

**Vivre et être actif -beaucoup- plus longtemps:
Perspectives sociales, démographiques et de santé**
SPF Sécurité sociale, Bruxelles, 12 janvier 2015

Increasing the length of healthy life: demographic and epidemiological reflections

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The three theories of the 1980s

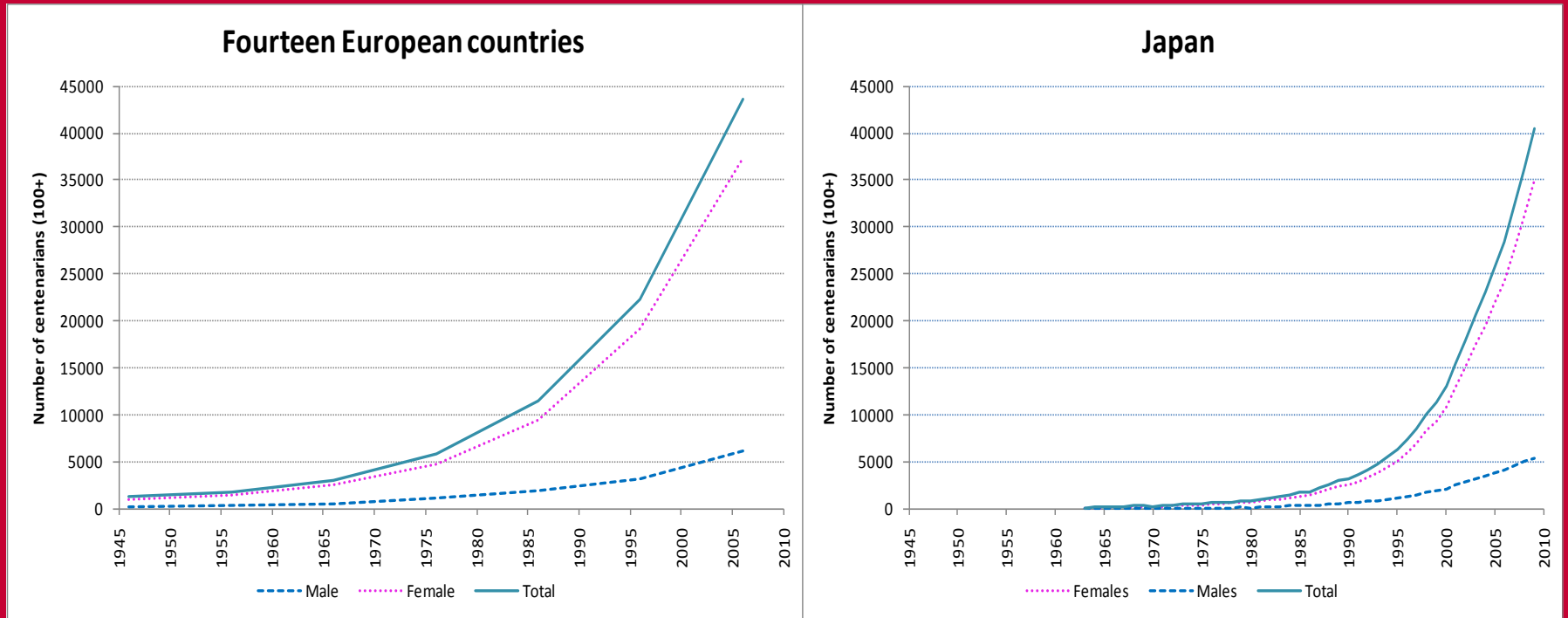
- The compression of morbidity: According to Fries, life expectancy was close to its maximum in the 1980s. Medical and health behaviors progress can only reduce the number of bad years to a small part of the life expectancy (Fries, 1980).
- The expansion of morbidity: On the opposite side, according to Gruenberg and Kramer, the same medical progress will increase the survival of frail elderly people such as those with dementia (Gruenberg, 1977; Kramer, 1980).
- The dynamic equilibrium: Between these two extreme futures, Manton proposed a dynamic equilibrium in which increased survival is offset by better control of chronic diseases, keeping the proportion of life lived in good health more or less constant (Manton, 1982).

The longevity revolution

- Worries about the future health status of the older population led the health authorities to build up population health surveillance systems in the 1980s including repeated cross sectional health surveys which allowed the functional health status of older people to be monitored.
- But no theory on health at that time was anticipating the longevity revolution which is currently occurring in most developed countries and which has led to impressive numbers of nonagenarians and centenarians.

The longevity revolution

Change in the number of centenarians in Europe vs. Japan



Europe vs. Japan

15 000 centenaires en 2010 en France, 200 000 en 2060 ?

Nathalie Blanpain, division Enquêtes et études démographiques, Insee

Au 1^{er} janvier 2010, 15 000 centenaires vivent en France métropolitaine : c'est treize fois plus qu'en 1970. Neuf centenaires sur dix sont des femmes et parmi les personnes de 110 ans et plus, qu'on appelle les « supercentenaires », il n'y a quasiment que des femmes. Un centenaire sur deux vit à domicile, qu'il soit seul, en couple, ou avec une autre personne que son conjoint. La part des centenaires qui vivent en solo ou en couple s'accroît. Les hommes sont plus fréquemment à leur domicile que les femmes.

Dans cinquante ans, la France pourrait compter 200 000 centenaires, soit treize fois plus qu'aujourd'hui. Si les conditions d'espérance de vie sont meilleures que prévu, ils pourraient être 380 000 en 2060, contre 120 000 dans le cas contraire.

doyenne a 114 ans et aucun homme n'a plus de 110 ans.

Treize fois plus de centenaires que dans les années 1970

En 2010, 15 000 centenaires vivent en France métropolitaine (*encadré 1*). Selon le point de vue adopté, on peut considérer que ce chiffre est élevé ou non. C'est beaucoup, car c'est treize fois plus que dans les années 1960-1970. Entre 1960 et 1975, leur nombre était stable, on en comptait 1 150 chaque année. Depuis 1975, leur effectif augmente continûment au rythme de 8 % par an. Au total, ils ne représentent que 0,02 % de la population, ou encore un centenaire pour deux ou trois communes en moyenne, sur les 37 000 que compte la France.

Les « supercentenaires » : quasiment tous des femmes

Selon les travaux de recherches disponibles

Number of Future Centenarians

December 2010

DWP Department for
Work and Pensions

Table 2: Number of centenarians in the United Kingdom

Year	100+	110+
1980	2,300	-
1985	3,400	-
1990	4,400	-
1995	5,700	-
2000	6,800	-
2005	8,900	-
2010	11,800	-
2015	15,000	-
2020	21,900	-
2025	37,600	-
2030	58,800	100
2035	97,300	100
2040	148,900	400
2045	202,100	1,000
2050	276,600	2,100
2055	306,200	3,500
2060	378,200	5,600
2065	487,400	7,200
2066	507,000	7,700
2070	563,500	10,700
2075	587,000	16,200
2080	626,900	21,000

Numbers rounded to nearest 100. Population estimates have been based on the 2009 Census, and 2008-based population projections from 2010 onwards.

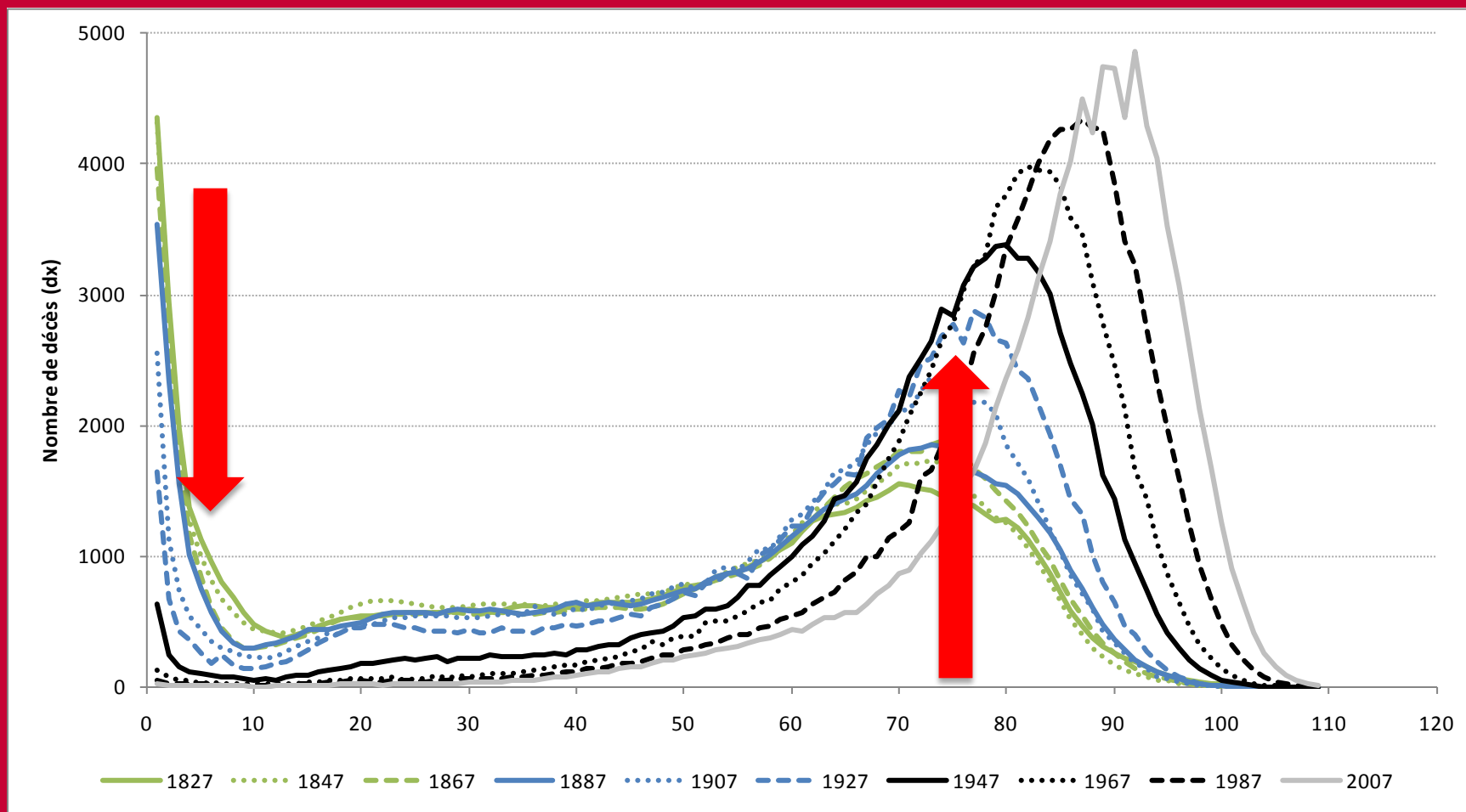
Source: Office for National Statistics, 2008-based Population Projections

Estimates of the very elderly:

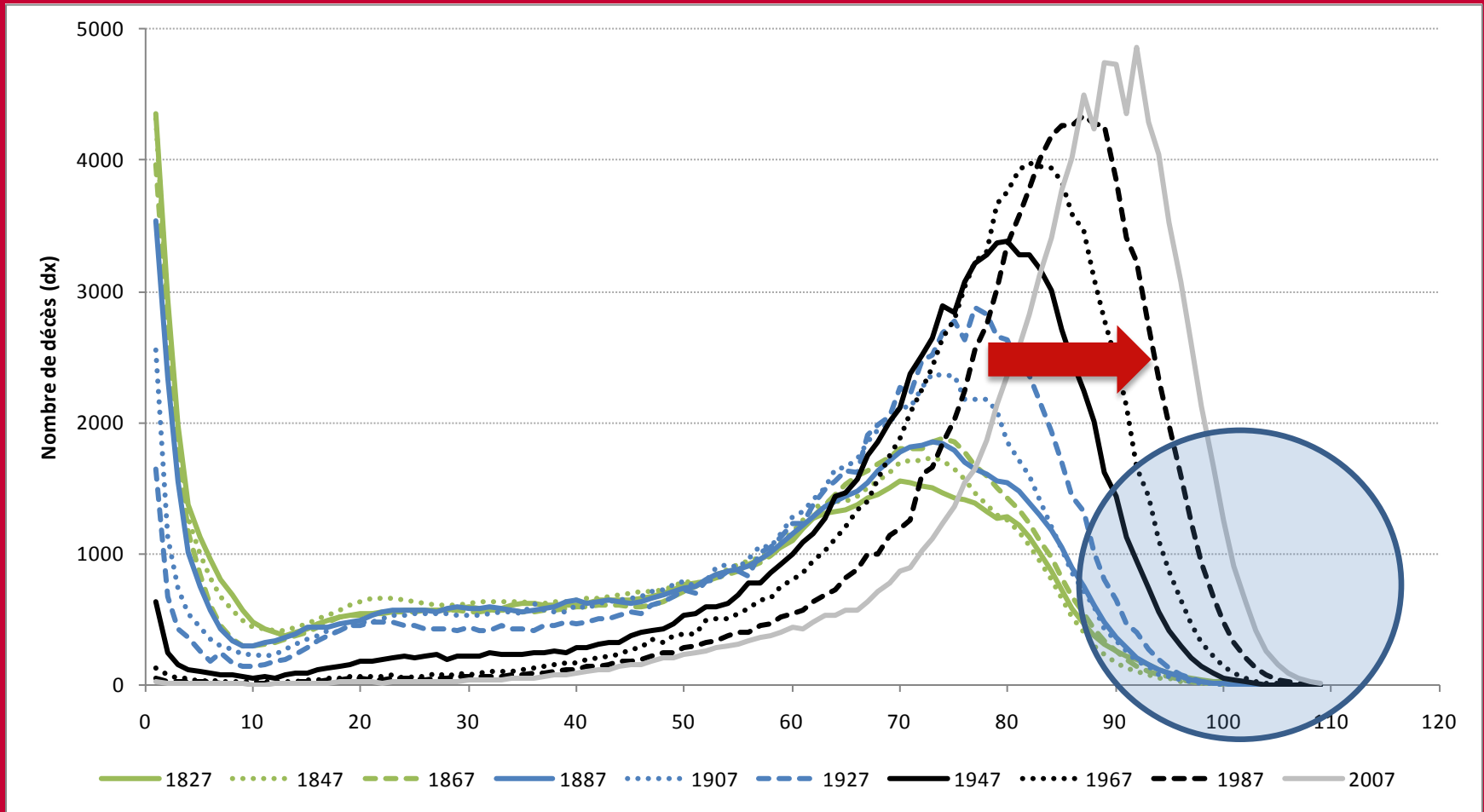
www.statistics.gov.uk/statbase/Product.asp?vlnk=15003

Mechanism

Change over time in the distribution of the ages at death in France since 1827, female - for 100.000 newborn



The longevity revolution



Compression vs. shifting mortality

Bongaarts, 2005, 2009

Population Studies, Vol. 63, No. 3, 2009, pp. 203–213

Trends in senescent life expectancy

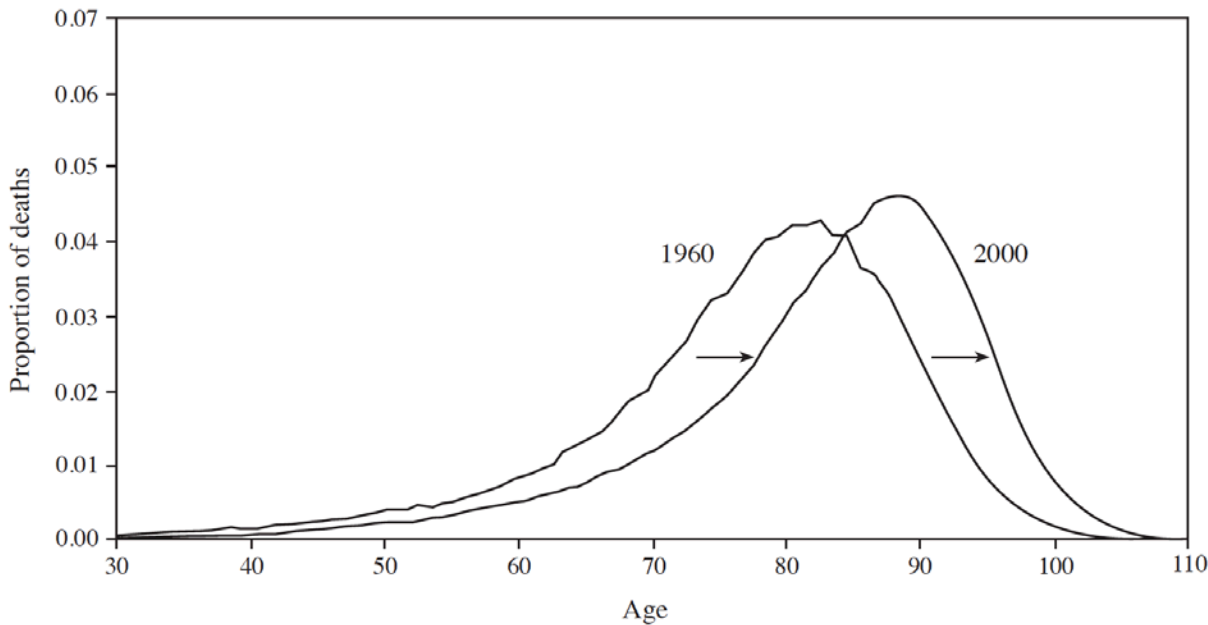


Figure 6 Distribution of senescent deaths by age, Swedish females, 1960 and 2000
Source: As for Figure 4

*describing
se mortality
estimating
death rates
expectancy
indicators
expectancy
ountries. The
distribution*

n method

Fries, 1980

blood pressure are examples of such variables. Exercise, weight control, and diet are some of the common modifying factors.

The modifiability, or “plasticity,” of aging has been demonstrated in studies in which performance can be bettered despite age, within surprisingly broad limits. This important phenomenon has been largely unnoticed partly because of an emphasis on average rather than individual performance and partly because disparate disciplines are involved. Average declines in variables in aging can hide remarkable individual variation. The marathon runner is an example (Fig. 4). A runner in middle life who completes a marathon in 3½ hours is in the 99th percentile for this endeavor; yet not until age 73 would that time set an age-group record. These marathon data are important in that they show the maximum rather than the average performance, but here too there is a linear decline in performance between age 30 and 70. Still, the age-related decrement in maximal performance is only 1 per cent per year. Variation between healthy persons of the same age is far greater than the variation due to age; age is a relatively unimportant variable, and training in marathon running is clearly more important than age.

Similar observations on increased variation be-

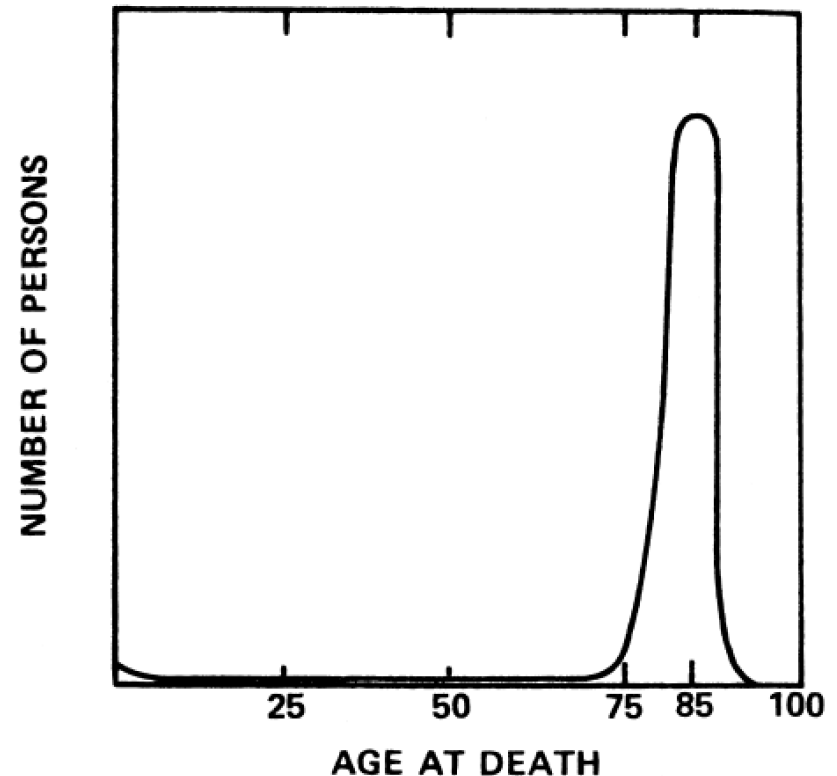
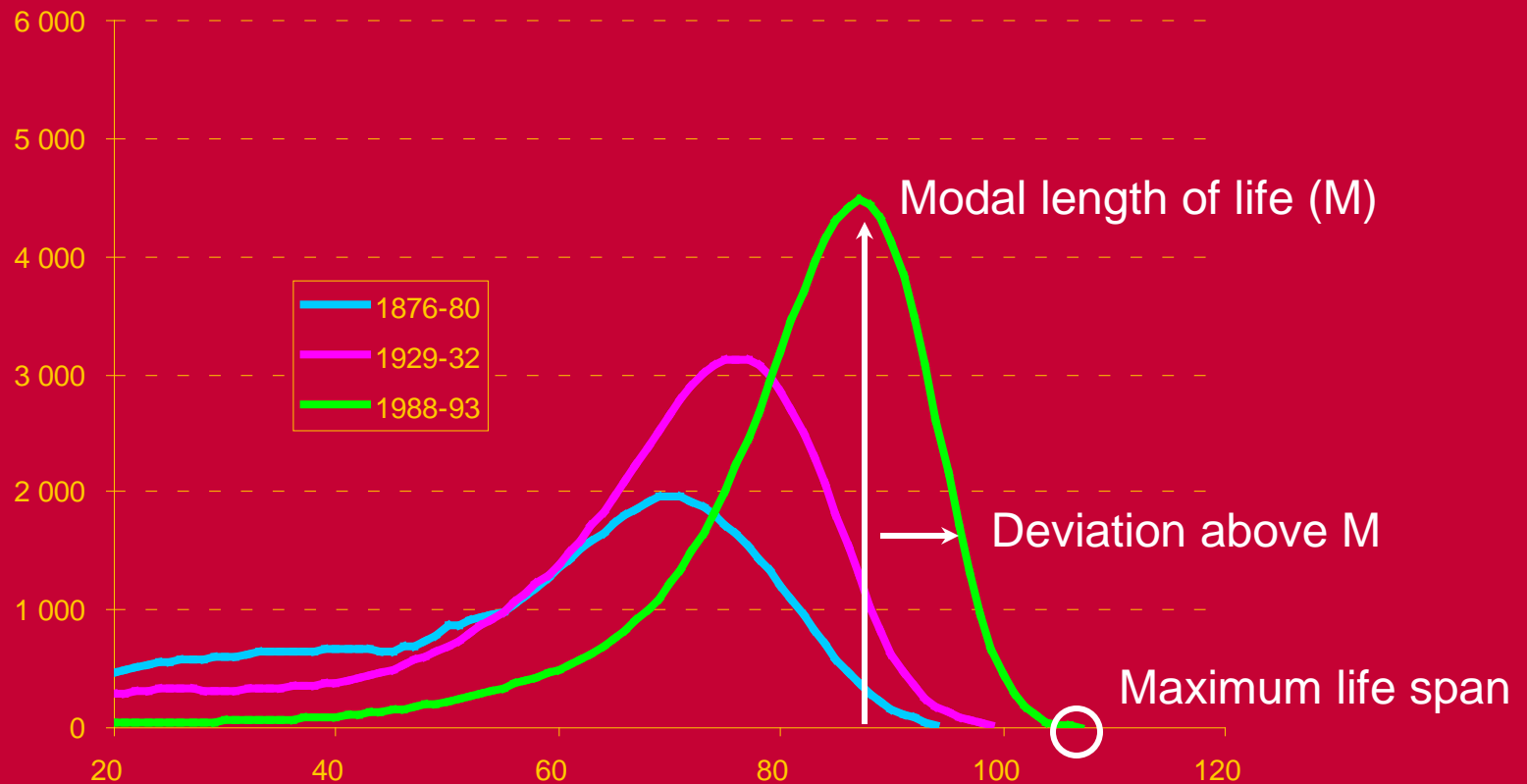


Figure 5. Mortality According to Age, in the Absence of Premature Death.

The morbidity curve is made rectangular, and the period of morbidity compressed between the point of the end of adult vigor and the point of natural death.

How long are adult life durations

$d(x)$ series



Distribution of the ages at death in Switzerland
1876-1880, 1929-1932, 1988-1993

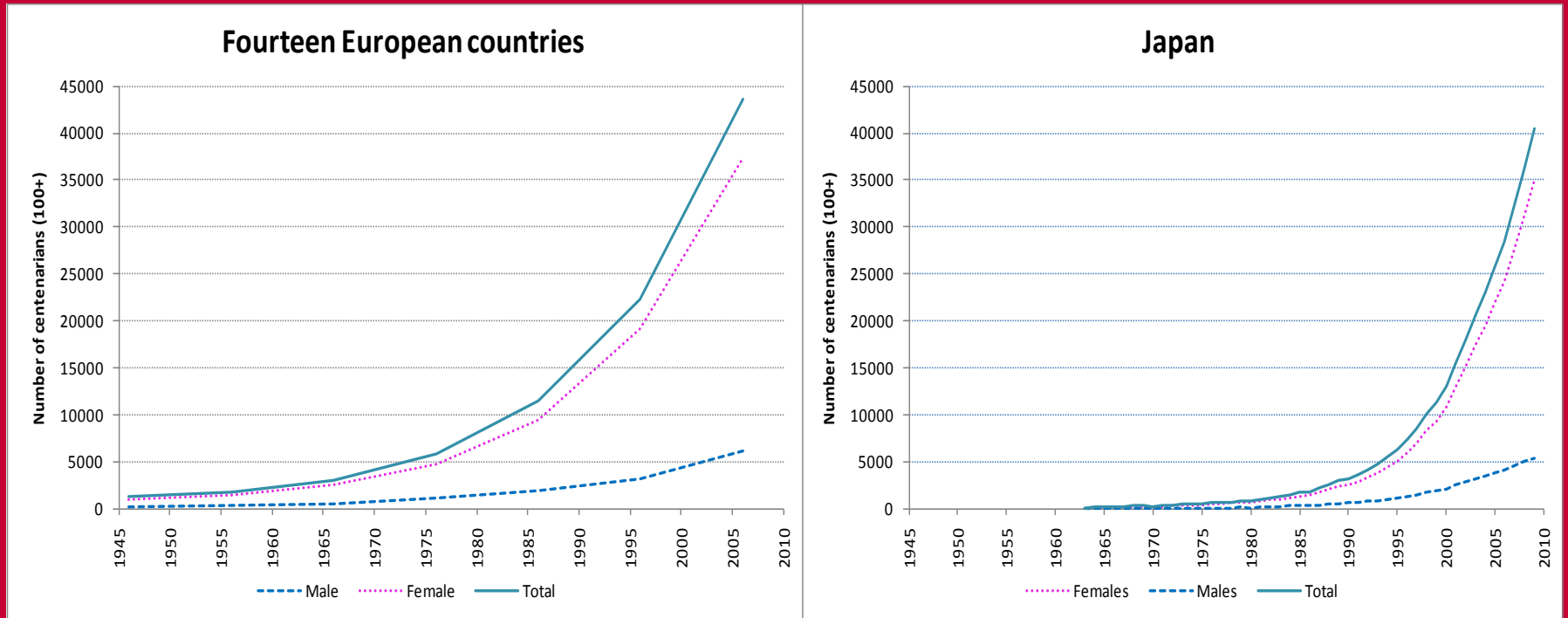
Europe vs. Japan

Table 4: Europe compared with Japan: Number of centenarians in 2006 and various centenarian indicators, by sex

Country	Males	Females	Total	Sex-ratio	Males	Females	Total
	Number of people aged 100 years and more				10-Year Increase		
Japan	3906	23236	27142	5,9	3,0	4,5	4,2
European countries	8228	49078	57306	6,0	2,0	2,0	2,0
	Number of people aged 100 years				Centenarian Rate (CR)*		
Japan	1644	9181	10826	5,6	49,3	259,4	157,5
European countries	3823	20675	24499	5,4	18,5	86,5	55,0

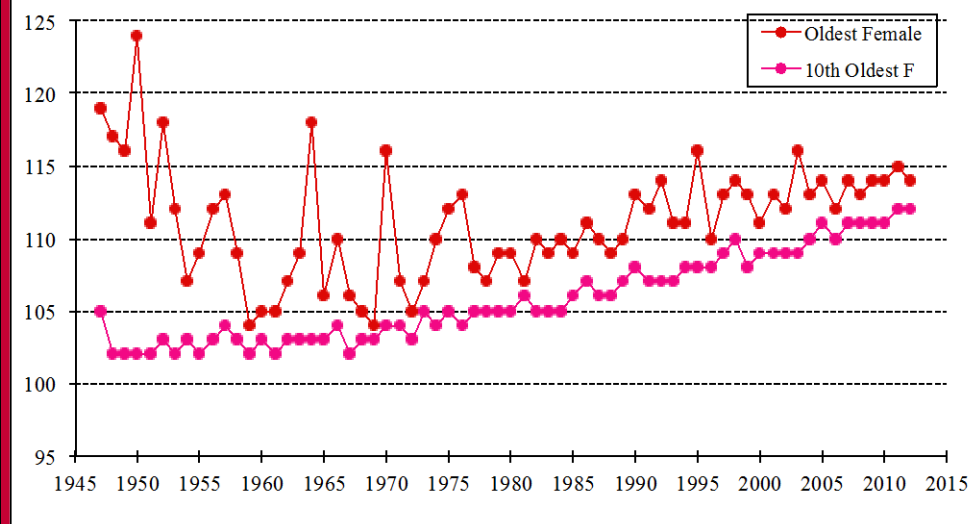
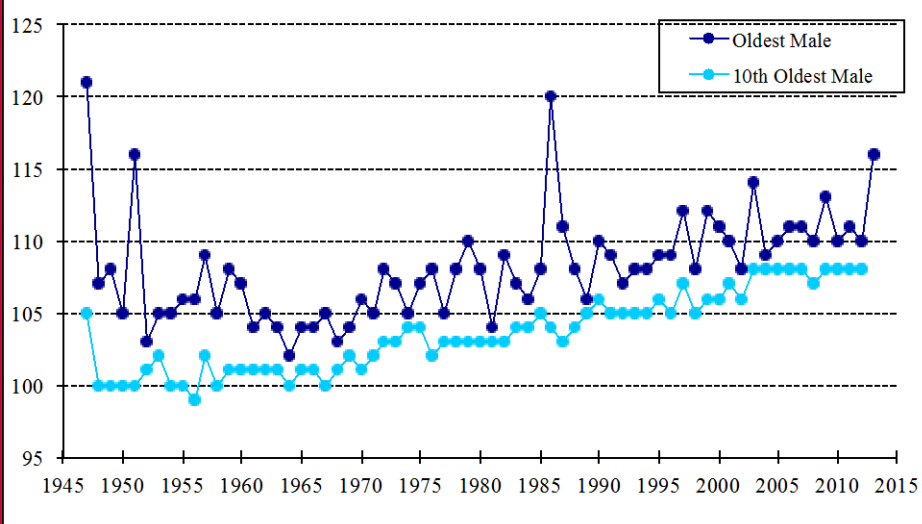
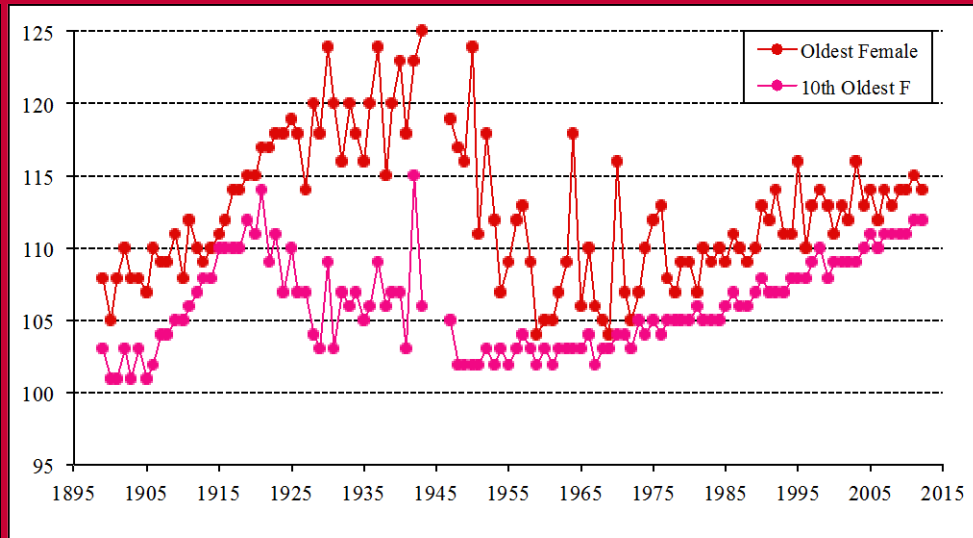
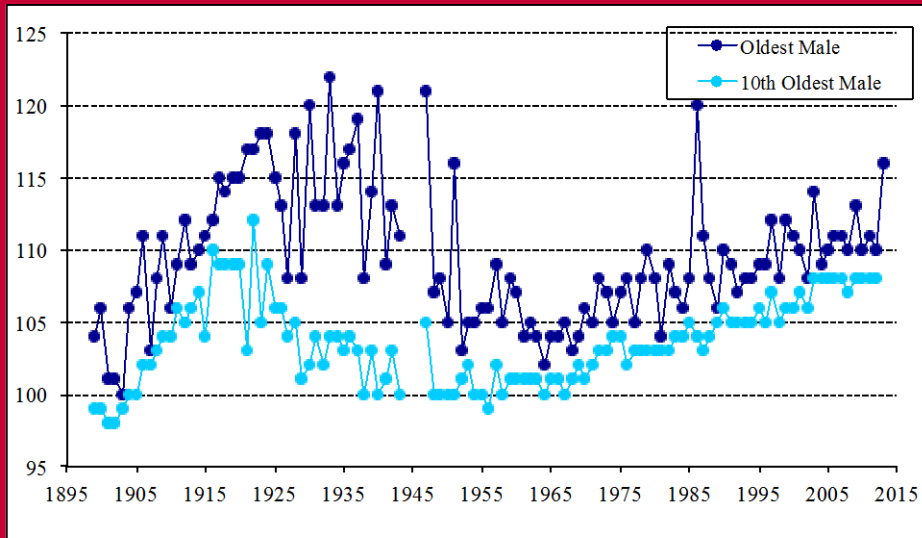
Source of data: Human Mortality Database (HMD); *Slovenia excluded

Change in the number of centenarians in Europe vs. Japan



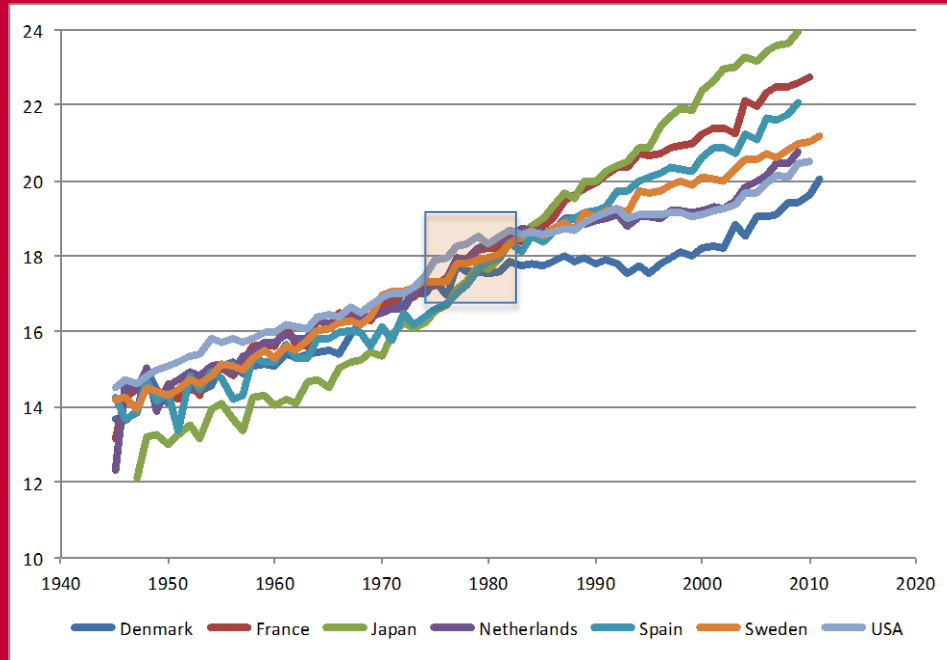
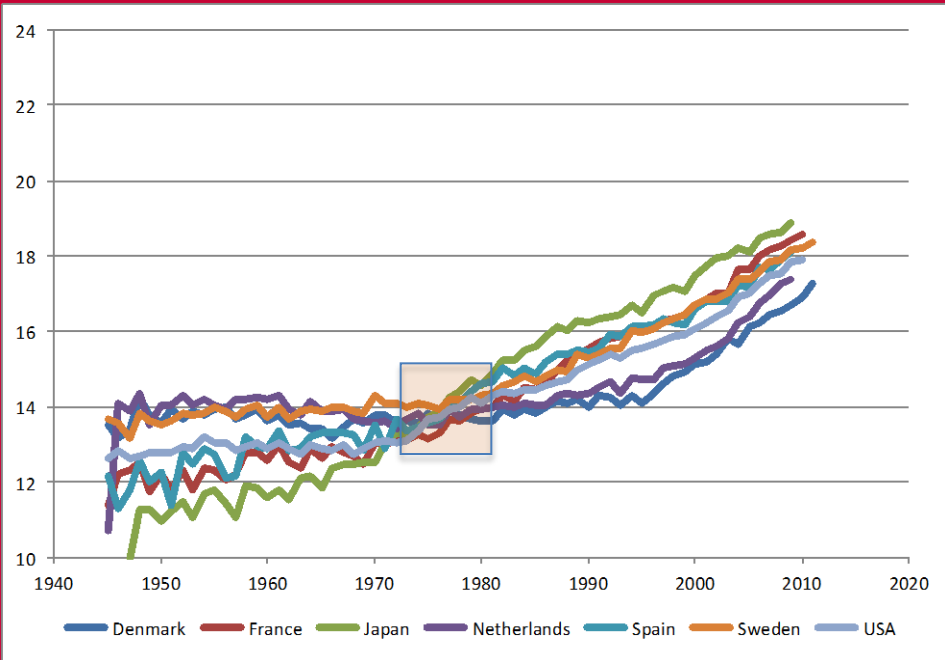
Europe vs. Japan

Maximum life span in Japan (empirical observations)



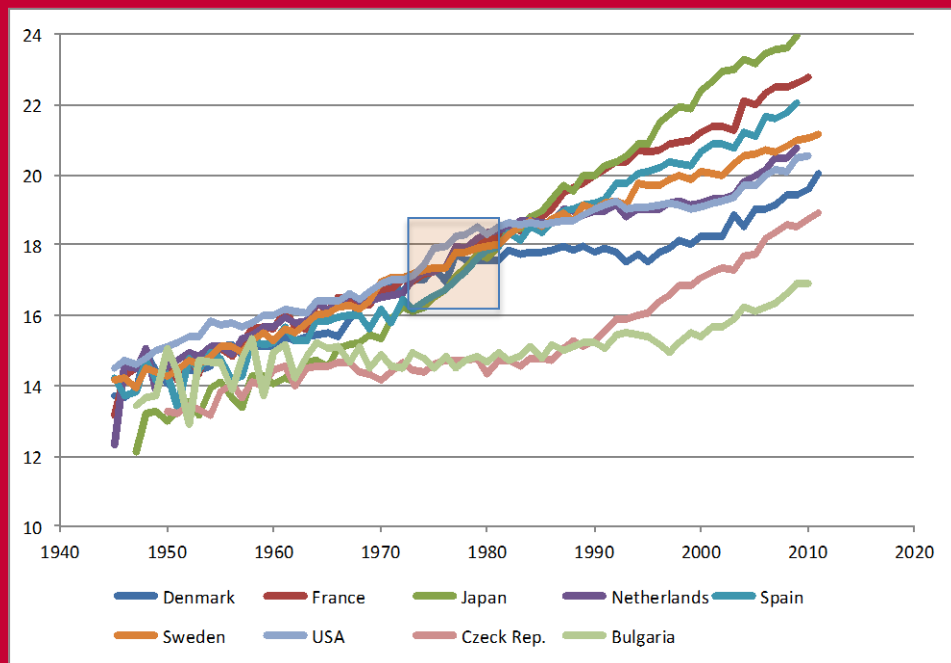
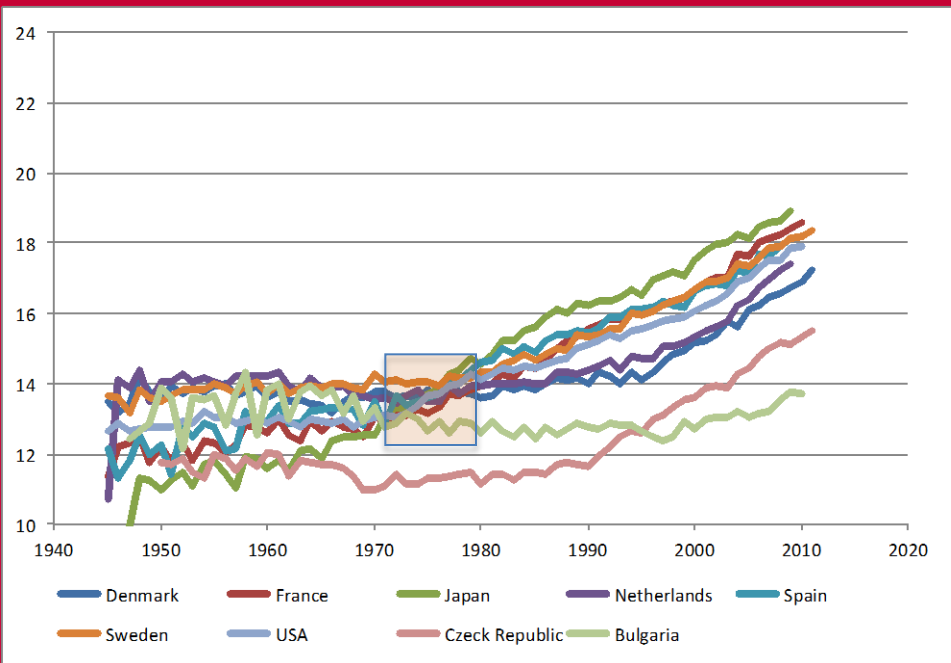
Warning:
Divergence and variability

Trends in life expectancy at age 65

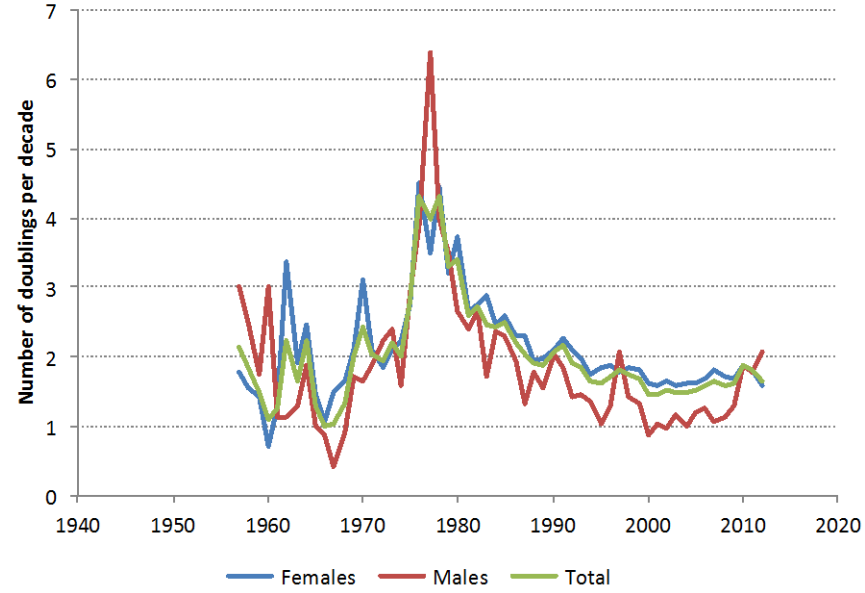
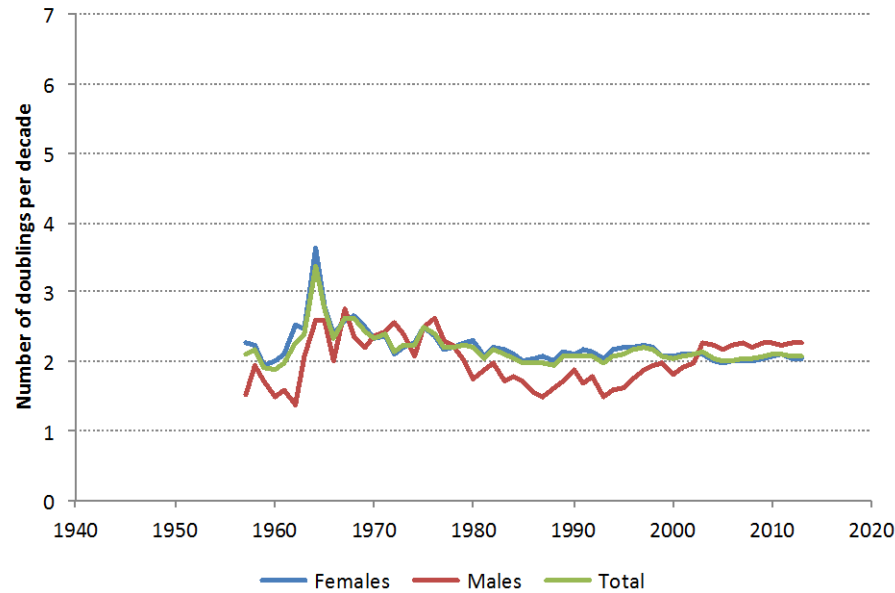
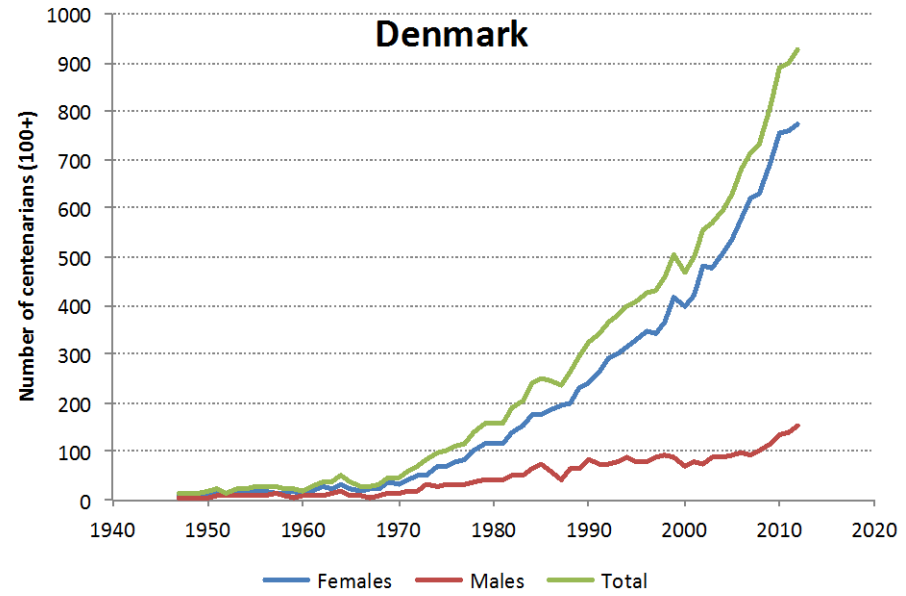
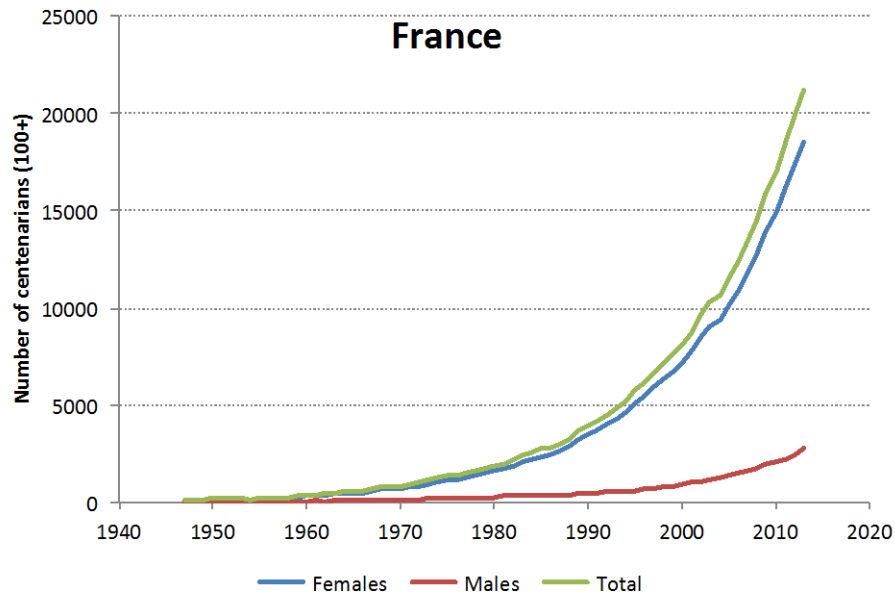


Denmark, the United States
and the Netherlands

Trends in life expectancy at age 65



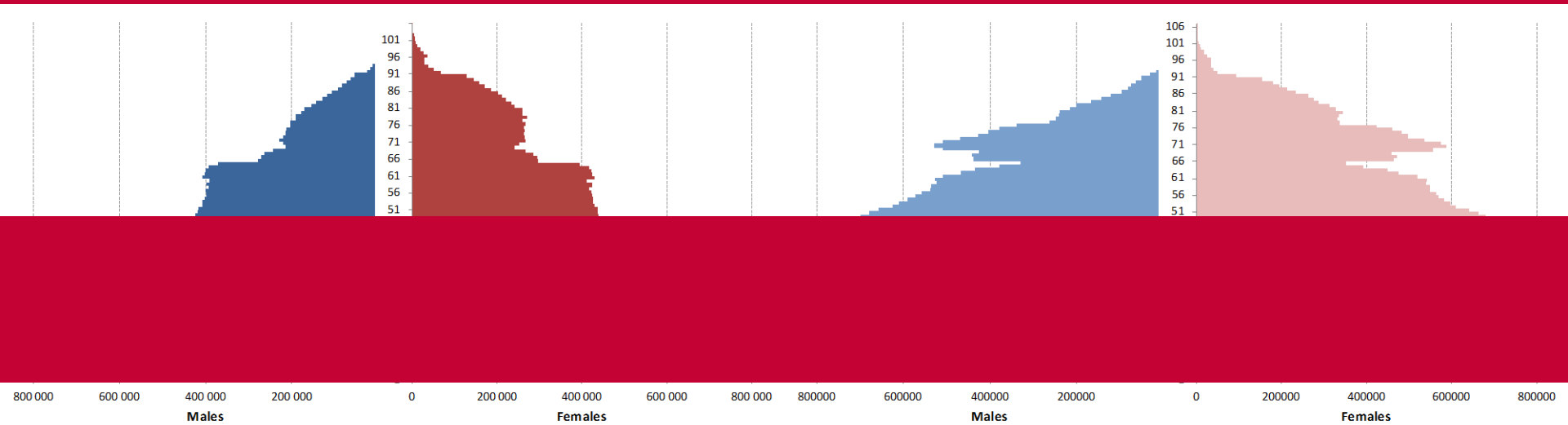
Number of centenarians (100+)



Population ageing

Population ageing

(i.e., % of the older people within the total population)

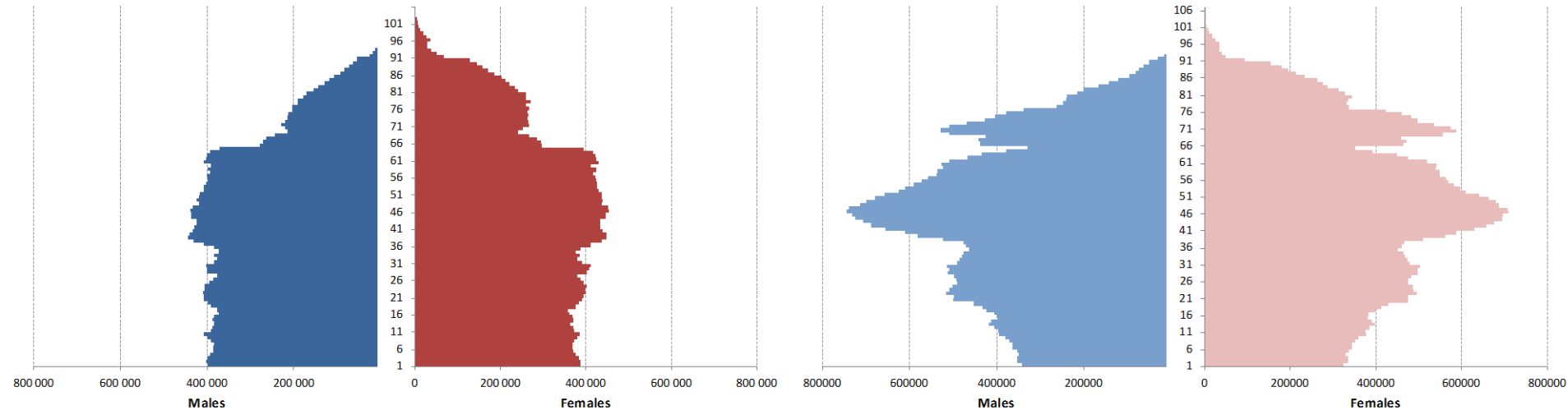


Population ageing

(i.e., % of the older people within the total population)

France

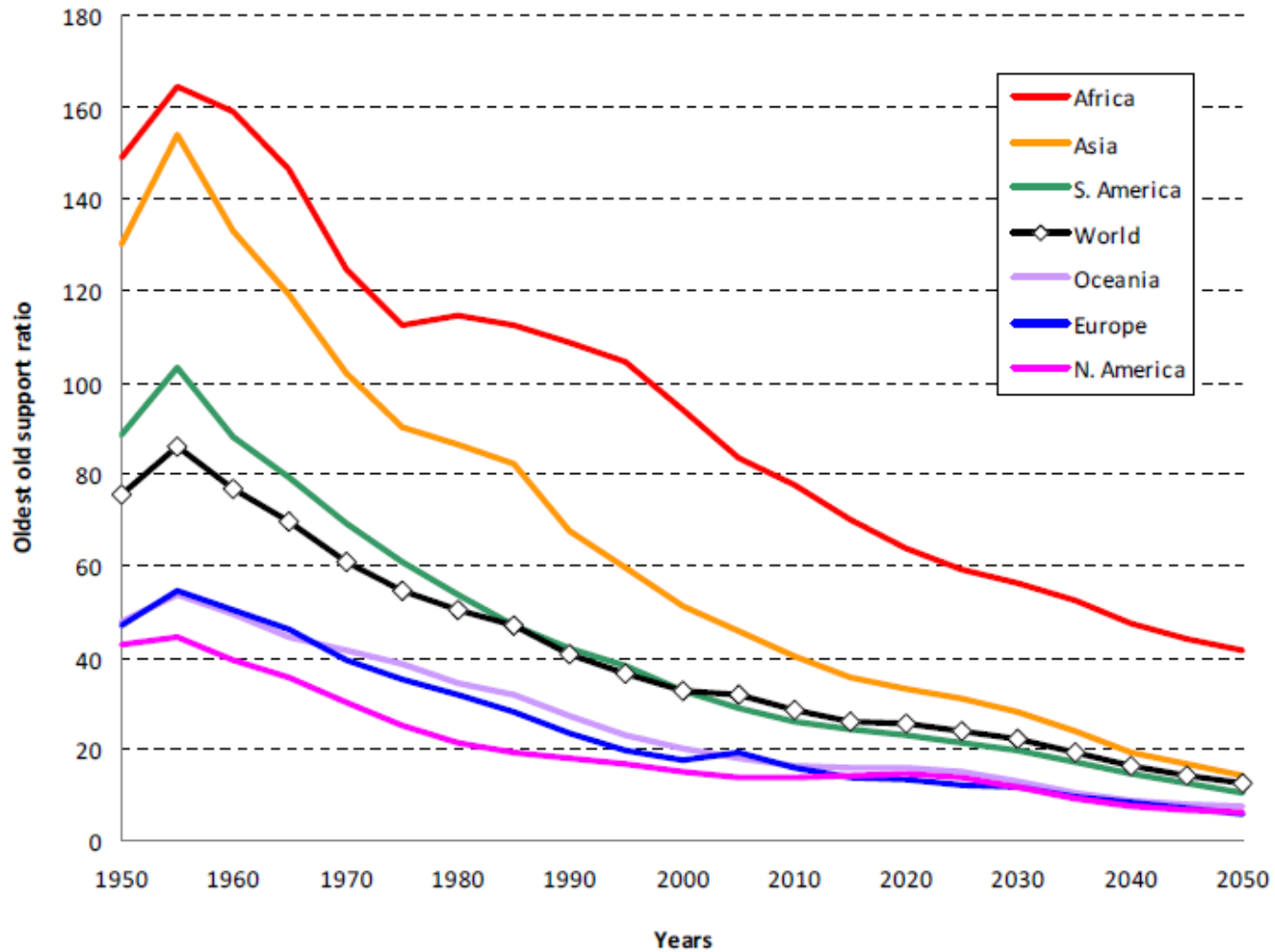
Germany



Demographic dependancy ratio

The oldest old support ratio

World wide decline in the oldest old support ratio



As the number of people aged 50-74 for each person aged ≥ 85

Disability-free life expectancy France vs. Sweden

Disability-free life expectancy at age 65 France vs. Sweden - in 2010 -

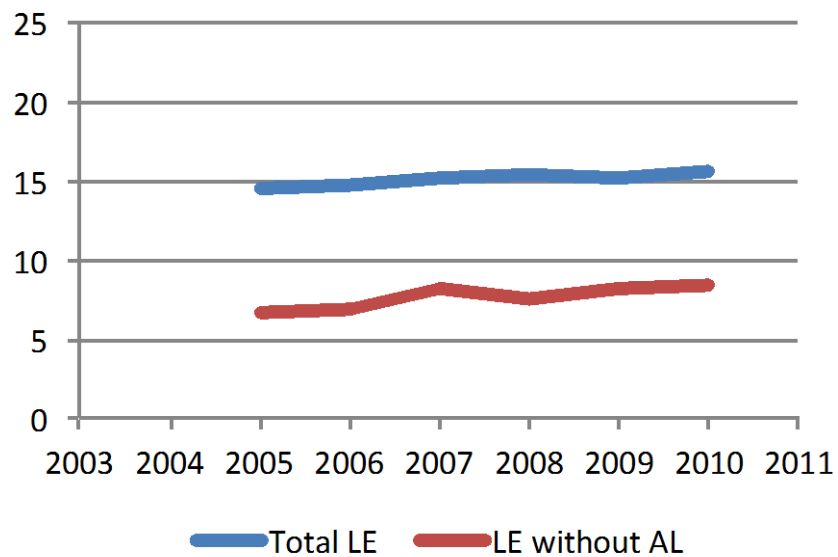
	Sexe féminin			Sexe masculin		
	EV	EVSI	%	EV	EVSI	%
Suède	21.2	15.5	73	18.3	14.1	77
France	23.5	9.8	42	18.9	9.0	48
Diff	-2.3	5.7	31	-0.6	5.1	29

In France, women spend 42% of their years of life without disability (all disability levels combined) versus 73% in Sweden

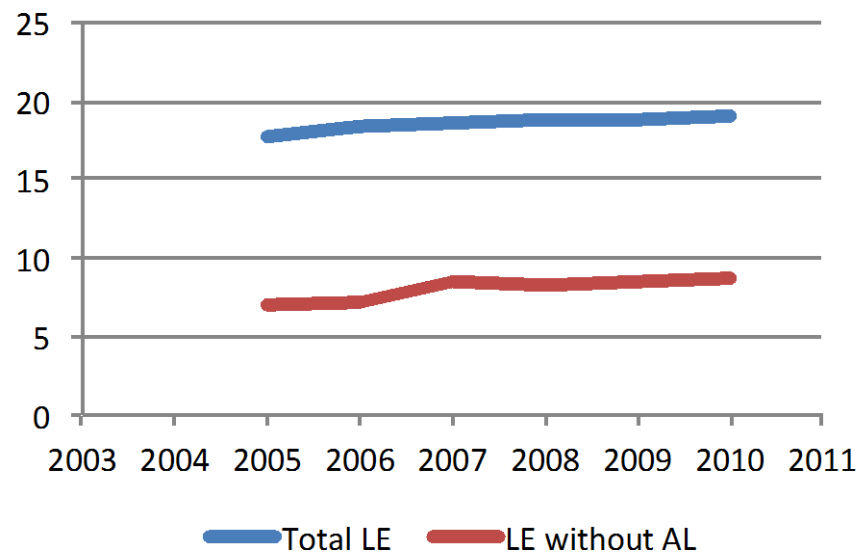
Trends in disability-free life expectancy at age 65

Compression of disability?

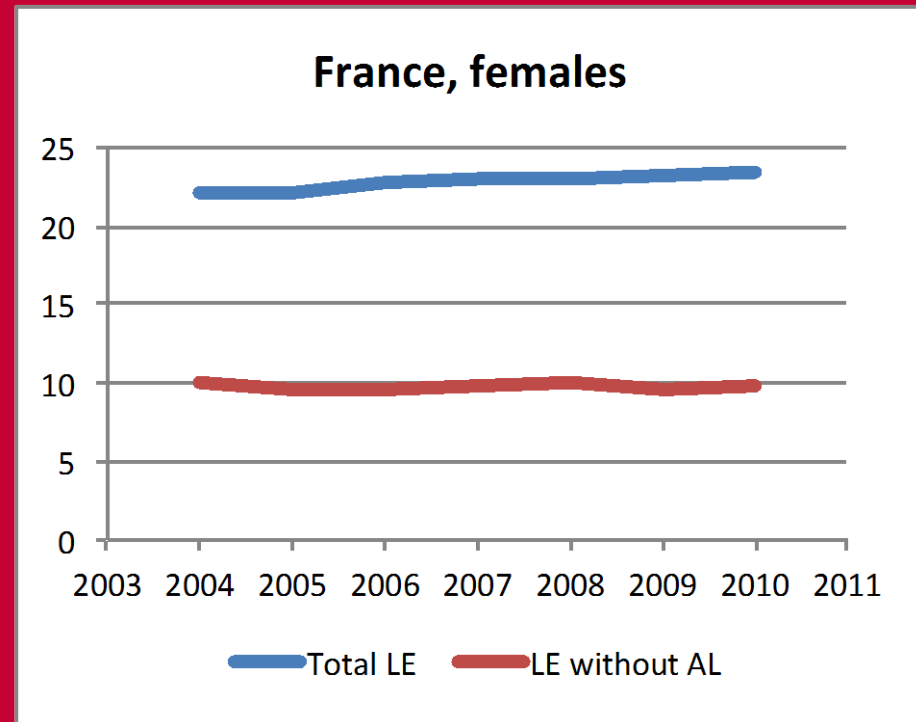
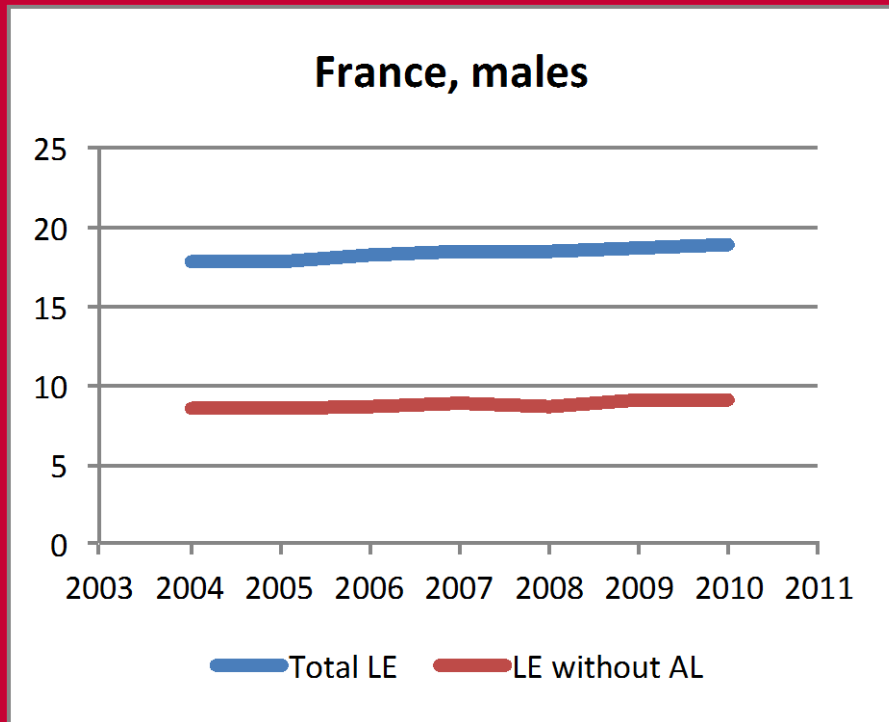
Czech Republic, males



Czech Republic, females

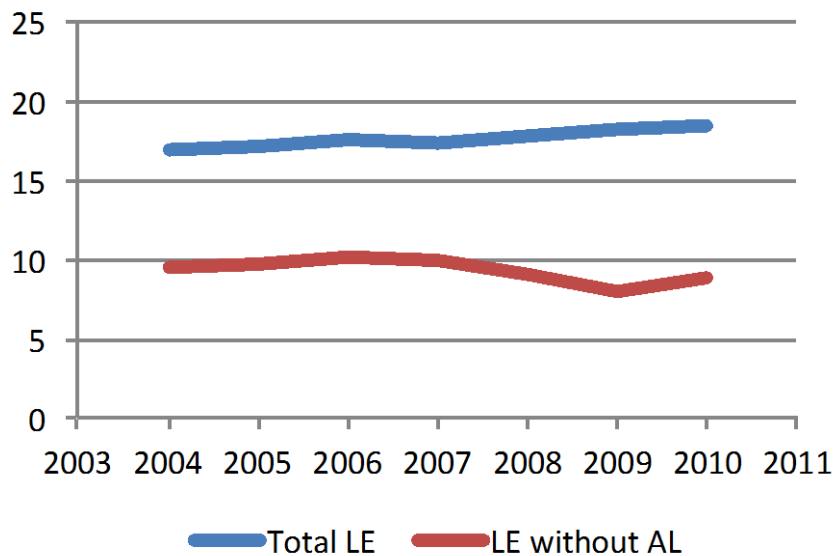


Dynamic equilibrium?

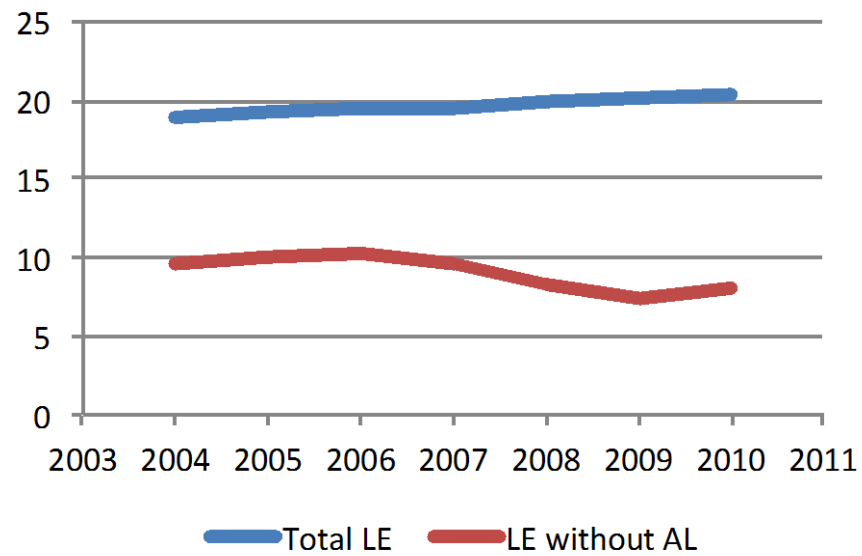


Expansion of disability?

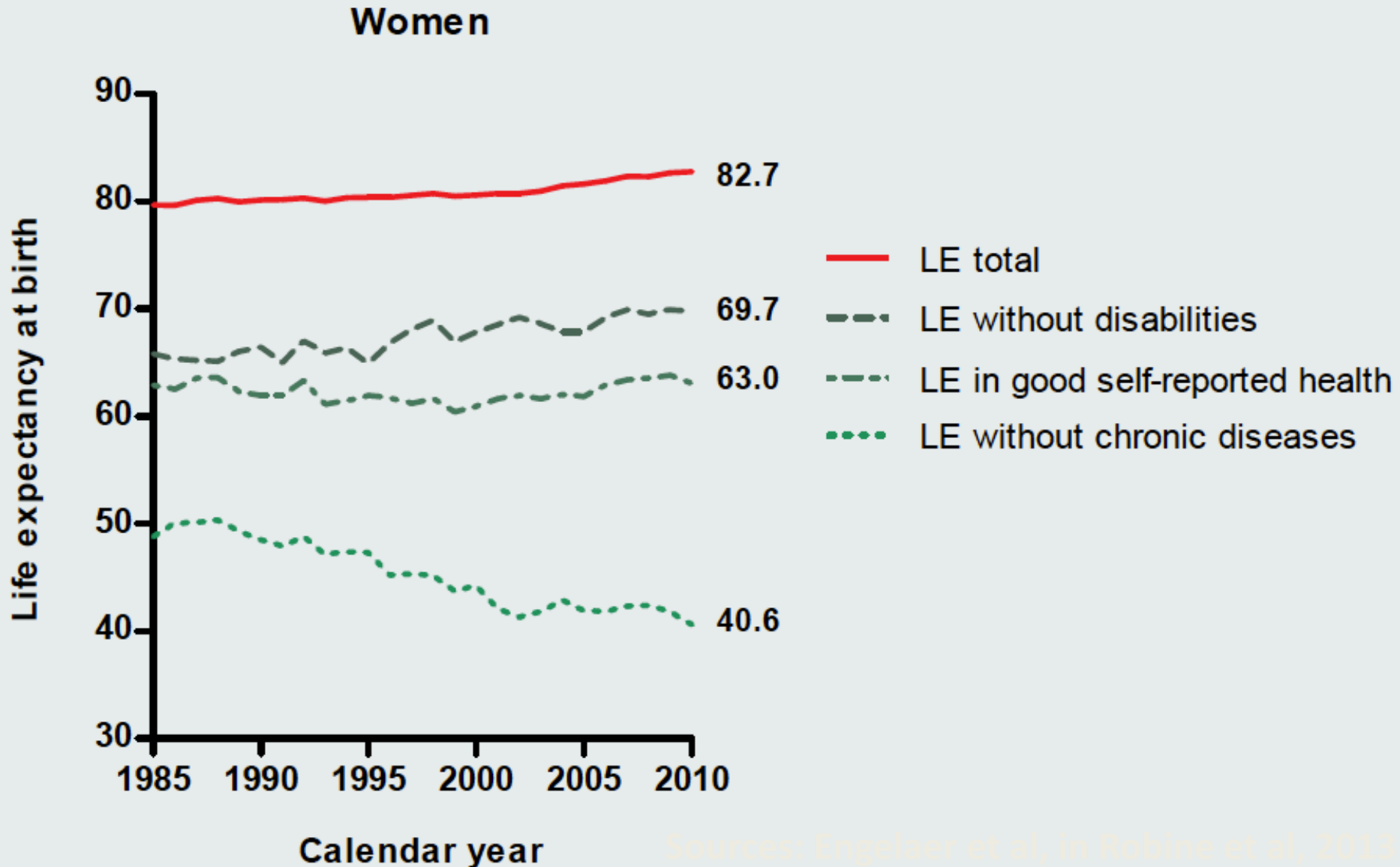
Greece, males



Greece, females



Netherlands, 1985-2010



Trends in prevalence of dementia

Decline in the prevalence of dementia

Selected Recent Studies of the Dementia Epidemic.

Study	Outcome	Data Source	Key Findings	Factors
Manton et al. (United States) ¹	Prevalence of severe cognitive impairment	National long-term care survey interviews, 1982–1999	Decline in dementia prevalence among people ≥65 yr of age (5.7% to 2.9%)	Higher educational level, decline in stroke incidence
Langa et al. (United States) ²	Prevalence of cognitive impairment	Ongoing population-based survey of people ≥51 yr of age	Prevalence of cognitive impairment among people ≥70 yr of age (12.2% in 1993 vs. 8.7% in 2002)	Higher educational level; combination of medical, lifestyle, demographic, and social factors
Schrijvers et al. (Rotterdam) ³	Incidence of dementia	Population-based cohort ≥55 yr of age in 1990, extended in 2000	Incidence rate ratios (6.56 per 1000 person-yr in 1990 vs. 4.92 per 1000 person-yr in 2000)	Higher educational level, reduction in vascular risk, decline in stroke incidence
Qiu et al. (Stockholm) ⁴	Prevalence of DSM-III-R dementia*	Cross-sectional survey of people ≥75 yr of age, 1987–1989 and 2001–2004	Age- and sex-standardized dementia prevalence (17.5% in 1987–1989 vs. 17.9% in 2001–2004); lower hazard ratio for death in later cohort suggests decreased dementia incidence	Favorable changes in risk factors, especially vascular risk; healthier lifestyles
Matthews et al. (England) ^{5†}	Prevalence of dementia in 3 regions	Survey interviews of people ≥65 yr of age, 1989–1994 (in CFAS I) and 2008–2011 (in CFAS II)	Dementia prevalence (8.3% in CFAS I vs. 6.5% in CFAS II)	Higher educational level, better prevention of vascular disease

* In the study by Qiu et al., dementia was diagnosed according to the criteria provided in the *Diagnostic and Statistical Manual of Mental Disorders*, third edition, revised (DSM-III-R).

† CFAS denotes Cognitive Function and Ageing Study.

Thank you for your attention!

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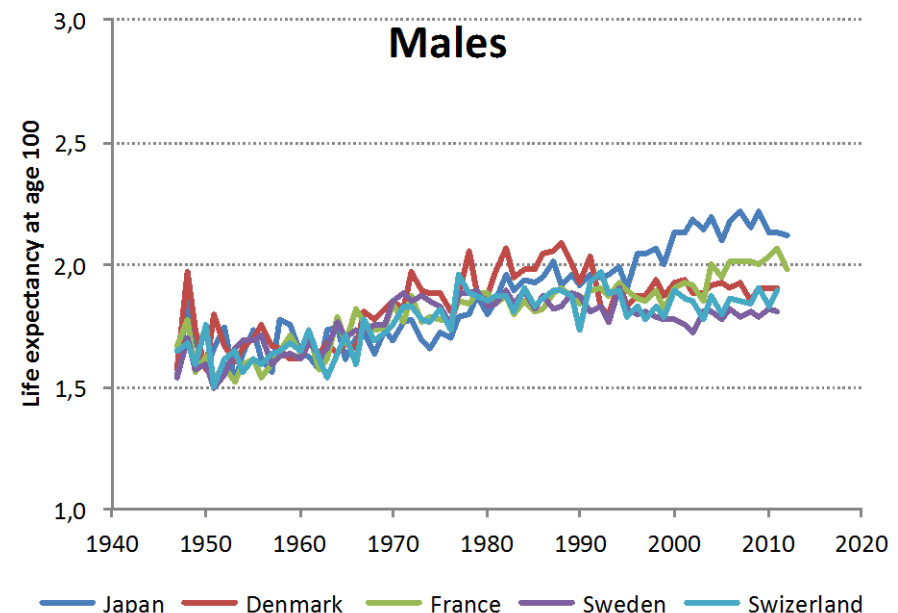
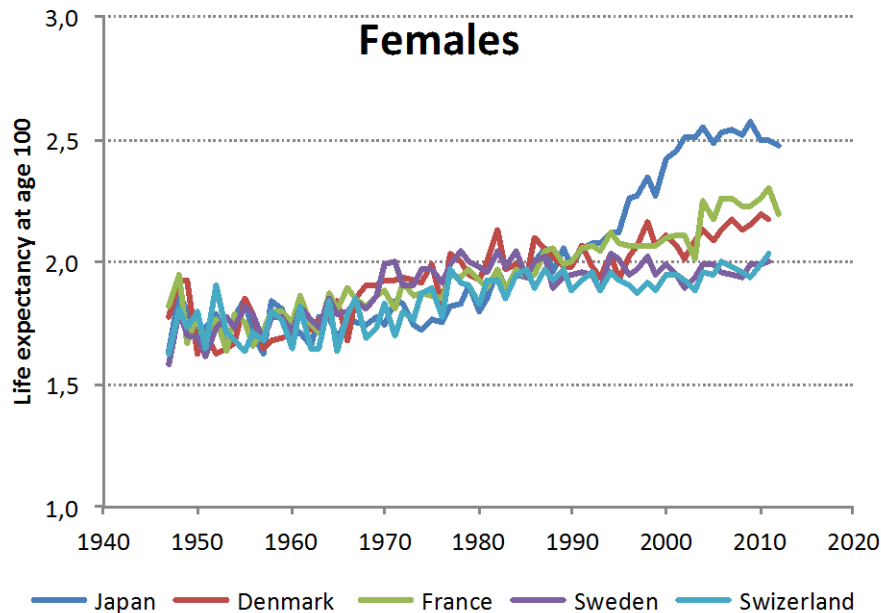
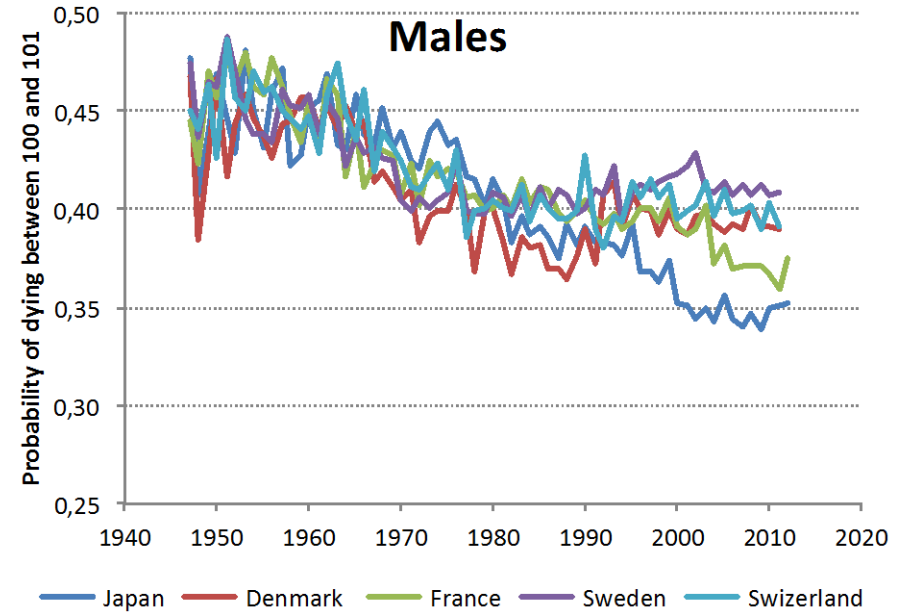
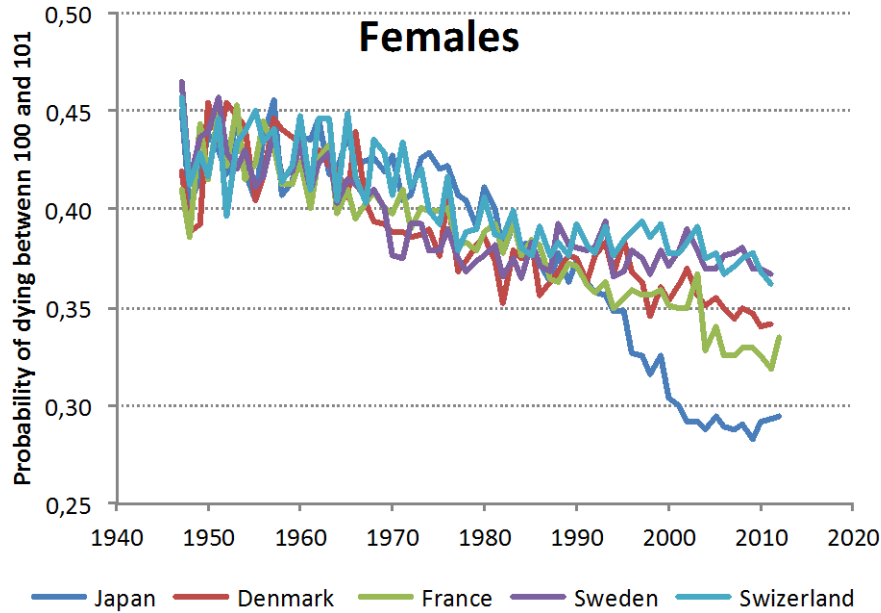
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Mortality and life expectancy above age 100



Number of oldest old in France by single age, 80 years and over

