Health and longevity – can we have both?
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Institute and Faculty of Actuaries

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Institute for Ageing

Health and longevity – can we have both?

Professor Carol Jagger

02 September 2016

Sources


Foresight
Government Office for Science
Trends in life expectancy and healthy life expectancy
Future of an ageing population: evidence review
Foresight, Government Office for Science


Articles
A comparison of health expectancies over two decades in England: results of the Cognitive Function and Ageing Study I and II
Summary
Findings
Interpretation
Funding
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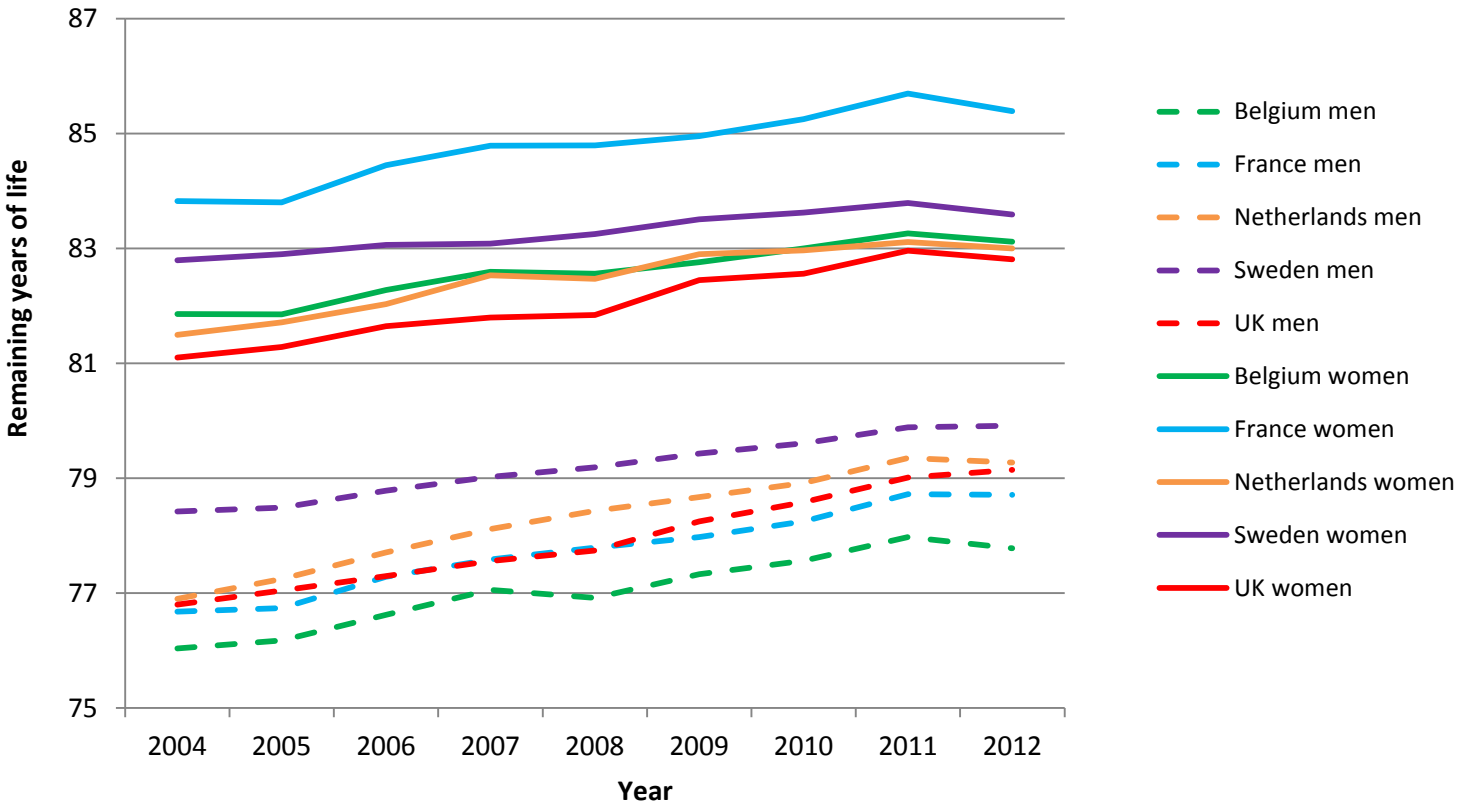
Summary

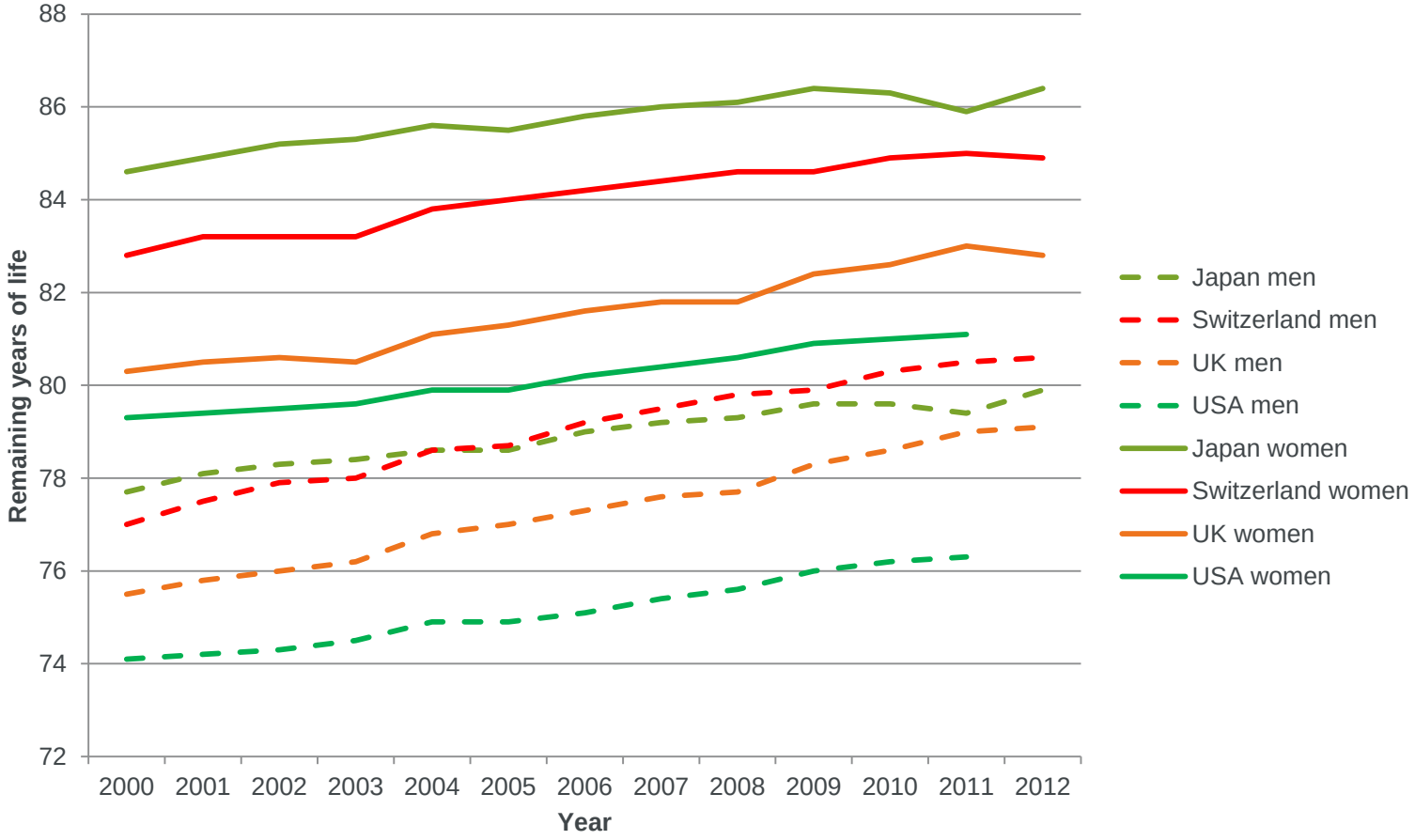
- Health expectancy increases in the UK are not keeping pace with gains in life expectancy, particularly at older ages.
- There is evidence that chronic diseases, unhealthy behaviours and the environment can influence health expectancy but many also influence life expectancy
- Influences on health expectancy must be examined alongside their effect on life expectancy to ensure that we achieve both longevity and health

LE at birth: selected EU countries



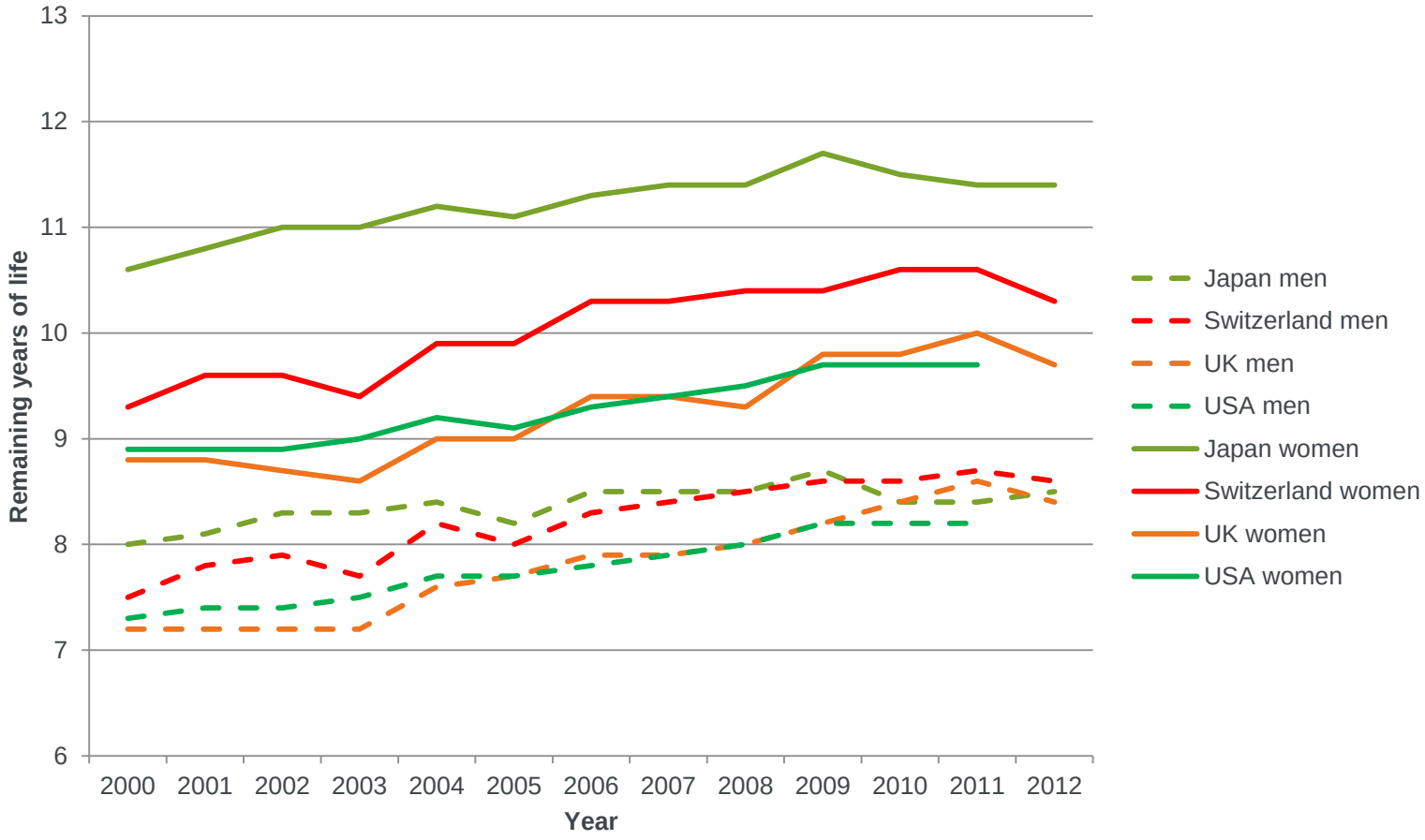
Source: Jagger Foresight evidence review

LE at birth: selected OECD countries



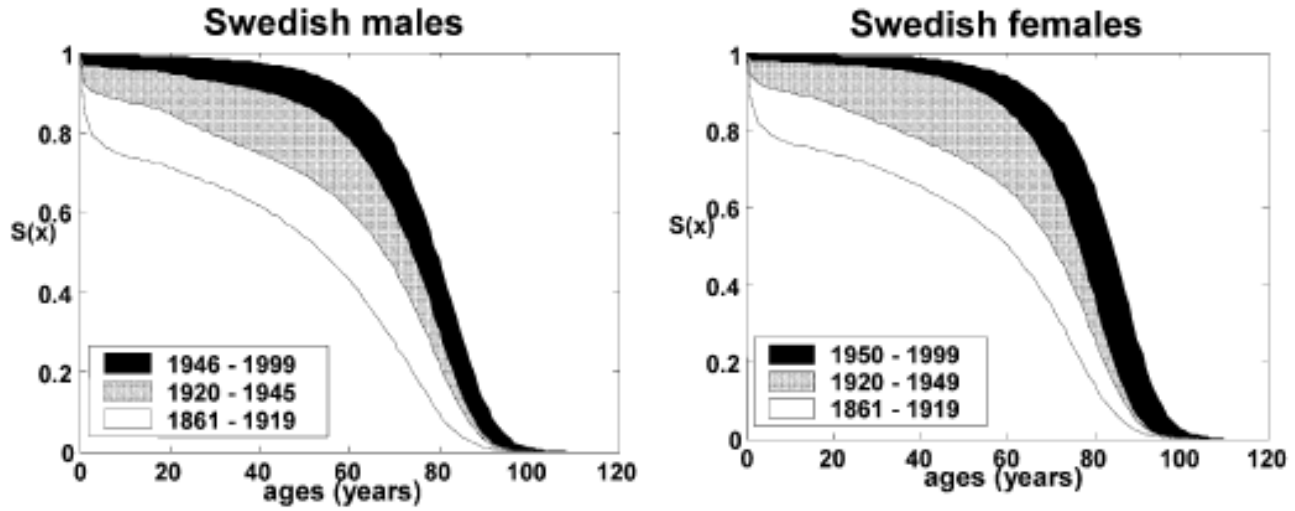
Source: Jagger Foresight evidence review

LE at age 80: selected OECD countries



Source: Jagger Foresight evidence review

Rectangularization of the survival curve



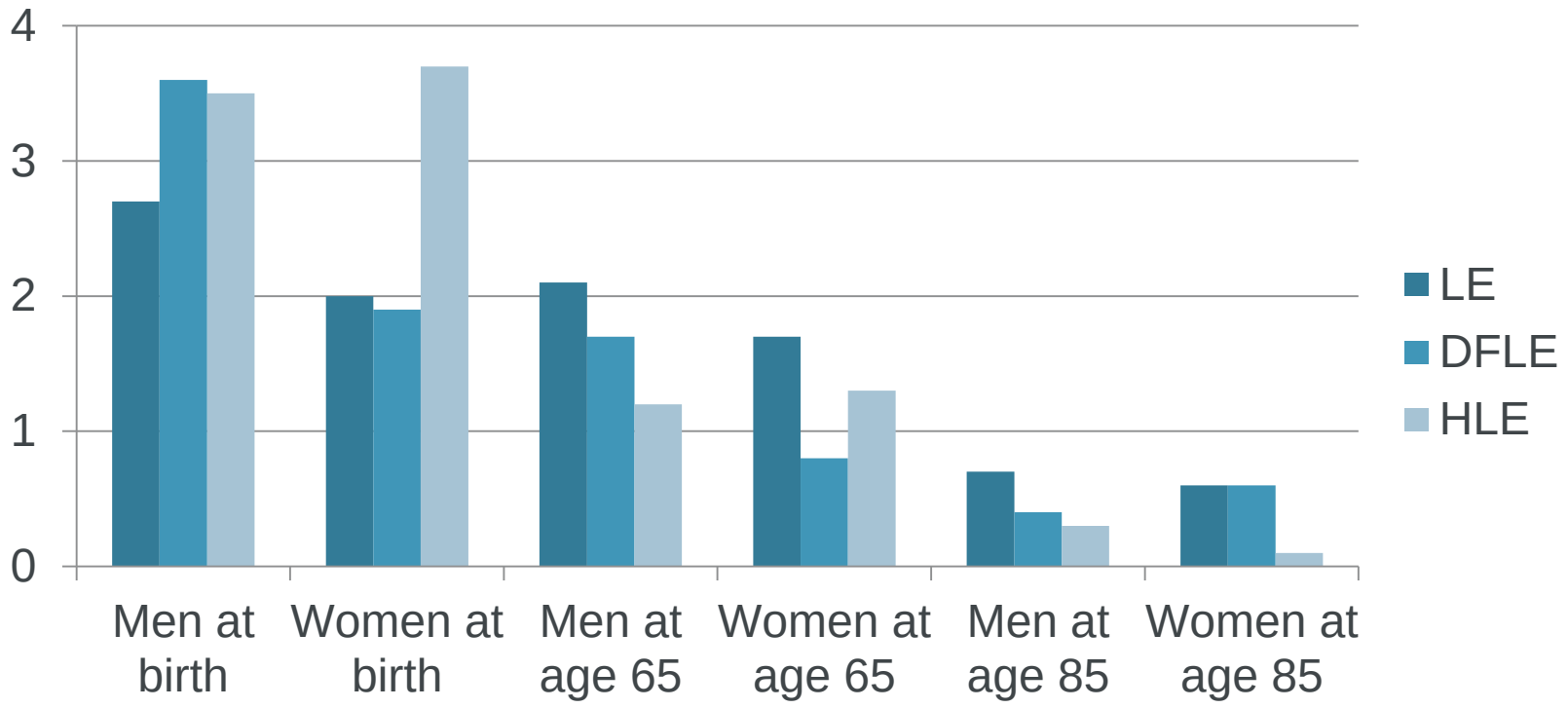
- 1920-1945: rectangularization
- 1946-1999: increase in maximum lifespan

Source: Yashin et al. (2002)

Trends in health expectancy – less simple

- What do we mean by health?
- Less harmonization
  - across countries
  - within countries over time
- Need to look at trends in HE alongside trends in LE

Changes in LE and HE, 2000-2 to 2009-11



- Some evidence of compression of disability and morbidity at younger ages in UK

Male LE and HLY: selected EU countries

	Change in years between 2005 and 2010					
	Birth		Age 65		Age 85	
	LE	HLY	LE	HLY	LE	HLY
MEN						
Belgium	**1.4**	**1.7**	1.0	0.9	0.8	0.7
France	1.5	-0.4	1.2	0.5	0.9	0.1
Netherlands	1.7	-4.4	1.3	-1.1	0.6	-1.2
Sweden	**1.1**	**7.0**	**0.9**	**3.4**	**0.3**	**1.3**
UK	1.5	0.9	1.2	0.4	0.5	-0.1
EU25	1.6	1.1	1.1	0.3	0.7	0.0

- Compression of disability for men in Belgium (birth) and Sweden (all ages)

Source: Jagger Foresight evidence review

Female LE and HLY: selected EU countries

	Change in years between 2005 and 2010					
	Birth		Age 65		Age 85	
	LE	HLY	LE	HLY	LE	HLY
WOMEN						
Belgium	1.1	0.5	1.1	-0.1	1.1	0.1
France	1.4	-1.2	1.4	0.2	1.4	0.7
Netherlands	1.3	-2.9	0.9	-1.6	0.6	-0.2
Sweden	**0.7**	**7.7**	**0.4**	**4.4**	**0.1**	**2.1**
UK	1.3	0.1	1.1	0.4	0.6	-0.1
EU25	1.3	0.5	1.1	0.2	0.9	0.1

- Compression of disability for women in Sweden (all ages)

Source: Jagger Foresight evidence review

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Male LE and HE: selected OECD countries

			Change in years over period					
			Birth		Age 65		Age 80	
	Period	Measure of ill-health	LE	HE	LE	HE	LE	HE
MEN								
Japan	1995-2004	activity limitation	2.3	1.2	1.7	0.8		
	1995-2004	ADL limitation	2.3	2.0	1.7	1.3		
	2005-2009	care needs			0.8	0.2	0.4	0.1
	1995-2004	less than good health			1.7	-0.7	1.0	-0.3
Switzerland	2008-2012	activity limitation	**0.8**	**2.9**	**0.4**	**1.4**	**-0.1**	**0.8**
	2008-2012	less than good health			**0.4**	**0.5**	**-0.1**	**0.7**
UK	2001-2010	disability	**2.7**	**3.6**	2.1	1.7	0.7	0.4
	2001-2010	less than good health	**2.7**	**3.5**	2.1	1.2	0.7	0.3
USA	2000-2006	activity limitation	1.0	0.7	1.0	1.0	0.3	0.3

- Compression in men evident for UK (birth) and Switzerland (all ages)

Source: Jagger Foresight evidence review

Female LE and HE: selected OECD countries

			Change in years over period					
			Birth		Age 65		Age 80	
	Period	Measure of ill-health	LE	HE	LE	HE	LE	HE
WOMEN								
Japan	1995-2004	activity limitation	1.7	0.8	2.3	0.8		
	1995-2004	ADL limitation	1.7	1.7	2.3	1.2		
	2005-2009	care needs			0.8	0.5	0.6	0.4
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	2001-2010	less than good health	**2.0**	**3.7**	1.7	1.3	0.6	0.6
USA	2000-2006	activity limitation	0.9	0.5	**0.7**	**0.8**	0.3	0.3

- Compression in women evident for UK (birth), Switzerland (birth and age 65) and USA (age 65)

Source: Jagger Foresight evidence review

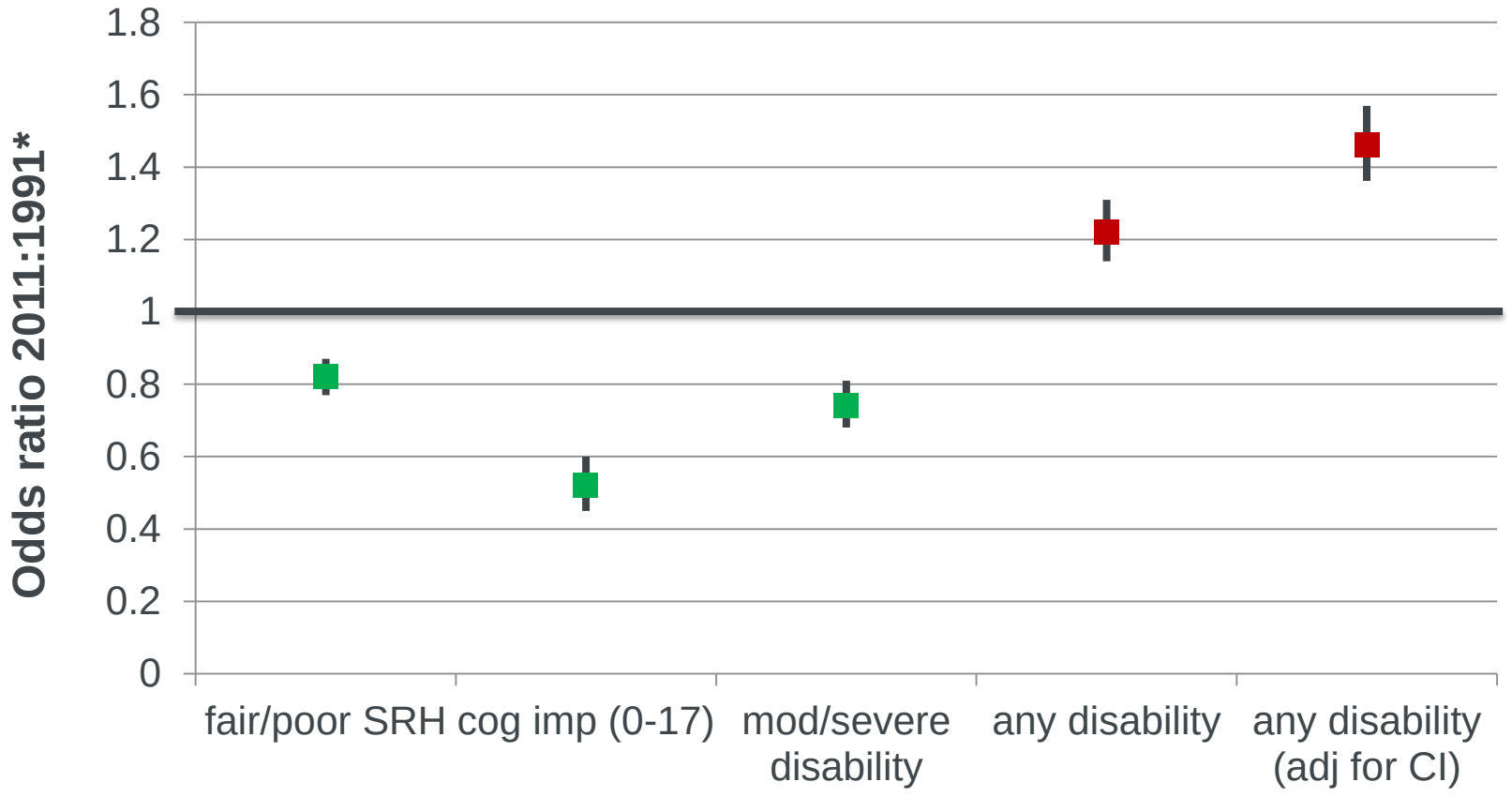
Most recent trends in HE

- CFAS I (1991) six areas
  - sampling from whole population geographically
- Three taken forward for CFAS II (2011)
  - Cambridgeshire (Ely and surrounding area)
  - Newcastle
  - Nottingham
- Design:
  - Equal numbers aged 65-74 and 75+ years
  - Complete population (including care homes)
- HE measures:
  - Cognitive impairment-free LE (CIFLE)
  - Disability-free LE (DFLE) based on (I)ADLs
  - Healthy LE (HLE) based on self-rated health

Study characteristics

	CFAS I (N=7635)	CFAS II (N=7796)
	% (n)	% (n)
Gender		
Women	60 (4590)	54 (4246)
Age group (years)		
65-69	26 (1981)	25 (1939)
70-74	23 (1776)	24 (1873)
75-79	23 (1725)	21 (1624)
80-84	17 (1308)	17 (1290)
85+	11 (845)	14 (1070)
Living arrangements		
Alone	38 (2903)	36 (2772)
With spouse	47 (3589)	54 (4205)
With others	10 (749)	7 (535)
In care home	5 (346)	3 (197)
Education (years full-time)		
0-9	74 (5529)	27 (2052)
10-11	17 (1238)	51 (3923)
12+	9 (692)	22 (1704)

Changes* in prevalence (CFAS)

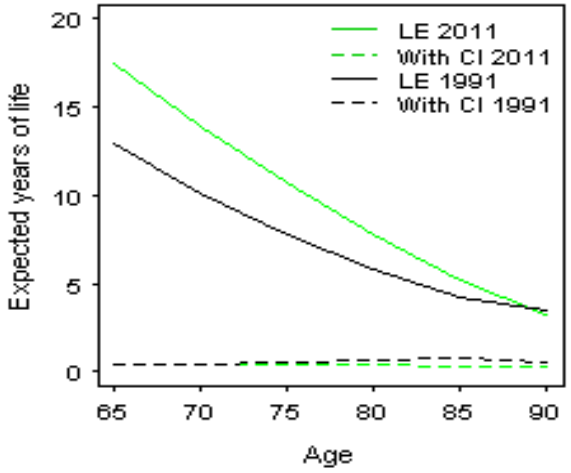


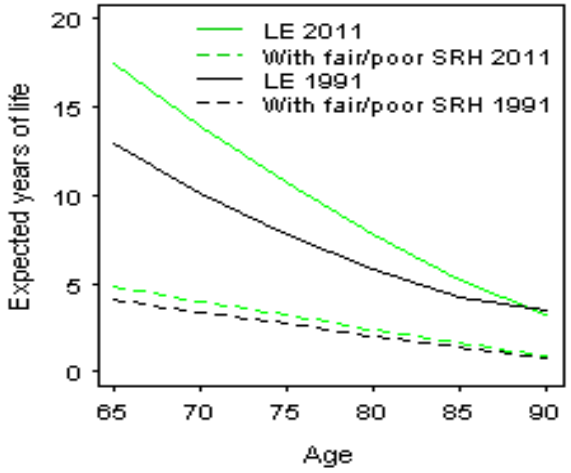
*adjusted for age, sex, region and deprivation

Source: Jagger et al. Lancet 2016

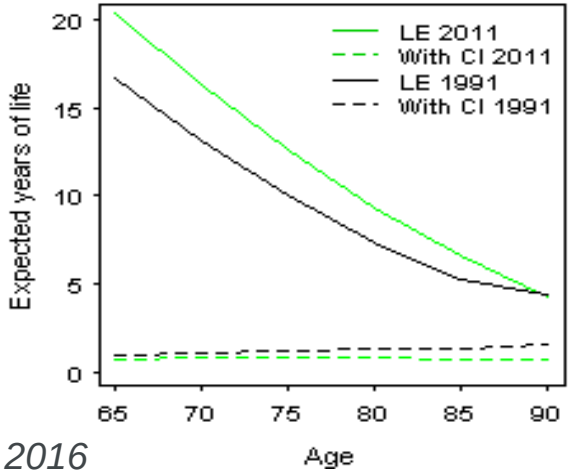
Cognitive impairment-free LE and HLE

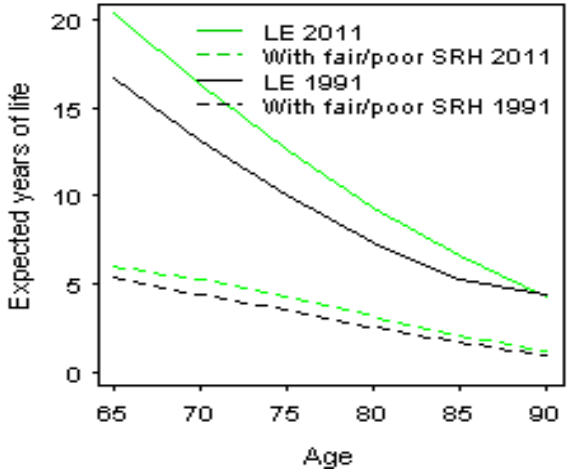
Men





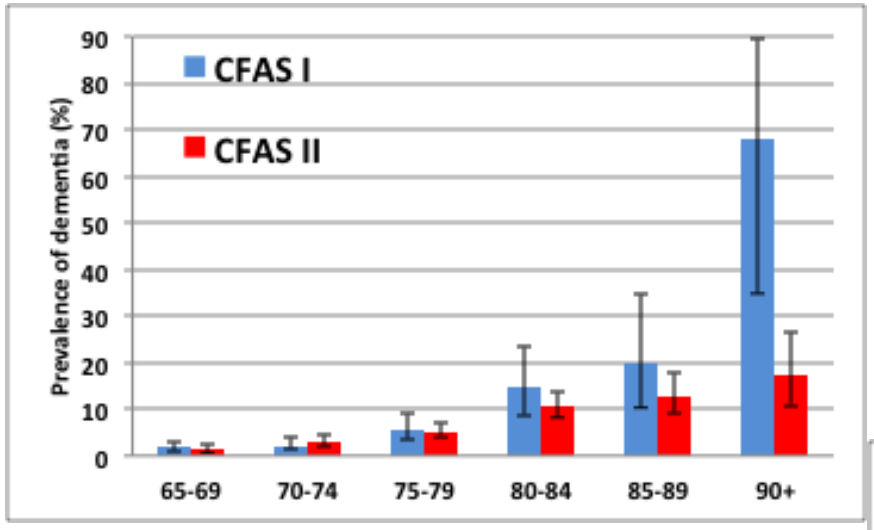
Women





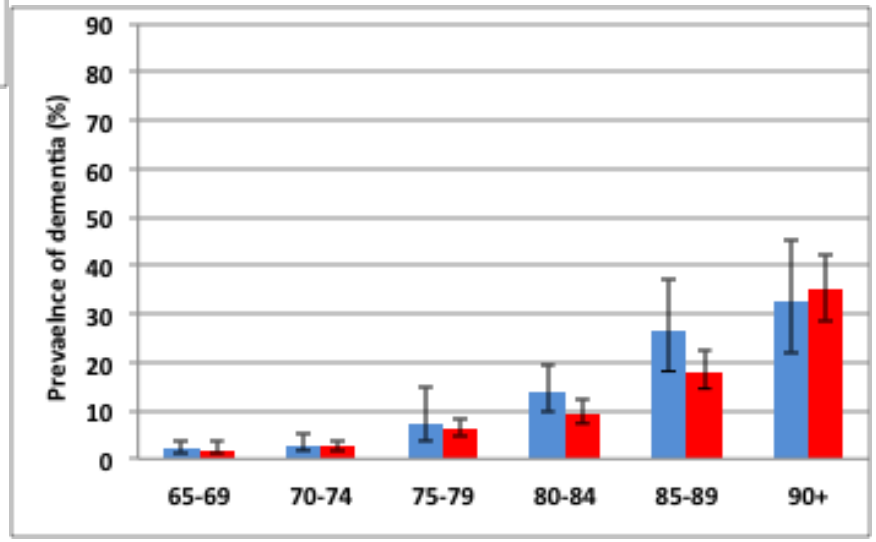
Source: Jagger et al. Lancet 2016

Prevalence of dementia 1991 - 2011



Men

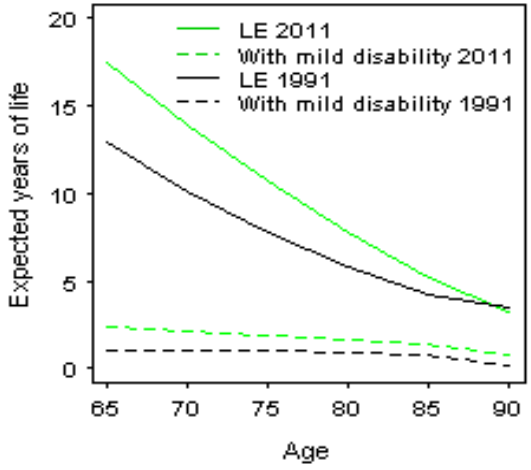
Women

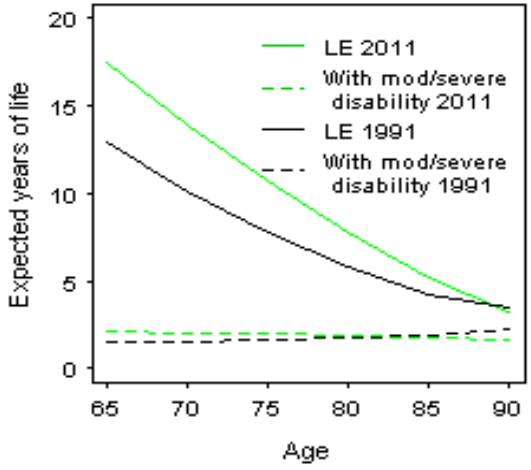


Source: Matthews et al. Lancet 2013

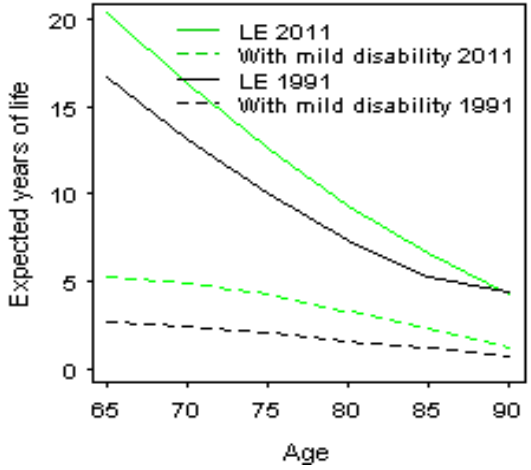
Disability-free LE

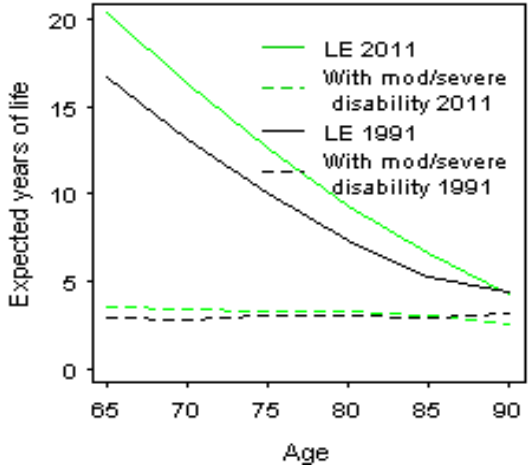
Men





Women





Source: Jagger et al. Lancet 2016

Prevalence of disability 1991-2011

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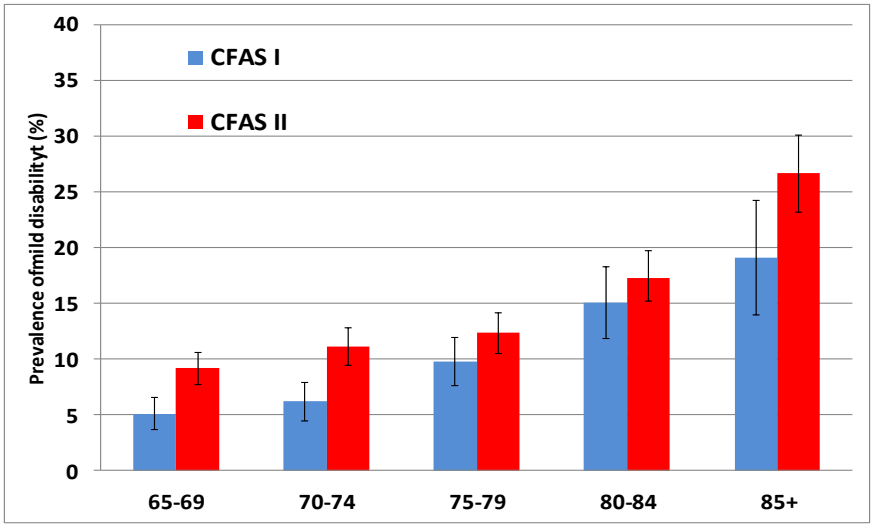
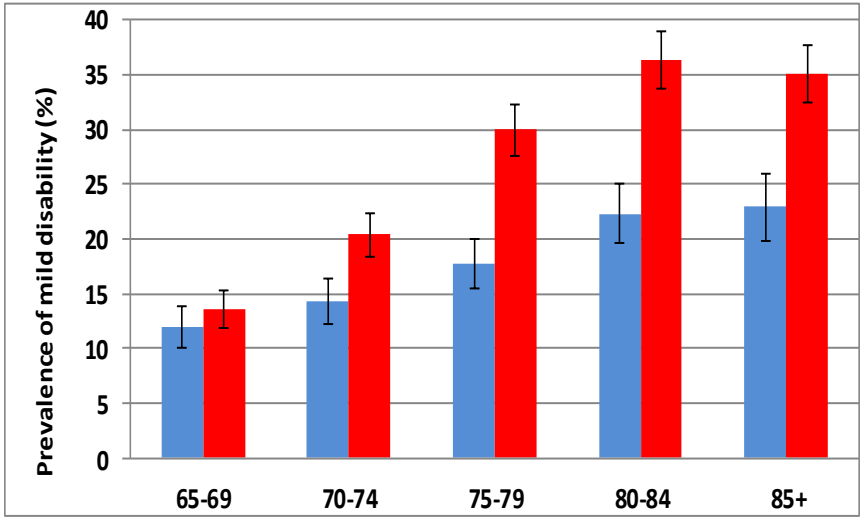
Men

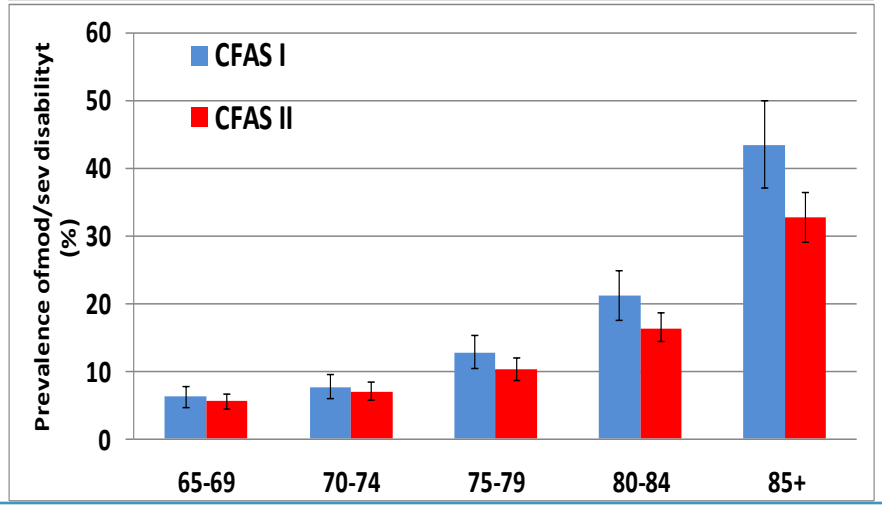
Women

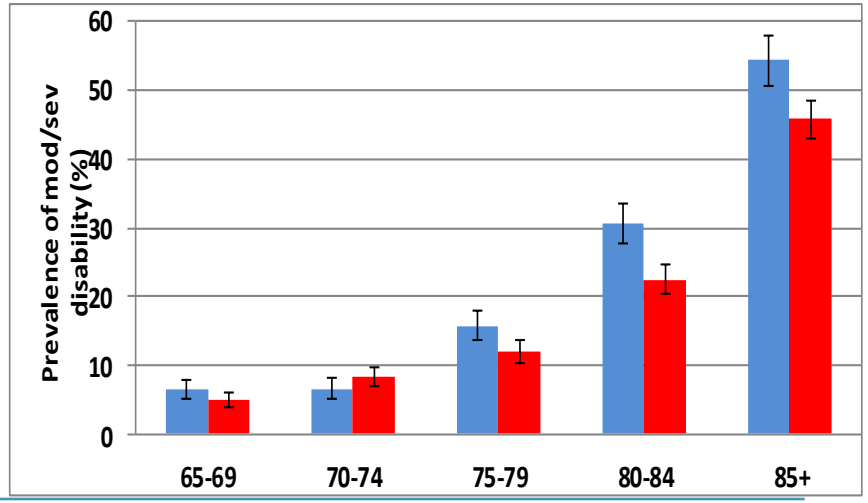
Mild disability





Mod/severe





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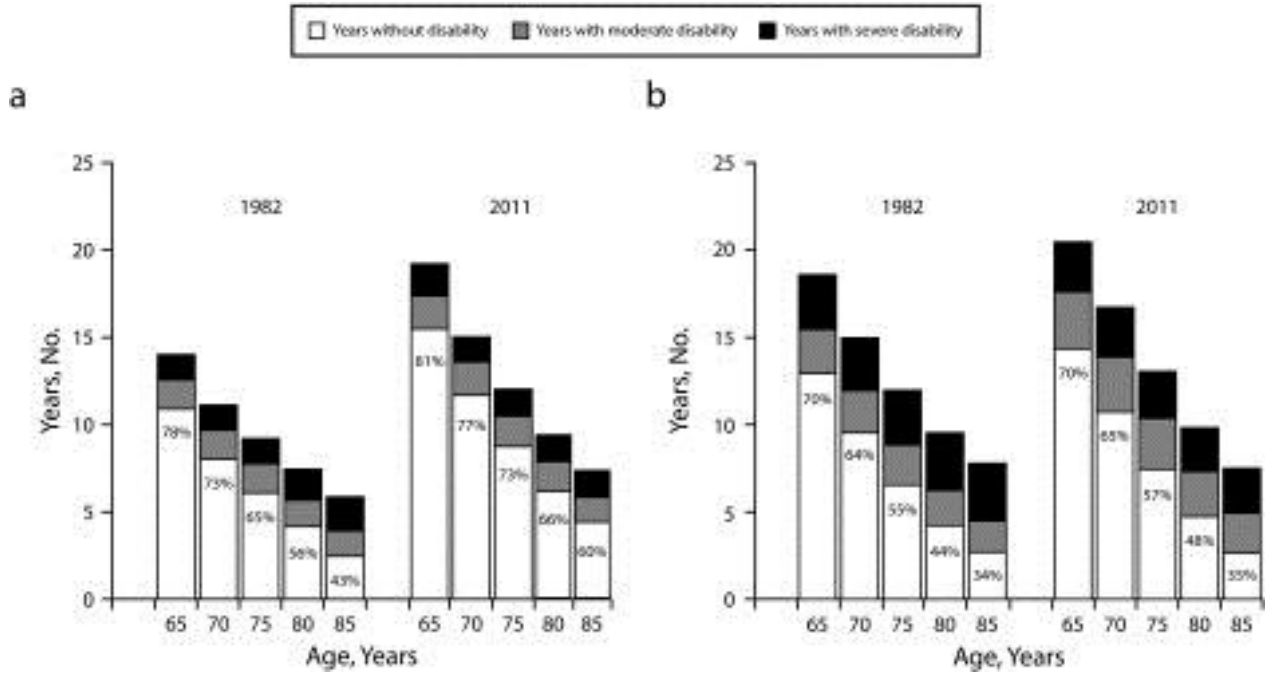
Comparisons with other countries

- HLE
  - Belgium 1997-2004 increase in HLE similar to LE (*Van Oyen et al., 2008*)
  - Denmark 1987-2005 increase in HLE greater than LE (*Jeune & Bronnum-Hansen, 2008*)
- DFLE
  - France 1990-2000 increases in mild mobility disability in (*Cambois et al. 2008*)
  - Belgium 1997-2004 greater improvements for men (and compression) than women (*Van Oyen et al., 2008*)
  - Denmark 1987-2005 compression of mobility limitations for men and women (*Jeune & Bronnum-Hansen, 2008*)
  - USA 1970-2010 greater increases in LE than DFLE (*Crimmins et al, 2016*)

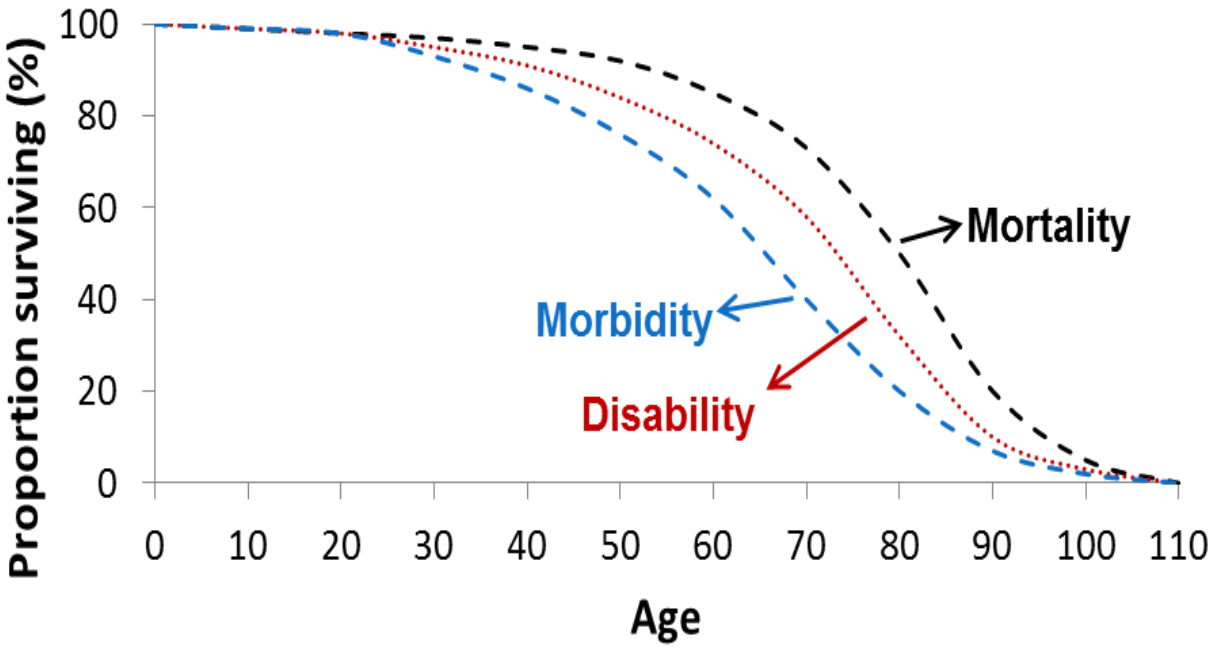
USA DFLE 1985-2011



- Men's DFLE at age 65 increased by 4.5 years, women by 1.4.
- Years with severe disability stable for men and women
- Increase in years with moderate disability in women

Source: Freedman et al (2016)

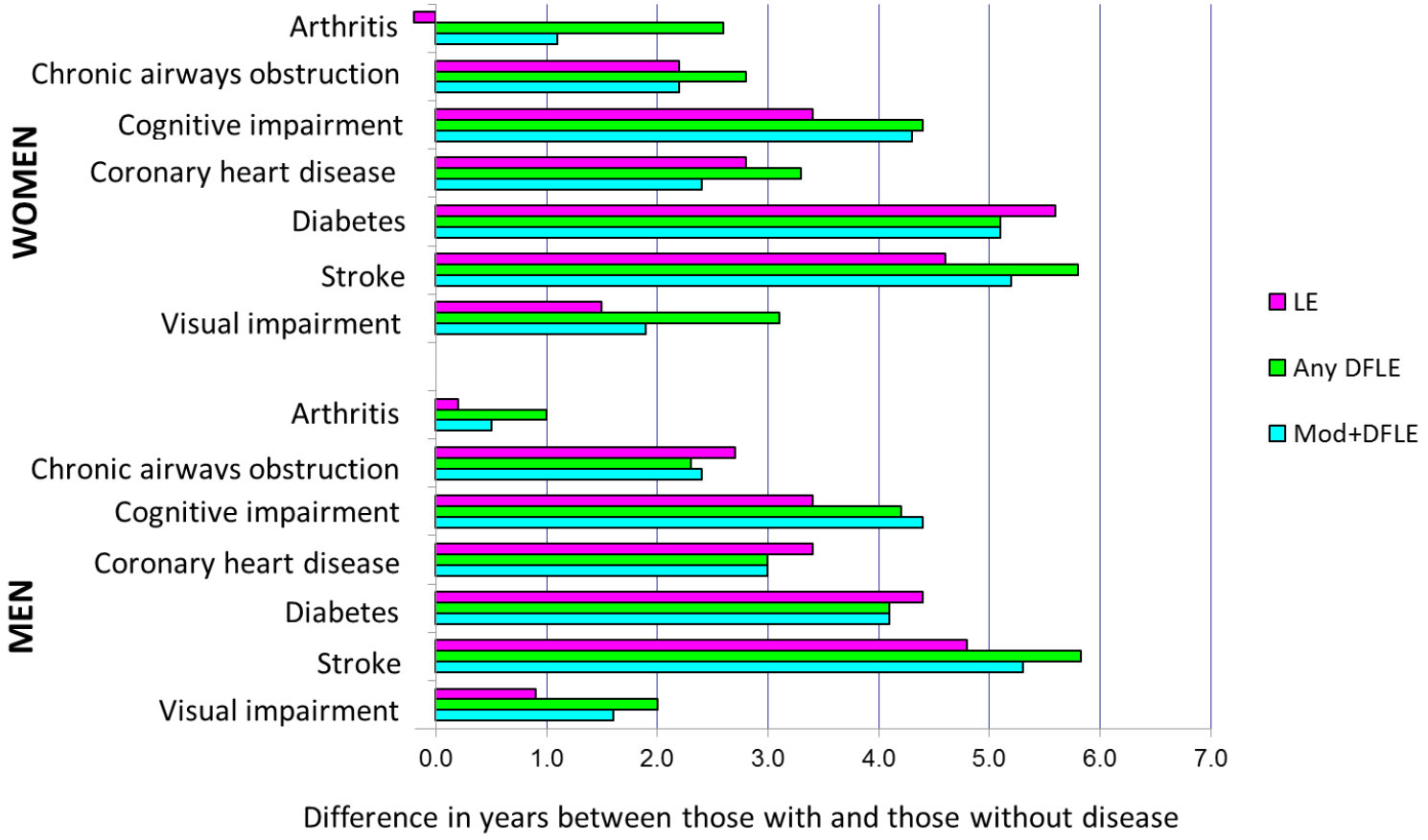
Influences on HLE



Model of health transitions (WHO, 1984)

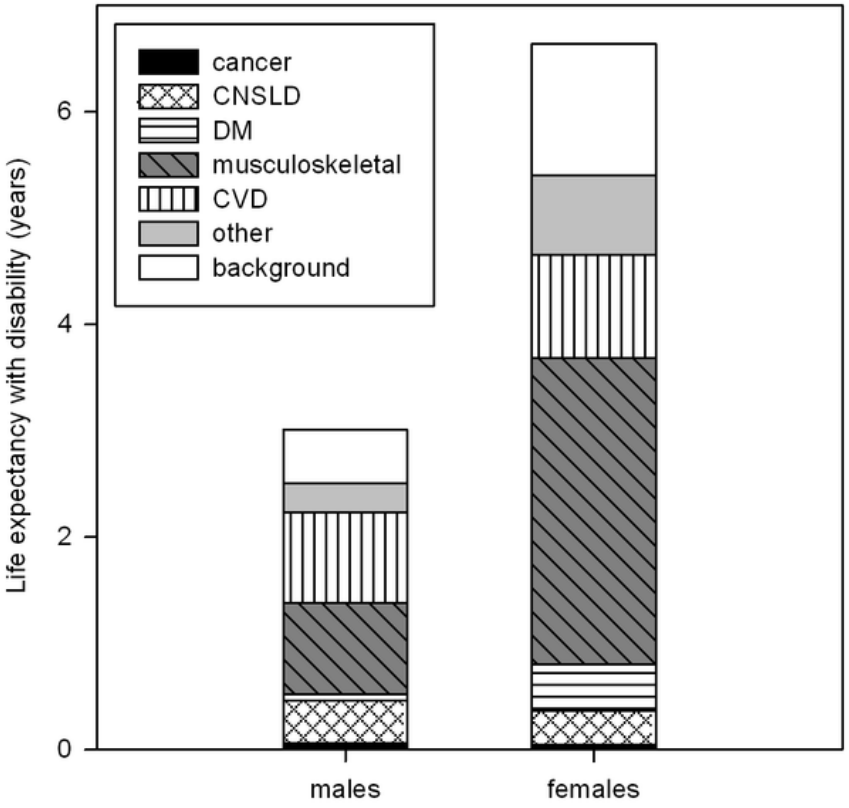
- Socio-economic factors (education, occupation)
- Chronic conditions
- Health behaviours (obesity, smoking, physical inactivity)
- Environment

Contribution of diseases to LE and DFLE at age 65 (CFAS I)



Source: Jagger et al (2007)

Influence of chronic conditions

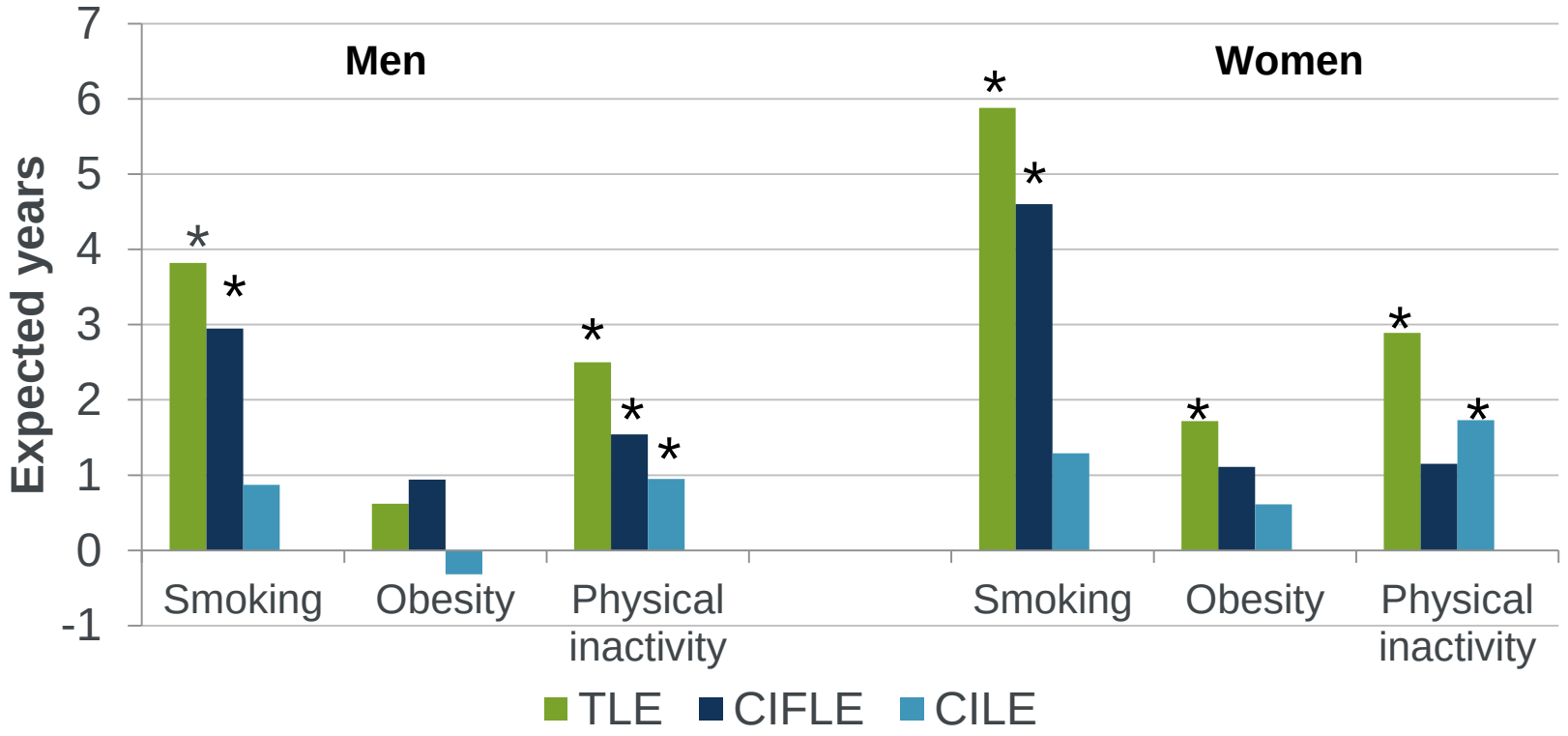


Source: Klijs et al (2011)

- Multiple conditions do not appear to reduce LE but often increase years with disability:
  - 12.2% (11.1–13.2) with no conditions,
  - 39.1% (28.3–49.8) with heart disease and
  - 47.0% (46.9–47.1) with heart disease, diabetes and hypertension.

Source: Laditka & Laditka (2016)

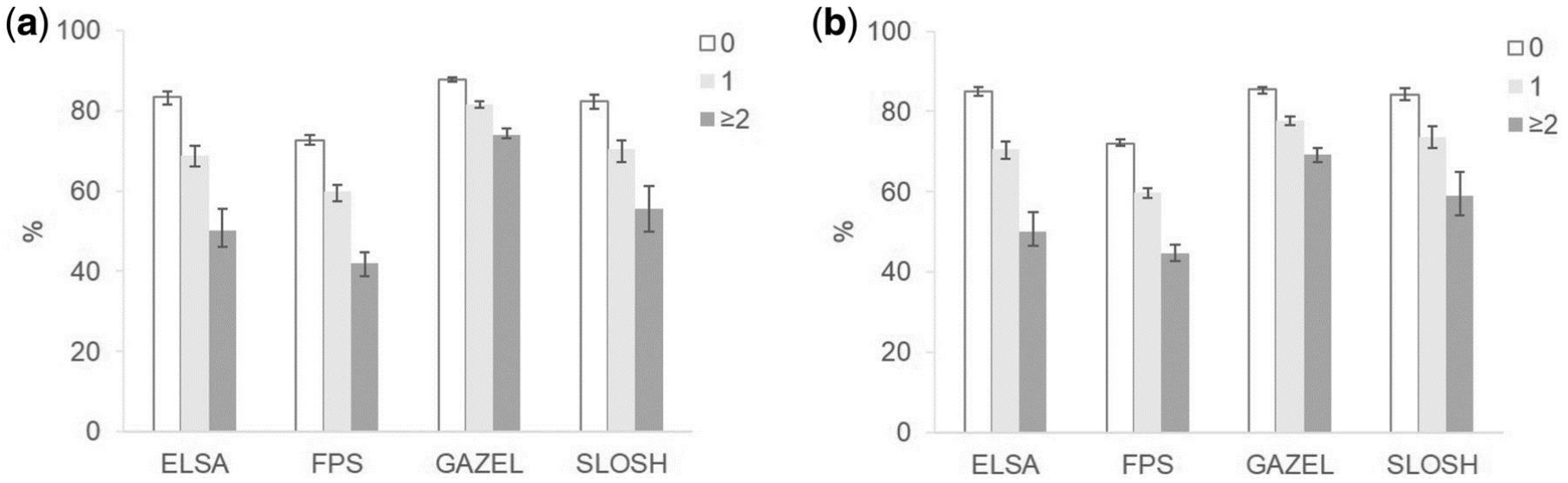
Influence of behaviours on CIFLE



Years gained (*= significantly>0) in total life expectancy (TLE), cognitive impairment free life expectancy (CIFLE) and life expectancy with cognitive impairment (CILE) **without** risk factor (high educated)

Source: Anstey et al. IJE 2015

Influence of behaviours on HLE



Proportion of life spent in good health between the ages of 50 and 75 by co-occurrence of behaviour related risk factors by study cohort. (a) Men (b) Women

Source: Stenholm et al. IJE 2016

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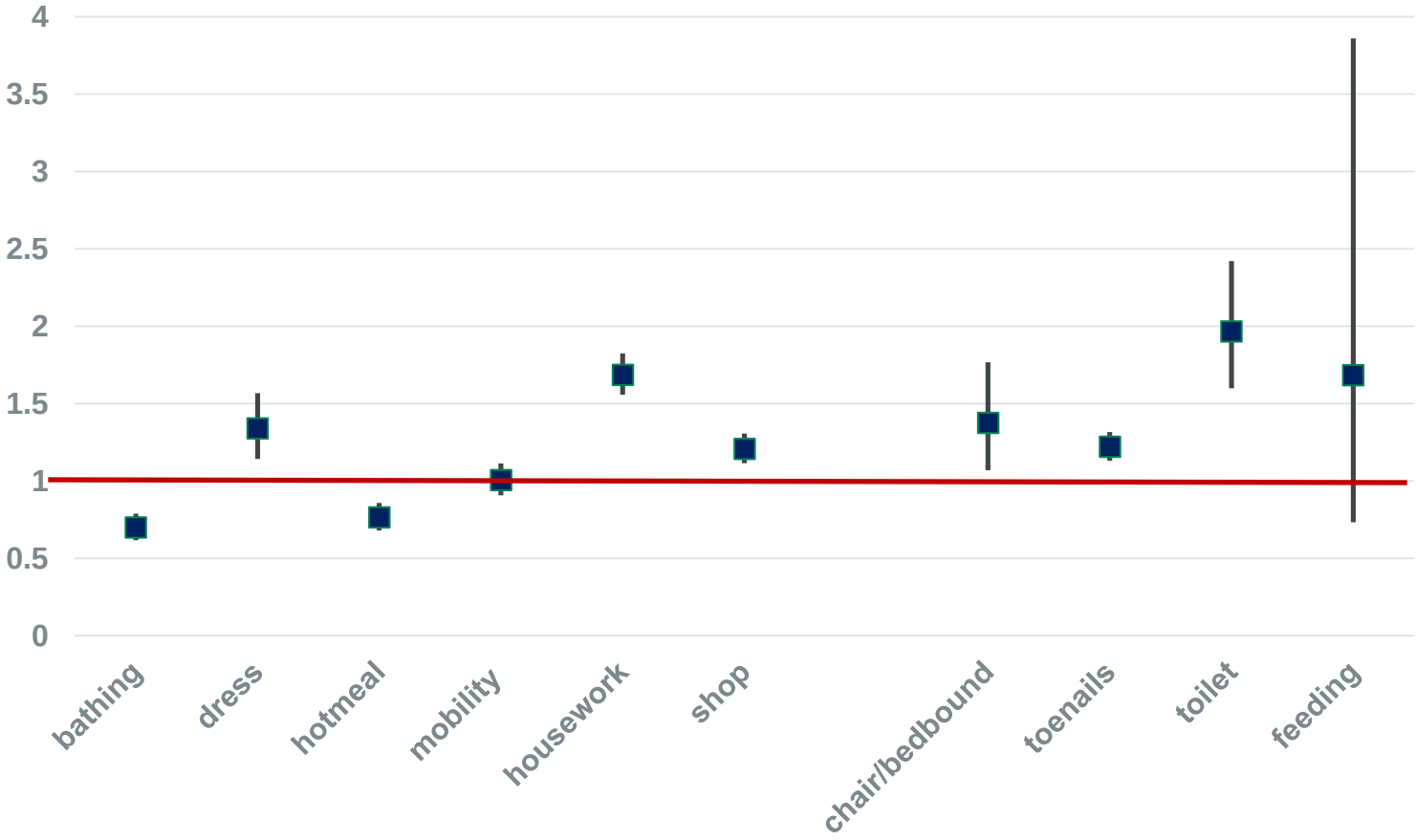
Influence of environment on disability



Odds ratio (95% CI) of inability in each item in 2011 compared to 1991, adjusted for age group, sex, centre and education (CFAS)

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Summary

- Health expectancy increases in the UK are not keeping pace with gains in life expectancy, particularly at older ages.
- There is evidence that chronic diseases, unhealthy behaviours and the environment can influence health expectancy but many also influence life expectancy
- Influences on health expectancy must be examined alongside their effect on life expectancy to ensure that we achieve both longevity and health

Acknowledgements

CFAS studies collaboration

Colleagues in

- European Health and Life Expectancy Information System (EHLEIS)
- Newcastle University Institute of Health & Society
- Australian Centre of Excellence in Population Ageing Research (CEPAR)