



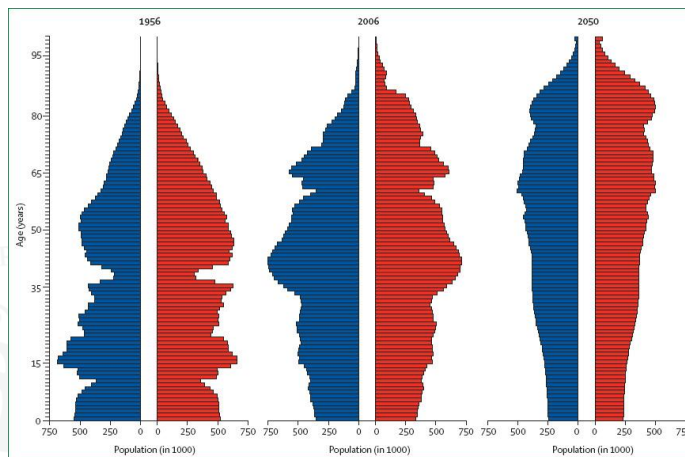
Are we ageing better at the highest ages?



Kaare Christensen
The Danish Ageing Research Center



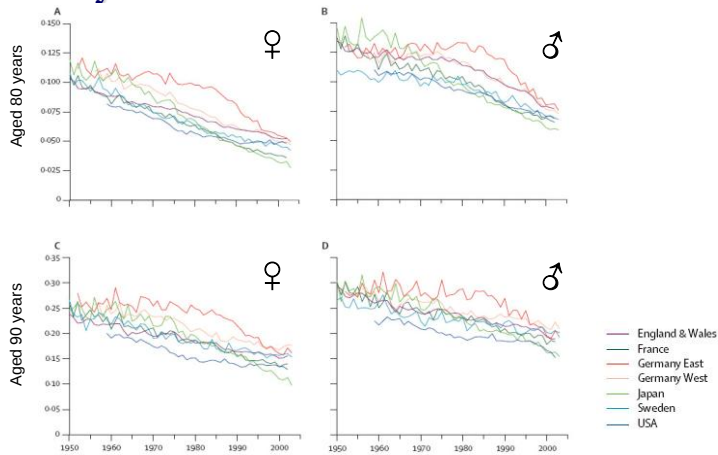
Population pyramids for Germany in 1956, 2006, and 2050



Christensen, Doblhammer, Rau, and Vaupel: Lancet 2009



Probability of dying for elderly men and women 1950-2003



Christensen, Doblhammer, Rau, and Vaupel: Lancet 2009



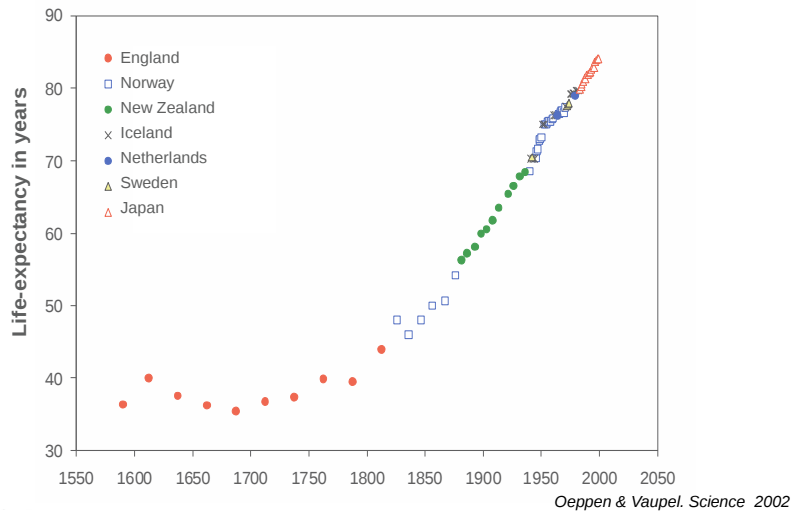
Key Question

Survival:

Will the progress continue?



Record Life-Expectancy



Oldest age in which at least 50% of a birth cohort is still alive

	2000	2001	2002	2003	2004	2005	2006	2007
Canada	102	102	103	103	103	104	104	104
Denmark	99	99	100	100	101	101	101	101
France	102	102	103	103	103	104	104	104
Germany	99	100	100	100	101	101	101	102
Italy	102	102	102	103	103	103	104	104
Japan	104	105	105	105	106	106	106	107
UK	100	101	101	101	102	102	103	103
USA	101	102	102	103	103	103	104	104

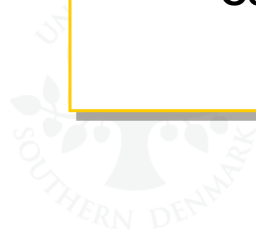
Data are in years. Baseline data were obtained from the Human Mortality Database and refer to the total population of the respective countries.

Christensen, Doblhammer, Rau, and Vaupel: Lancet 2009

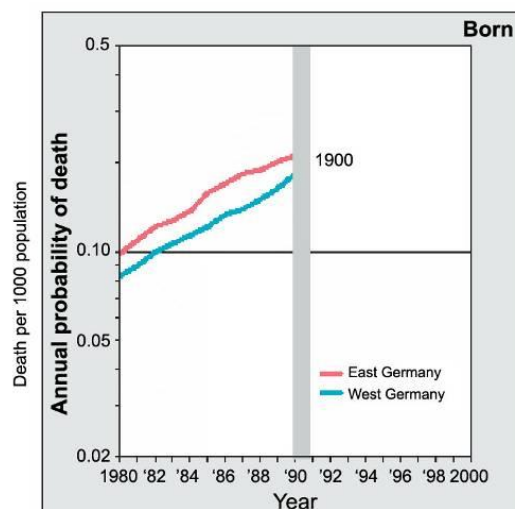


Key Question

**Declining mortality among the oldest-old:
Cohort and/or period effects?**



Germany 1980-2000

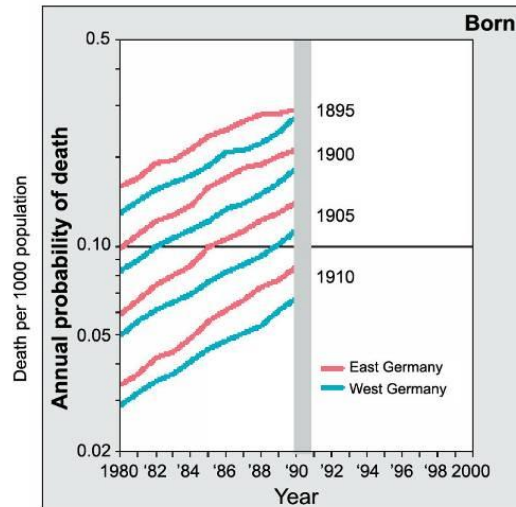


Vaupel, Carey, Christensen. Science 2003





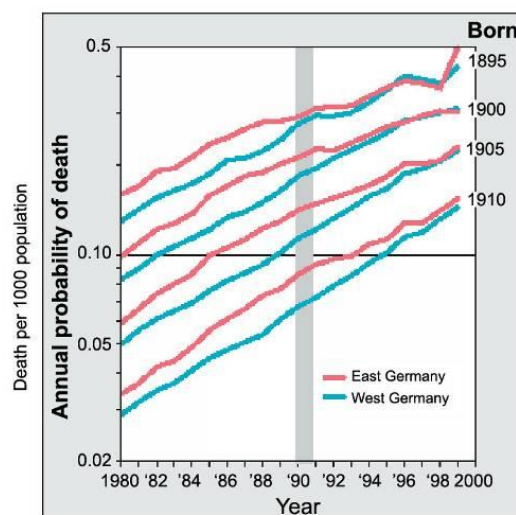
Germany 1980-2000



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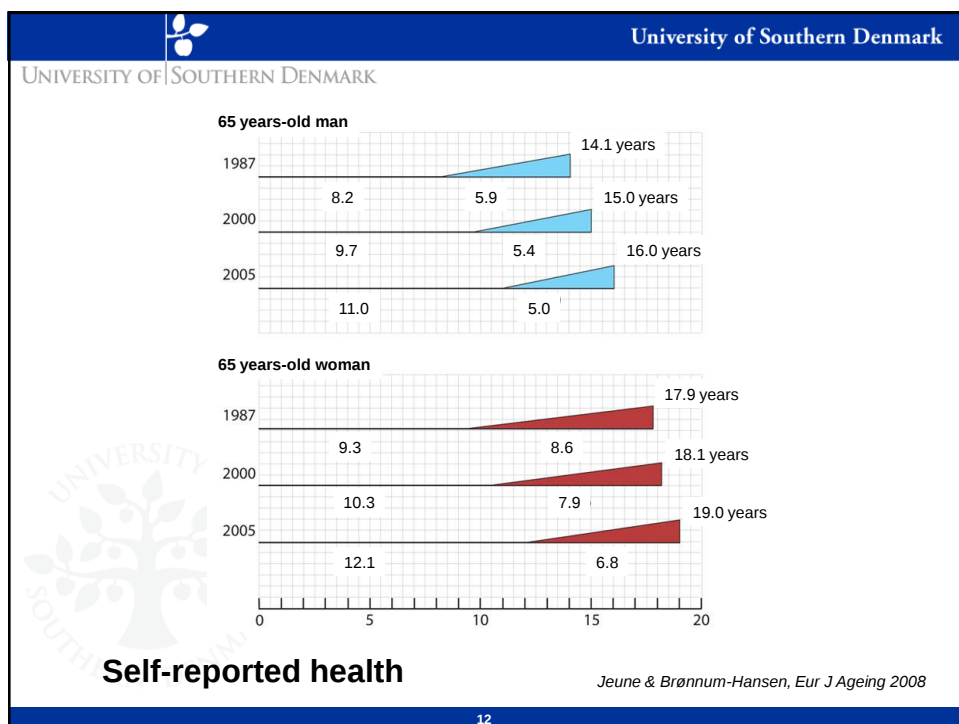
UNIVERSITY OF SOUTHERN DENMARK

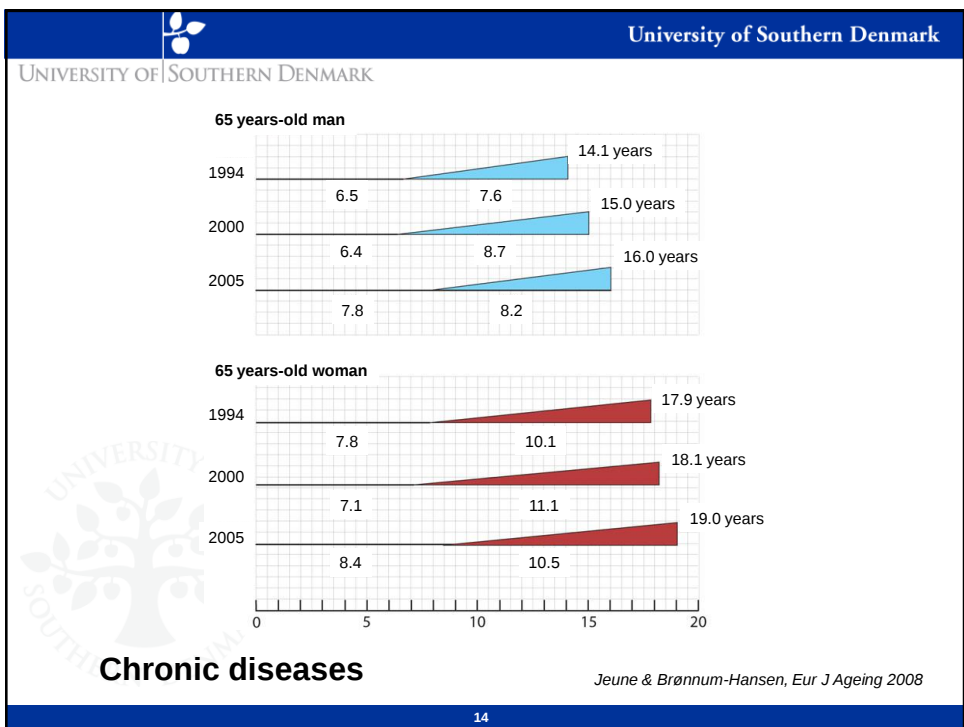
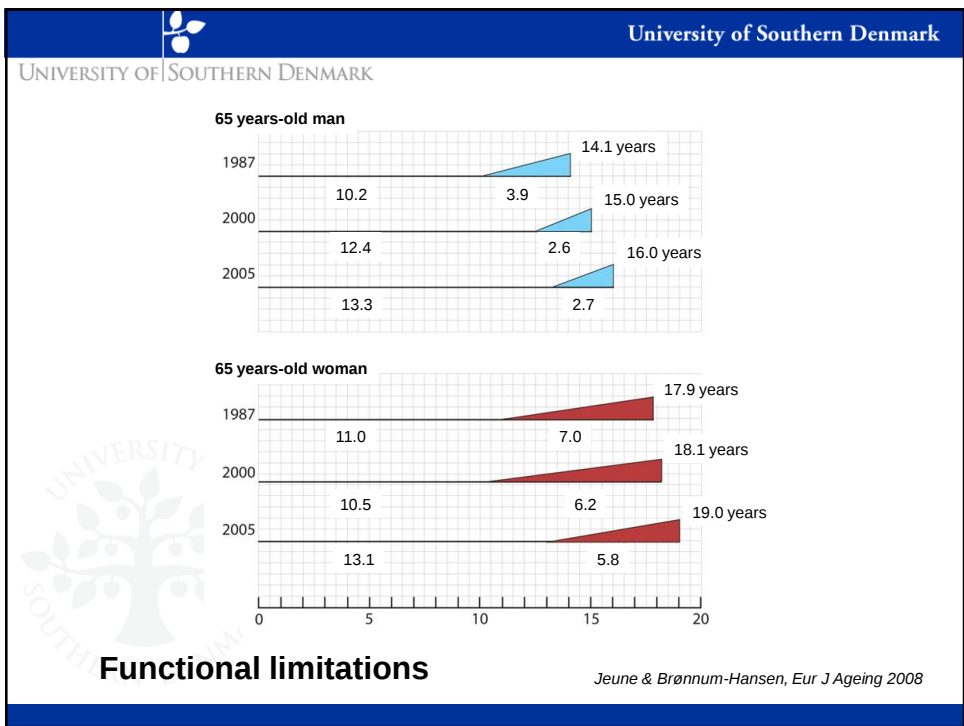
University of Southern Denmark

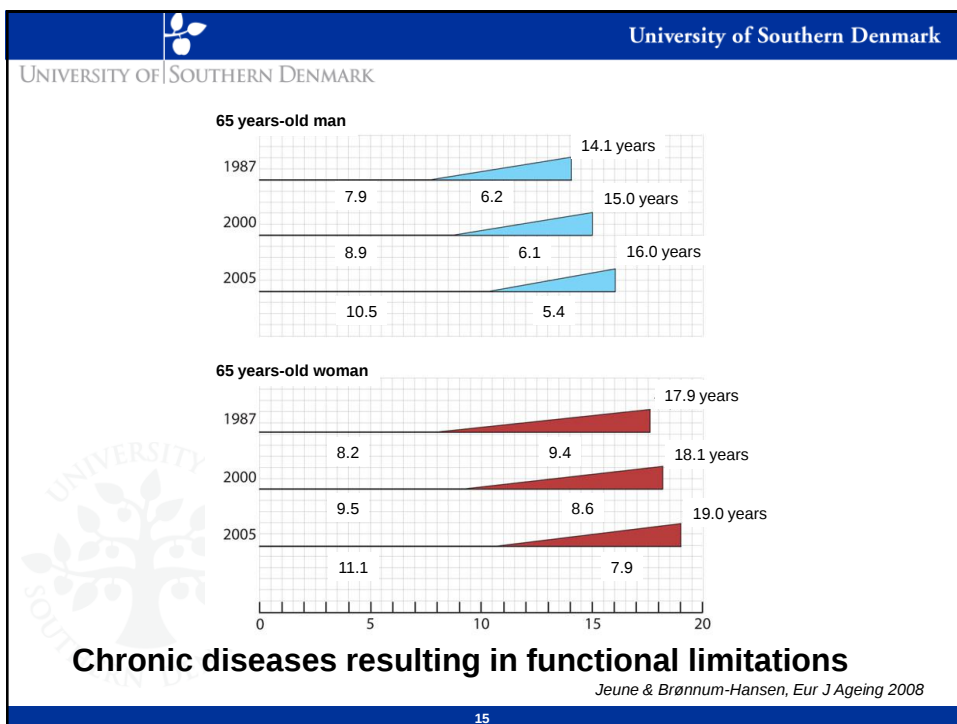
Key Question

Living longer –

and in better health ?





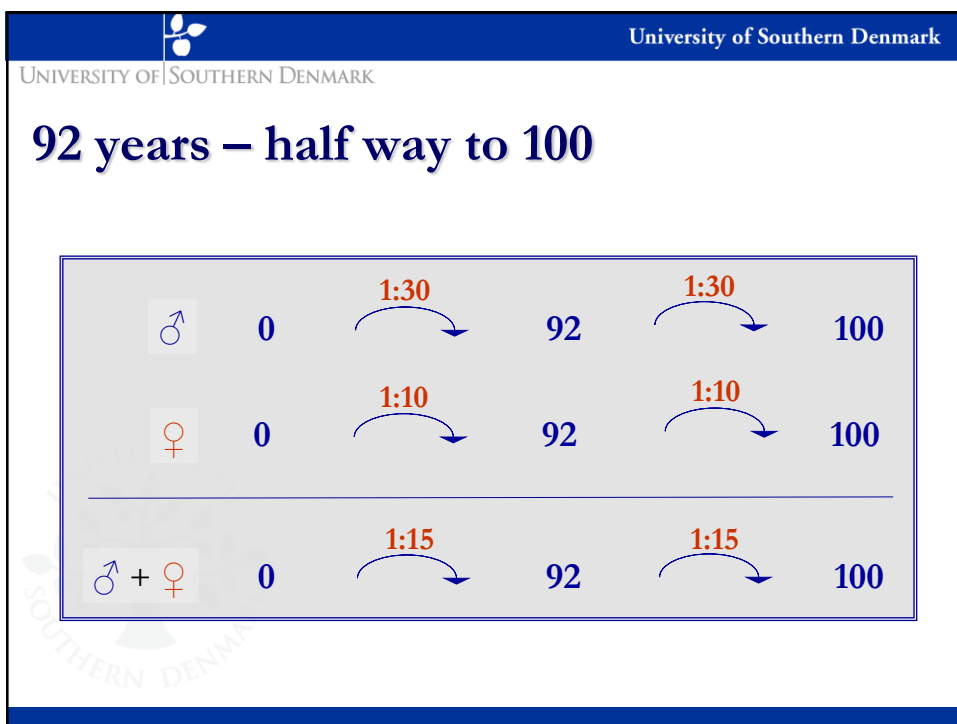
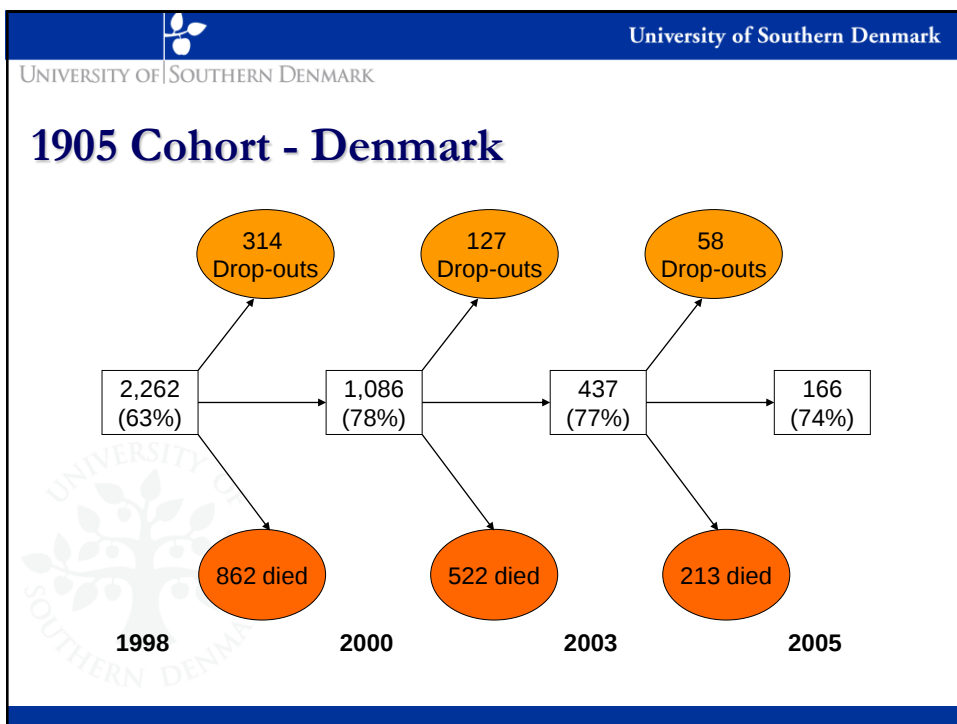


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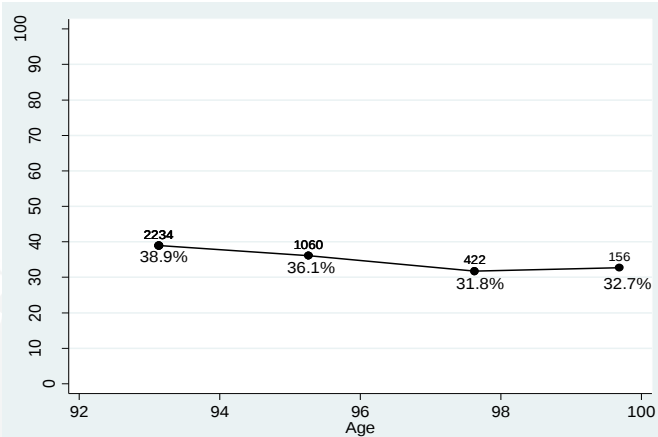
The Fourth Age

Does extreme longevity lead to extreme levels of disability?





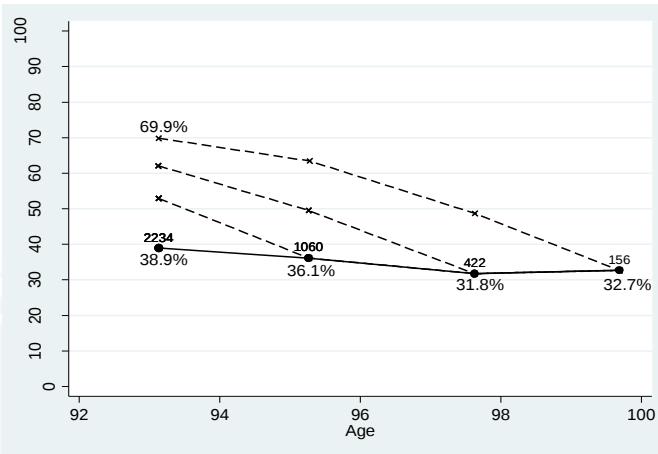
Independence in the 1905-Cohort



Christensen et al. PNAS, 2008



Independence in the 1905-Cohort



Christensen et al. PNAS, 2008



The Fourth Age

EXTREME AGES

Good news for populations

Bad news for individuals



The Fourth Age

Do cohort advances in functional status
extend to the Oldest-Old?

1895-Cohort vs 1905-Cohort

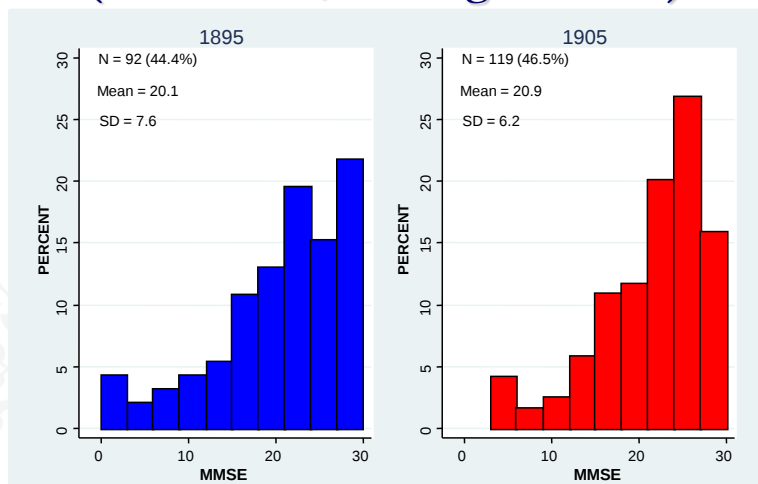


The Fourth Age

50% more made it to 100 years
in the 1905-Cohort
compared to the 1895-Cohort



MMSE (Not vision-/hearing-disabled)



Engberg et al. J Gerontol 2008



The Fourth Age

50% more made it to 100 years
in the 1905-Cohort
compared to the 1895-Cohort

Still no increased disability level



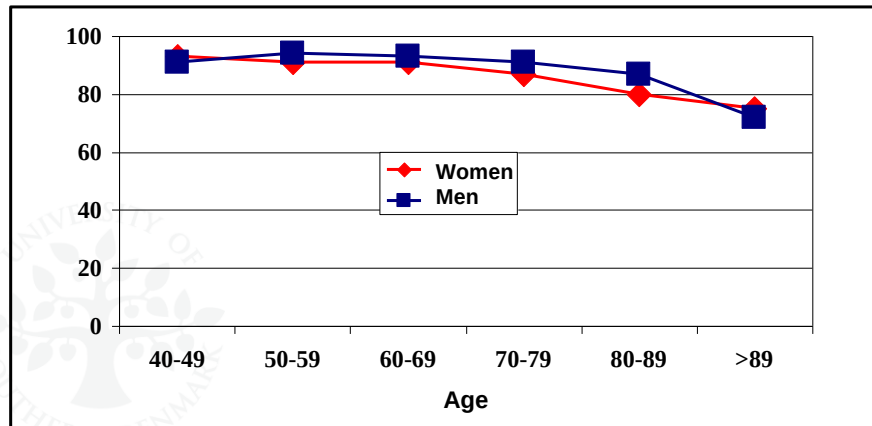
OK to be ambitious



Behandlingen

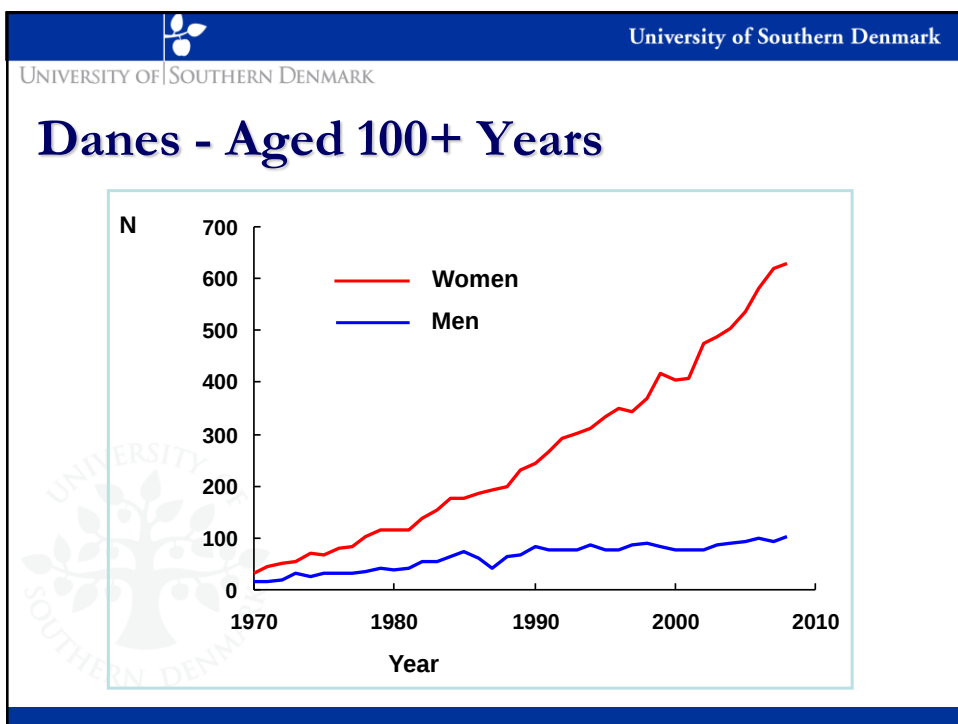
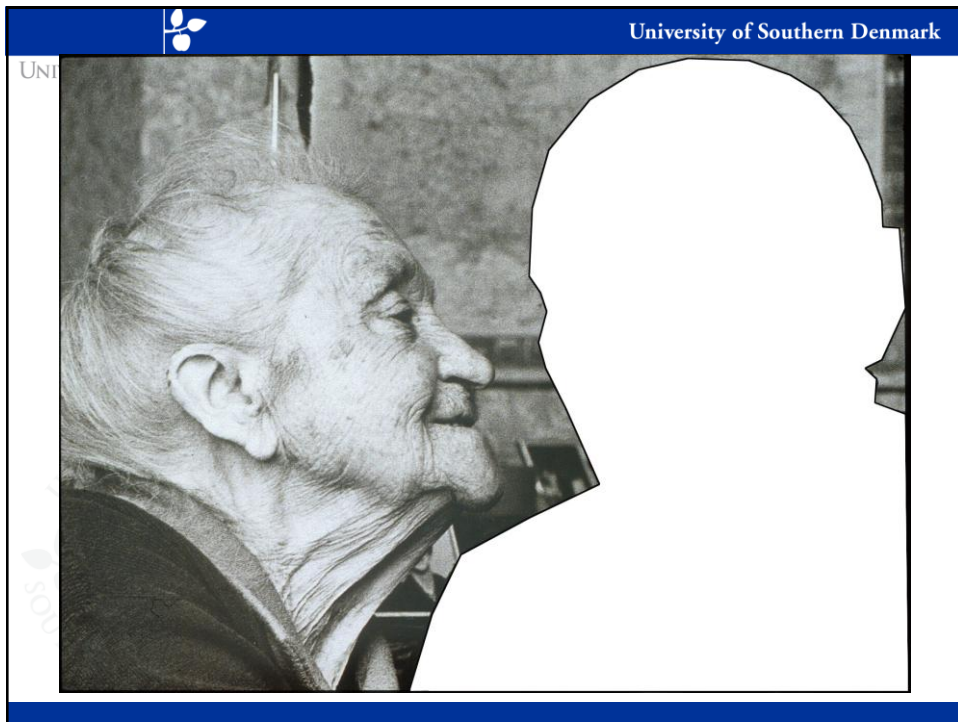


Proportion satisfied with life



Andersen et al. Scand J Pub Health 2007







Is it worthwhile becoming a centenarian?



Jeanne Calment

Age: 122 years
February 21, 1875 *
August 4, 1997 †



Chris Mortensen

Age: 115 years
August 16, 1882*
April 25, 1998 †



Follow-up of entire Danish 1905 Cohort

39,945 persons

- Hospitalizations
- Number of hospital days

January 1, 1977

December 31, 2004

Date at death was available until December 2006.



Results

Mean number of hospital days per individual per year by age at death (years) in the 1905 Cohort*

Total sample - men and women (n=39,945)

Age at death	N	Hospitalized at age:											
		71-74		75-79		80-84		85-89		90-94		95-99	
		Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
71-74	5484	17.2	0.3										
75-79	9012	5.5	0.1	15.1	0.2								
80-84	9494	3.1	0.1	5.6	0.1	14.0	0.2						
85-89	8506	2.0	0.1	3.2	0.1	5.5	0.1	11.5	0.2				
90-94	5261	1.4	0.1	2.1	0.1	3.1	0.1	5.1	0.1	7.2	0.2		
95-99	1829	1.3	0.1	1.3	0.1	1.7	0.1	2.9	0.1	3.8	0.2	4.8	0.2
100+	359	1.0	0.2	1.5	0.2	1.4	0.2	1.6	0.2	2.7	0.3	2.8	0.3

* Individuals with a migration status were excluded from the study population, n = 410

Engberg et al. Aging Cell 2009



Is it worthwhile becoming a centenarian?



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