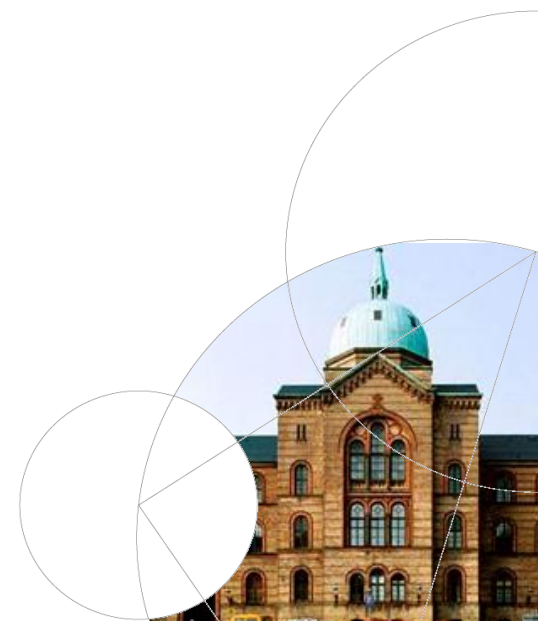




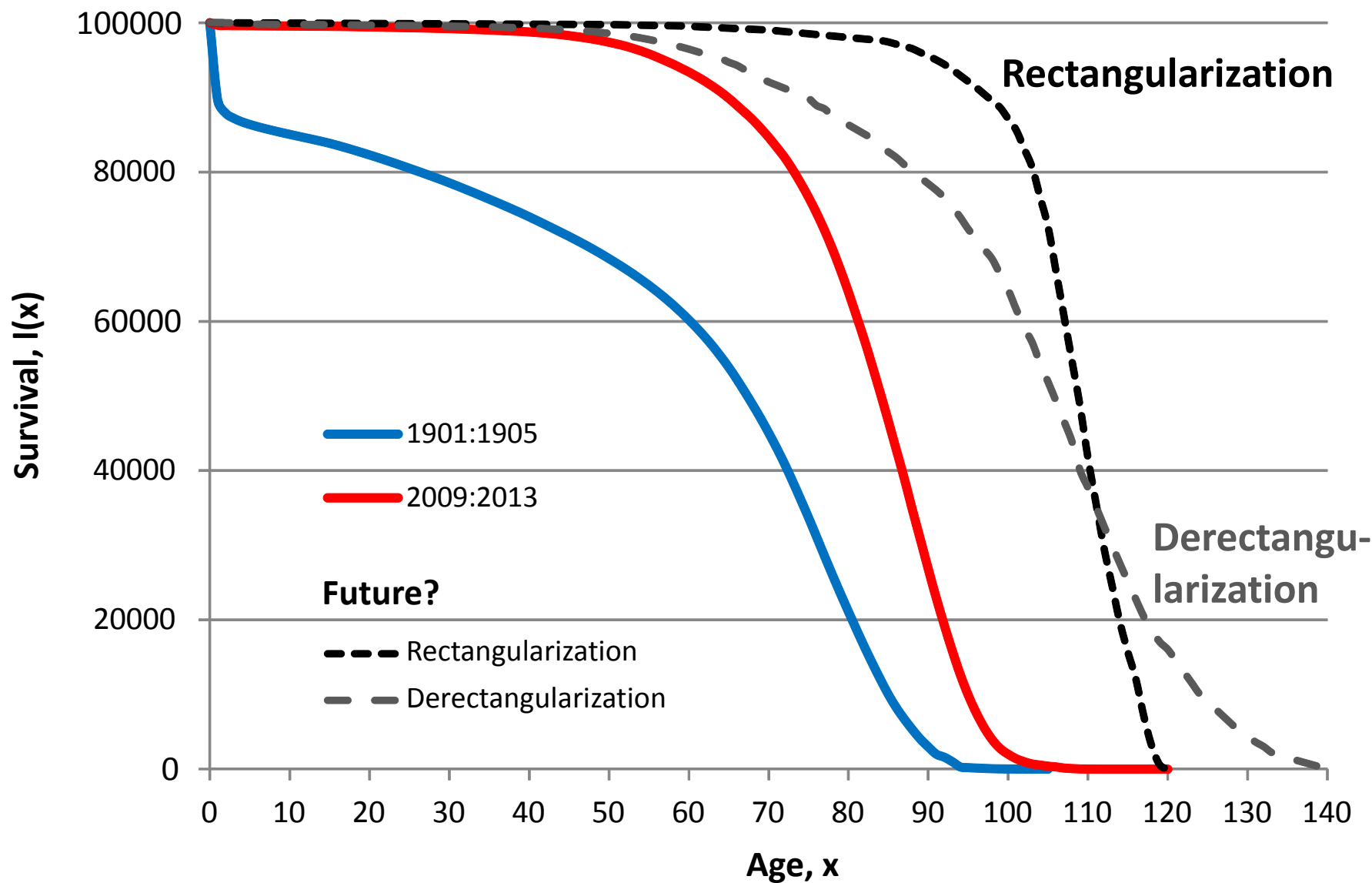
Social differentials in trends and patterns of adult mortality in Denmark

28th REVES meeting
Vienna
8 – 10 June 2016

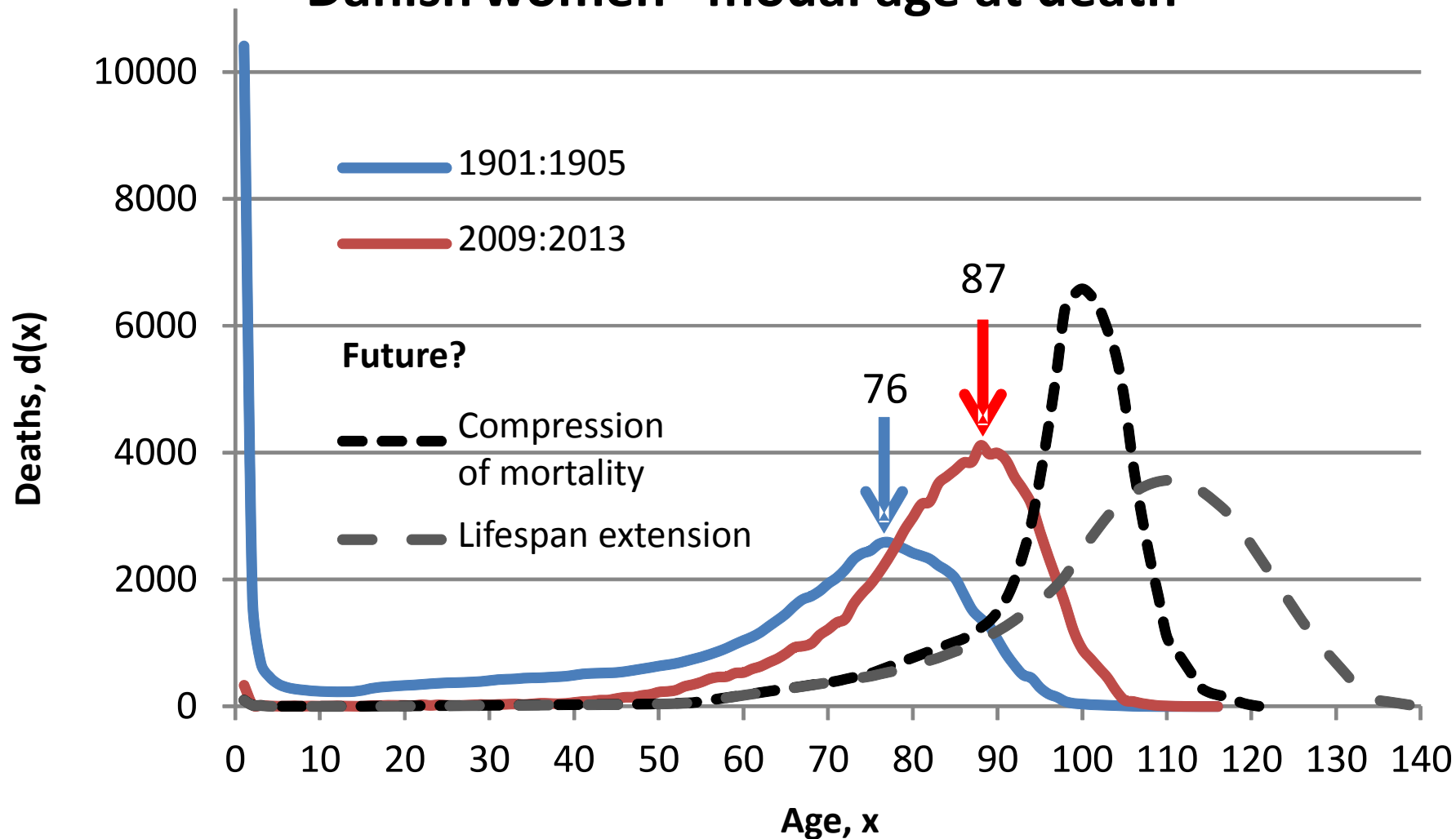
Henrik Brønnum-Hansen



Survival curve for Danish women



Danish women - modal age at death

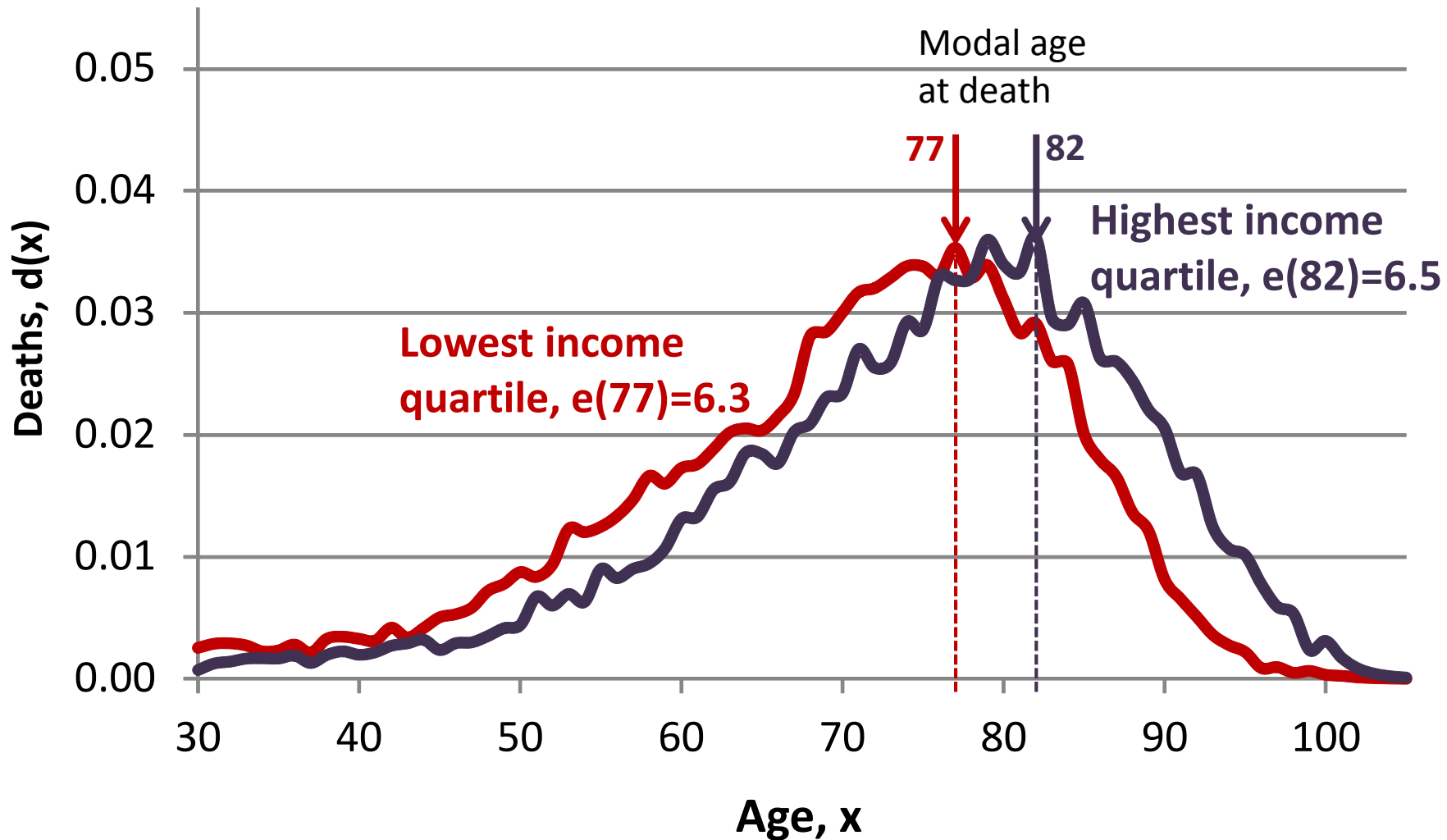


Since 1986 the difference in life expectancy between the lowest and highest income quartile (equivalent disposable income) increased from 5.5 to 9.6 years for men and from 5.3 to 5.7 years for women

Purpose: to investigate how changes in the mortality pattern differs between socioeconomic groups in Denmark

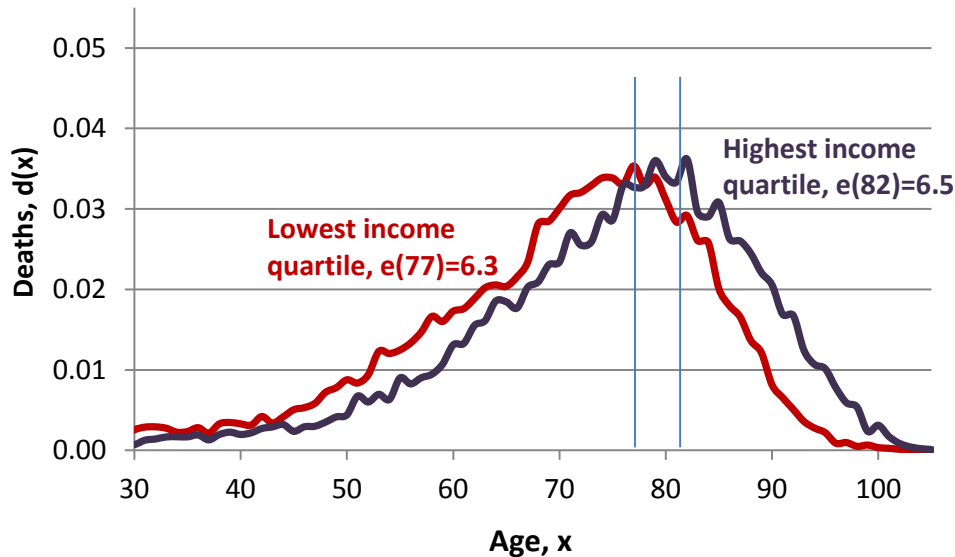
Focus on men's life expectancy and disparity, and whether the compression of lifespan differs between low and high income groups

Danish men, 1986

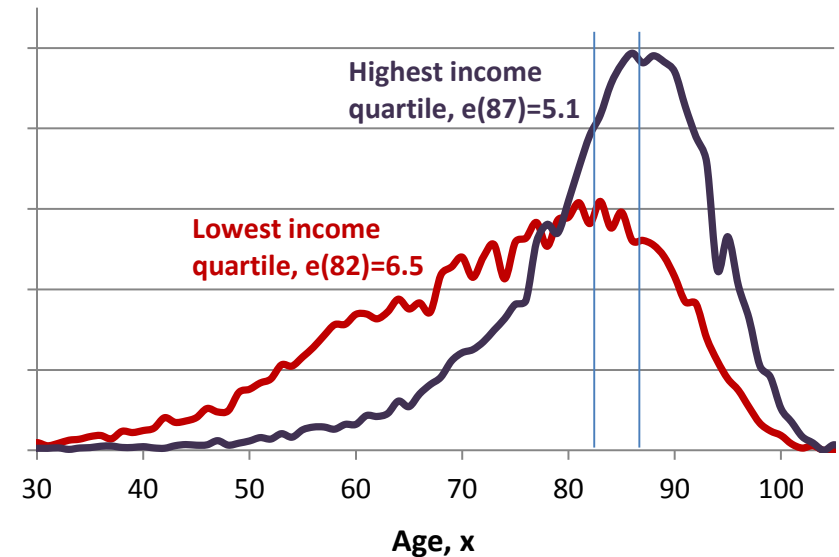


Age at death by income quartile (lowest and highest) in 1986 and 2014

Danish men, 1986



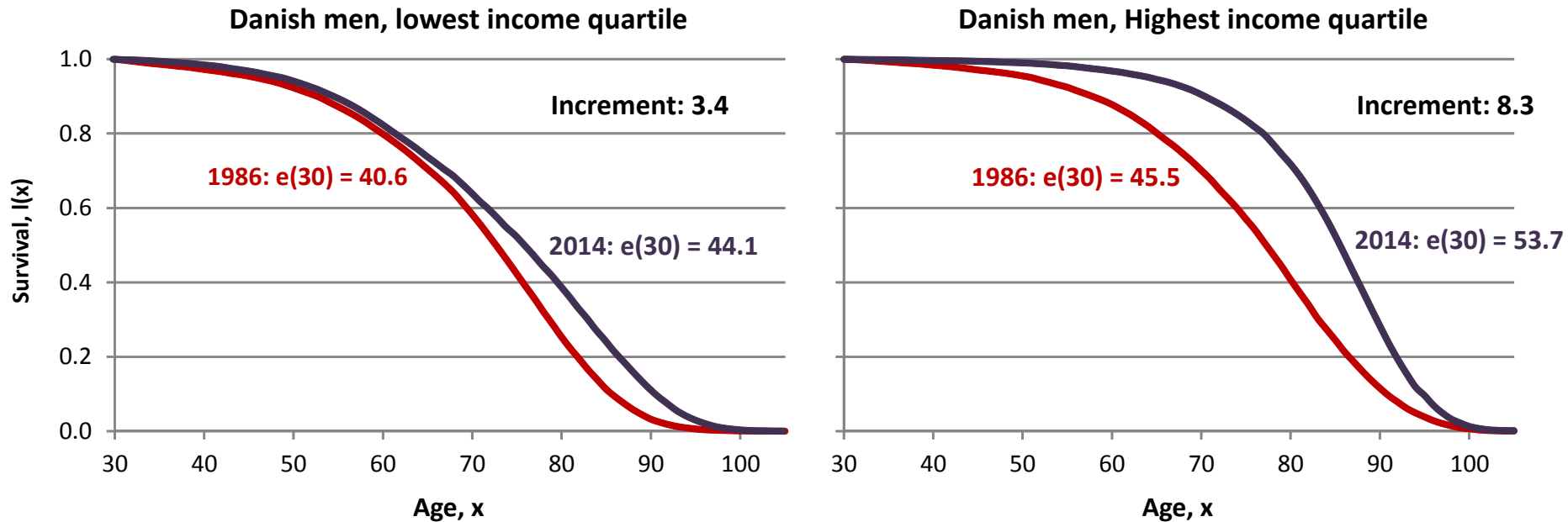
Danish men, 2014



Comparison of the changes from 1986 to 2014 between lowest and highest income quartile demonstrates

- No change in the difference (5 years) in modal age at death, but
- a distinct different change in the shape of the distribution of age at death

Survival curves by income quartile (lowest and highest) in 1986 and 2014



Comparison of the changes from 1986 to 2014 between lowest and highest income quartile demonstrates
Rectangularization of the shape of the survival curve seems to occur for the highest but not the lowest income quartile

Quantification of mortality patterns:

- **Life disparity**
- **Threshold age that separates 'early' and 'late' deaths**

Following methods developed by Vaupel, Zhang, Raalte and others

Life disparity, e^\dagger , is defined as life expectancy lost due to death:

$$e^\dagger = \int_0^\infty e(x) d(x) dx$$

Life disparity at age a , $e^\dagger(a)$, is defined as life expectancy lost due to death among survivors to age a :

$$e^\dagger(a) = \frac{1}{\ell(a)} \int_a^\infty e(x) d(x) dx$$

Threshold age, a^\dagger , is defined as the (unique) solution to the equation:

$$e^\dagger(a) + e(a)(H(a) - 1) = 0,$$

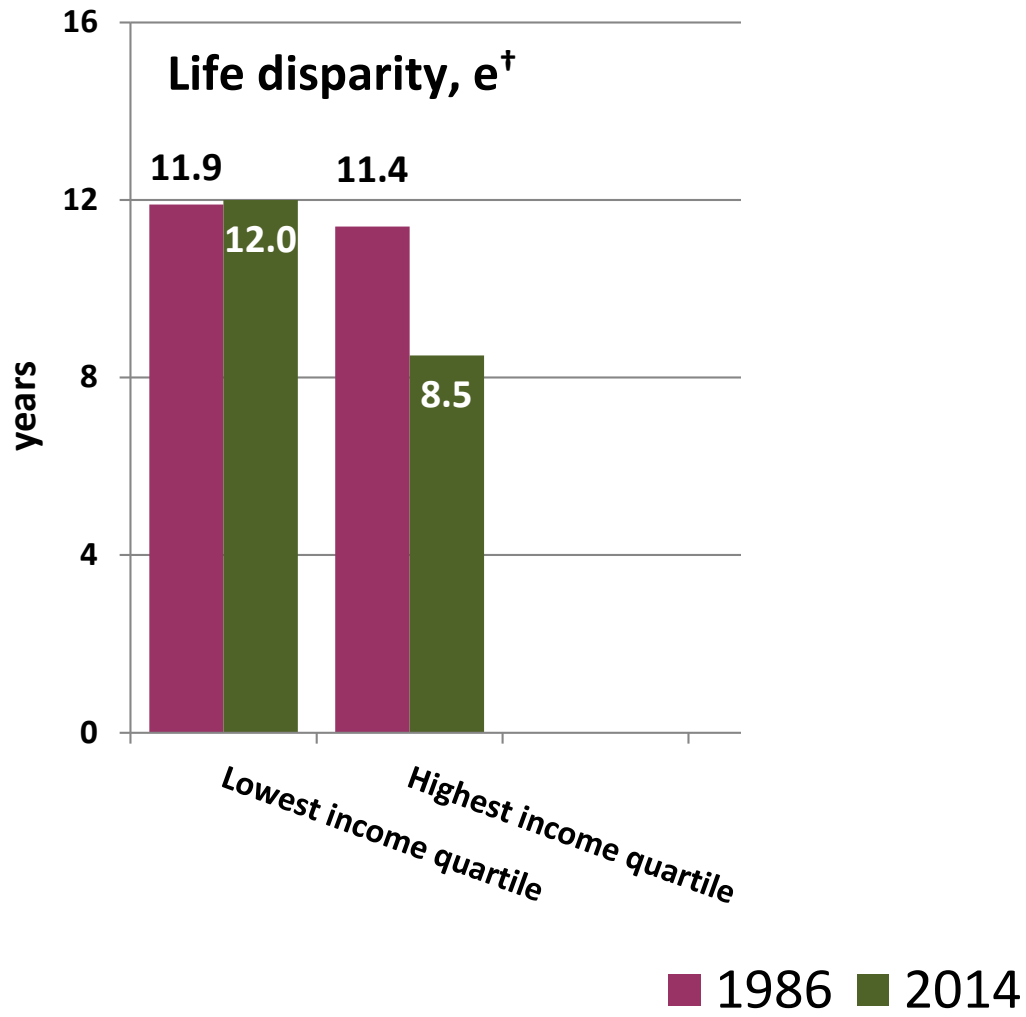
where $H(a)$ is the cumulative hazards function: $H(a) = \int_0^a \mu(x) dx$

Zhang and Vaupel have shown that a^\dagger is separating 'early' and 'late' deaths in the sense that postponing deaths before age a^\dagger ('early' ages) decreases life disparity, i.e. compresses lifespan disparity

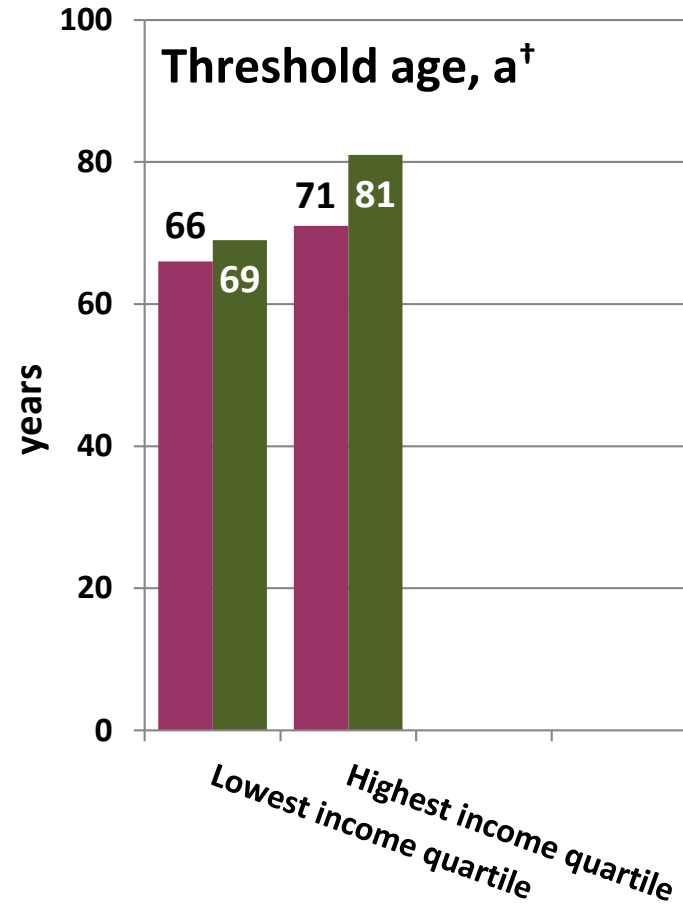
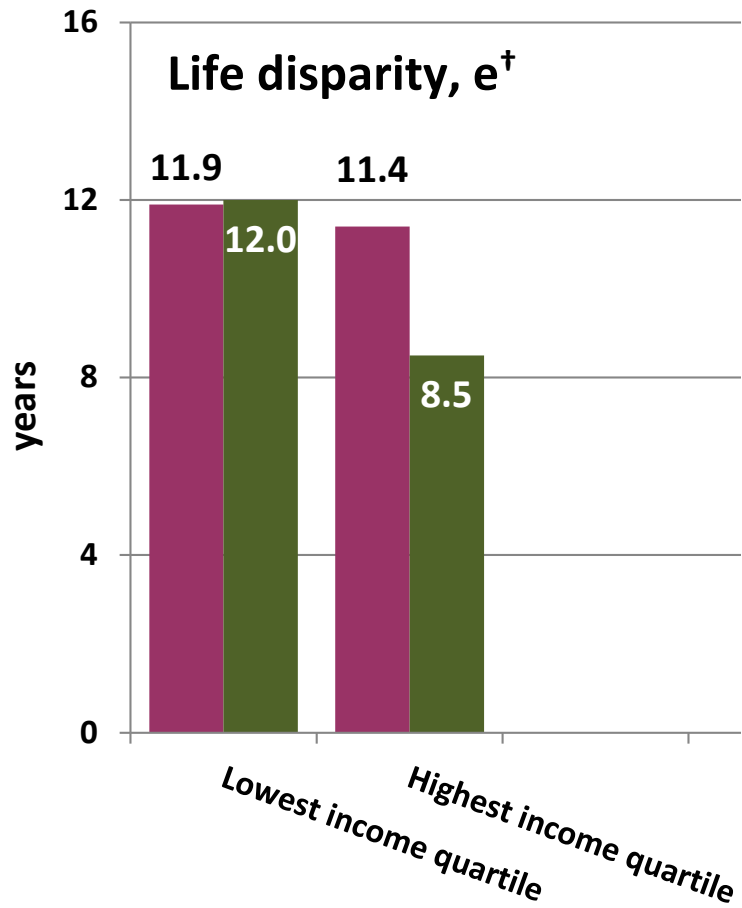
(Zhang Z, Vaupel JW. The age separating early deaths from late deaths. Demographic Research 2009;20:721-30)

Results

Men



Men



■ 1986 ■ 2014

Summary of results

For the lowest income quartile:

- Life expectancy at birth increased by 4.4 years since 1986
- No change during the last 28 years in life disparity
- Threshold age increased by 3 years since 1986

For the highest income quartile:

- Life expectancy at birth increased by 8.4 years since 1986
- Life disparity decreased by 2.9 years during the last 28 years
- Threshold age increased by 10 years since 1986

Conclusions

Changes in various measures of the adult mortality pattern differ markedly between males in the lowest and highest income quartile

- Modal age at death increased by 5 years for both groups,
- but the compression of the distribution of lifespan in the highest income quartile didn't occur for the lowest income quartile

Thank you!