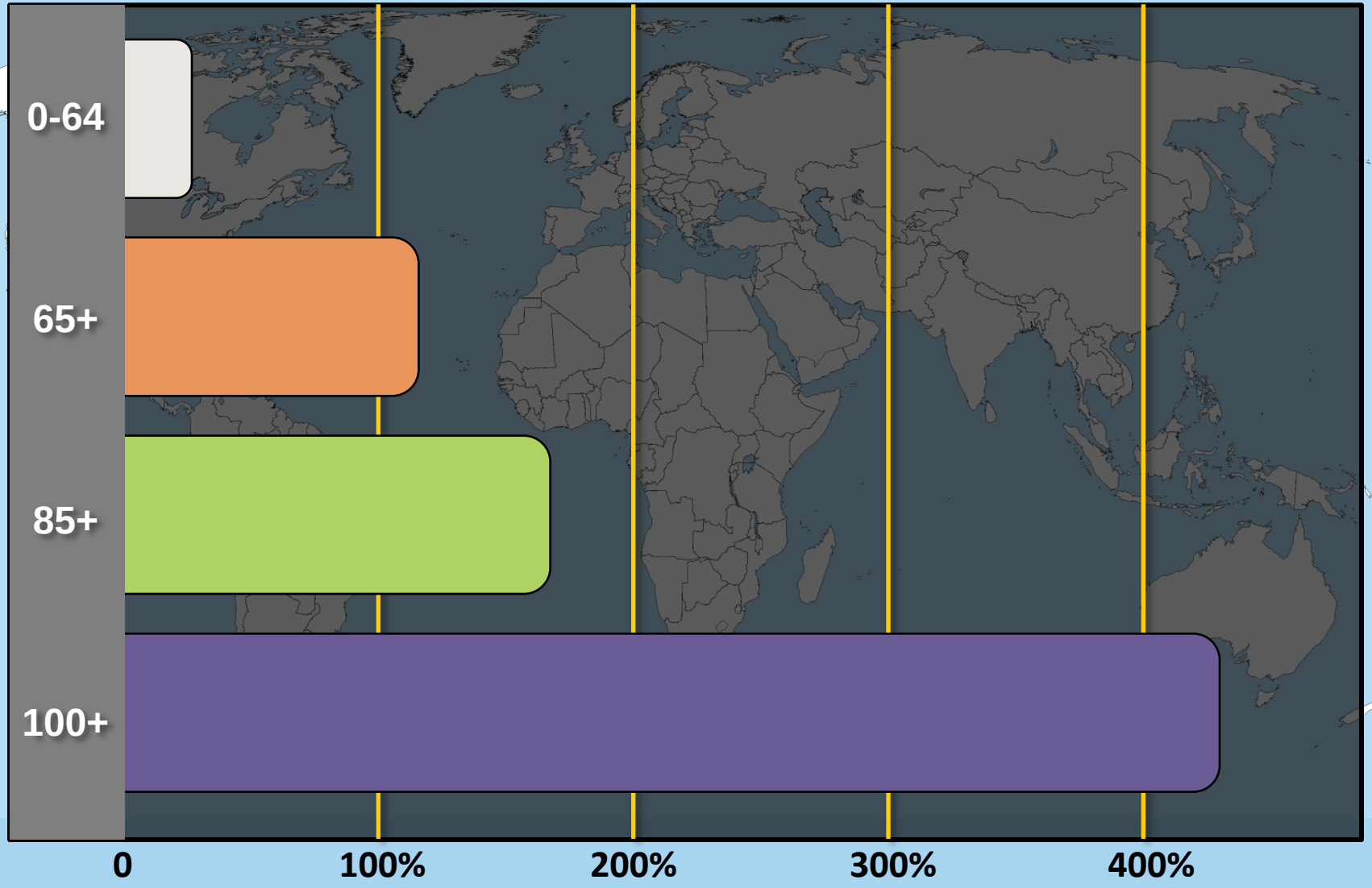
Mobility in Older Irish Adults: Evidence from TILDA

Dr Orna Donoghue, Project Manager

28 March 2017


Average life expectancy over time
85
80
75
70
65
60
55
50
45
40
35
30
1800
1850
1900
1950
2000

Projected increase in Global Population between 2005 – 2030, by age



Source: UN Dept of Economic & Social Affairs

The Challenge …

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… to ensure not just

extended life span

but rather…

healthier and happier

extended life span

International family of longitudinal studies on ageing

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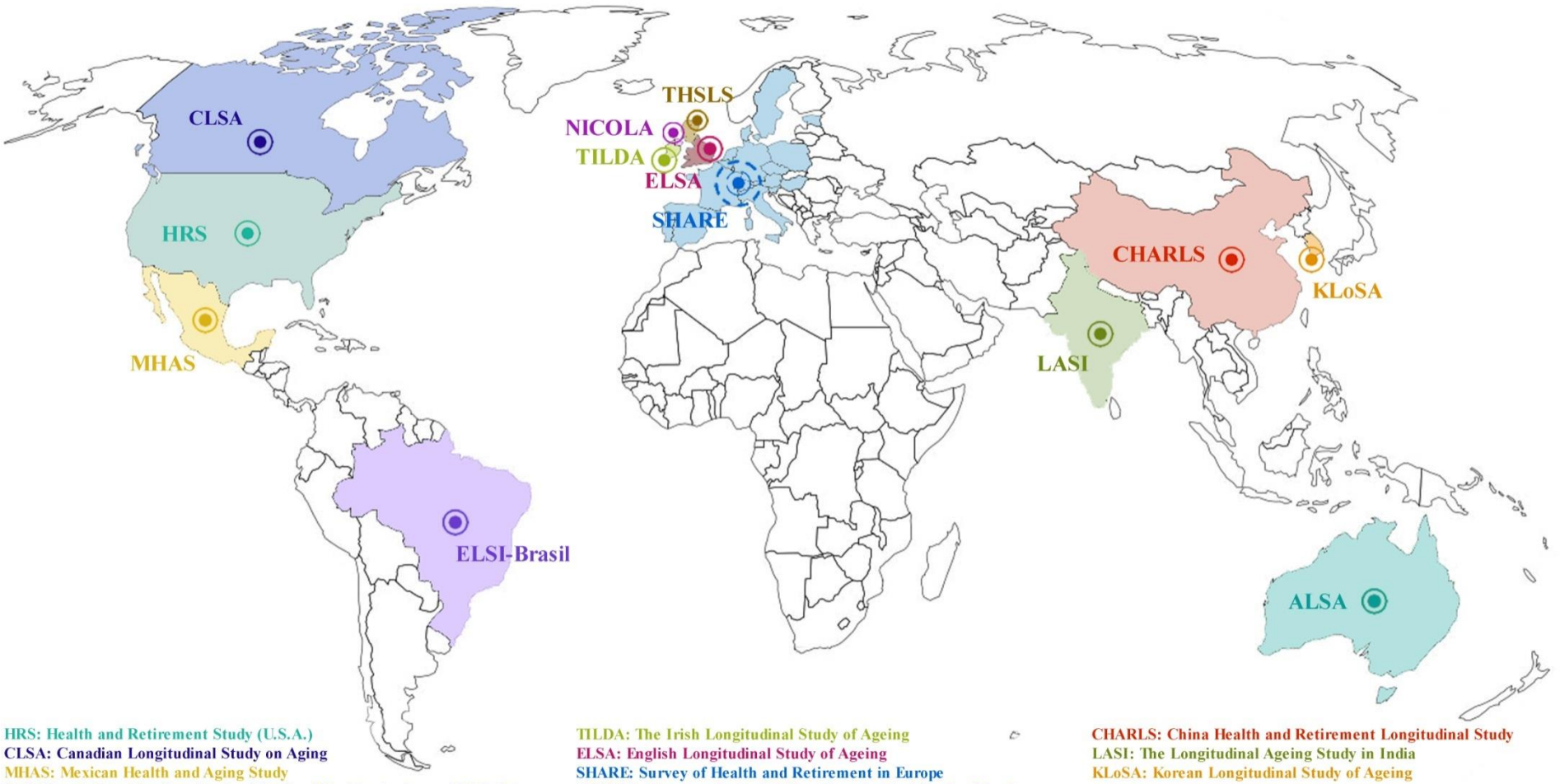

HRS: Health and Retirement Study (U.S.A.)
CLSA: Canadian Longitudinal Study on Aging
MHAS: Mexican Health and Aging Study
ELSI-Brasil: Brazilian Longitudinal Study of Health, Ageing and Well Being

TILDA: The Irish Longitudinal Study of Ageing
ELSA: English Longitudinal Study of Ageing
SHARE: Survey of Health and Retirement in Europe
NICOLA: Northern Ireland Cohort Longitudinal Study of Ageing
THSLS: The Scottish Longitudinal Study of Ageing

CHARLS: China Health and Retirement Longitudinal Study
LASI: The Longitudinal Ageing Study in India
KLoSA: Korean Longitudinal Study of Ageing

ALSA: The Australian Longitudinal Study of Ageing

Study design

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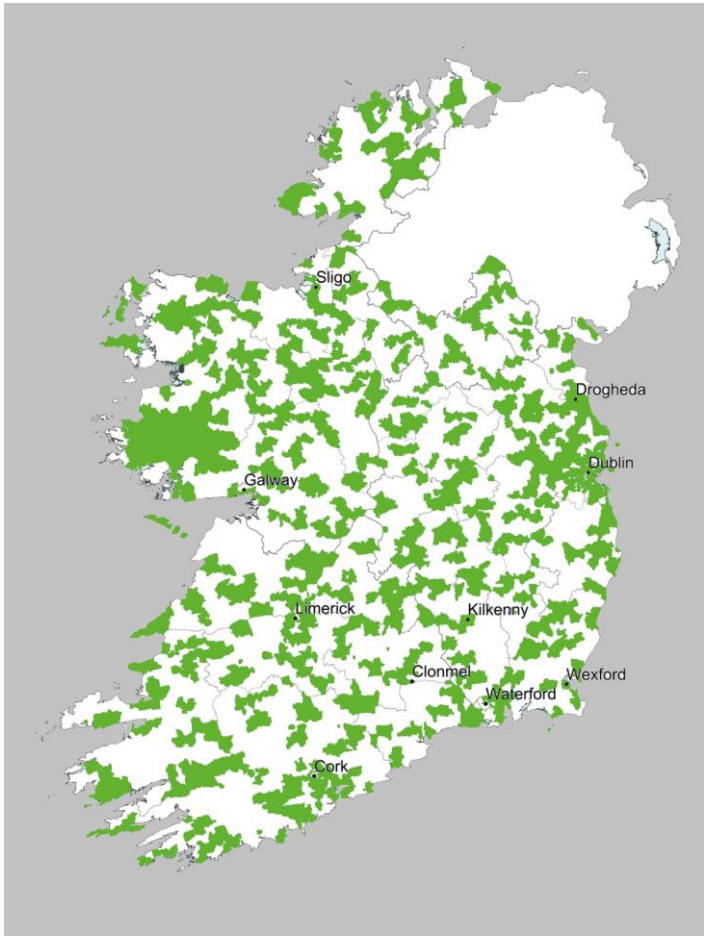
- Nationally representative study
- Sampling frame is based on Irish Geodirectory
- Randomly selected a sample of addresses from each cluster
- Interviewers visited 25,600 houses
- n=8,504 community-dwelling adults (n=8,172 aged ≥50 years)



Data collection

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CAPI

SCQ

Health assessment

CAPI & SCQ

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Social

- Household circumstances
- Demographics
- Transfers to Children/Parents
- Social connections
- Activities of daily living and helpers
- Expectations
- Transport
- Housing

Economic

- Employment situation
- Job history
- Planning for retirement
- Sources of Income
- House ownership
- Other assets
- Healthcare utilisation
- Literacy

Health

- Physical health
- Cognitive health
- Mental health
- Behavioural health
- Medications

Health assessment

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Neuro-psychological

- Mini-Mental State Examination (MMSE)
- Montreal Cognitive Assessment (MOCA)
- Sustained Attention to Response Task (SART)
- Picture memory
- National Adult Reading Test (NART)
- Visual reasoning
- Choice reaction time
- Colour trails test
- Depressive symptoms
- State anxiety

Cardiovascular

- Pulse wave velocity
- Sitting & standing blood pressure
- Phasic blood pressure
- Heart rate variability
- Cerebral perfusion
- Respiration

Mobility

- Timed Up-and-Go
- Repeated chair stands
- GAITRite assessment
  - Usual speed
  - Maximum speed
  - Dual task

Sensory

- Visual acuity
- Contrast sensitivity
- Macular pigment density
- Retinal photograph
- Multisensory integration (SHAMS)

Anthropometric / other

- Height
- Weight
- Waist & hip circumference
- Grip strength
- Heel ultrasound
- Blood samples
- Hair samples
- Accelerometry
- MRI
- Dental assessment

TILDA Timeline

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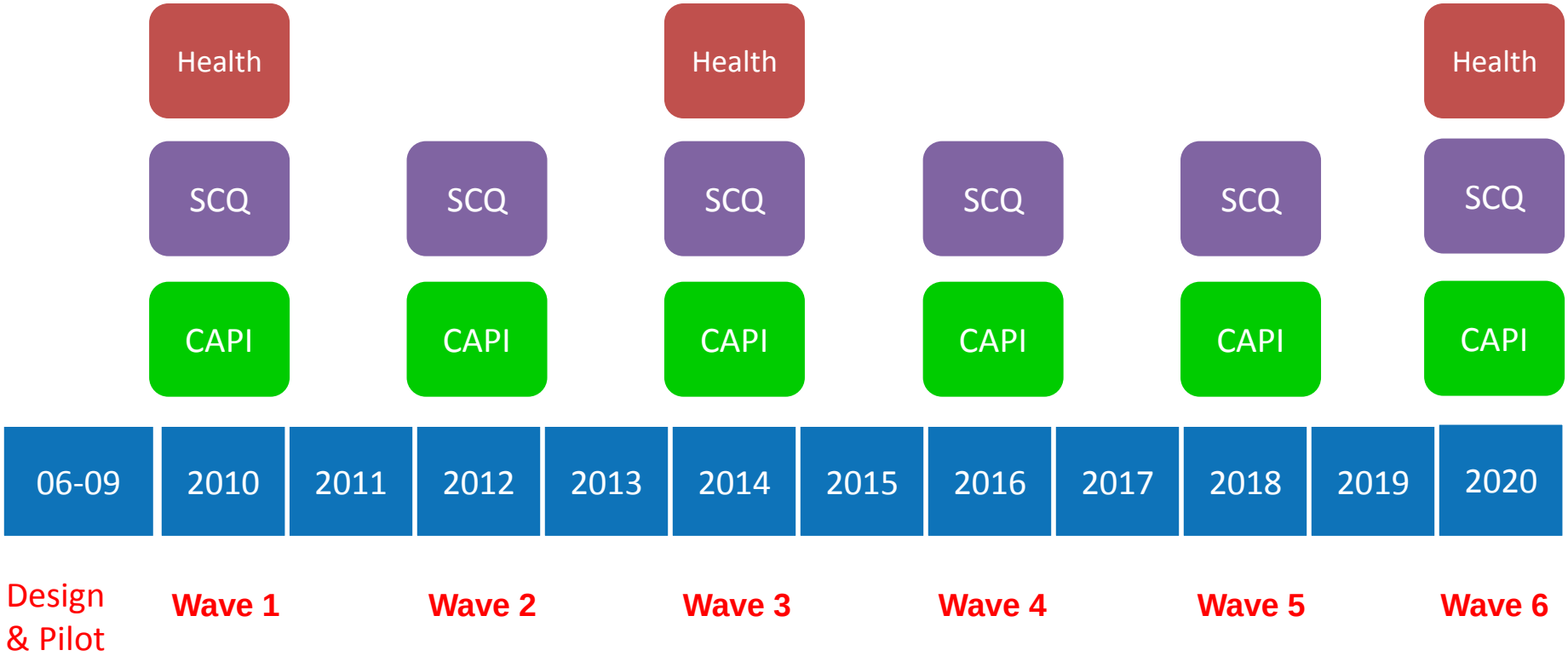

Gait and balance impairments

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- Gait and balance involves a complex interaction between multiple systems
- Indicator of multi-systemic wellbeing – 'a vital sign' (Fritz & Lusardi, 2009)
- Gait impairments occur for multiple reasons (e.g. age, fear of falling, depression, underlying medical conditions, neurological disorders, cognitive disorders) but may also be an early indicator of subclinical disease

Gait and balance impairments

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- Examples of gait impairment:
  - Reduced gait speed
  - Unsteadiness
  - Lack of smoothness or symmetry

- Slow gait speed predicts
  - mobility disability
  - cognitive decline
  - falls
  - institutionalisation
  - survival (Abellan van Kan et al., 2009; Studentski et al., 2011; Maki, 1997; Hausdorff et al., 1997

Mobility and GAITRite assessment

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- Timed Up-and-Go (W1, W2, W3, W4)
- Repeated chair stands (W3)
- Normal walk
  - Usual pace (W1, W3)
  - Maximum pace (W3)
- Dual task (manual) walk (W1)
  - carry a glass of water
- Dual task (cognitive) walk (W1, W3)
  - recite every second letter of alphabet (A-C-E, etc)

Walking speed is related to

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- Muscle strength
- Balance
- Vision and hearing (Donoghue et al, 2013; Duggan et al, 2017)
- History of falls (O'Connell et al, 2016)
- Fear of falling (Donoghue et al, 2013)
- Psychological factors e.g. mood & medications (Donoghue et al, 2015)
- Cognitive function (Killane et al, 2014; Donoghue et al, 2012)
- Cardiovascular conditions (Duignan et al, 2012; Donoghue et al, 2015)

Fear of falling

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- Up to 44% of community-dwelling older adults
- With and without a history of falls
- Two consequences
  - Increased caution → positive fall prevention strategies
  - Avoidance of activities → spiral of decline (Delbaere et al., 2004)

Associated with:

Increasing age
Female
Depression
Anxiety
History of falls
Slow or impaired gait
Fewer social contacts
Decreased life satisfaction
Increased frailty
Polypharmacy
Impaired vision

(Kressig et al, 2001; Vellas et al., 1997; Arfken et al., 1994; Howland et al., 1998; Friedman et al., 2008)

Is fear of falling associated with gait impairments?

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- Significant gait impairments in older adults with fear of falling and these are more pronounced in those with fear-related activity restriction (Donoghue et al, 2012)

- Most pronounced in people who have fear-related activity restriction and poor visual function (Donoghue et al, 2014)

Implications

- Assess gait and ask about FOF in older adults
- Interventions to reduce FOF and prevent activity restriction

New conceptual model of fear of falling

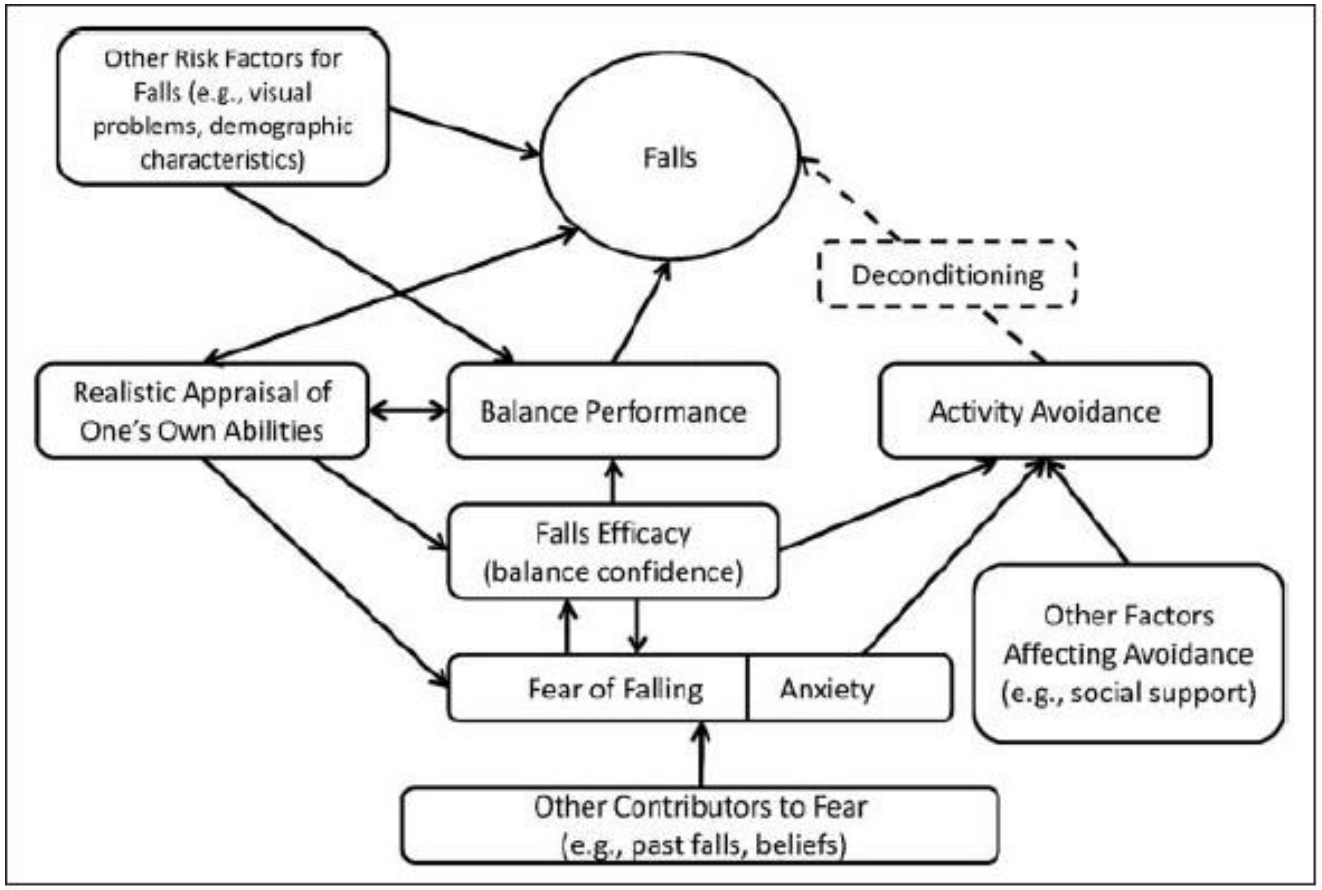

Figure 2. Reconceptualizing fear of falling

(Hadjistavropoulos et al, 2011)

Self-reported unsteadiness and fear of falling at two years follow-up

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	Fear of falling IRR [95% CI]	Fear-related activity restriction IRR [95% CI]
Model 1	1.94 [1.49, 2.52]***	4.02 [2.41, 6.71]***
Model 2		
Model 3		

*p<0.05; **p<0.01; ***p<0.001

Model 1: unadjusted.

(Donoghue et al, in press)

Self-reported unsteadiness and fear of falling at two years follow-up

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	Fear of falling IRR [95% CI]	Fear-related activity restriction IRR [95% CI]
Model 1	1.94 [1.49, 2.52]***	4.02 [2.41, 6.71]***
Model 2	1.42 [1.05, 1.91]*	2.46 [1.40, 4.30]**
Model 3		

*p<0.05; **p<0.01; ***p<0.001

Model 1: unadjusted.
Model 2: adjusted for age, sex, education, MMSE, self-rated health, number of cardiovascular conditions, number of chronic conditions, number of vision conditions, hip/wrist fracture, number of medications, depressive symptoms, self-reported hearing, self-reported vision, falls in the past year, days between baseline and follow-up interviews.

(Donoghue et al, in press)

Self-reported unsteadiness and fear of falling at two years follow-up

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	Fear of falling IRR [95% CI]	Fear-related activity restriction IRR [95% CI]
Model 1	1.94 [1.49, 2.52]***	4.02 [2.41, 6.71]***
Model 2	1.42 [1.05, 1.91]*	2.46 [1.40, 4.30]**
Model 3	1.19 [0.87, 1.63]	1.95 [1.06, 3.57]*

*p<0.05; **p<0.01; ***p<0.001

Model 1: unadjusted.
Model 2: adjusted for age, sex, education, MMSE, self-rated health, number of cardiovascular conditions, number of chronic conditions, number of vision conditions, hip/wrist fracture, number of medications, depressive symptoms, self-reported hearing, self-reported vision, falls in the past year, days between baseline and follow-up interviews.
Model 3: adjusted for variables listed in Model 2 + usual gait speed.

(Donoghue et al, in press)

What are the implications?

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Recognise prevalence and impact

Up to 60% of those with poor balance have reduced social, functional and physical activities (Lin et al, 2012)

Ask about balance!

Include in falls assessment tools and comprehensive geriatric assessment

Address possible causes

Medications, improve balance and balance confidence

How are depression and falls linked?

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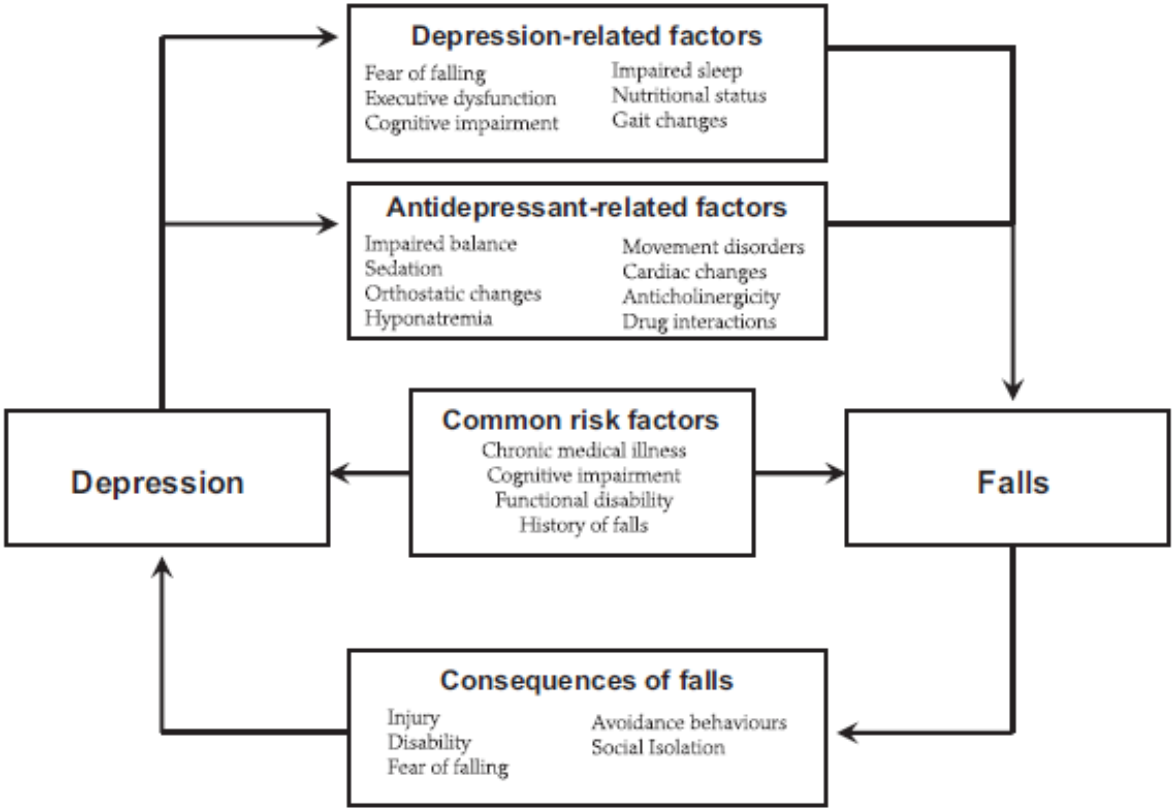
FIGURE 1. The association between depression and falls involves factors related to the symptoms of depression, the treatment of depression, and the effect of falls on mood. The interaction is further complicated by common risk factors for falls and depression in older adults.



(Iaboni et al, 2013)

Depressive symptoms, anti-depressants and gait

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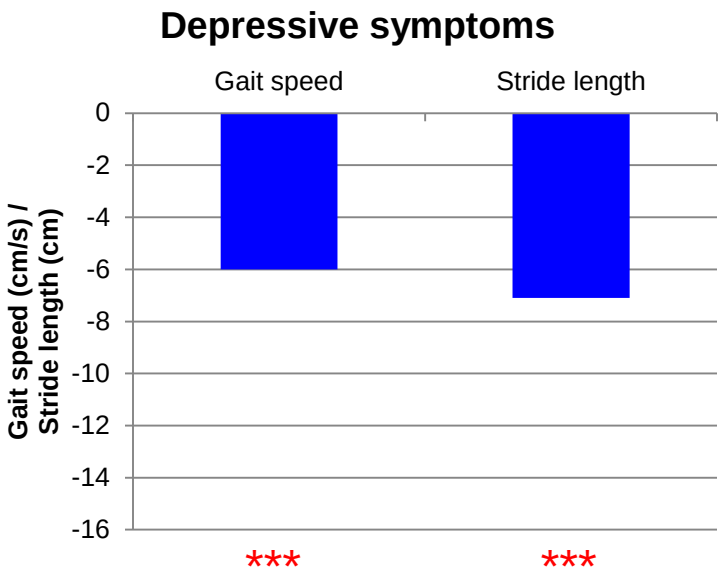

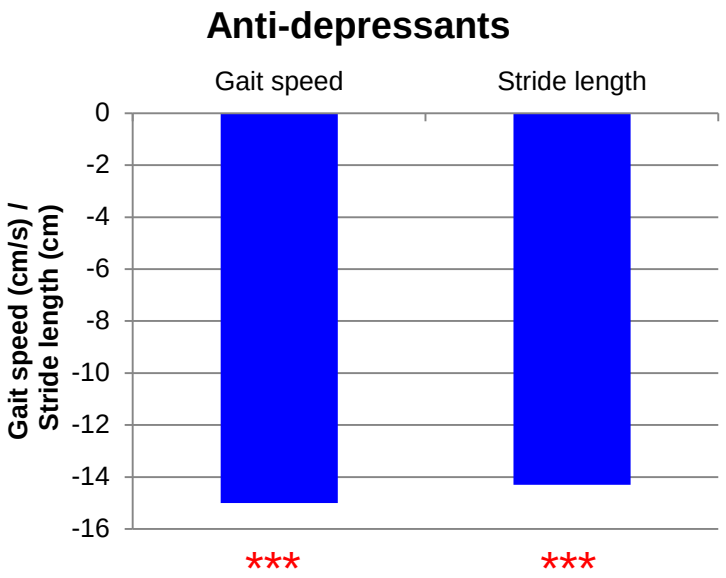

* $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Depressive symptoms, anti-depressants and gait

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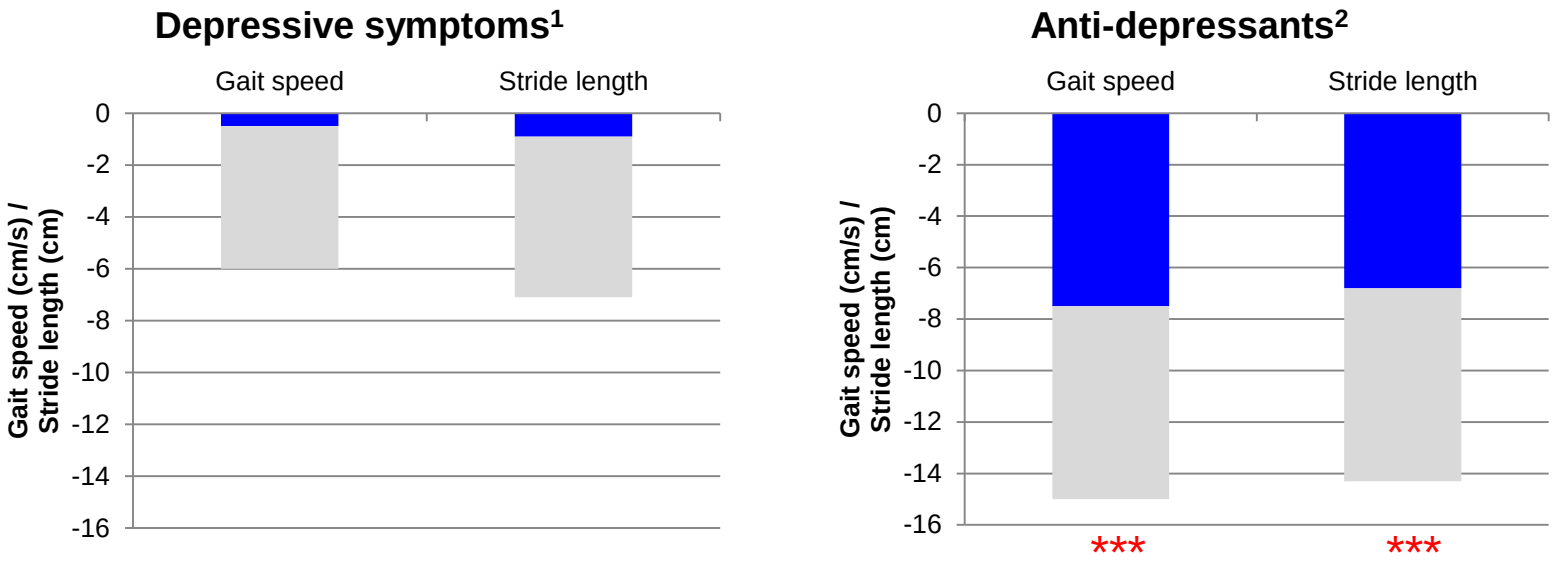

* $p<0.05$, ** $p<0.01$, *** $p<0.001$.

[1] Adjusted for age, sex, education, height, weight, living status, MMSE, co-morbidity, self-rated vision, chronic pain, polypharmacy, history of falls, fear of falling, grip strength, physical activity, use of anti-depressant medication.

[2] Adjusted for age, sex, education, height, weight, living status, MMSE, co-morbidity, chronic pain, polypharmacy, history of falls, fear of falling, grip strength, self-rated vision, physical activity, level of depressive symptoms (CES-D score).

(Donoghue et al, 2014)

Depression, anti-depressants and gait

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Potential explanations

- Anti-depressant side-effects
- Proxy for more chronic or persistent depressive symptoms
- Vascular pathology and WMLs

Implications

- Increased awareness of importance of basic assessments of gait and fall risk
- Most appropriate treatment for older adults (multidisciplinary input - medications, exercise interventions, cognitive behavioural therapy)

(Donoghue et al., 2014)


WAIT

1 in 3 adults over 65 have insufficient time to cross the road

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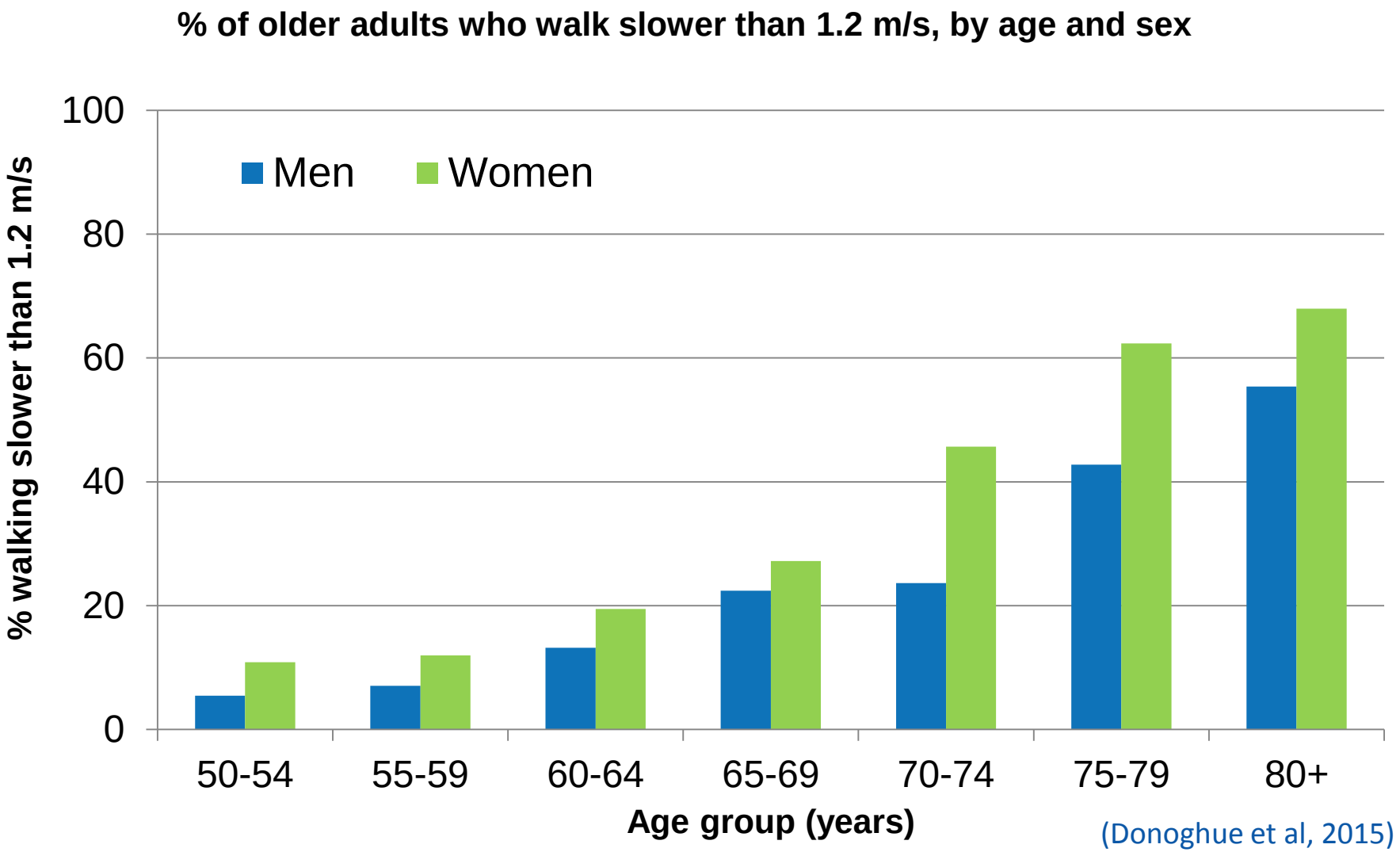

(Donoghue et al, 2015)

3 in 4 adults over 65 have insufficient time to cross the road

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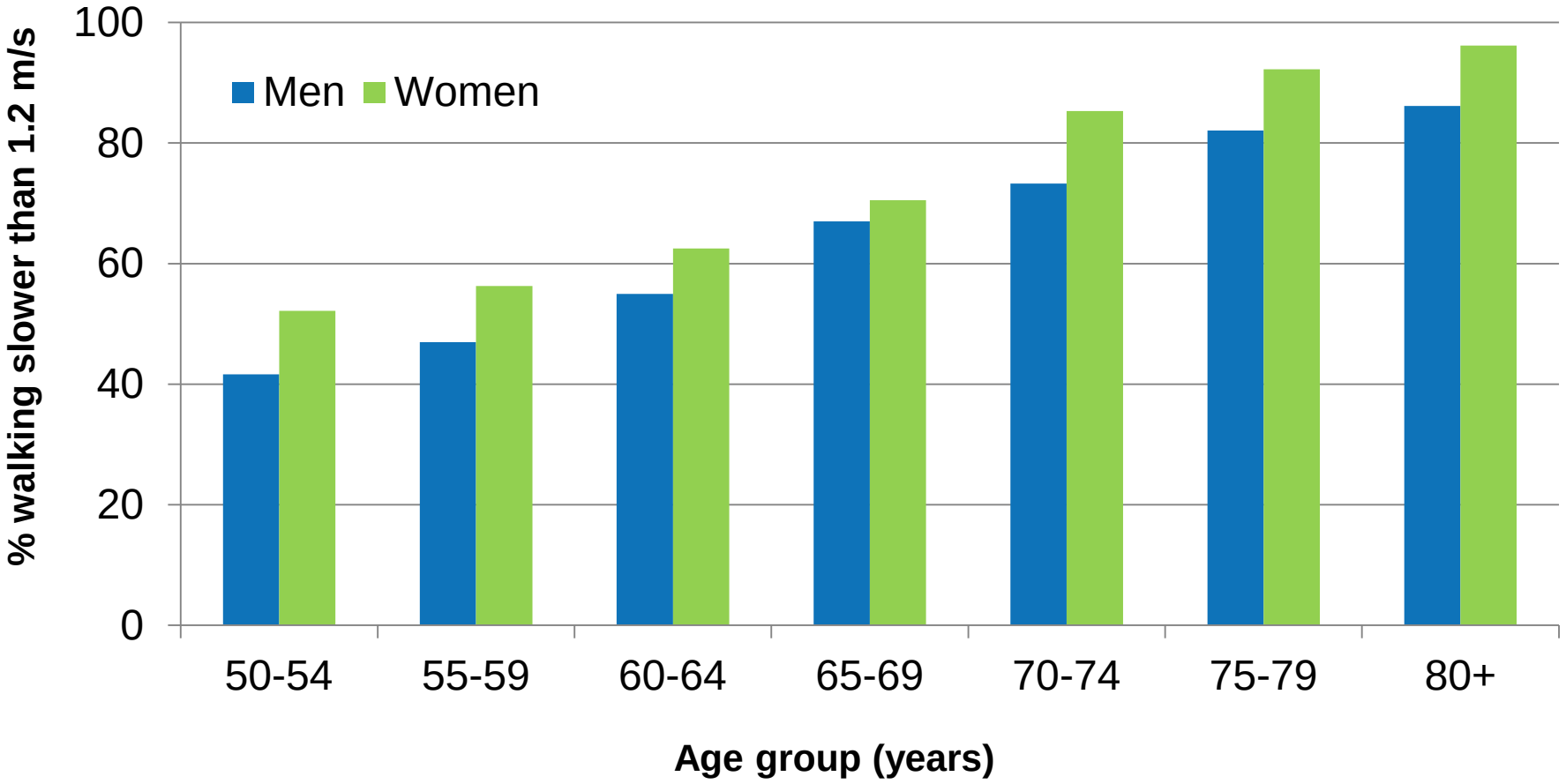
% of older adults who walk slower than 1.2 m/s, by age and sex



(Donoghue et al, 2015)

What is a good gait speed performance?

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TABLE 5 Red/Yellow/Green Flag Model of Self-selected Walking Speed as an Indicator of Future Health and Functional Status Applied to Cut Points for Risks of Adverse Outcomes From Current Research Literature.[a,b]

Flag Color Risk Zone	Self-selected Walking m/s Cut Point	Possible Adverse Outcome
Green (low risk)	1.3	Extremely fit[68]
	>1.0	Healthy older adult[70] Low risk of health events and better survival[42,67,70] Better cognitive function over time[66]
Yellow (moderate risk)	<1.0	Cognitive decline within 5-6 years[56,57] Death and hospitalization within 1 year[68] Cessation of regular physical activity[53,69] Indicator of subclinical atherosclerosis and risk of cardiac-related death in community-living older adults[60,61]
	<0.8	Mobility and activities of daily living disability at 2 years, mortality at 2 years and 3.8 years[71]
	<0.7	Death, hospitalization, institutionalization, and falls[66] Predicts future falls[52]
Red (high risk)	<0.6	Functional or cognitive decline, institutionalization, and mortality[68,71] High risk of recurrent falls[50] Criteria for geriatric frailty syndrome[54] Risk of cardiac-related death in hospitalized older adults[62]
	<0.4	Functional dependence and severe walking disability[72,73]
	<0.2	Extremely frail[68]
	<0.15	Institutionalization, highly dependent older people[74]

[a]Older adults walking at less than 0.6 m/s (in the red flag zone) had significant risk of functional and cognitive decline that increases substantially as walking speed slows. Those walking between 0.6 m/s and 1.0 m/s were vulnerable for hospitalization, morbidity, and even mortality in the coming 1 to 5 years. Those able to walk at more than 1.0 m/s were considered to be relatively healthy to fit and at much less risk of adverse health events and functional decline.

[b]Adapted from Abellan Van et al.[64]

(Lusardi, 2012)

Normative gait speed for Irish adults

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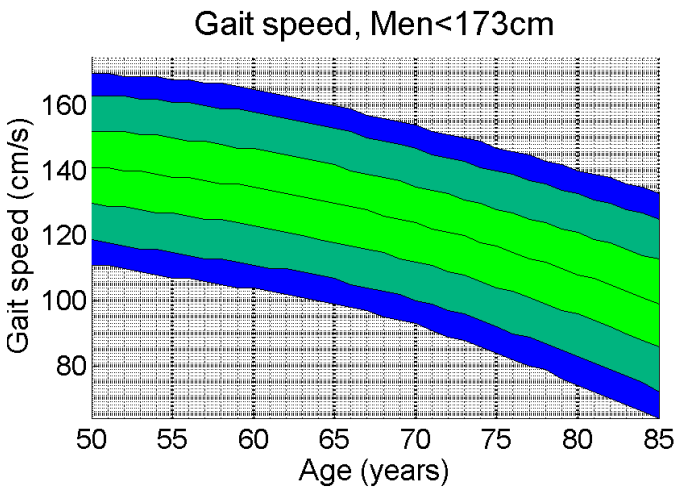

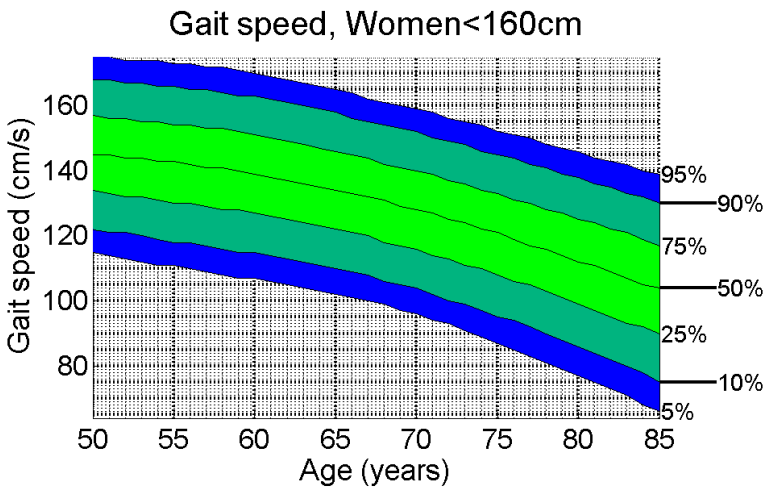

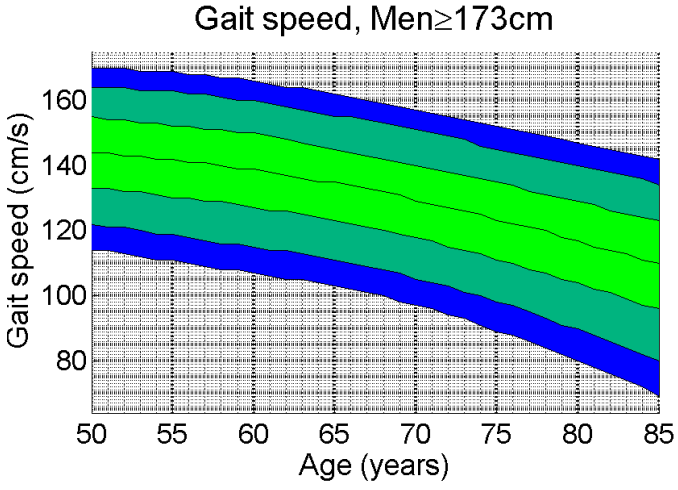

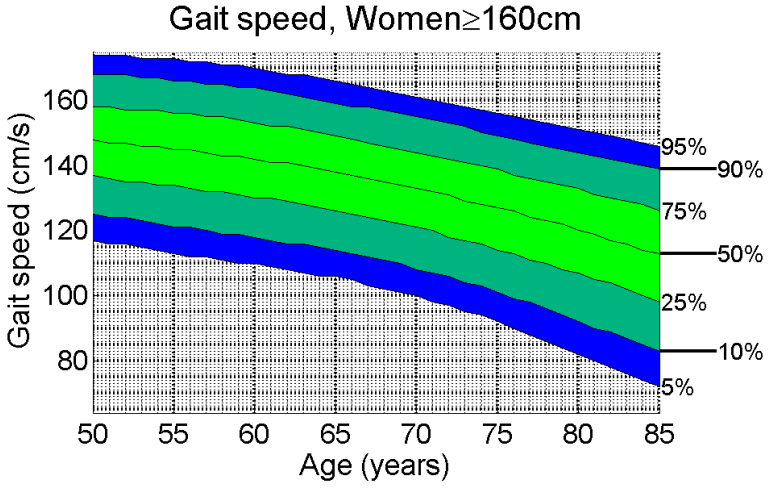

(Kenny et al, 2013)

A final word on attitudes to ageing…

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- Negative attitudes to ageing affect cognitive function and Timed Up-and-Go (TUG) performance (Robertson et al, 2015; Robertson et al, 2016)

Conclusions

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- Mobility is important contributor to physical, mental and cognitive health and wellbeing
  - Multiple factors
  - Impact on risk of future events
  - Impact on everyday activities
  - Modifiable

Core Funders (2006—2016)

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HRB Health Research Board

ENTERPRISE IRELAND
where innovation means business

NIH National Institutes of Health

HSE Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

CARDI Centre for Ageing Research and Development in Ireland

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HORIZON 2020

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Data access

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TILDA data available from

- Irish Social Science Data Archive (ISSDA), www.ucd.ie/issda/data/tilda/
- Interuniversity Consortium for Political and Social Research (ICPSR), www.icpsr.umich.edu/icpsrweb/ICPSR/studies/34315
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