Trends in Healthy Life Expectancy

Carol Jagger

Institute of Health & Society, Newcastle University and
Newcastle University Institute for Ageing

Newcastle University
Institute for Ageing

Institute of Health&Society

Background

- We are living longer – are the years good ones?
- UK computes
  - disability-free life expectancy (based in the past on limiting long-standing illness and now on activity limitation)
  - healthy life expectancy (based on self-rated health)

BUT

- Only two questions
- Questions have changed over time
- Institutions only included at census dates (every 10 years)

Plan

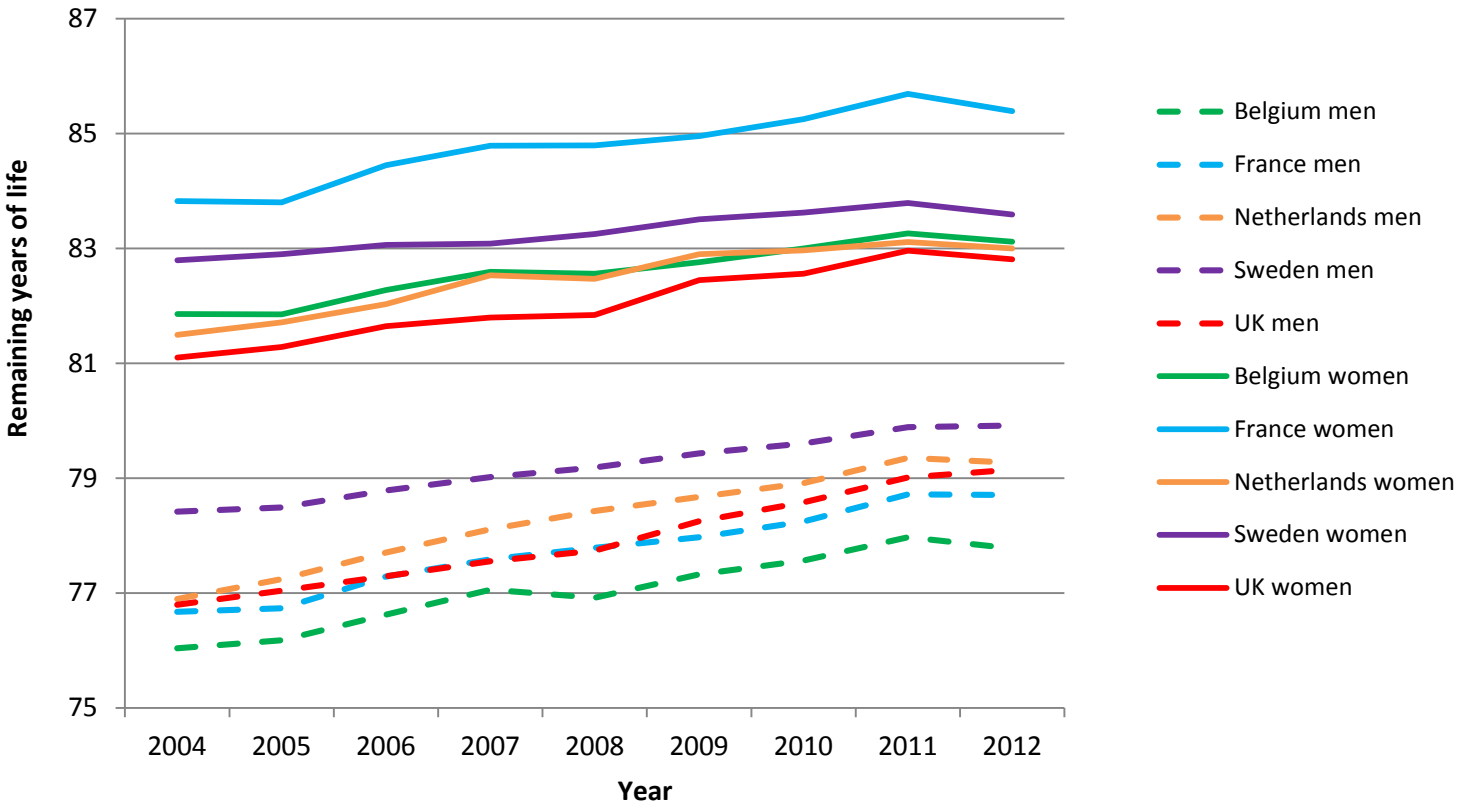
- Trends in LE and HLE at different ages (birth, 65, 80/85)
  - UK
  - Specific EU countries
  - Specific OECD countries (US, Japan, Switzerland)
- Inequalities in LE and HLE in the UK
  - regional
  - by ethnic group

  https://www.gov.uk/government/publications/future-of-ageing-life-expectancy-and-healthy-life-expectancy-trends
- Trends in LE and HLE using different measures at age 65 1991-2011
  - Healthy LE
  - Cognitive impairment-free LE
  - Disability-free LE (different severities)

  Jagger et al. Lancet 2016 Vol 387(10020): 779 - 786

Trend in LE

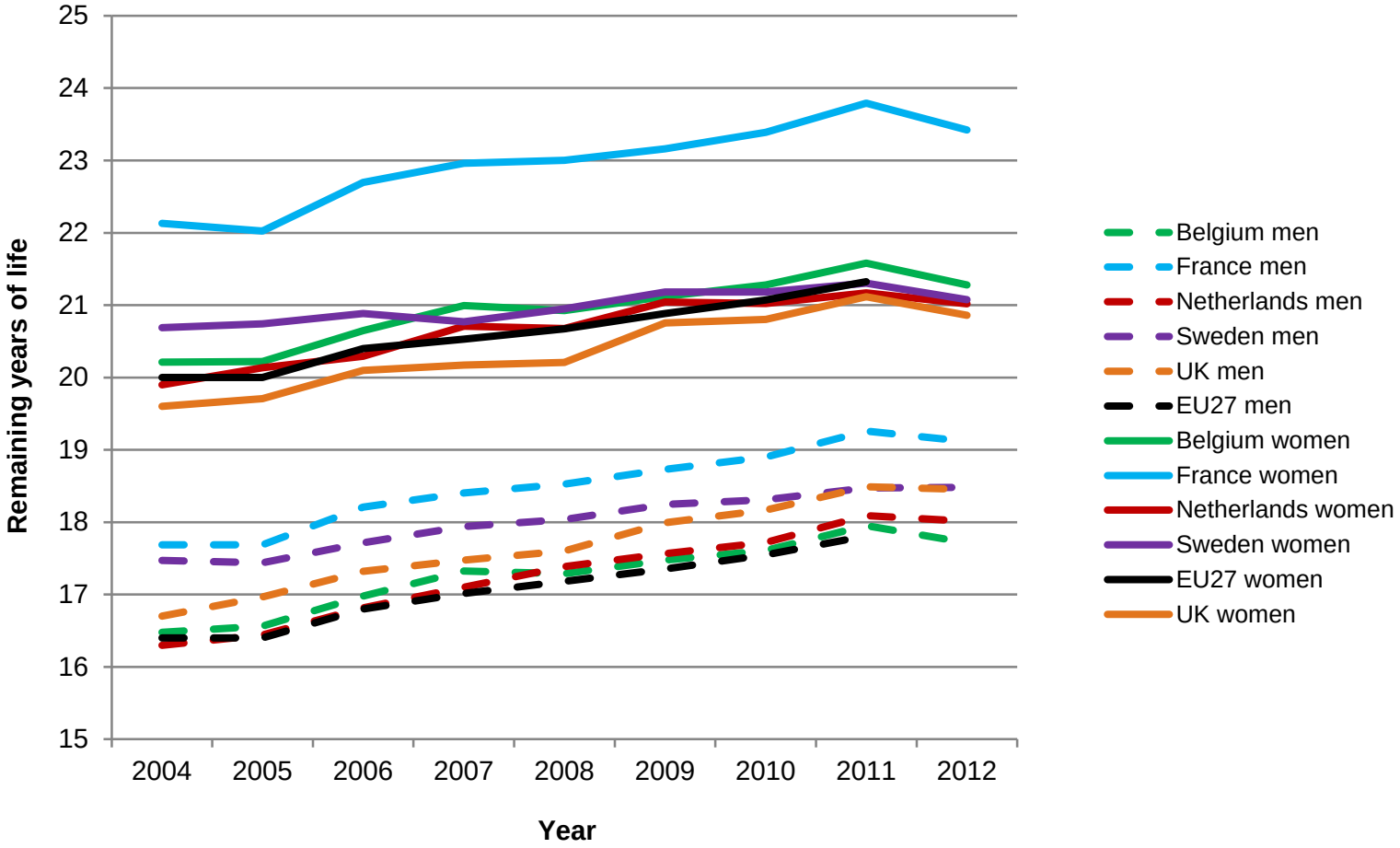
LE at birth: selected EU countries



Source: Eurohex (www.eurohex.eu)

Newcastle University
Institute for Ageing

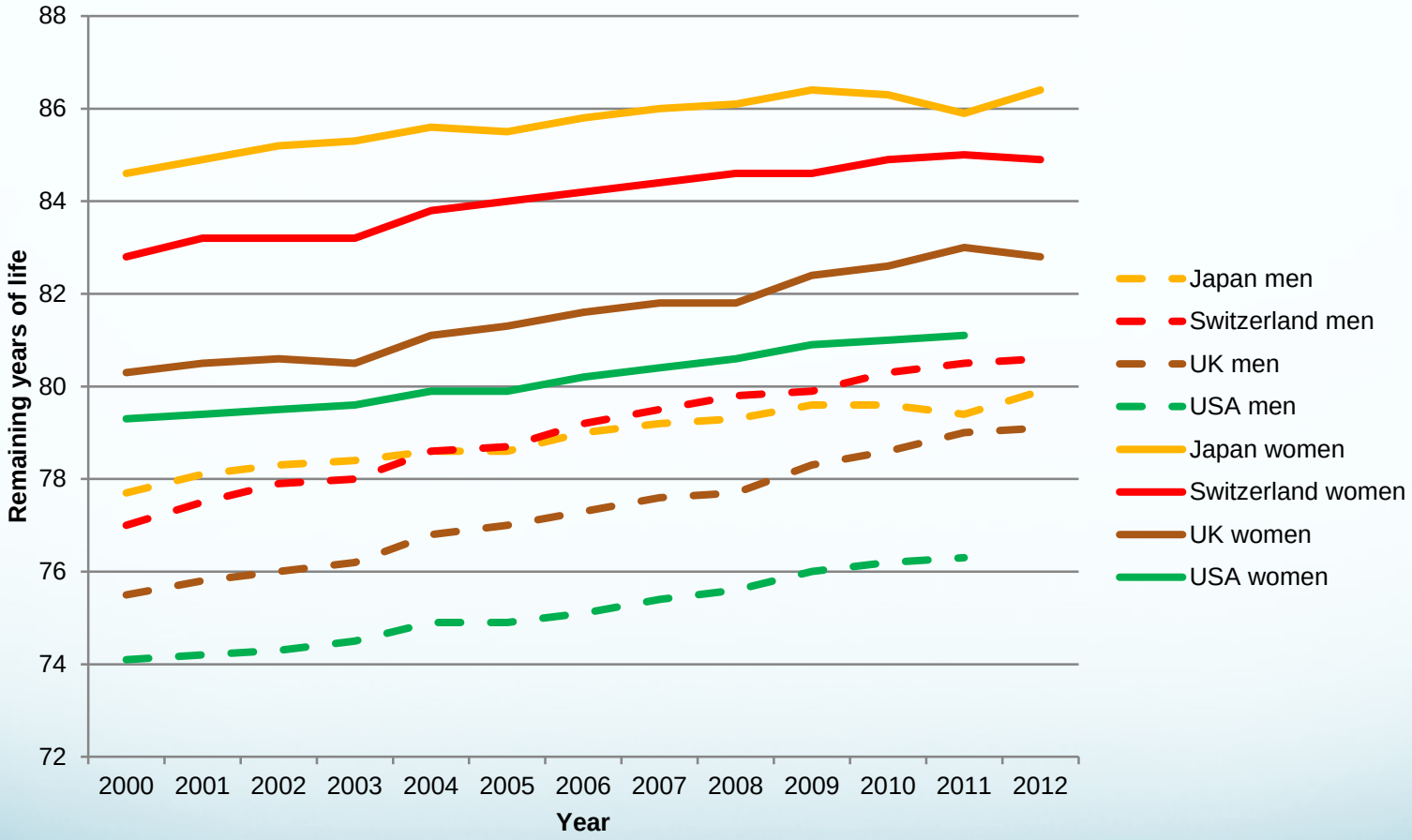
LE at age 65: selected EU countries



Source: Eurohex (www.eurohex.eu)

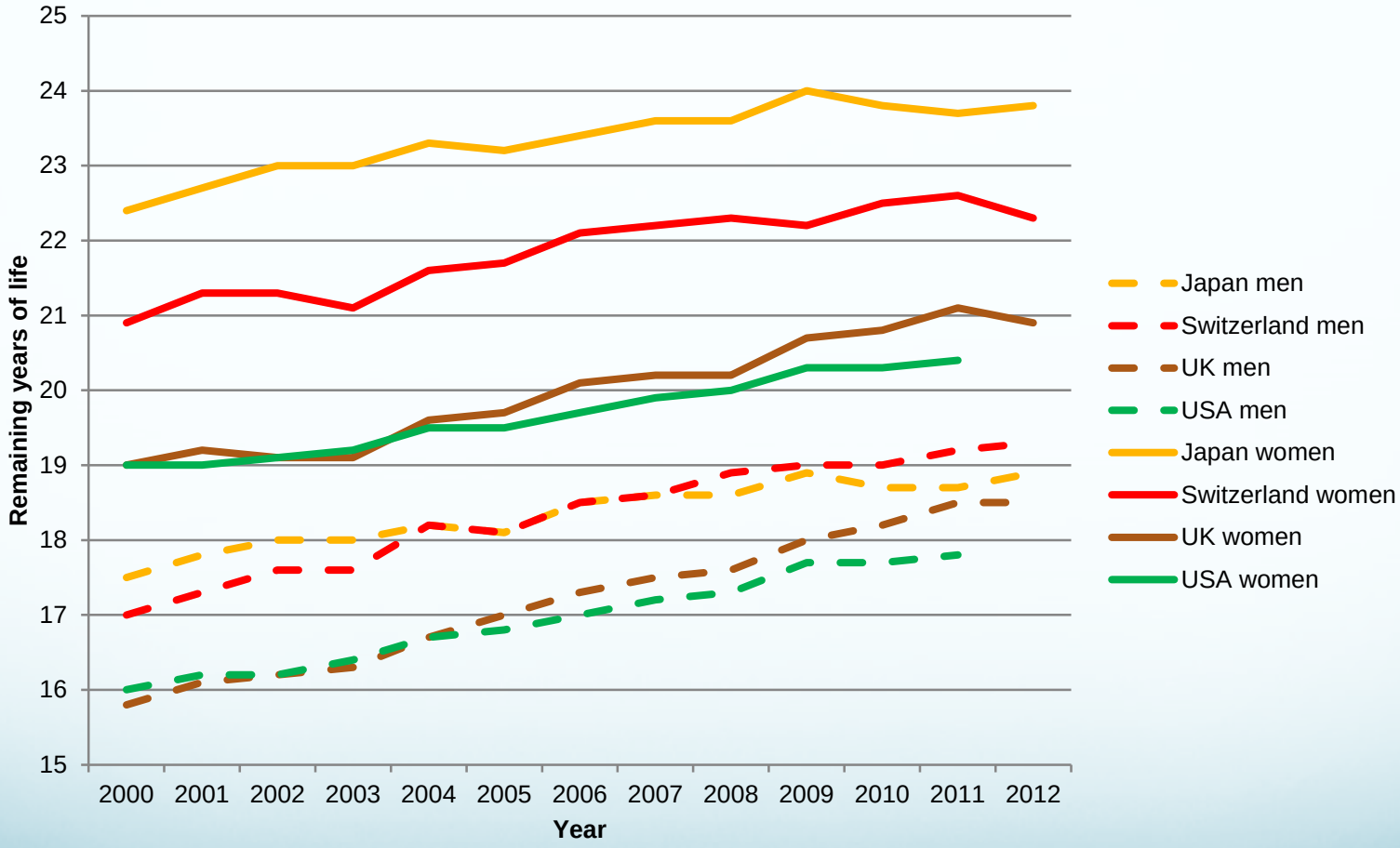
Newcastle University
Institute for Ageing

LE at birth: selected OECD countries



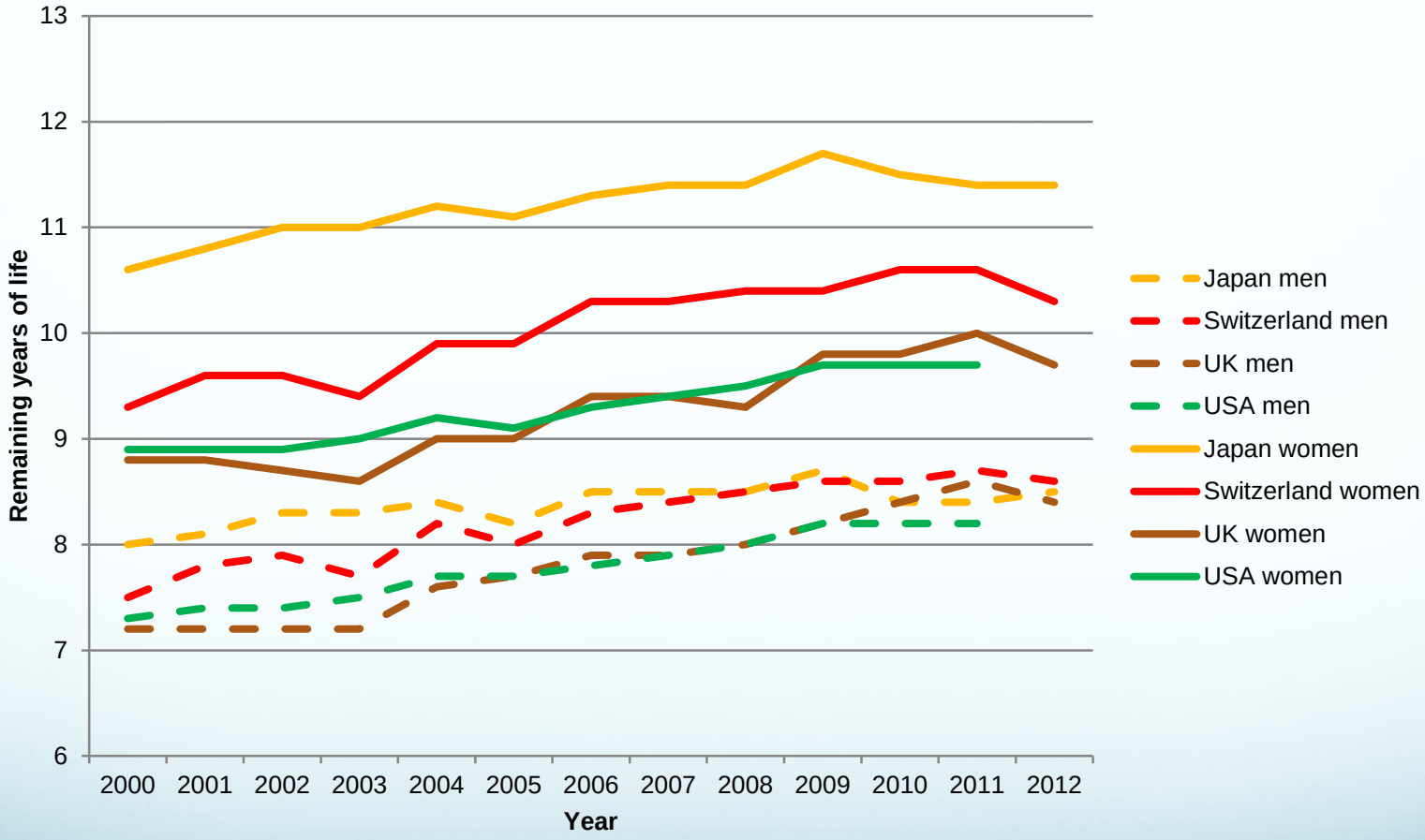
Newcastle University
Institute for Ageing

LE at age 65: selected OECD countries



Newcastle University
Institute for Ageing

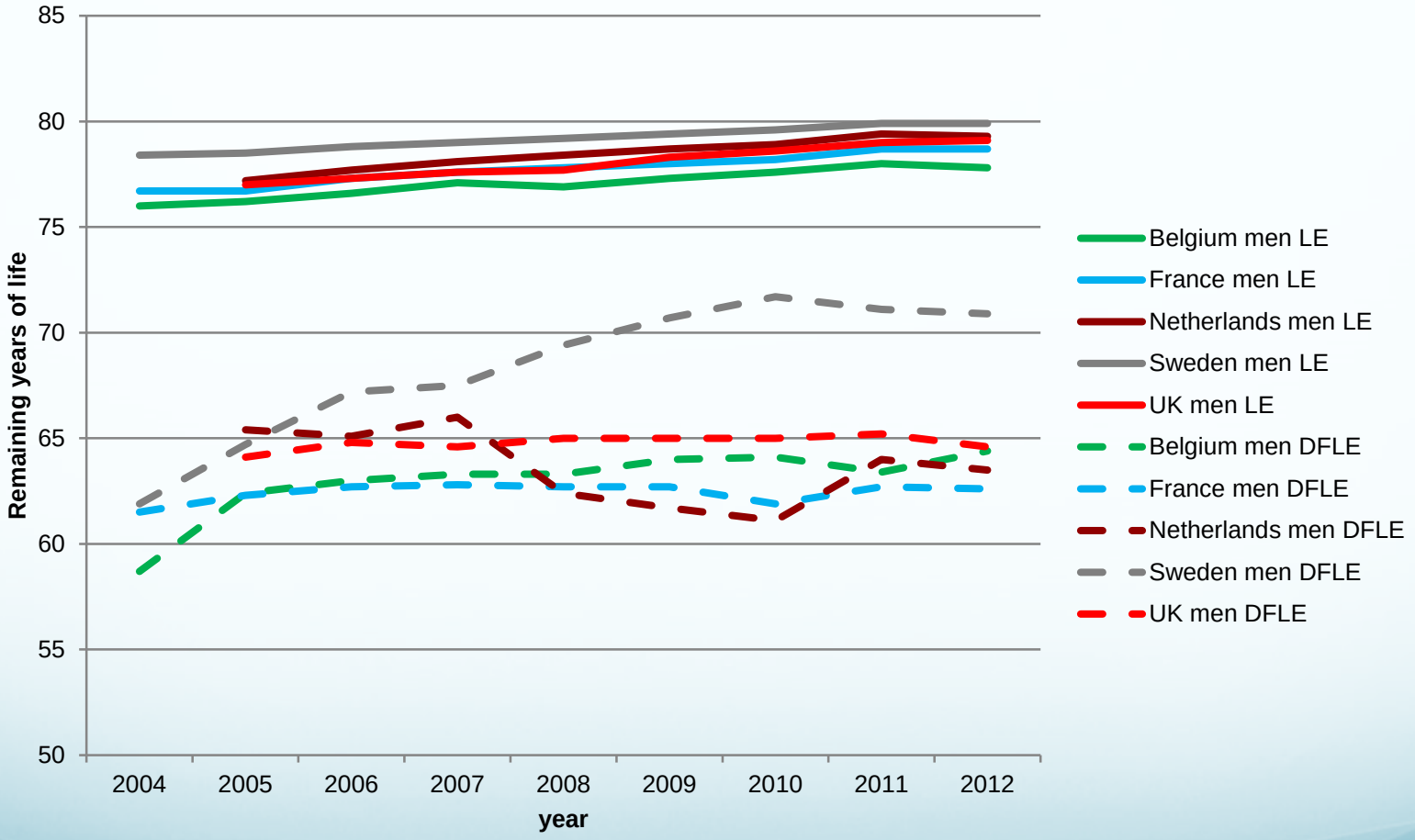
LE at age 80: selected OECD countries



Newcastle University
Institute for Ageing

Healthy Life Expectancy

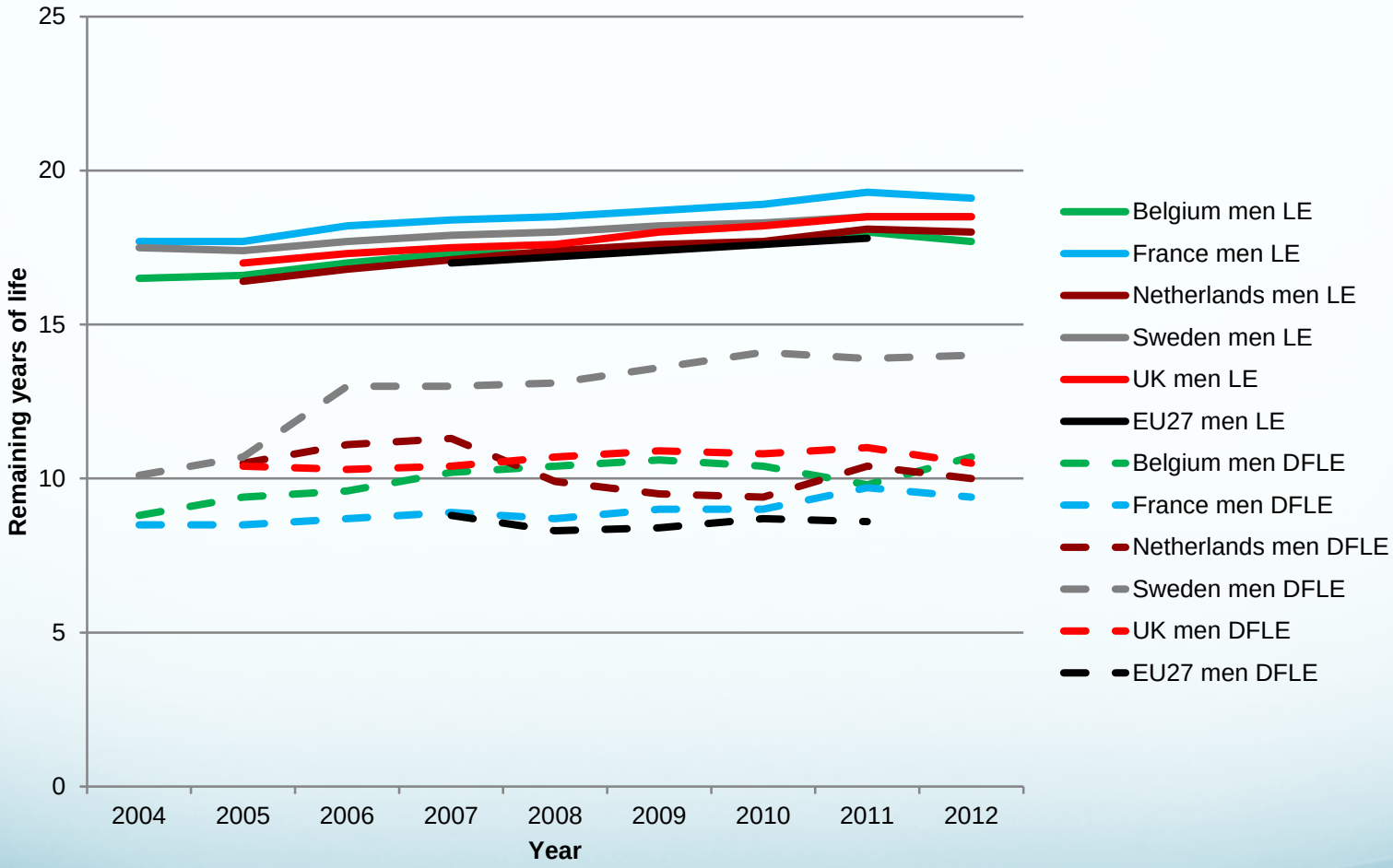
Healthy Life Years (DFLE) at birth: selected EU countries (men)



Source: Eurohex (www.eurohex.eu)

Newcastle University
Institute for Ageing

Healthy Life Years (DFLE) at age 65: selected EU countries (men)



Source: Eurohex (www.eurohex.eu)

Newcastle University
Institute for Ageing

Trends selected EU countries (men)

	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)

Newcastle University
Institute for Ageing

Trends selected EU countries (women)

	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)

Trends selected OECD countries (men)

			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

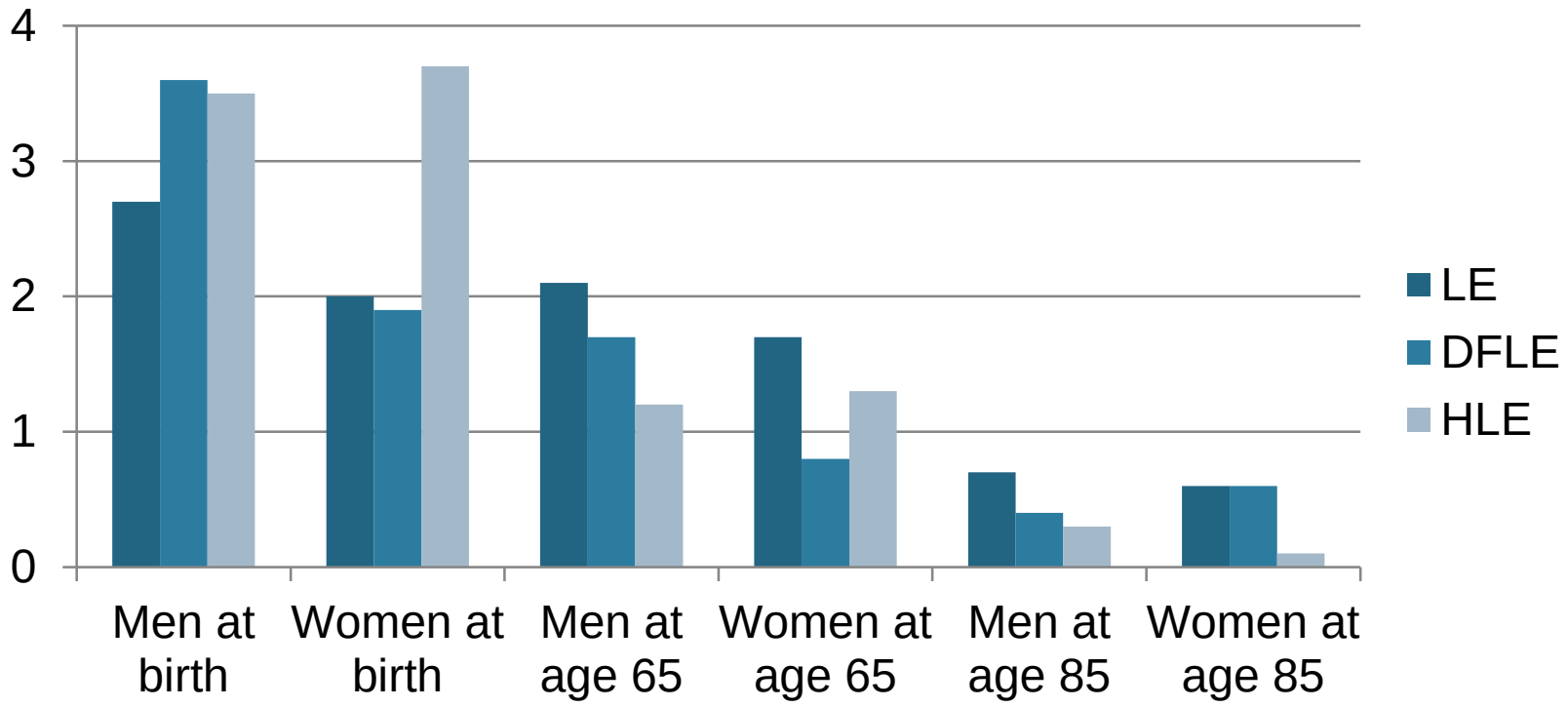
- Compression in men evident for UK (birth) and Switzerland (all ages)

Trends selected OECD countries (women)

			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
	1995-2004	less than good health			2.4	-0.7	1.4	-0.4
Switzerland	2008-2012	activity limitation	0.3	3.0	0.1	1.4	-0.2	-0.2
	2008-2012	less than good health			0.1	0.6	-0.2	-0.6
UK	2001-2010	disability	2.0	1.9	1.7	0.8	0.6	0.1
	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)

UK trends 2000-2 to 2009-11



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

Inequalities in LE and HLE within the UK

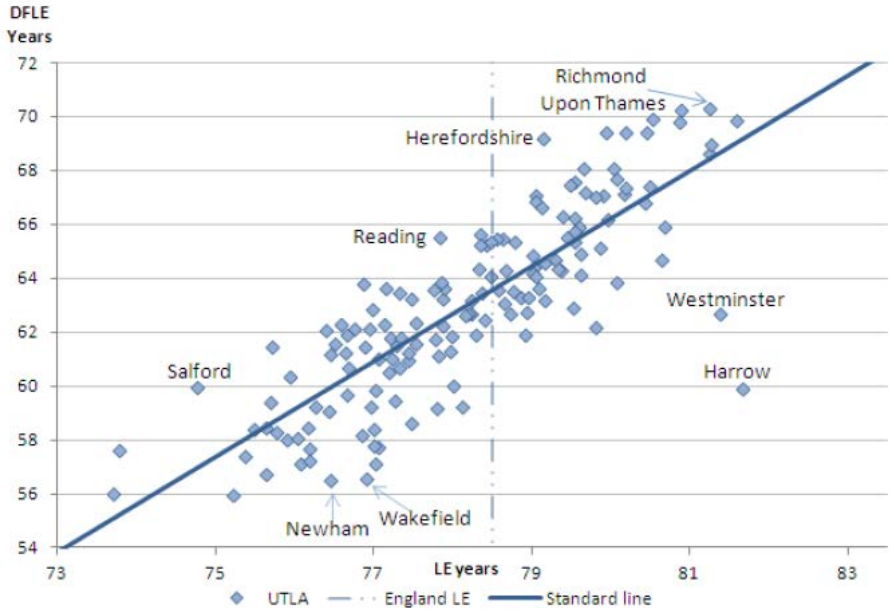
Inequalities in DFLE and HLE are greater than those in LE

		Inequalities between UK areas (years)					
		MEN			WOMEN		
	Year	LE	DFLE	HLE	LE	DFLE	HLE
Birth	1991	8.0	18.8[1]		6.8	13.8[1]	
	2001	8.2	18.8[1]	14.9[1]	6.5	16.5[1]	14.2[1]
	2007	8.3	15.0[2]		7.7	16.1[2]	
	2008	8.4	15.1[2]		7.3	14.0[2]	
	2009	8.3	14.3[2]		7.5	14.3[2]	
	2011	8.9	15.1[3]	17.5[4]	7.1	16.0[3]	15.4[4]
Age 65	1991	4.9	9.3[1]		4.8	5.9[1]	
	2001	4.8	6.6[1]	6.8[1]	5.0	6.4[1]	7.5[1]
	2007	5.6	7.9[2]		5.7	8.9[2]	
	2008	5.4	10.1[2]		5.4	8.3[2]	
	2009	5.4	8.9[2]		5.6	8.5[2]	
	2011	5.1	6.5[3]	7.4[4]	5.1	6.7[3]	8.1[4]

[1]Upper Tier Local Authorities in England and Wales 1991 and 2001 from census data
[2]Upper Tier Local Authorities in England, 2007-2009 from the Annual Population Survey
[3]English Clinical Commissioning Groups, 2011 from census data
[4]Upper Tier Local Authorities, 2011 from Annual Population Survey - for HLE at birth CCG variation is similar for men with 17.8 years but much higher for women 19.8 years.

Challenges of extending working life

LE and DFLE at birth (men): UTLA



Source: ONS

UTLA with 2010-12 DFLE significantly below 65 (%)

Region	DFLE<65 (%)	
	Men	Women
ENGLAND	51	45
East	18	18
East Midlands	44	44
London	34	31
North East	92	100
North West	83	78
South East	42	16
South West	13	20
West Midlands	57	50
Yorkshire and The Humber	80	60

Newcastle University
Institute for Ageing

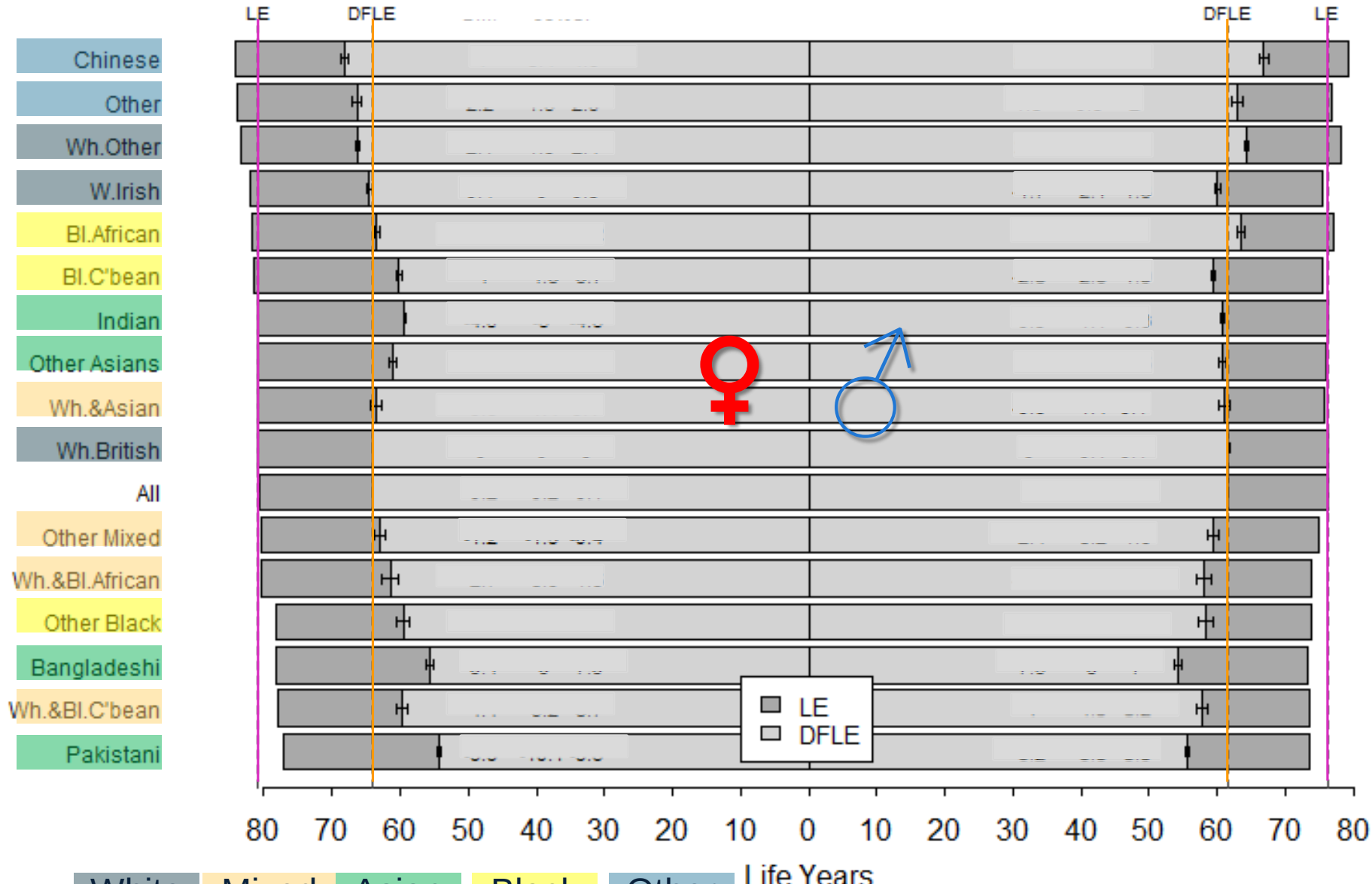
Inequalities within Newcastle

Expected age at disability onset for 55 yr old

Courtesy Prof Peter Gore/Prof Carol Jagger/ONS

Newcastle University
Institute for Ageing

DFLE at birth for ethnic groups, 2001



Source: Wohland et al 2014, Ethnicity & Hea

Trends in LE and HLE (different measures)

Cognitive Function and Ageing Studies

Over a 20 year period to document

- Changes in life expectancy
- Changes in health expectancy (HE)
  - Cognitive impairment free life expectancy
  - Healthy life expectancy
  - Disability-free life expectancy
  - Years with different care needs (in progress)
- To assess whether different measures give different results on compression/ expansion

Newcastle University
Institute for Ageing

MRC CFAS

- CFAS I six areas– sampling from whole population geographically
- Three taken forward for CFAS II
  - Cambridgeshire (Ely and surrounding area)
  - Newcastle
  - Nottingham
- Design:
  - Equal numbers aged 65-74 and 75+ years
  - Complete population (including care homes)
  - CFAS I: Two stage – screen then assessment
  - CFAS II: One interview (screen and assessment combined)
- Response rates
  - 7640 in CFAS I(80% response)
  - 7796 in CFAS II (56% response)

Health measures I

Three health measures

- Self-perceived health:
  - "Would you say that for someone of your age, your health in general is ... excellent/good/fair/poor" (excellent+good v fair+poor)

→ Healthy Life Expectancy (HLE)

- Cognitive impairment:
  - Mini-Mental State Examination (MMSE) score (0-17 v 18-30)

→ Cognitive Impairment-free Life Expectancy (CIFLE)

- Disability:
  - Mild (IADL difficulty only)
  - Moderate or severe (IADL and ADL)
  - Any disability

→ Disability-free Life Expectancy (DFLE)

Health measures II

- Unable without help to do at least one of:
  - Bath or all-over wash
  - Dress (put on shoes and socks)
  - Prepare a hot meal
  - Get around outside (housebound, chairbound, bedbound)

Moderate-severe disability

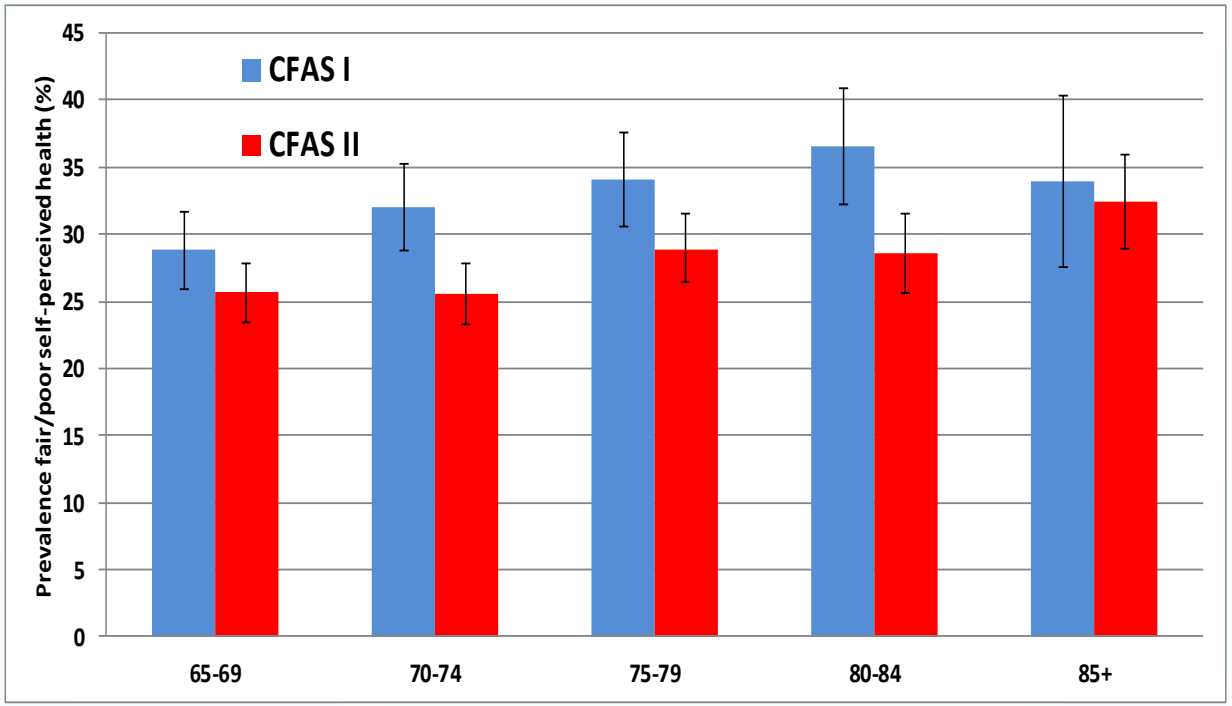
- Able to do all above but required help with at least one of:
  - Shopping
  - Heavy housework

Mild disability

Measure developed for Spiers et al. *J Gerontol A* 2004

Results - Study characteristics

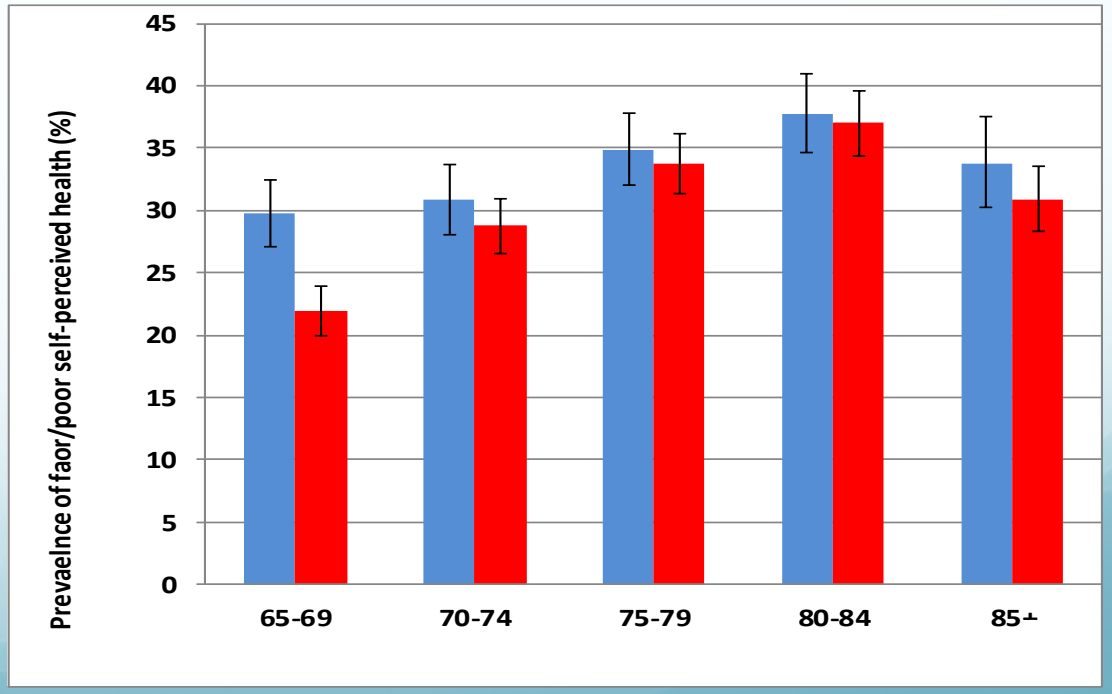
	CFAS I (N=7635)	CFAS II (N=7796)
	% (n)	% (n)
Gender		
Women	60 (4590)	54 (4246)
Age group (years)		
65-69	26 (1981)	25 (1939)
70-74	23 (1776)	24 (1873)
75-79	23 (1725)	21 (1624)
80-84	17 (1308)	17 (1290)
85+	11 (845)	14 (1070)
Living arrangements		
Alone	38 (2903)	36 (2772)
With spouse	47 (3589)	54 (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)



Men

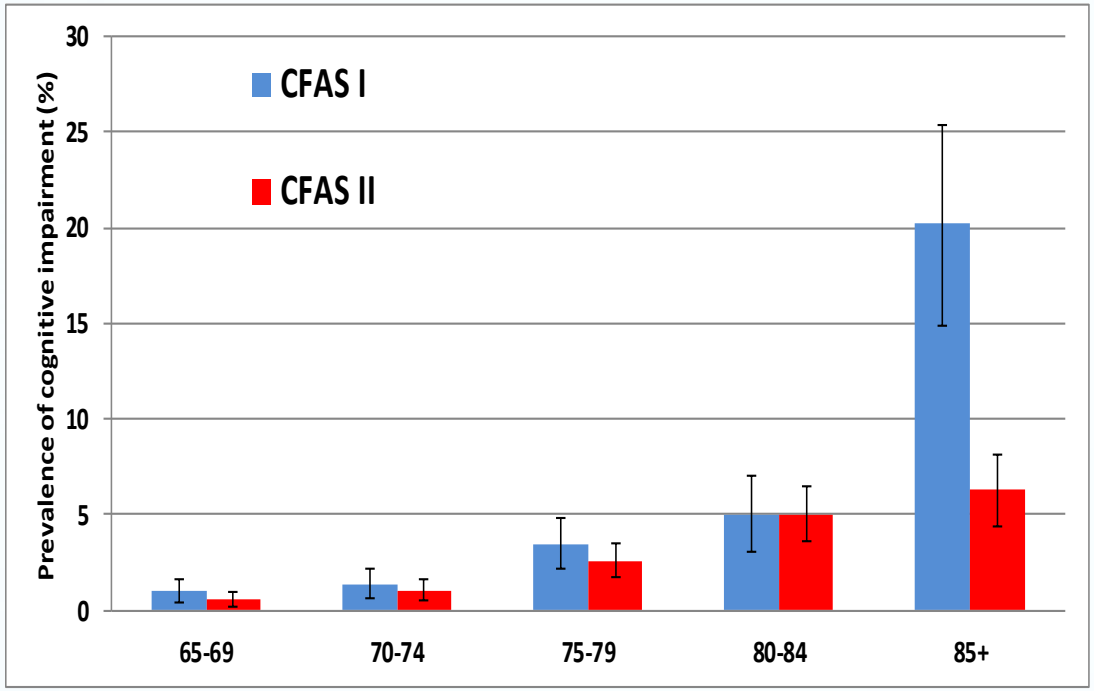
Women

Self-perceived health



Newcastle University

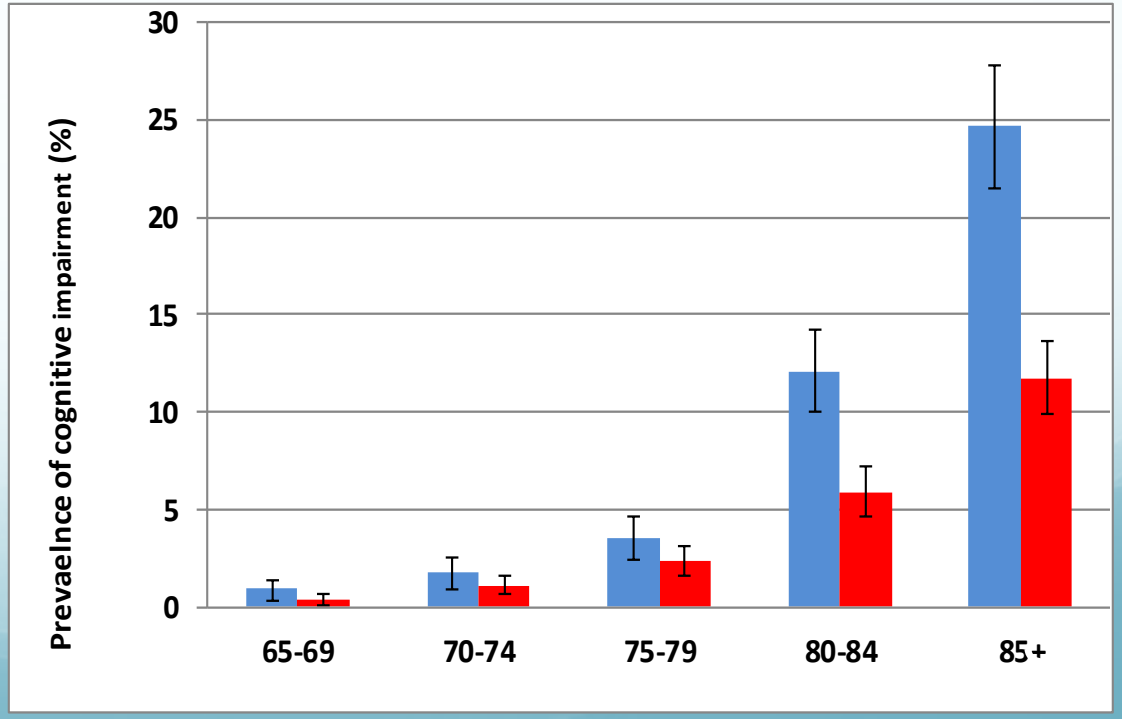
Institute for Ageing



Men

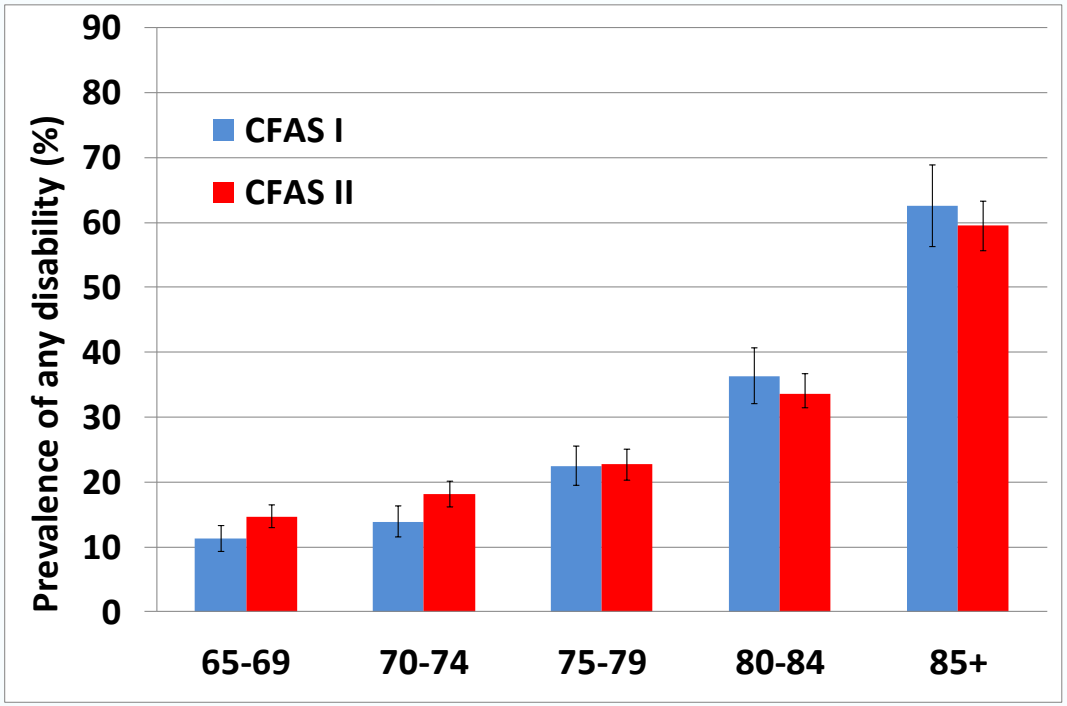
Women

Cognitive Impairment



Newcastle University

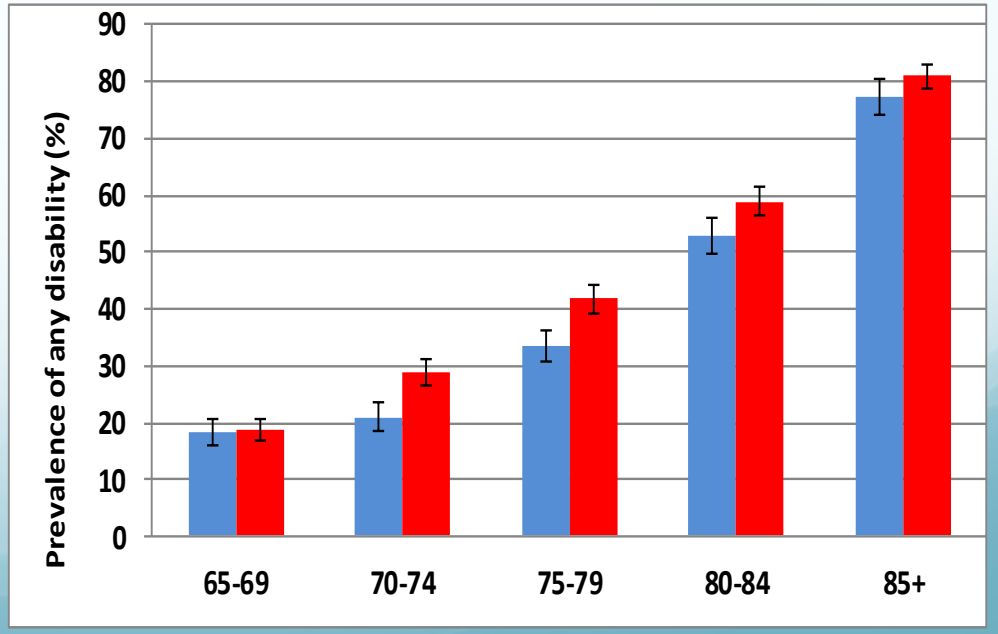
Institute for Ageing



Men

Women

Any disability



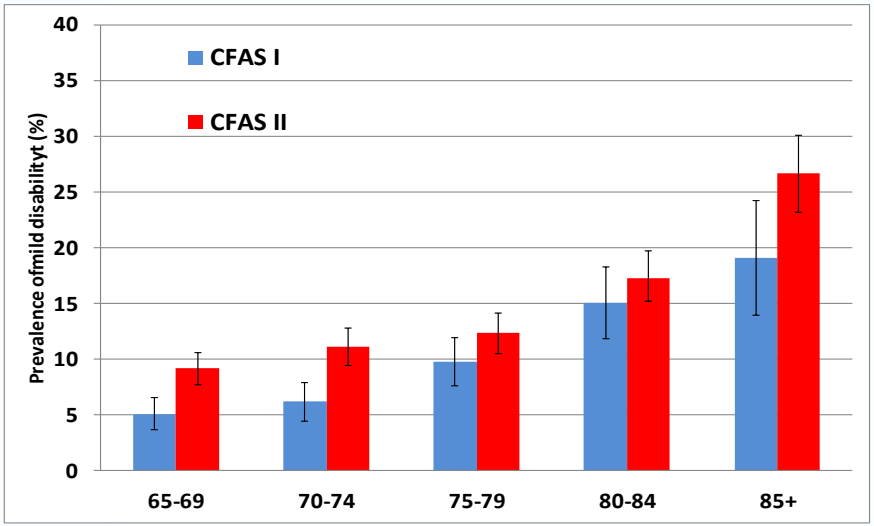
Newcastle University

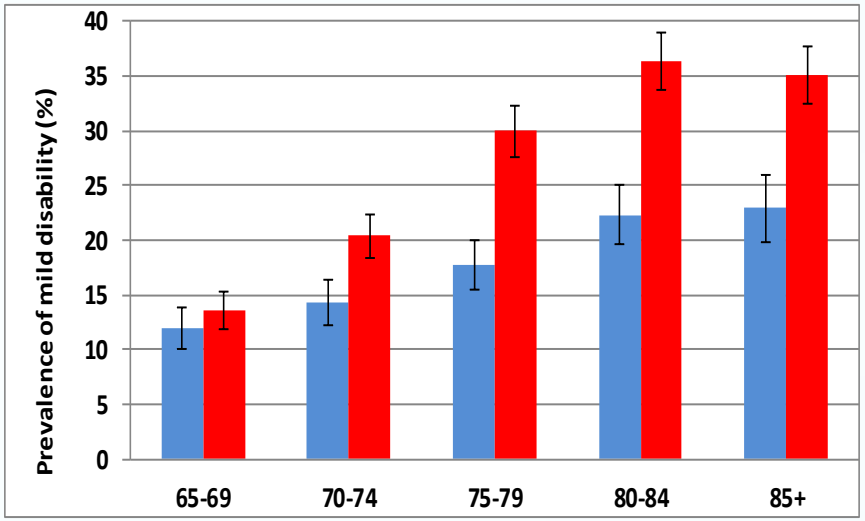
Institute for Ageing

Men

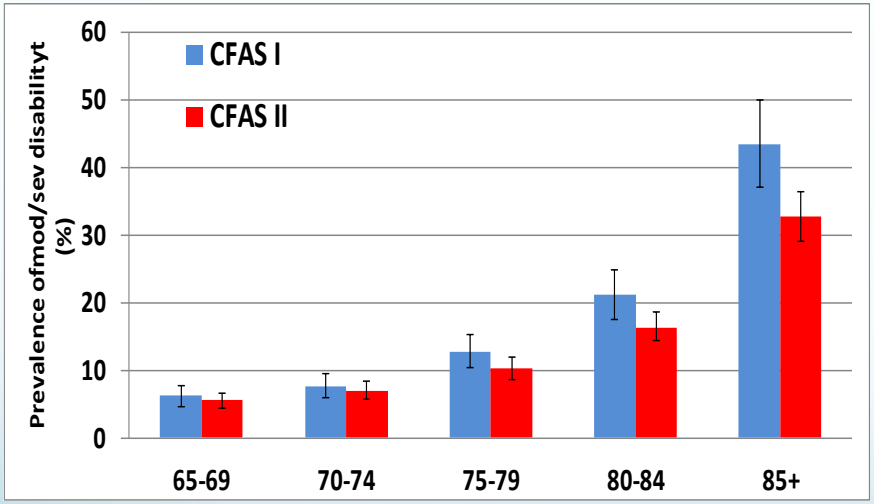
Women

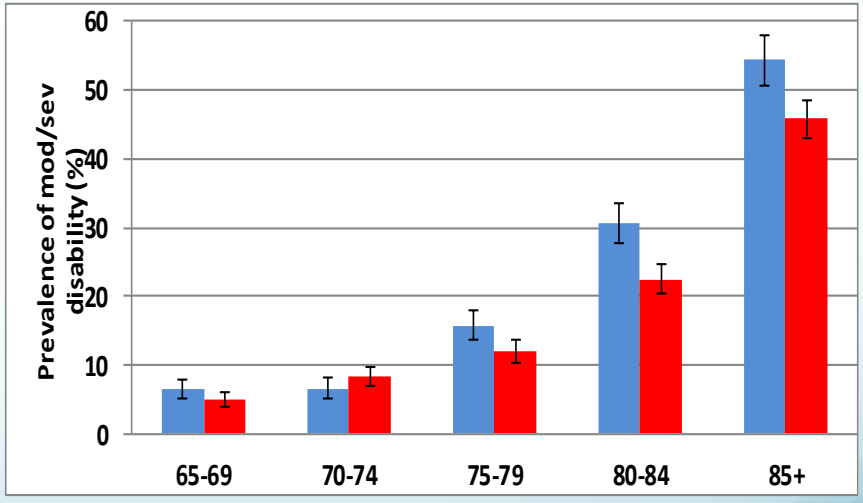
Mild disability





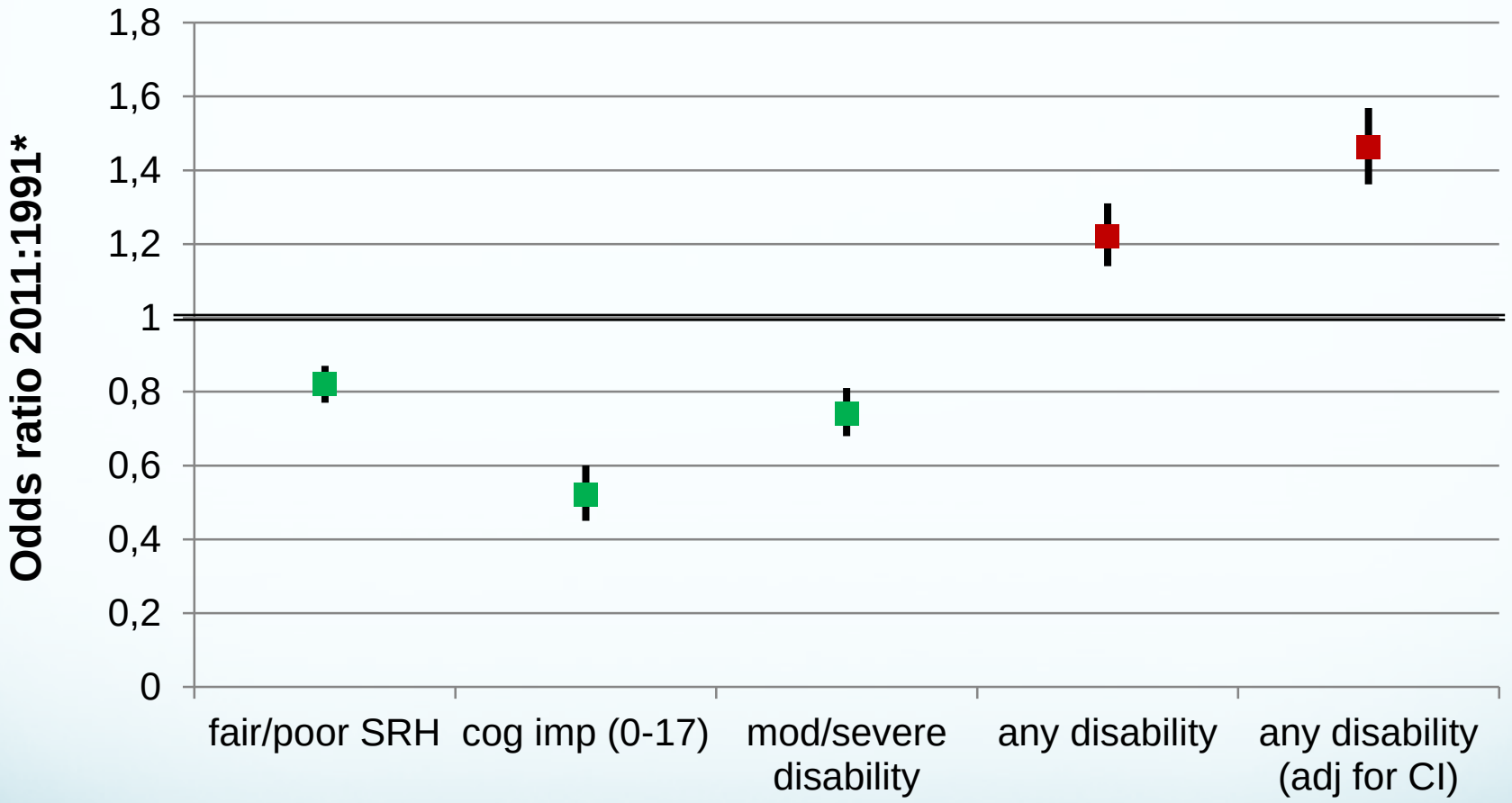
Mod/severe





Newcastle University
Institute for Ageing

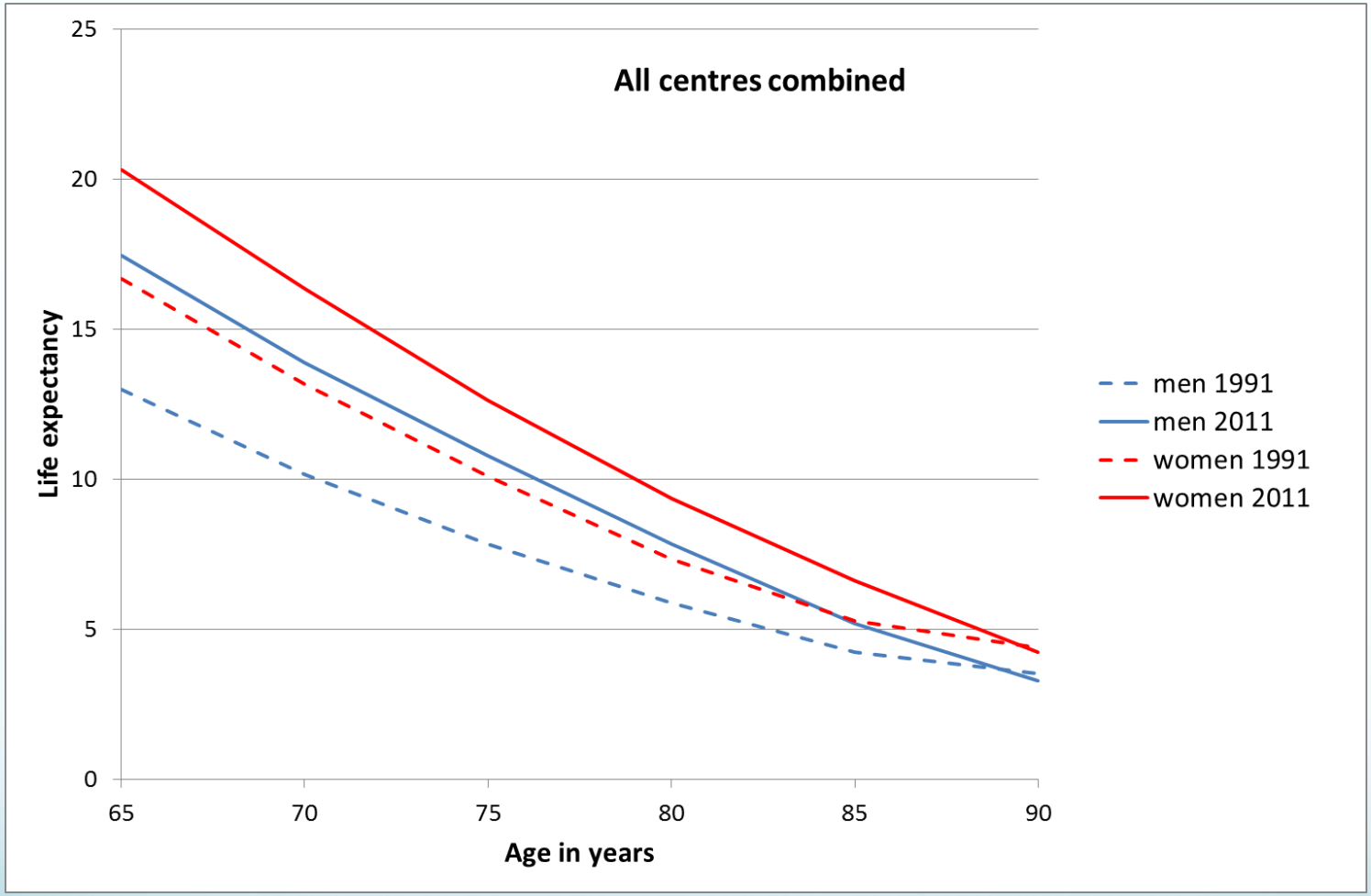
Changes* in prevalence



*adjusted for age, sex, region and deprivation

Newcastle University
Institute for Ageing

Changes in life expectancy



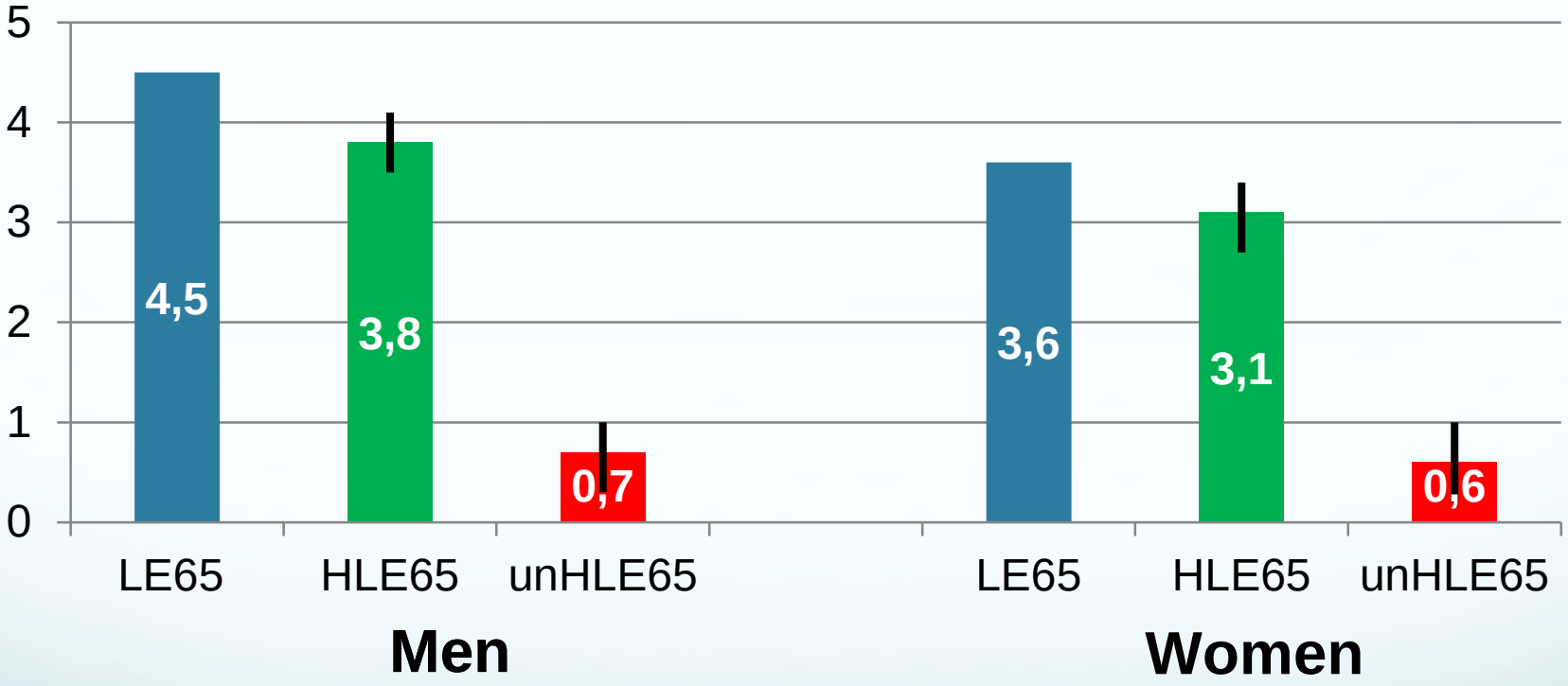
Newcastle University
Institute for Ageing

Analysis

- Sullivan method
- Population mid-year estimates and death data provided at the district level for the three regions.
- Inverse probability weighting for age and sex-specific prevalence
  - Adjusts for non-response (CFAS I and CFAS II)
    - Age, sex, area, deprivation
  - Study design
    - Age, sex, area, year of interview, cognitive screen

Change at age 65:1991 to 2011

Healthy Life Expectancy

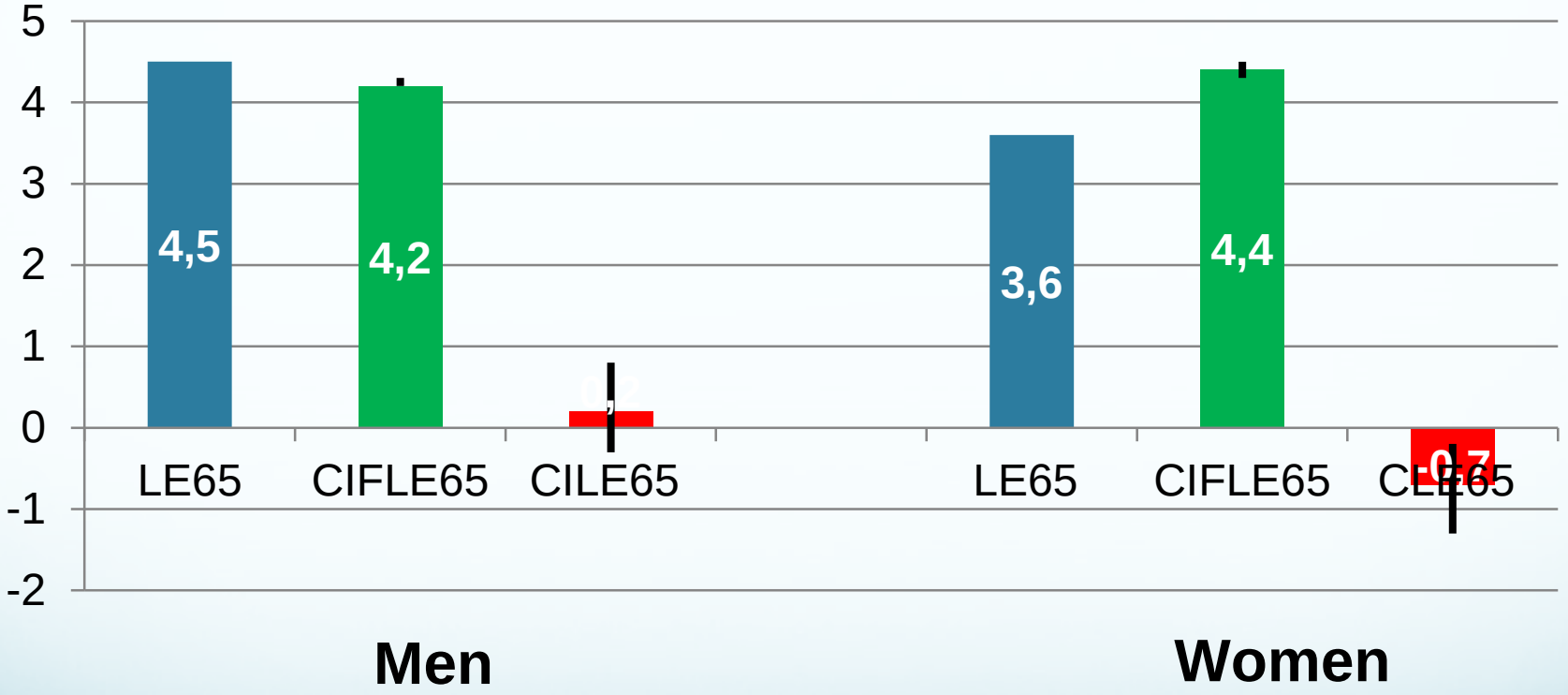


%HLE/LE ↑ = relative compression

Newcastle University
Institute for Ageing

Change at age 65:1991 to 2011

Cognitive Impairment Free Life Expectancy



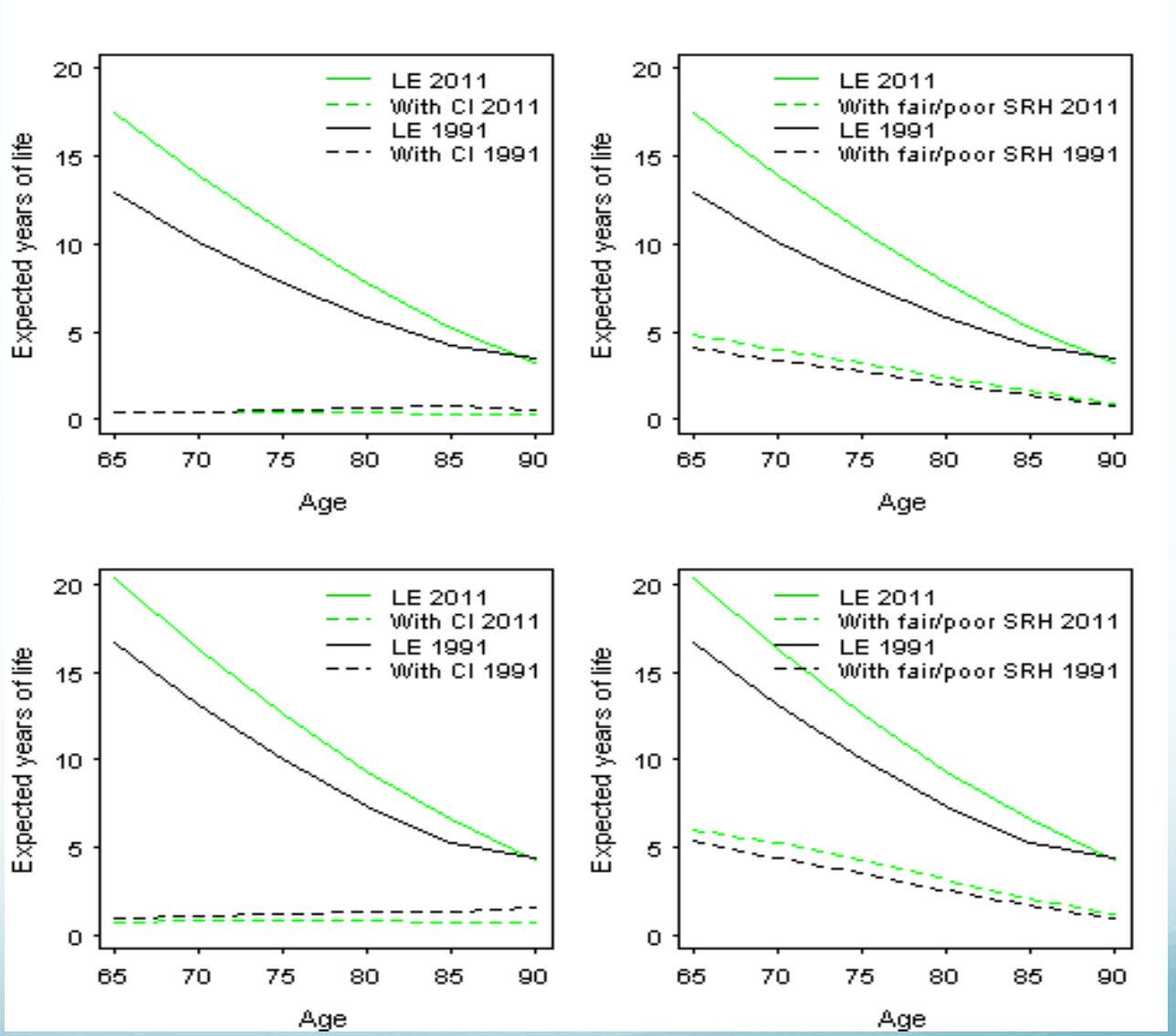
CIFLE ↑ > LE ↑ = compression

Newcastle University
Institute for Ageing

CIFLE and HLE

Men

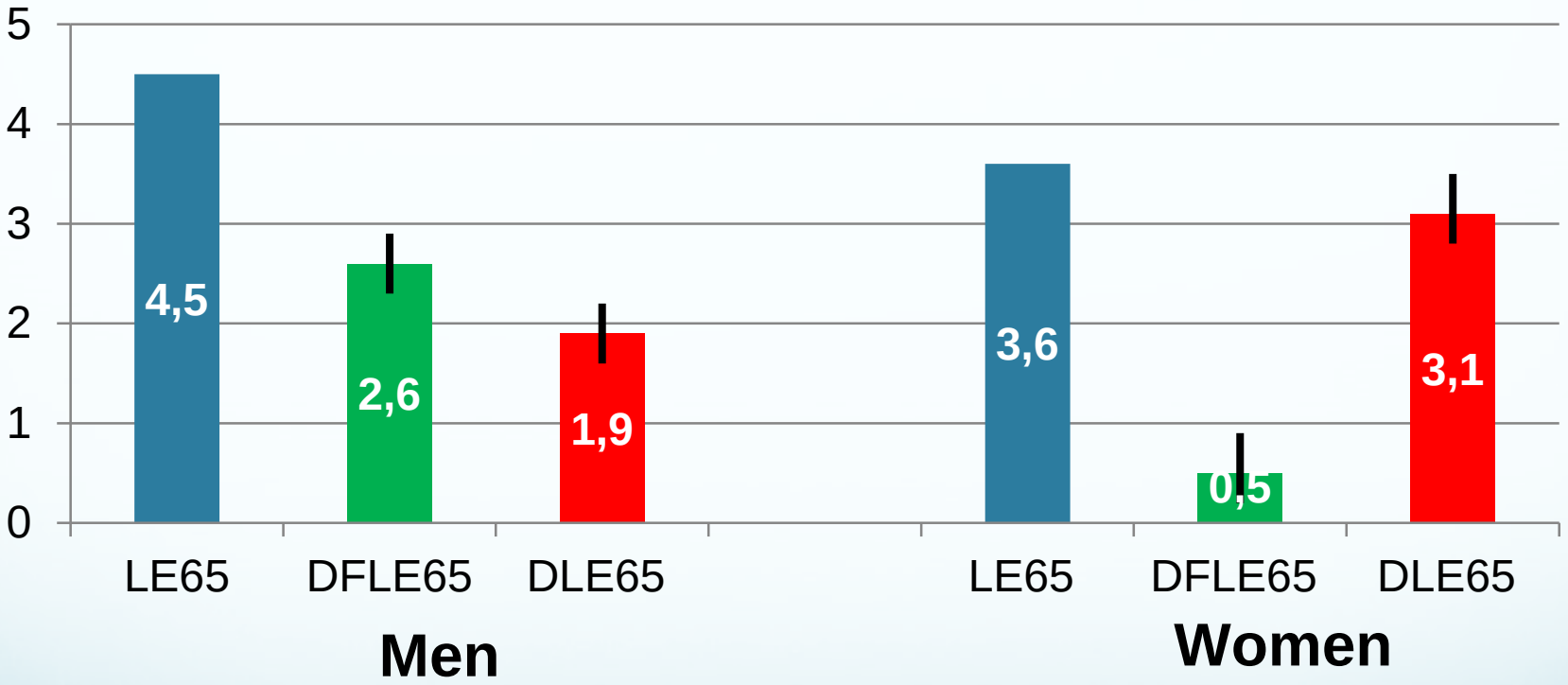
Women



Newcastle University
Institute for Ageing

Change at age 65:1991 to 2011

Disability Free Life Expectancy

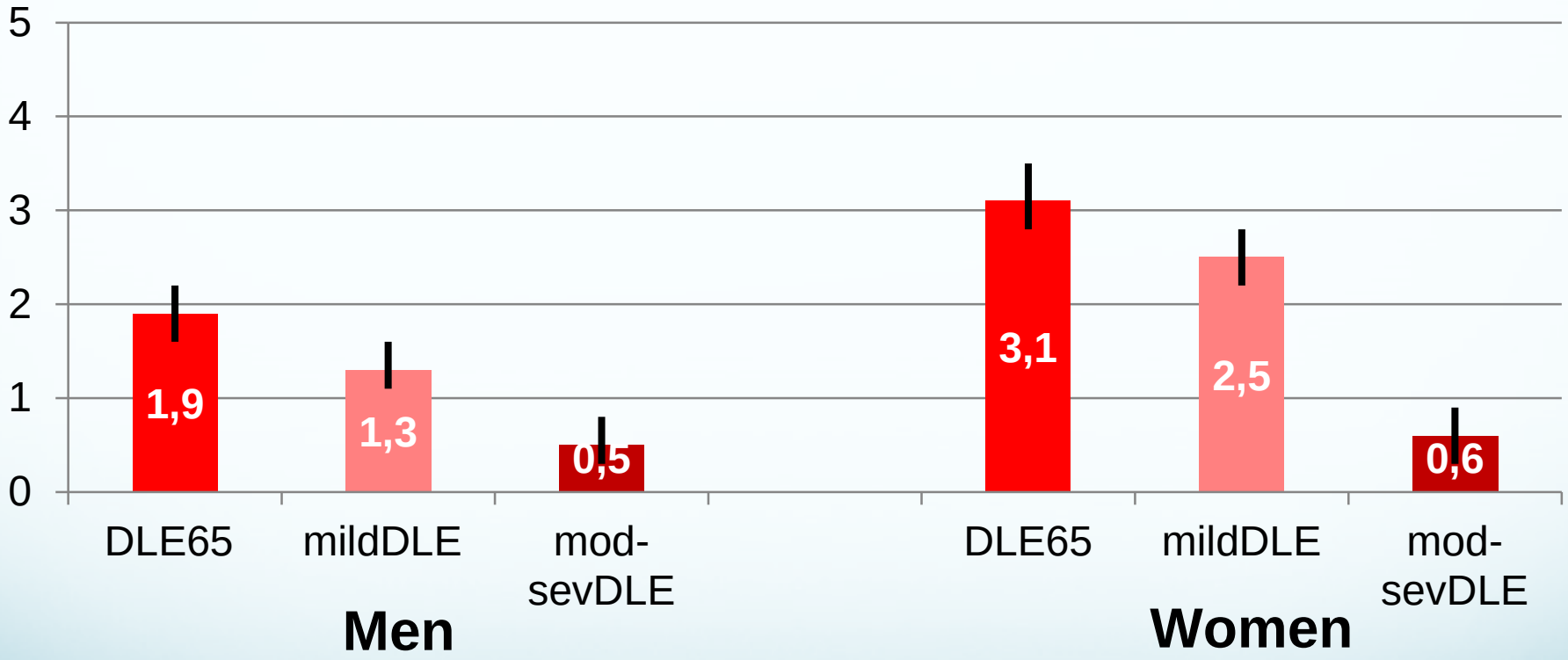


%DFLE/LE ↓ = expansion

Newcastle University
Institute for Ageing

Change at age 65:1991 to 2011

Severity of disability

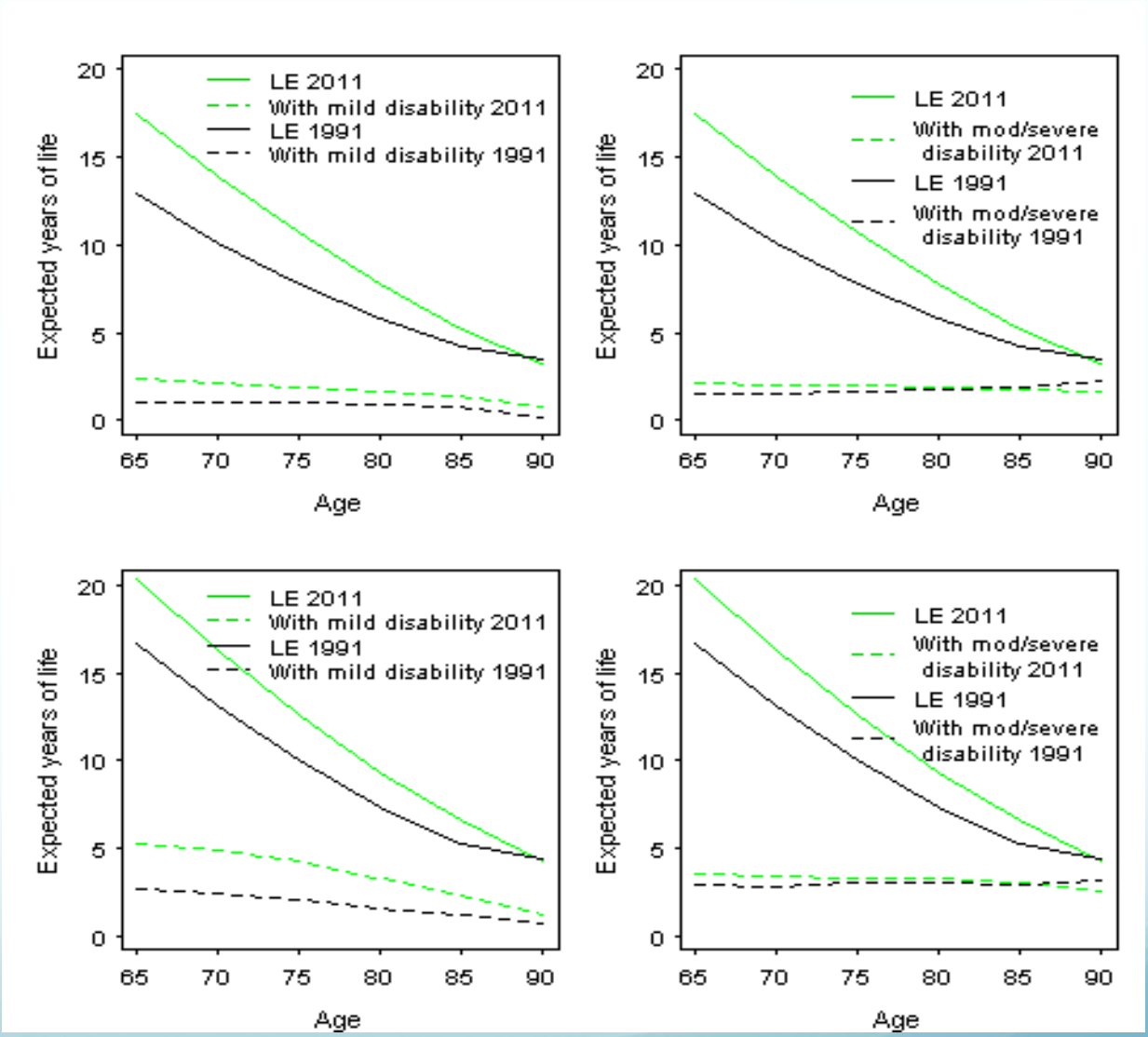


Newcastle University
Institute for Ageing

Disability-free LE (DFLE)

Men

Women



Newcastle University
Institute for Ageing

Health measures II

- Unable without help to do at least one of:
  - Bath or all-over wash
  - Dress (put on shoes and socks)
  - Prepare a hot meal
  - Get around outside (housebound, chairbound, bedbound)

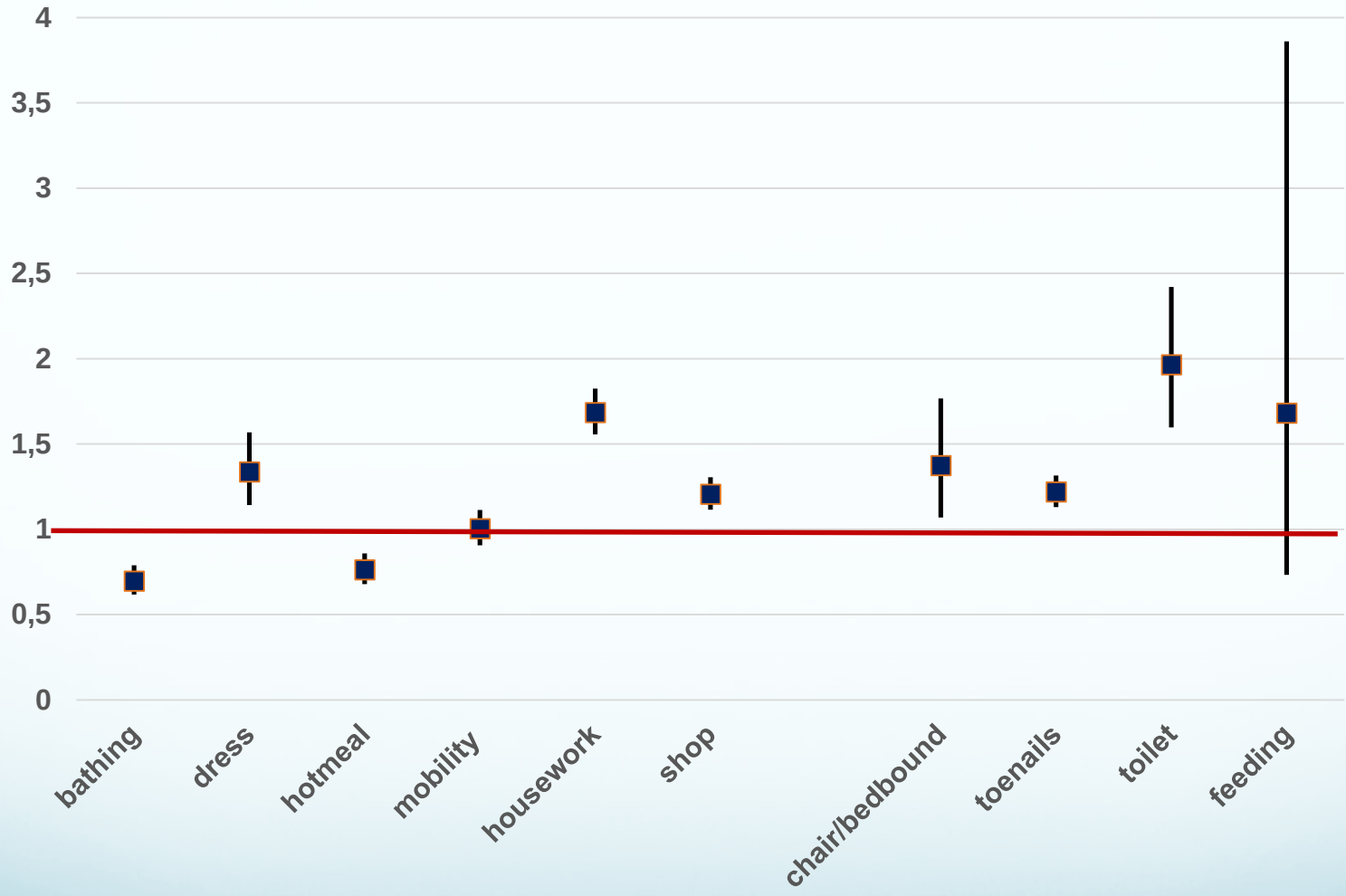
Moderate-severe disability

- Able to do all above but required help with at least one of:
  - Shopping
  - Heavy housework

Mild disability

Measure developed for Spiers et al. *J Gerontol A* 2004

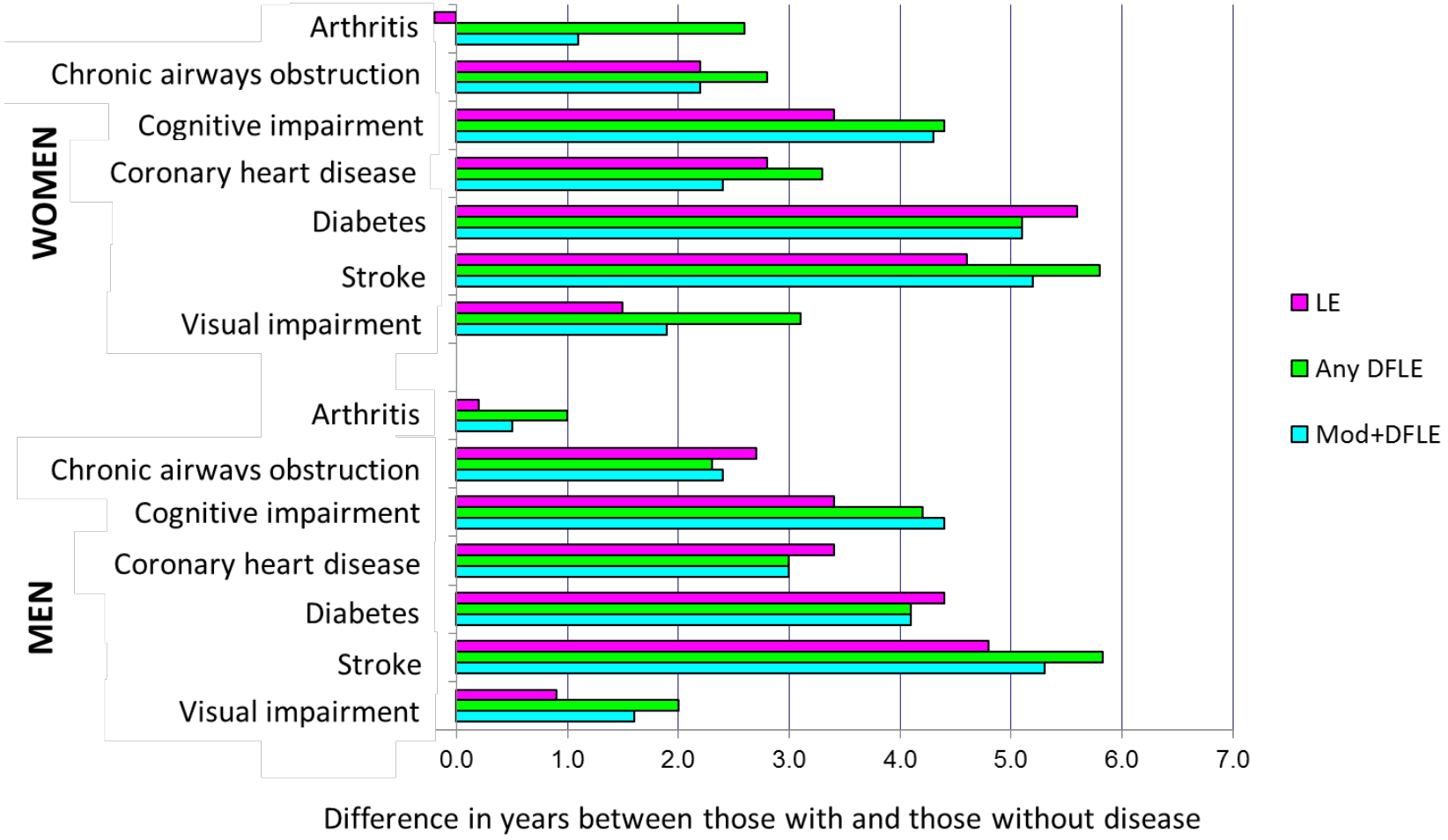
Changes* in individual items



***Odds ratio (95% CI) in 2011 compared to 1991, adjusted for age group, sex, centre and education**

Newcastle University
Institute for Ageing

Contribution of diseases and conditions to LE, any DFLE and moderate/severe DFLE at age 65



Source: Jagger et al (2007)

Limitations and strengths

- Limitations
  - Response has decreased since 1990's
    - More "gatekeepers" who refused on behalf of participants
    - But also an active ageing population who were too busy
- Strengths
  - Same design
  - Multiple health measures

Conclusions

From 1991-2011

- LE65 has increased: 4.5 yrs (men), 2.6 yrs (women)
- Years in good health (and %HLE/LE) have increased but not as much as LE – **relative compression**
- Years free of cognitive impairment have increased – **compression of CI**
- Years free of any disability have increased but not as much as LE (and %DFLE/LE has decreased) – **expansion**
  - Years with mild disability increased by more than years with mod-severe disability
  - Years with mod/severe disability small increase at 65, less at older ages – **dynamic equilibrium**

Newcastle University
Institute for Ageing

One measure is not enough!

TRENDS IN LE AND HLE: KEY FINDINGS

- Increases in heath expectancies in the UK are not keeping pace with gains in life expectancy, particularly at older ages.
- Inequalities in health expectancies are much greater than those in life expectancy and are widening.
- There are a high proportion of local areas in the North of England with DFLE at birth below 65 – challenging for extending working life.
- Regional variations in unemployment, deprivation and ethnicity contribute to inequalities in health expectancies.
- Lower DFLE in many non-white ethnic groups, particularly South Asians, may moderate DFLE increases as these populations age.
- There have been reductions in some disabling diseases and unhealthy behaviours which influence health expectancies, but the prevalence of diabetes and obesity, are still rising.
- Projections of health expectancy are scarce and do not include the effect of changing diseases, lifestyle factors or SES on DFLE.

Thank you

carol.jagger@ncl.ac.uk

Newcastle University

Institute for Ageing