

The English Longitudinal Study of Ageing

Cognitive functioning and dementia

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Ageing and Cognition

- a continual process of change
(the timing may differ)



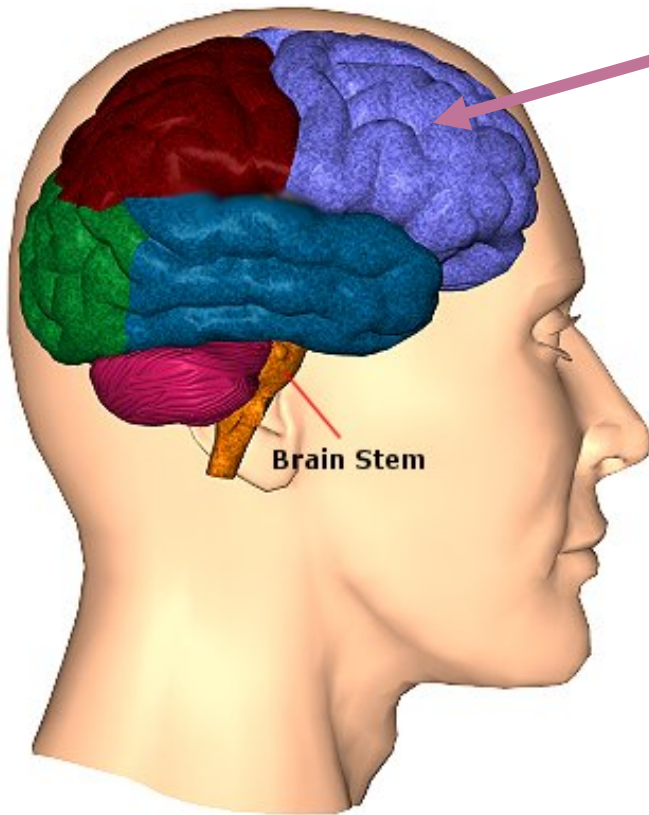
- affects different functions at different points in time
 - For top athletes, “ageing” may begin in 20s
 - for mental activities, “ageing” usually noticed in 50s, although there is decline from 30s onward

Ageing Mind: Ageing Brain

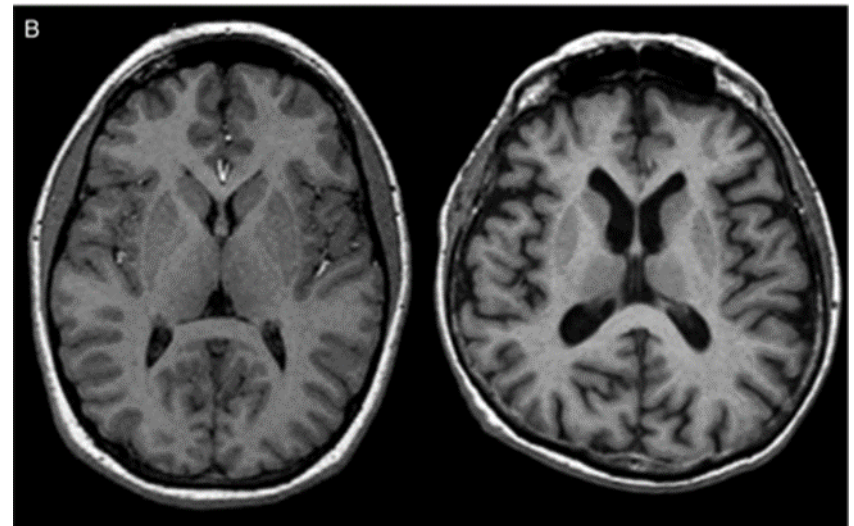
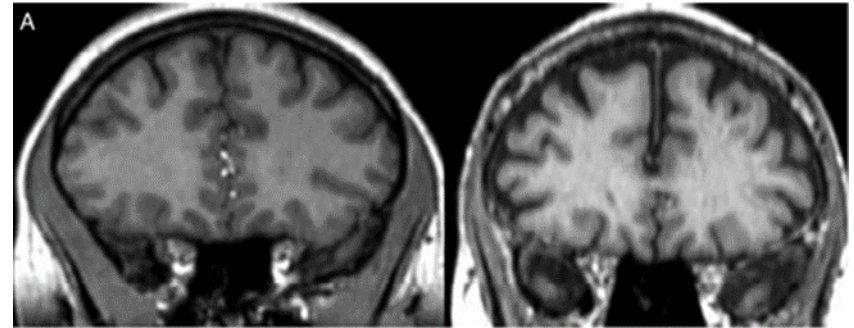
- The brain is constantly changing
- Unused connections get pruned; used connections get strengthened
- This process continues throughout our life



Working memory & executive functioning



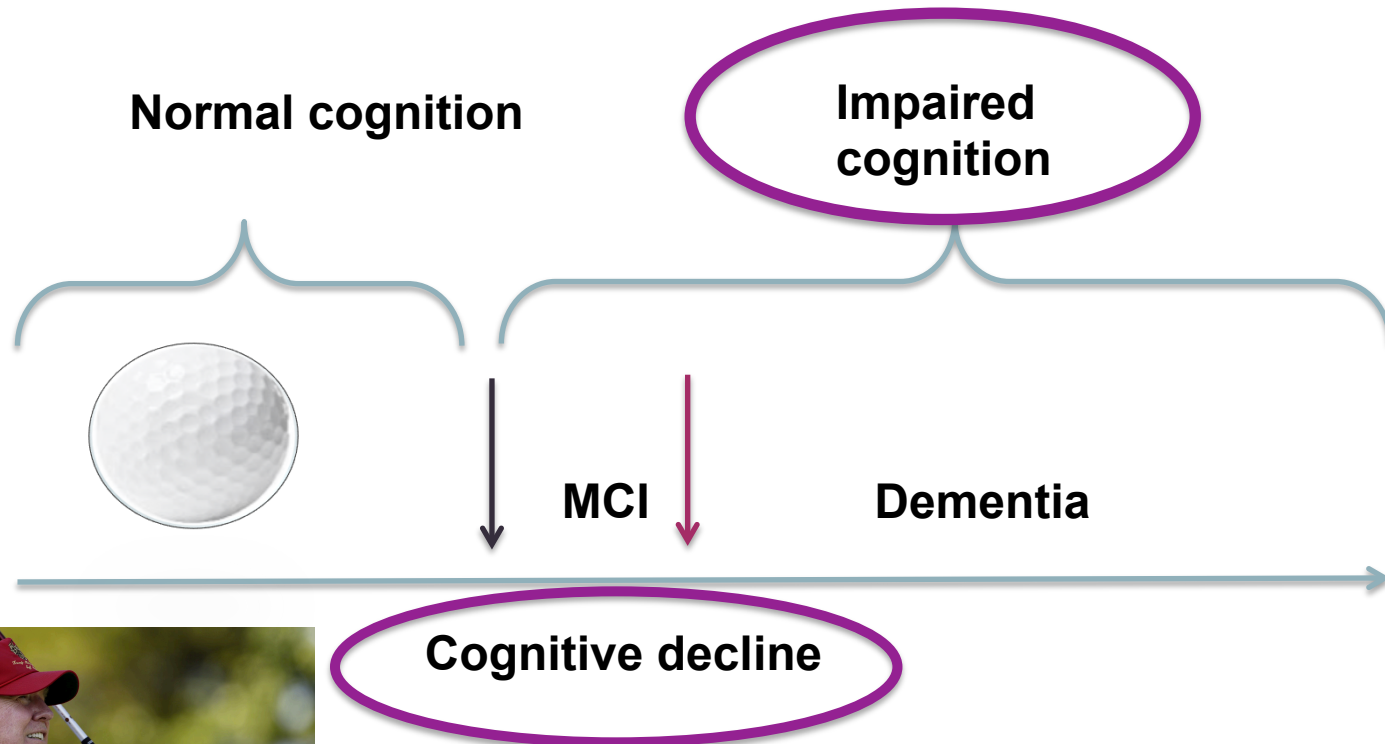
Reliant on prefrontal cortex ...a region that undergoes cell shrinkage & cell loss with age



Young adult

Older adult

Cognition and cognitive impairment



MCI: Mild Cognitive Impairment

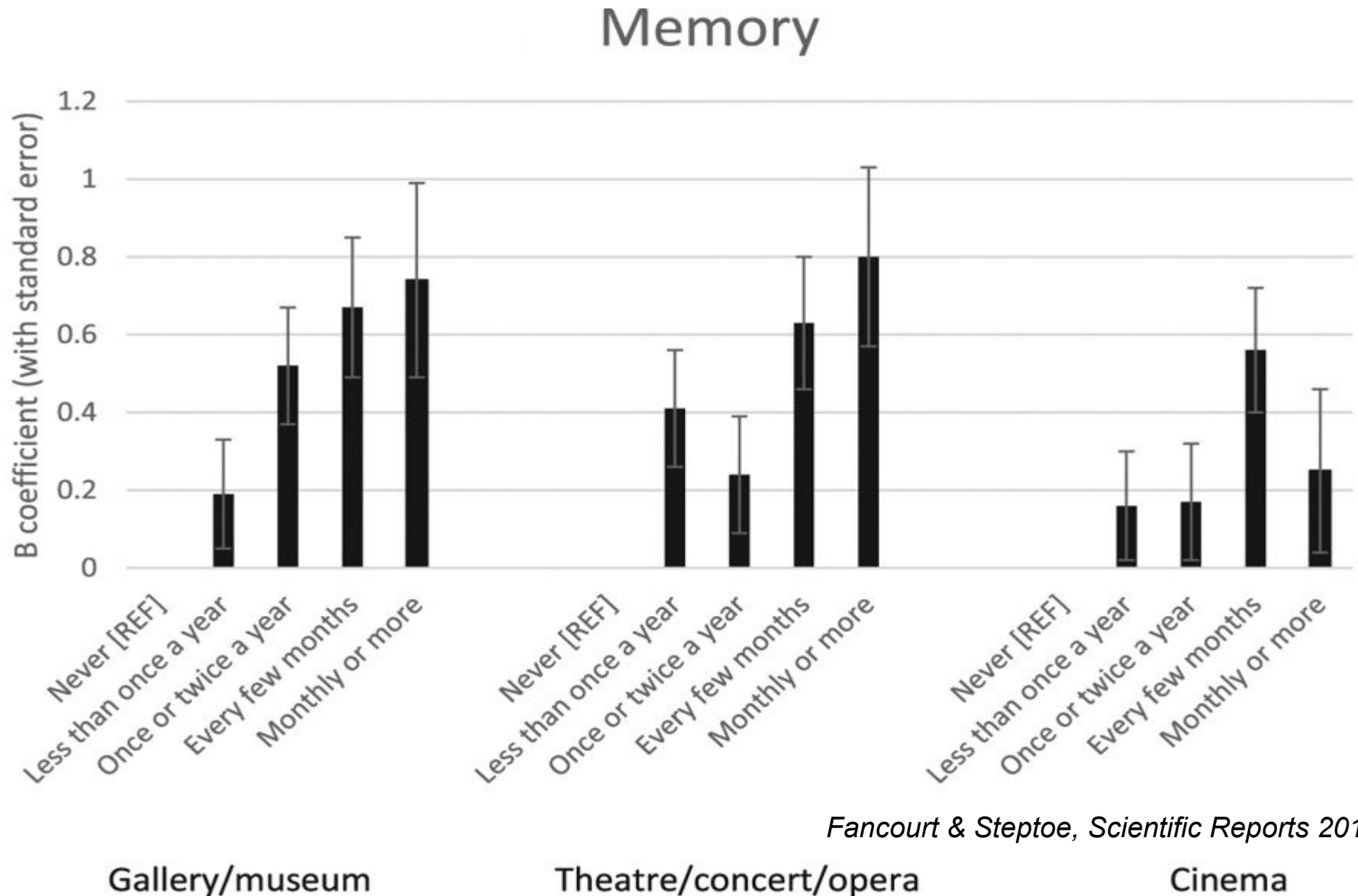
ELSA: Cognitive functioning

- Memory
- Orientation
- Attention
- Language
- Intelligence
- “Everyday functioning in familiar environments”

ELSA: Cognitive assessment

	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6	Wave 7	Wave 8
Memory								
Self-rated memory	✓	✓	✓	✓			✓	✓
Orientation in time	✓	✓	✓	✓	✓	✓	✓	✓
Word-list learning (imed and delayed)	✓	✓	✓	✓	✓	✓	✓	✓
Prospective memory	✓	✓	✓	✓	✓		✓	✓
Executive function								
Word-finding (verbal fluency)	✓	✓	✓	✓	✓		✓	✓
Letter cancellation (processing speed)	✓	✓	✓	✓	✓			
Backwards counting							✓	✓
Serial 7s							✓	✓
Object naming							✓	✓
Basic cognitive skills/abilities								
Numerical ability	✓			✓		(✓)	(✓)	(✓)
Literacy		✓			✓	(✓)	(✓)	(✓)
Other variables								
Quality of cognitive interview (interviewer's assessment)	✓	✓	✓	✓	✓	✓	✓	✓
Proxy interview of cognitive functioning IQCODE scale		✓	✓	✓	✓	✓	✓	✓

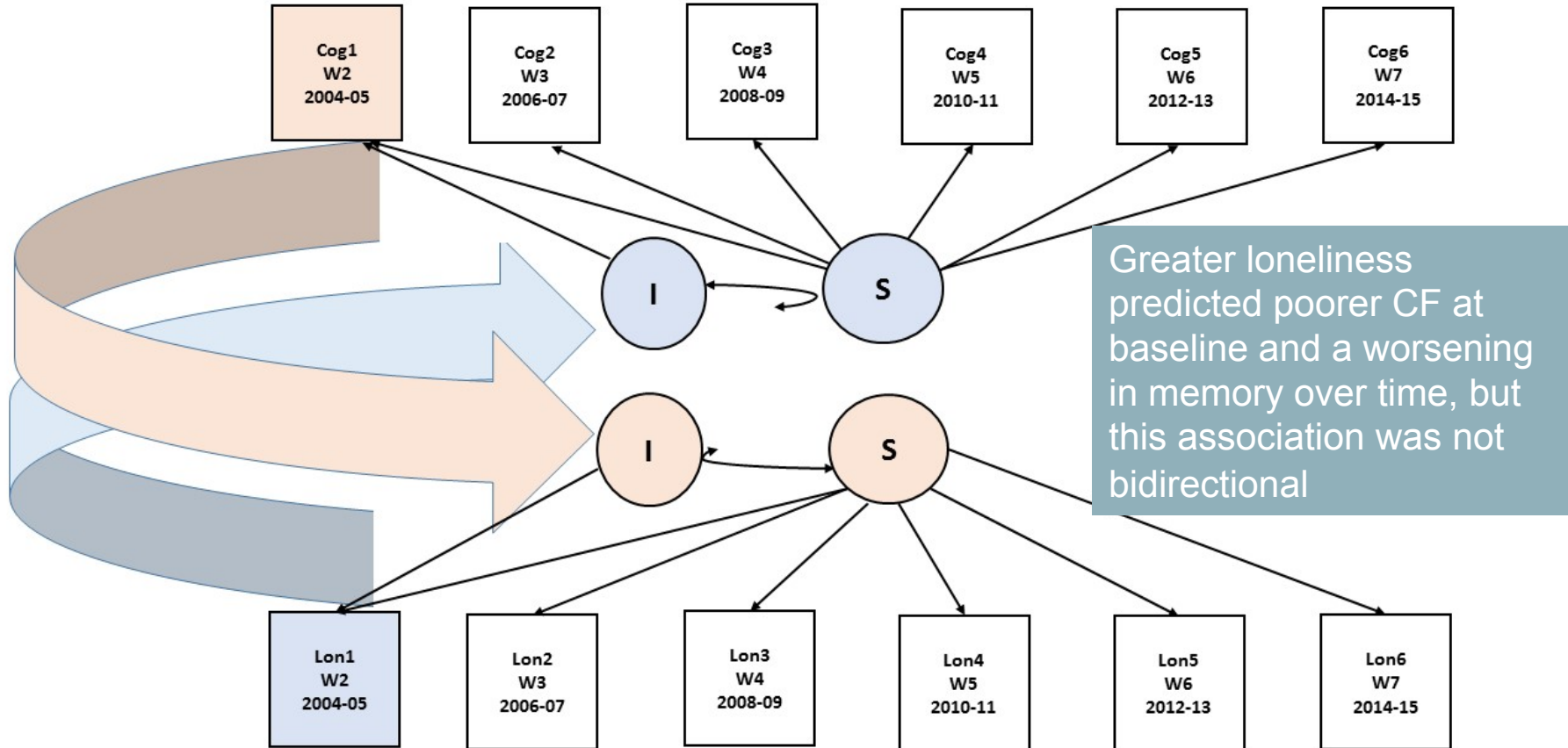
ELSA: Cognition & cultural engagement



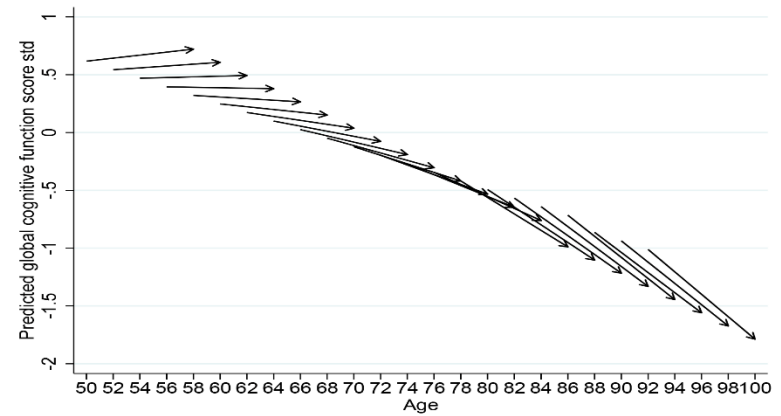
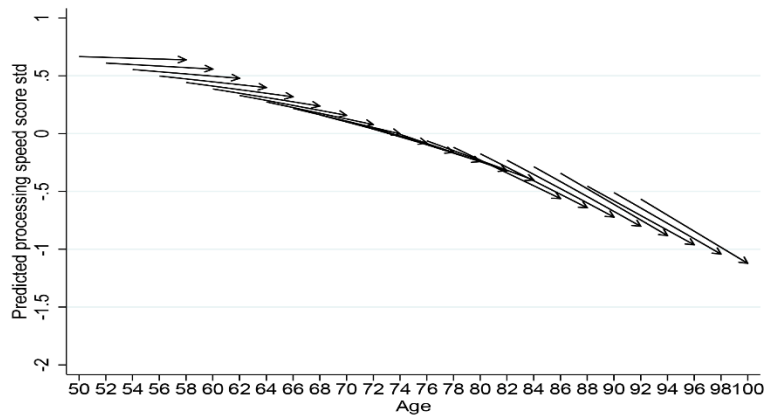
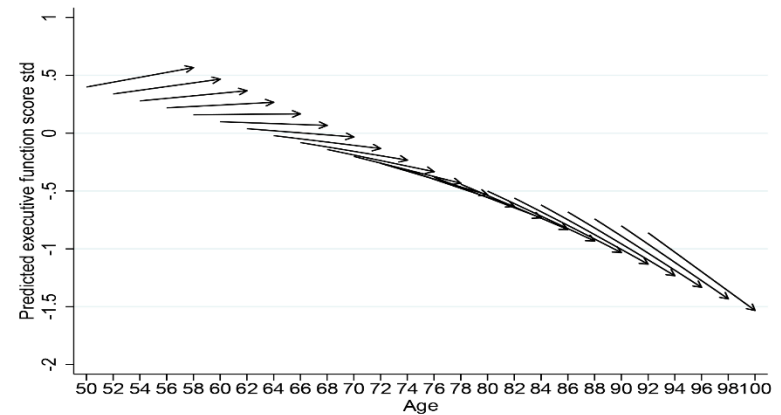
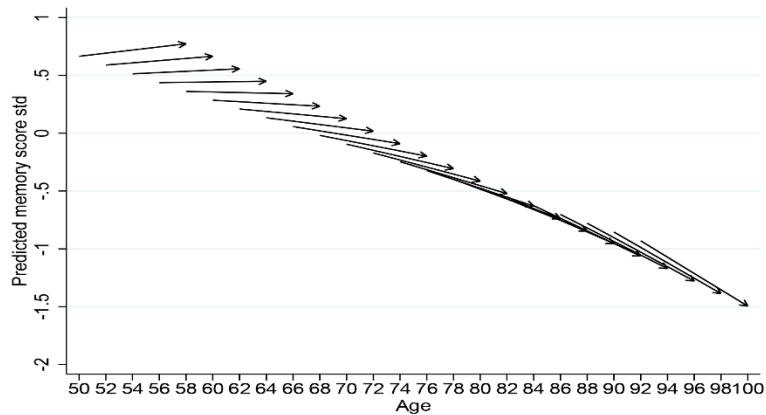
Fancourt & Steptoe, *Scientific Reports* 2018

ELSA: Cognition and Loneliness

Loneliness and cognitive function
over 10 year follow-up



ELSA: Cognitive trajectories



Examples of papers using cognitive functioning in ELSA

Batty et al., Association of Cognitive Function With Cause-Specific Mortality in Middle and Older Age: Follow-up of Participants in the English Longitudinal Study of Ageing. *Amer J Epidemiol* 2016

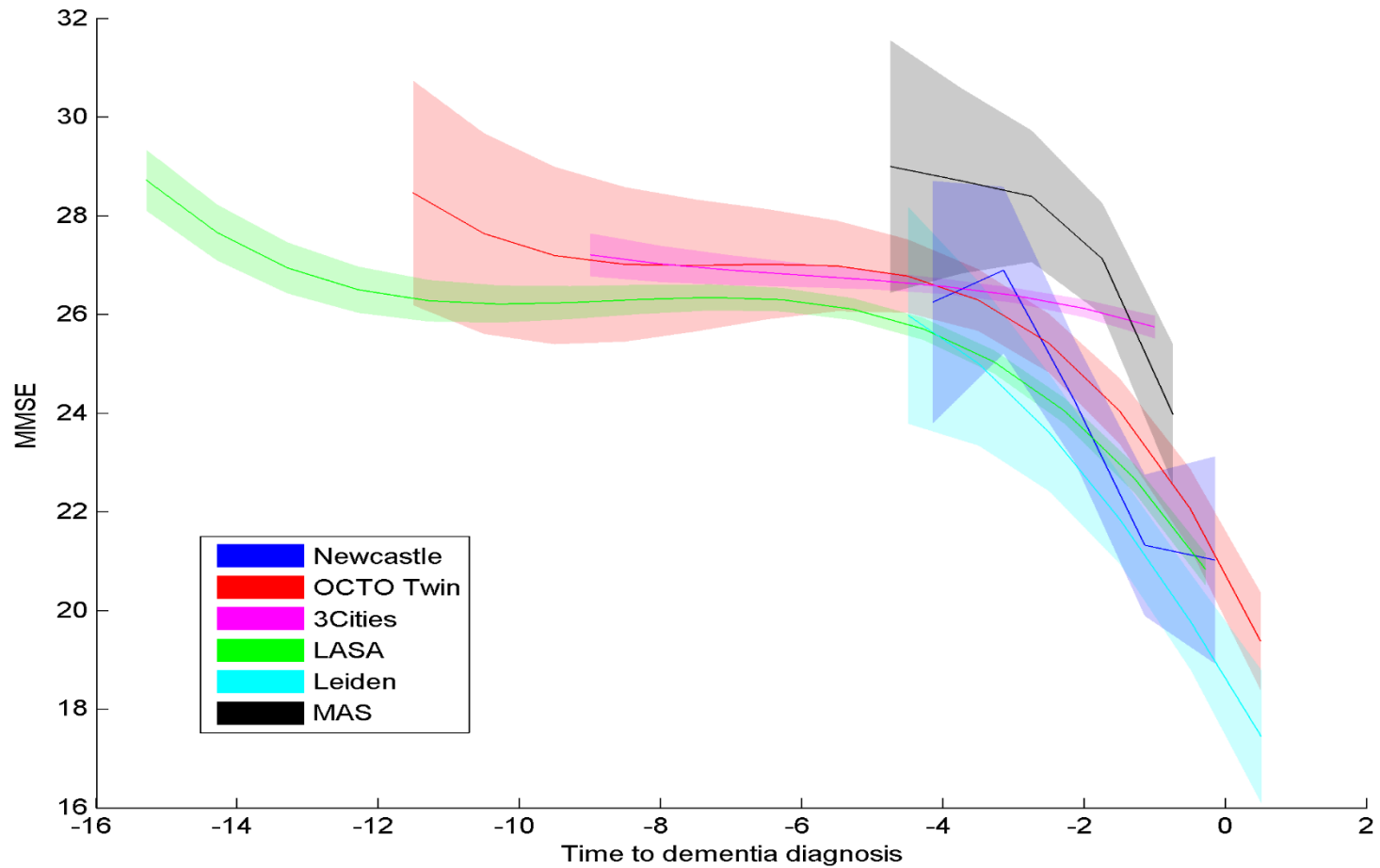
Bourassa & Sbarra et al., Body mass and cognitive decline are indirectly associated via inflammation among aging adults. *Brain Behav Immun* 2017

Chan et al., Harmonizing Measures of Cognitive Performance Across International Surveys of Aging Using Item Response Theory. *J Aging Health* 2015

McHugh et al., The discrepancy between social isolation and loneliness as a clinically meaningful metric: findings from the Irish and English longitudinal studies of ageing (TILDA and ELSA). *Int J Geriatr Psychiatry* 2017

Zaninotto et al., Cognitive function trajectories and their determinants in older people: 8 years of follow-up in the English Longitudinal Study of Ageing. *J Epidemiol Comm Health* 2018

Cognitive trajectories prior dementia diagnosis



Data harmonisation- challenges



ELSA – part of a cross-cohort venture

- Global Aging USA (NIA funded)
 - Comparative – USA (HRS) and Europe (HSE, SHARE, TILDA, NICOLA, HAGIS)
 - ELSA the longest running cohort

ELSA – part of a cross-cohort venture

GATEWAY TO
GLOBAL
AGING
DATA

[SURVEY](#) [CONCORDANCE](#) [DOCUMENTATION](#) [GRAPH](#) [PUBLICATIONS](#) [DOWNLOAD](#) [HELP](#)



Welcome to The Gateway to Global Aging Data

WHAT'S NEW

- Register for an upcoming webinar
- Harmonized SHARE Ver.D.4 now available
- New Open Position: Project Manager
- New and improved survey and dataset search
- Upcoming ELSA User Day
- Harmonized CHARLS Ver.C now available
- New Universal Access to Study Data page

VIDEO



ELSA – part of a cross-cohort venture

- Global Aging USA (NIA funded)
 - Comparative – USA (HRS) and Europe (HSE, SHARE, TILDA, NICOLA, HAGIS)
 - ELSA the longest running cohort
- Dementia Platform UK (MRC funded)
- Particular advantages for cross-cohort and cross-national studies of specific outcomes (e.g. dementia, MCI) investigating common risk factors or psychological and socioeconomic consequences of dementia

ELSA – part of a cross-cohort venture



DATA PORTAL

DPUK HOME | CONT

HOME COHORT DATA ▾ APPLY FOR DATA ACCESS ANALYSE DATA ▾ FA

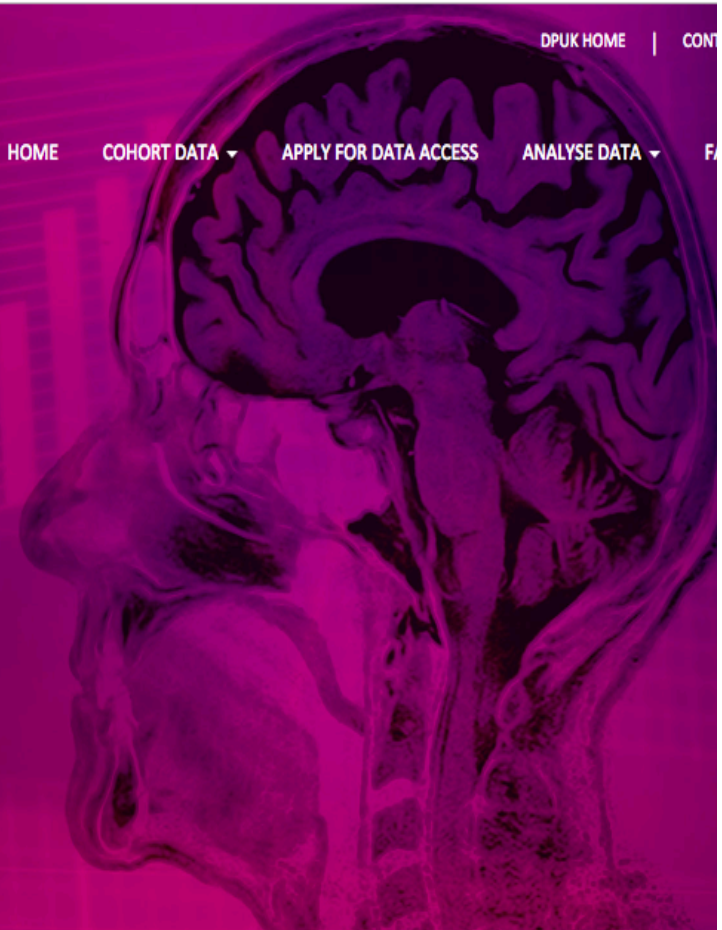
Welcome to the Data Portal

The DPUK Data Portal brings together records of over 2 million people in a **free-to-access** resource.

Researchers can identify which cohorts are relevant to them, apply for access to the data and then analyse it in a secure, remote environment with a complete data linkage and analysis package.

Explore Cohorts

Apply for Data Access



Cognitive enhancement (harmonisation)

	HRS USA	ELSA UK	TILDA Ireland	SHARE Europe	NICOLA N Ireland	HAGIS Scotland	G- Scotland
Verbal declarative memory	✓	✓	✓	✓	✓	✓	✓
Prospective memory		✓	✓				
Executive function	✓	✓	✓	✓	✓	✓	✓
Processing speed	✓	✓			✓	✓	✓
Reasoning	✓	✓			✓	✓	
Numeracy & literacy	✓	✓		✓		✓	
Crystallised intelligence	✓					✓	✓
Global cognition	✓	✓	✓	✓		✓	
Subjective cognition	✓	✓	✓	✓		✓	
Proxy cognition	✓	✓					

Adapted from Lara et.al., (2015) BMC Medicine

Cognitive impairment

The modified version of
TICS (TICS-m)
Score range 0-27



Langa & Weir approach

Word-list recall (WLR)
Maximum score =20



Memory

Serial 7s subtraction (e.g. $100-7=93$, $93-7=86...$)
Maximum score =5



Attention and
calculation

Counting backwards (e.g. 20,19,18,17...)
Maximum score =2



Reasoning and
processing speed



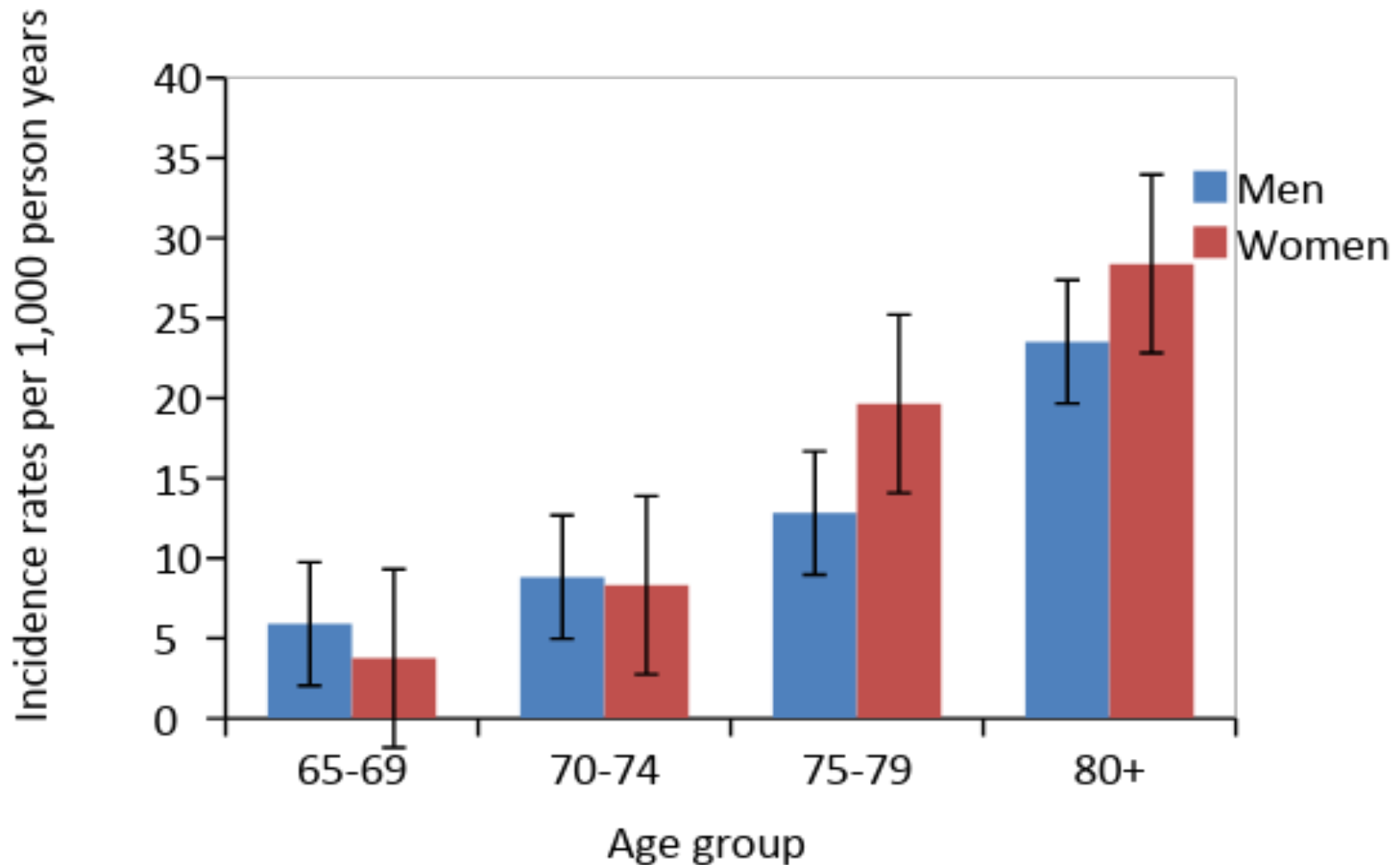
Memory &
Executive
function

Dementia
0-6

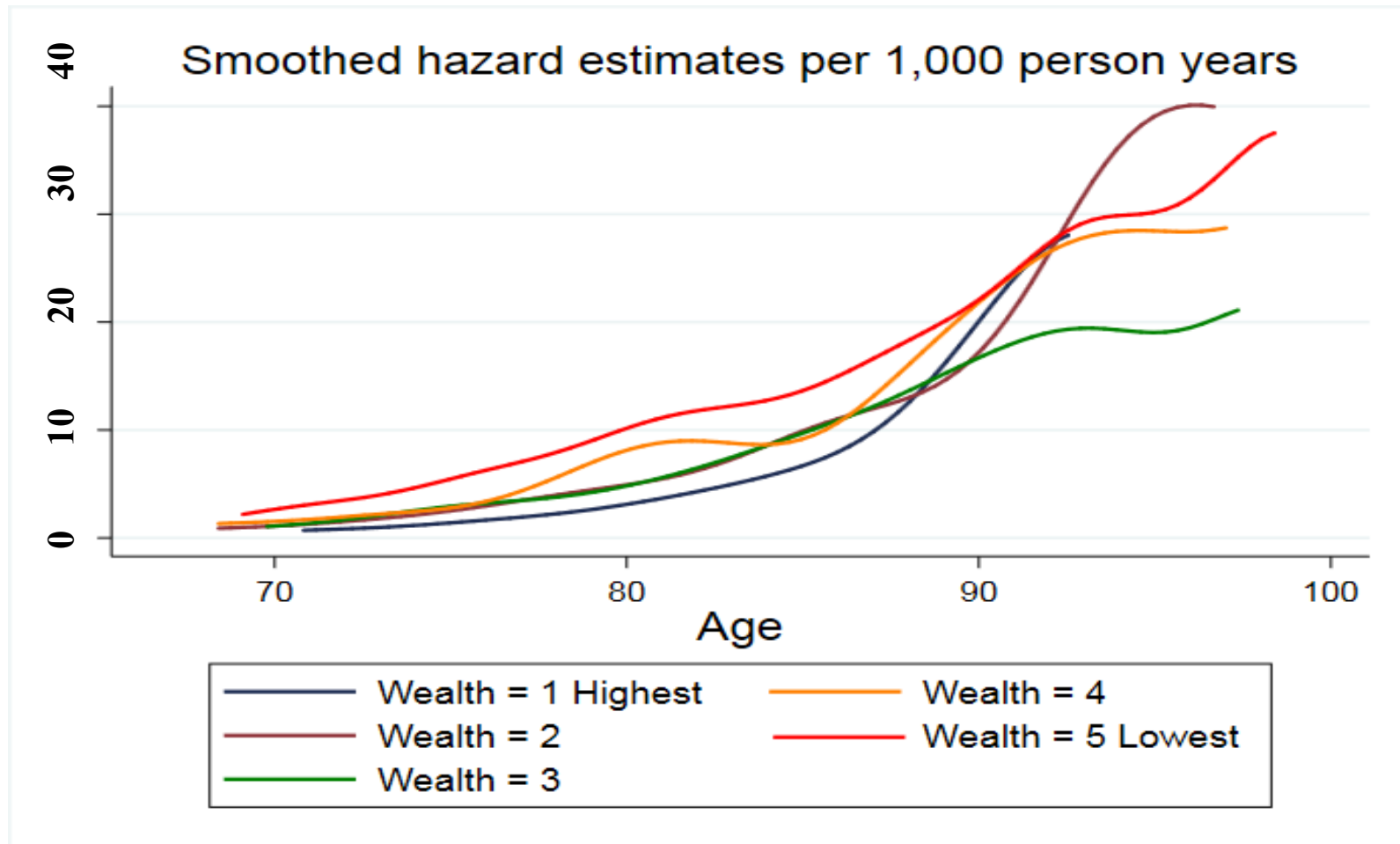
Cognitively
impaired
7-11

Cognitively
normal
 ≥ 12

ELSA: Dementia rates



ELSA: Dementia rates by age

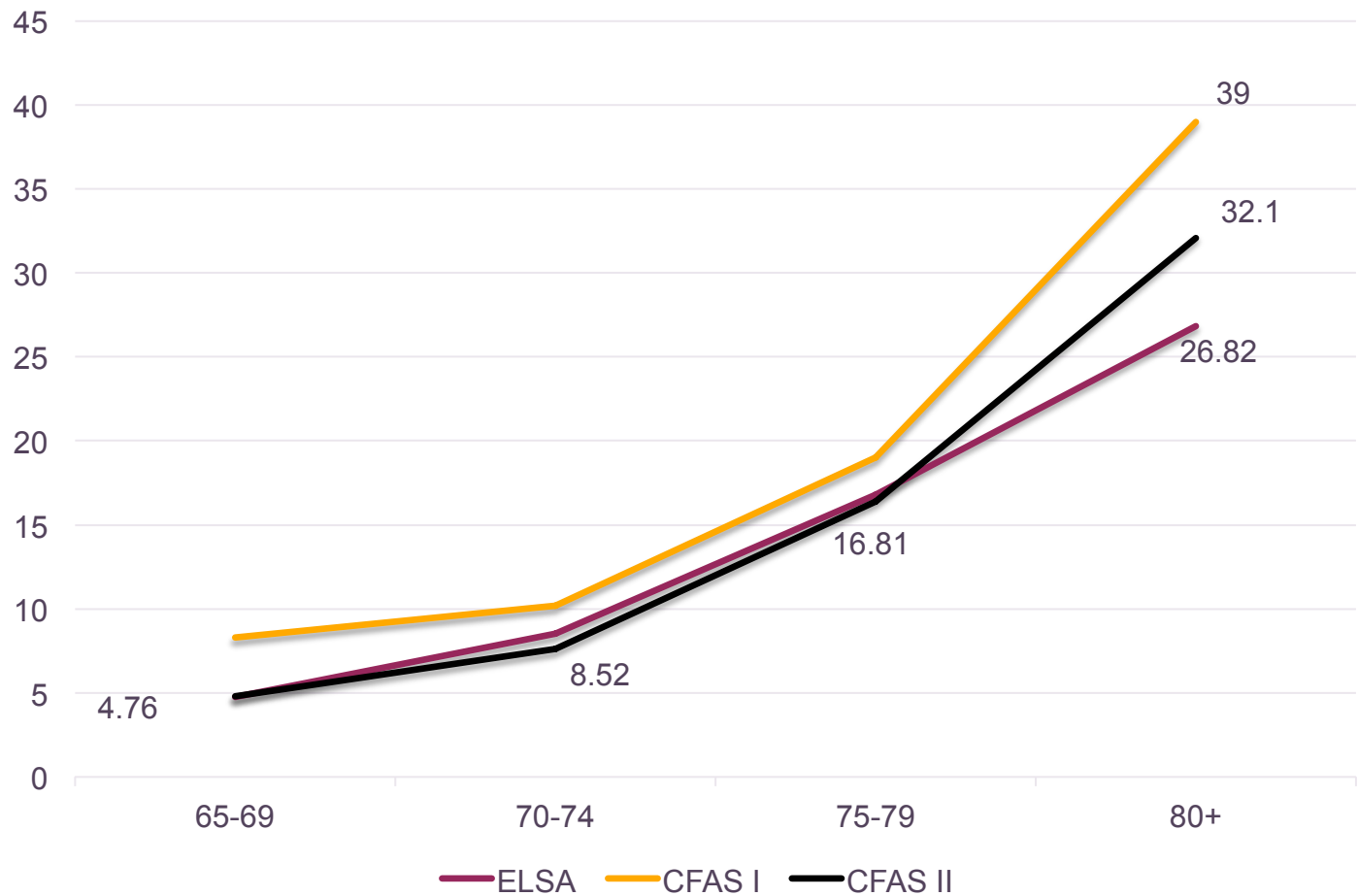


Dementia rates cross-cohort

ELSA
2002-2016

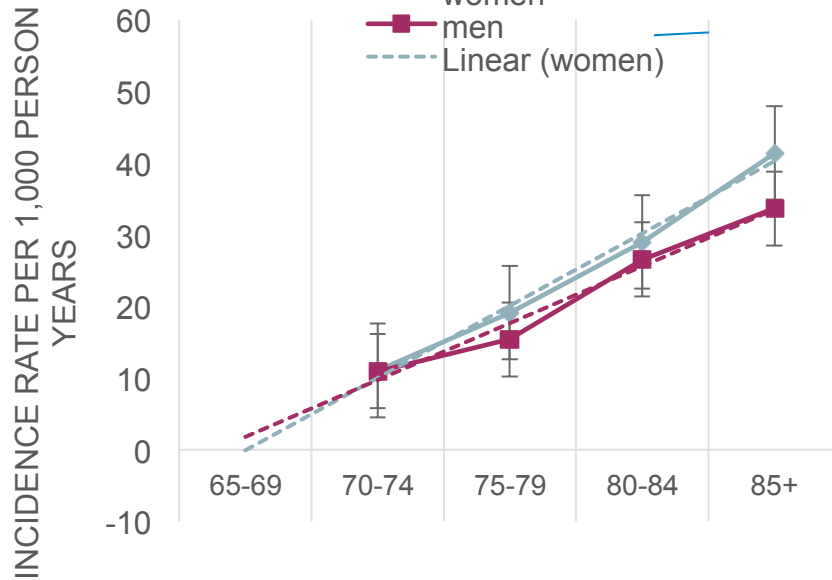
CFAS I
1990-1993

CFAS II
2008-2013

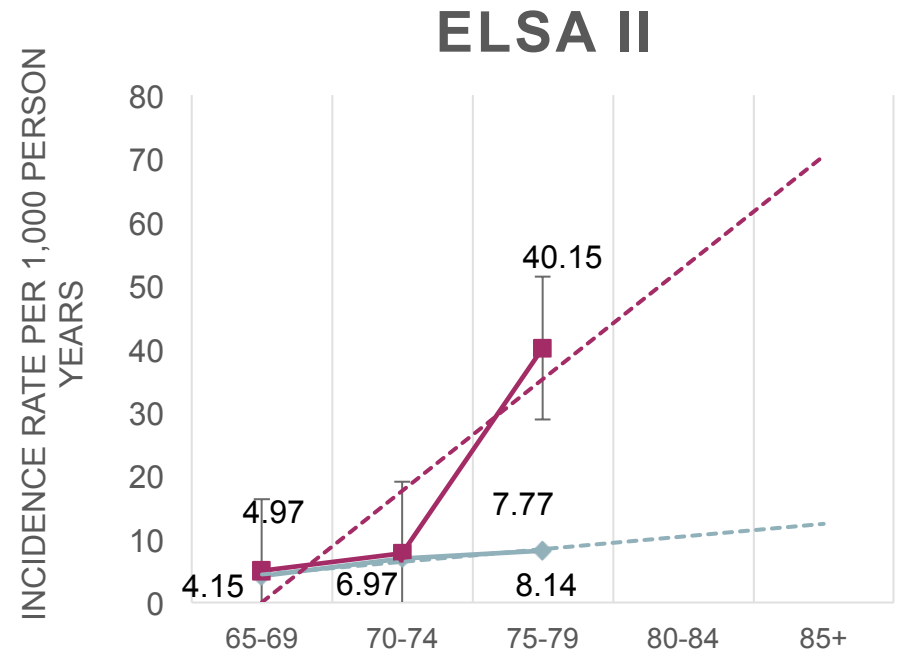


ELSA: Dementia rates by age-cohorts

ELSA I (Born 1900-1925)

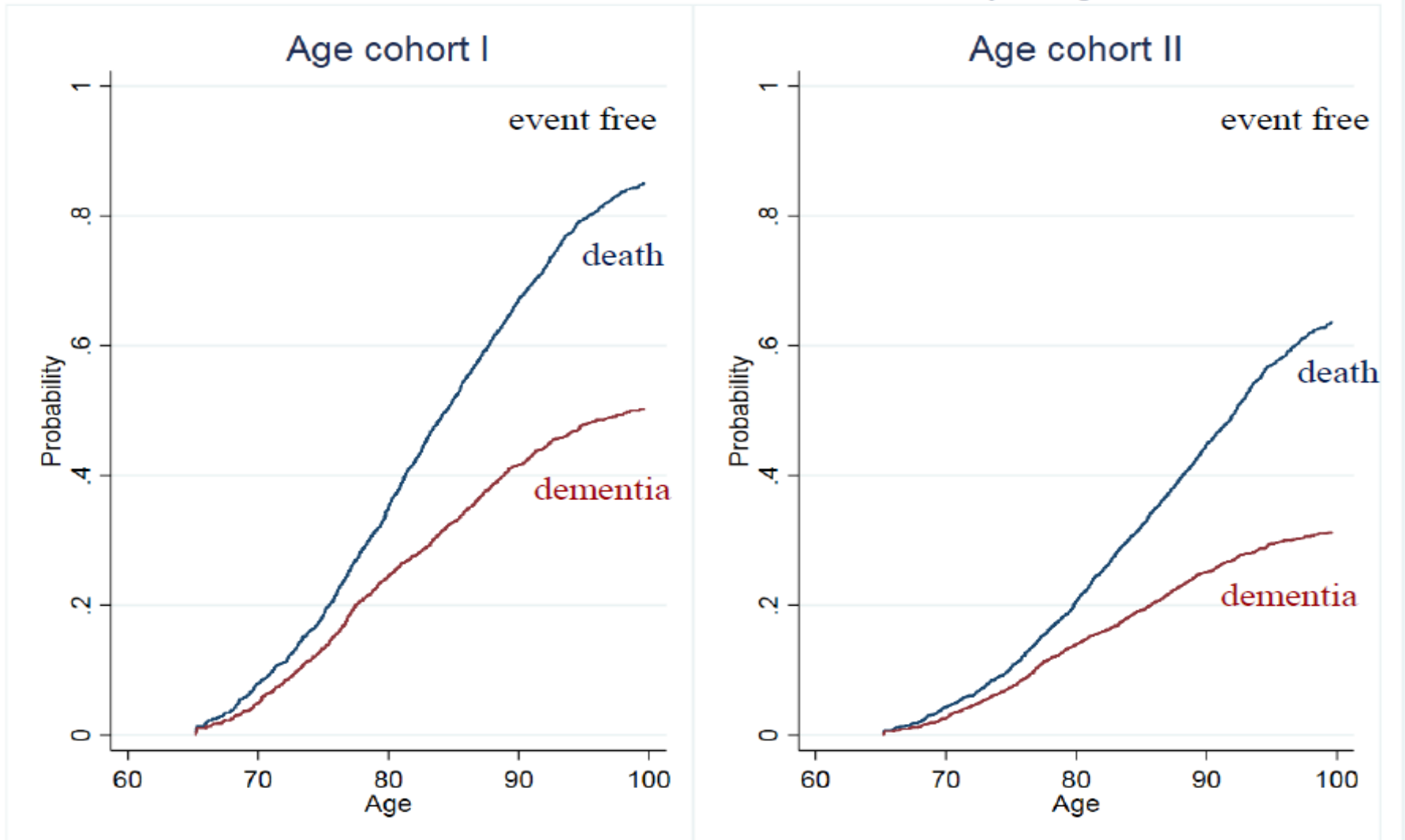


ELSA II (Born 1926-1943)



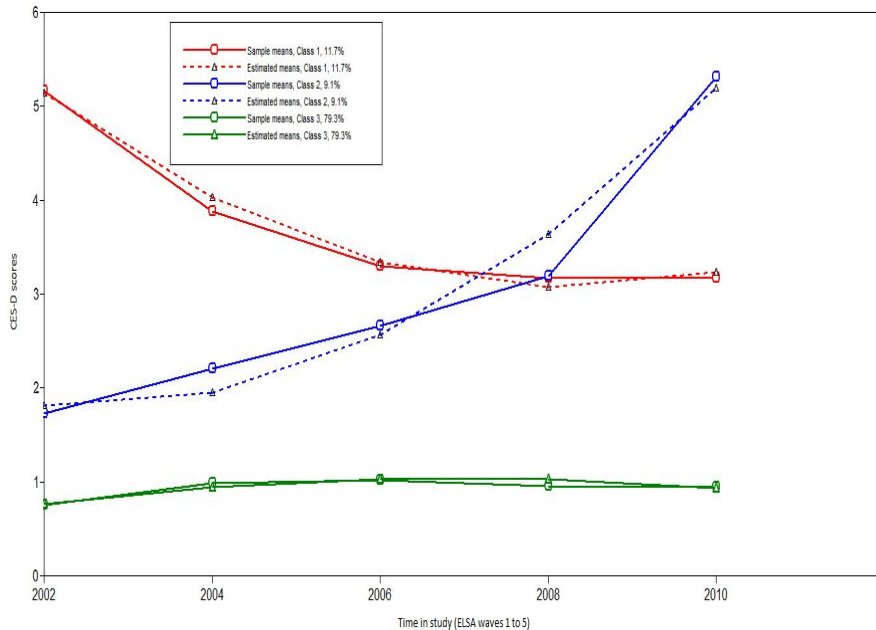
ELSA: dementia & death

Stacked cumulative incidence for dementia and competing risk of death



ELSA: dementia & depressive symptoms

CES-D trajectories -dementia



Class I - Started with and maintained affective symptoms (>4 CES-D score)

Class II - Started with no affective symptoms but increased over time

Class III - Started with no reported affective symptoms and maintained

Class I vs. II (**Depressed/ maintained** vs. **Increased depression**)

Class I vs. III (**Depressed/ maintained** vs. **No depression/ stable**)

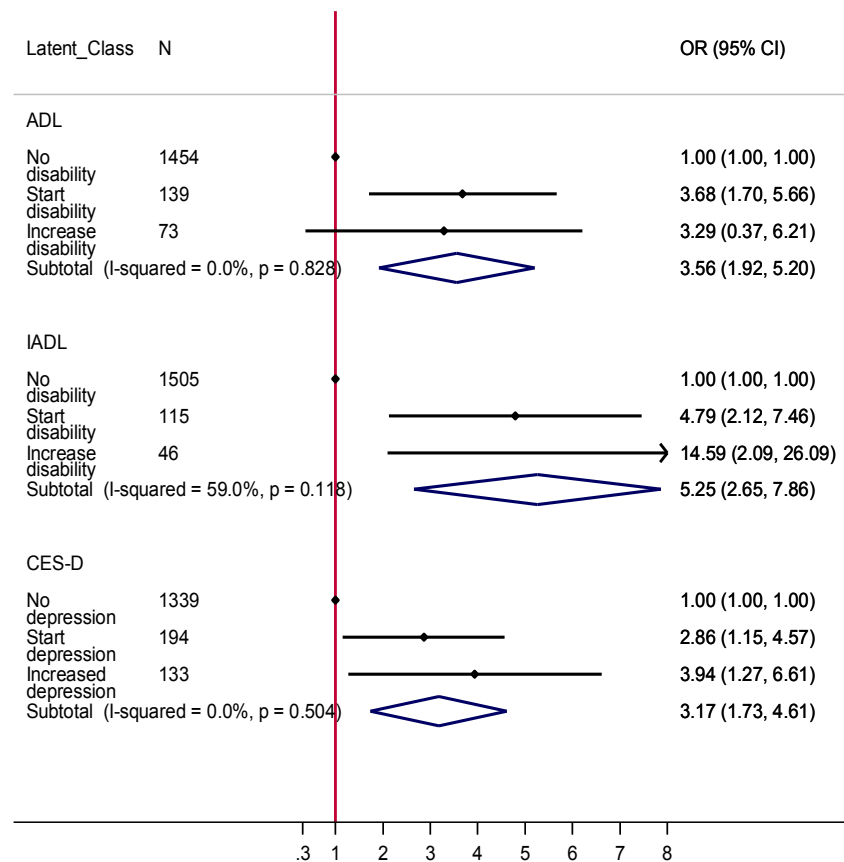
Class II vs. III (**Increased depression** vs. **No depression/ stable**)

ELSA: dementia & functional trajectories

Functional & mental health trajectories

Both ADL & IADL offer unique contributions in dementia risk

Affective symptoms (CES-D) are also predictive in dementia risk



Other examples of papers using dementia in ELSA

Snorri et al., Loneliness, Social Integration, and Incident Dementia Over 6 Years: Prospective Findings from the English Longitudinal Study of Ageing. *J Gerontology B*. 2017

Khondoker et al., Positive and Negative Experiences of Social Support and Risk of Dementia in Later Life: An Investigation Using the English Longitudinal Study of Ageing. *J Alz disease*. 2017

Davies et al., Vision impairment and risk of dementia: Findings from the English Longitudinal Study of Ageing. *JAGS* 2018

Hackett et al., Walking speed, cognitive function and dementia risk in the English Longitudinal Study of Ageing. *JAGS* 2018

Fancourt, Steptoe & Cadar, Cultural engagement and cognitive reserve: museum attendance and dementia incidence over a 10-year period. *Brit J Psychiatry* 2018

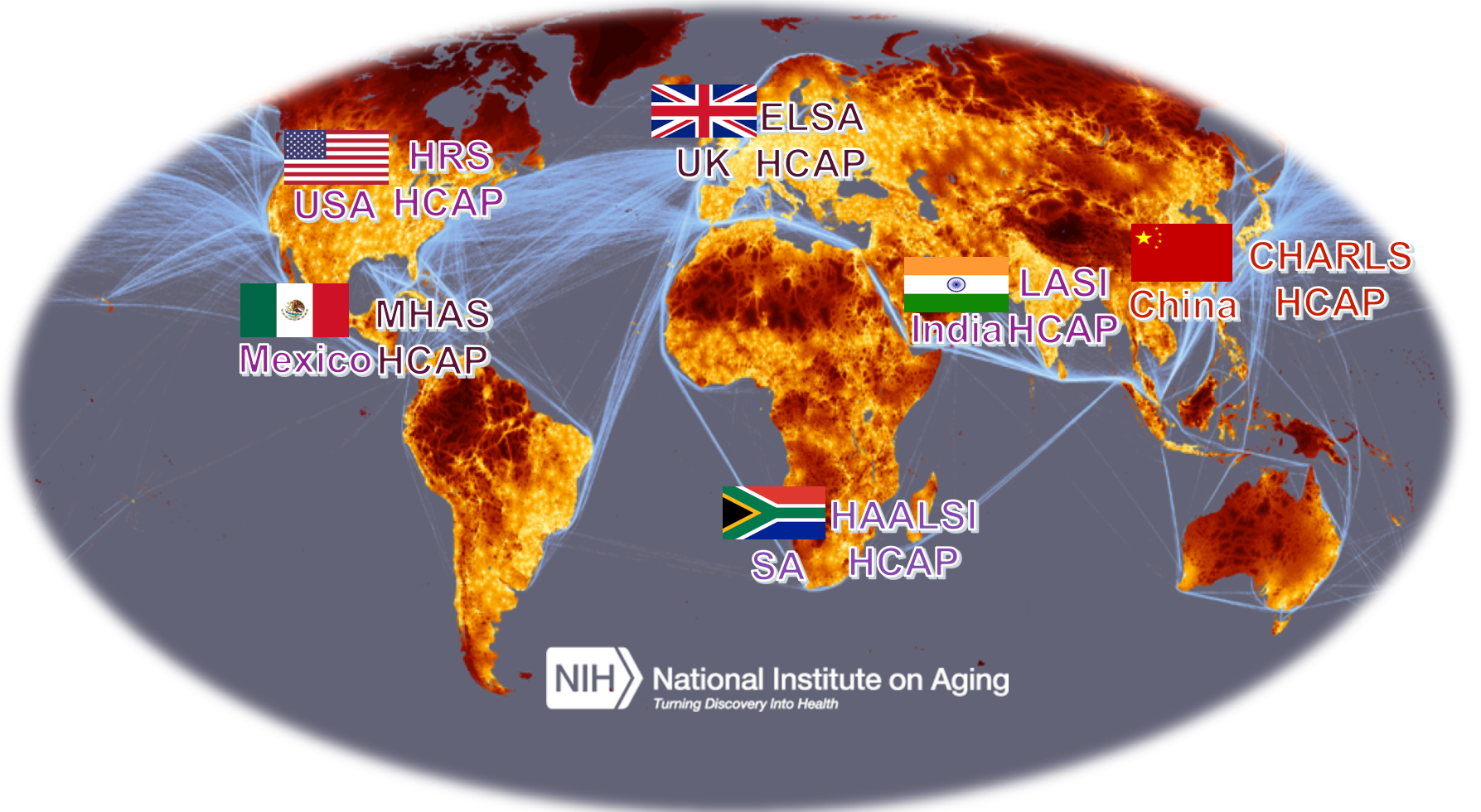
HCAP



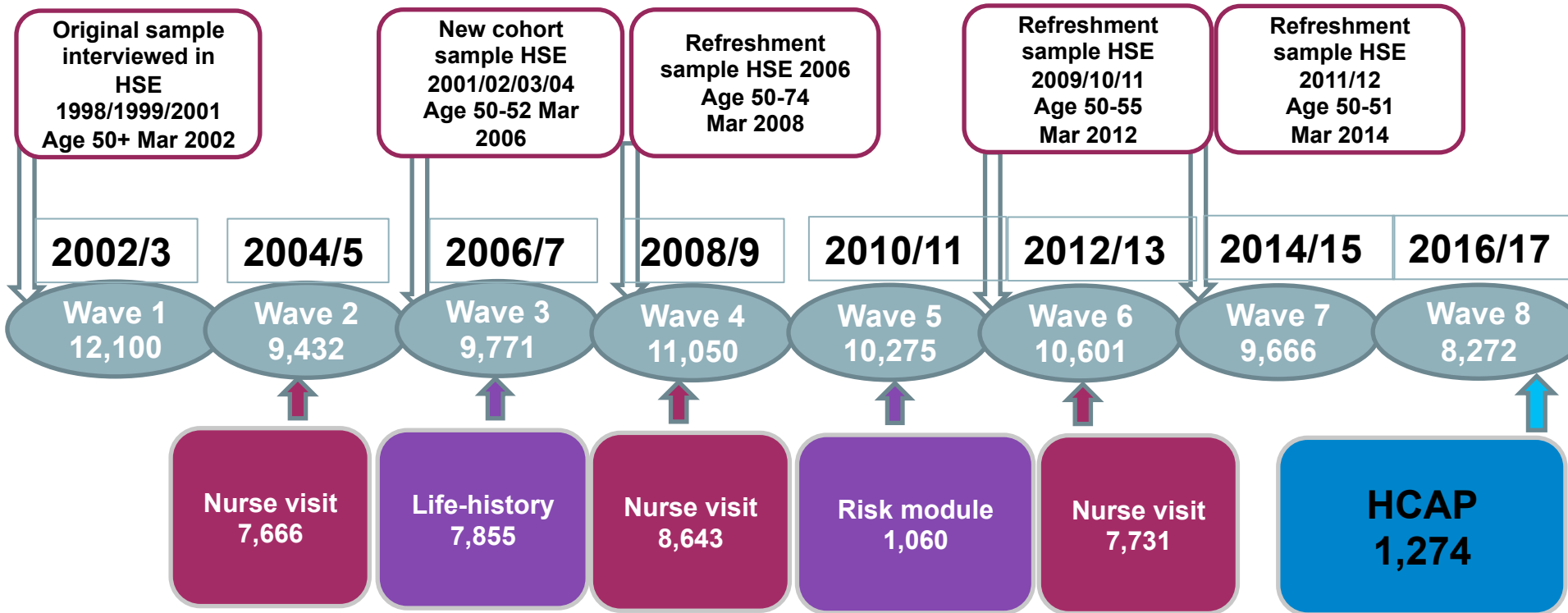
**Harmonised Cognitive Assessment Protocol
or
Healthy Cognitive Ageing Project**

**Worldwide initiative funded by
the National Institute on Aging (NIA)
to implement a harmonised protocol to assess
dementia and mild cognitive impairment**

HCAP Worldwide



Implementation of HCAP in ELSA



Implementation of HCAP in ELSA

- Stratified subsample of 1274 adults 65+ years
- The first England-wide dementia study completed
- Extensive neuropsychology, clinical assessment (1h)
- International algorithmic approach to dementia diagnosis
- Cross-walk to complete ELSA sample
- Data available at the end of 2018

HCAP protocol - respondents

- Mini mental state exam (MMSE)
- TICS
- Word list – immediate recall
- Retrieval fluency
- Letter cancellation
- Backwards counting
- 10/66 questions
- Word list – delayed recall
- Story memory – immediate
- Word list recognition
- Constructional praxis
- Story memory – delayed
- Logical memory – recognition
- Number series
- Raven's matrices
- Trail making
- Depressive symptoms
- Smell test

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UCL

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University of Michigan

• **Professor Ken Langa**
University of Michigan

