Sex, survival and subsistence

A mediaeval Danish perspective

Genre, survie et subsistance -
Une perspective médiévale danoise

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Paleodemography

[...] attempts to identify demographic parameters
from past populations
derived from archeological contexts

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Male-Female Mortality Paradox

"The lives of females are shorter than the lives of men,
in most cases"

(Moses Maimonides, 1135-1204)

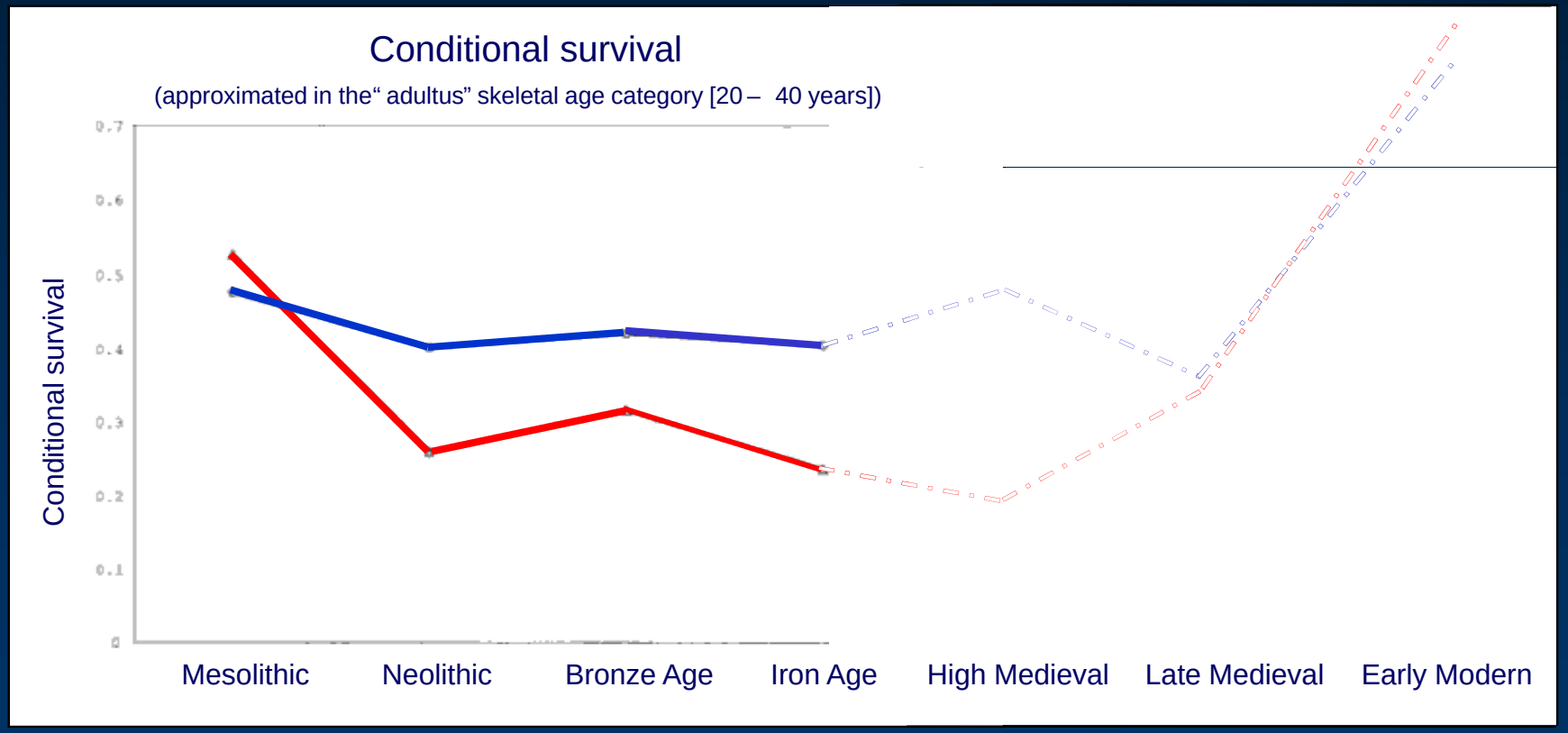
"Being male is now the single largest demographic risk factor
for early mortality in developed countries"

(Kruger & Nesse, 2004)

Differential mortality over time

Mortality differences between the sexes

(Estimated from skeletal collections)



Bentley, Paine et al. 2001

What shapes differential mortality?

Biology, behaviour, and availability of resources

- Males show higher mortality in most animal species
- In humans male disadvantage during pregnancy: Male:female ratio 1.3:3 at conception, but 1.06:1 at birth
- Men are more vulnerable to infections and parasites
- Level of oestrogen influences immune system and susceptibility for coronary heart disease
- ‘Dangerous fertile years’: higher female mortality due to childbearing or maternal depletion

What shapes differential mortality?

Biology, behaviour, and availability of resources

- Shorter inter-birth intervals increase maternal morbidity
- Hormones can determine behaviour:
  - Testosterone can increase risk-taking behaviour in young males & plays a role in modulating aggressive behaviour
  - Oxytocin in fertile women induces ‘tend and befriend’-strategies

What shapes differential mortality?

Biology, behaviour, and availability of resources

Behaviour:

- Women's role includes
  - cooking (susceptible to respiratory diseases),
  - caring for sick (more often exposed to bacteria and viruses),
  - herding the animals (potential source of infections)
- Immigration exposes varying groups to new diseases
- Violence (combat or inter-group aggression)

Resources:

- Unequal distribution of nutrition and health care inside families
- Urban/rural differences in nutrition and housing

Hypothesis

The general level of economic and social development

of a historical community shaped the mortality regimes

of the individuals living in it

Mediaeval Period

- Dating from around A.D.1050 to A.D.1536
- Defined by Catholic faith as dominant religious belief

Source: Hellesen & Tuxen 1988

Demographic changes

- After period of growth reduction in population size

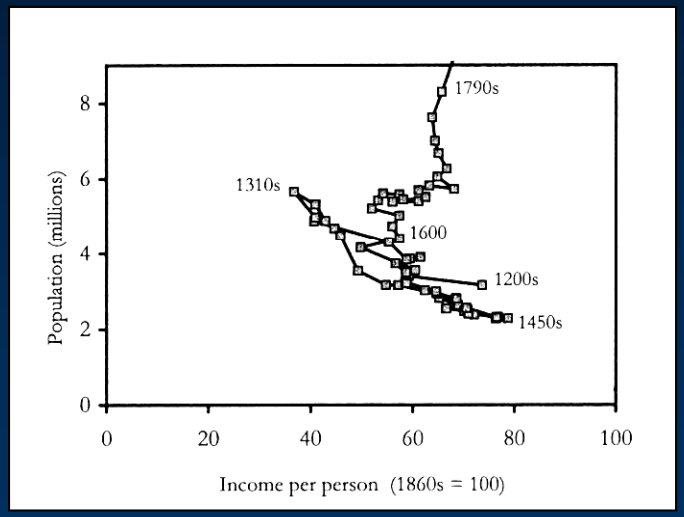
Year A.D.	1050	1300	1400	1660
Population (Mil.)	0.5	1 - 2	0.25 - 0.5	0.49

New structures in society

- Social mobility

  From manorial systems with self-sufficient farmers, living as tenants, to a feudal society, divided in 4 states:

  Nobility, clergy, burghers and peasants



- Immigration from countryside to towns

Data

Nordby

1050-1250

Early Middle Ages

(N = 145)

Partly market integrated agriculture

Sct.Mikkel, Viborg

1050 - 1530

Middle Ages

(N = 182)

Urban (partly) market integrated agriculture

Sweden

1751 - 1759

Early Modern

(Human Mortality Database)

Urban (fully) market integrated agriculture

Tirup

1150-1350

High Middle Ages

(N = 213)

S:t Jörgen, Malmö

1300 - 1530

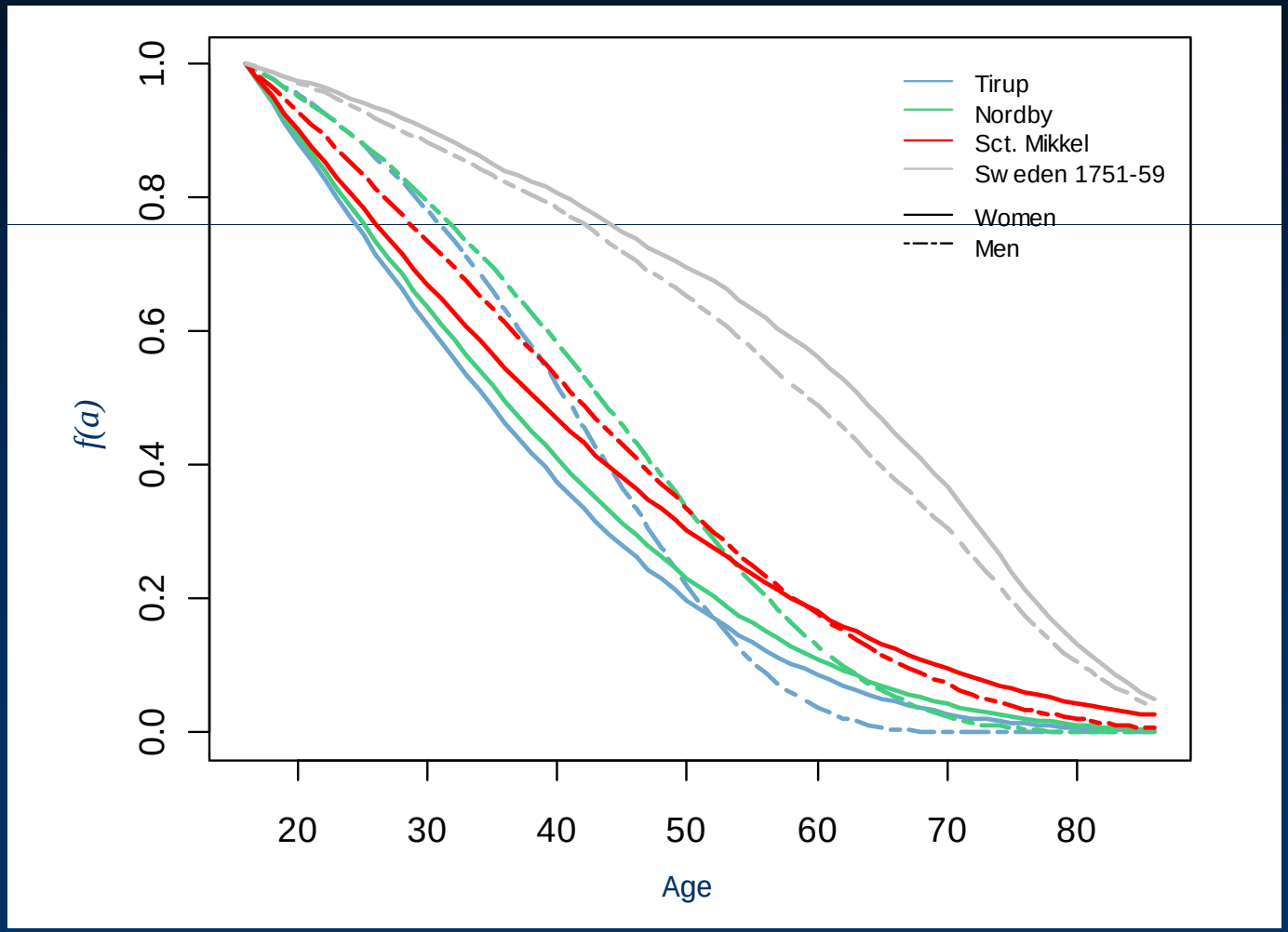
Late Middle Ages

(N = 986)

Age at death distribution

Norby, Tirup, Sct. Mikkel & Sweden

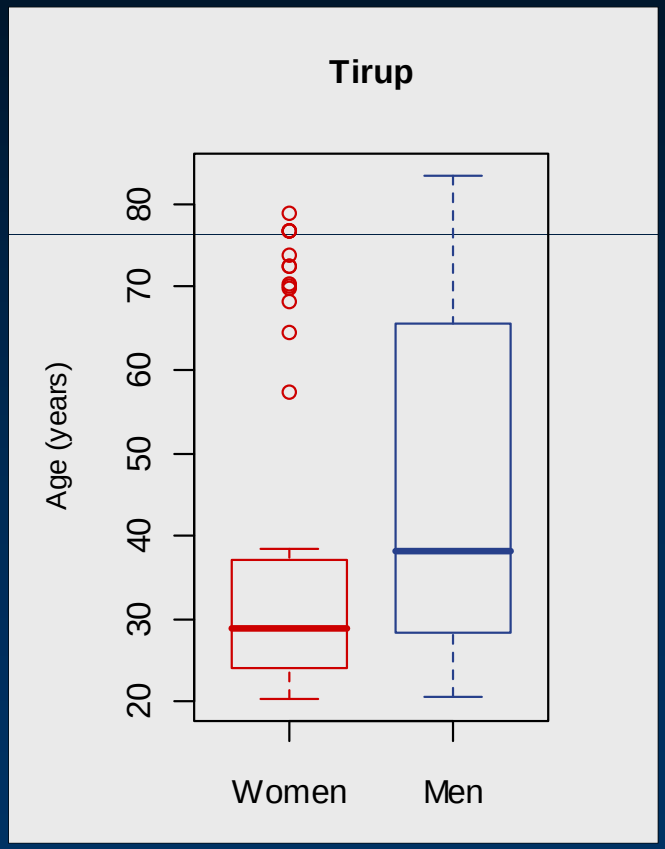
(Conditioned on survival to age 16)

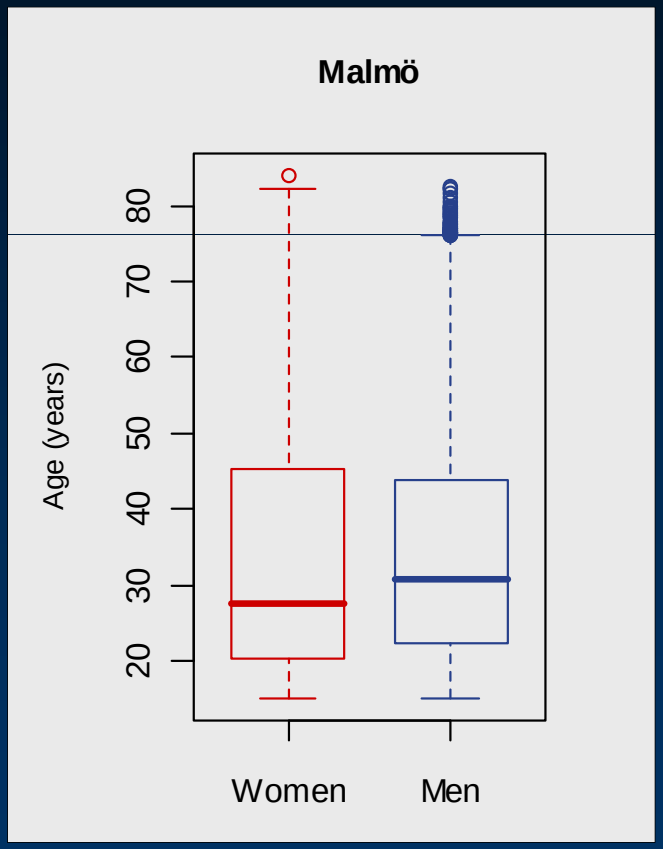


Distribution of deaths

Ages at death according to sex (Tirup & Malmö)

(Conditioned on survival to age 16)

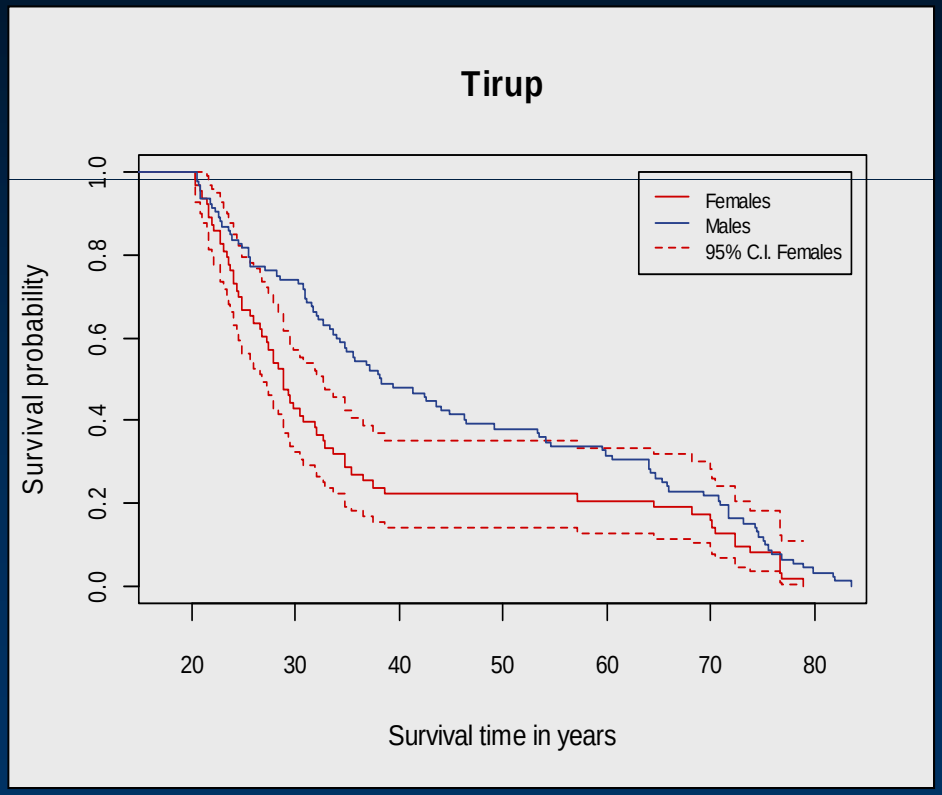


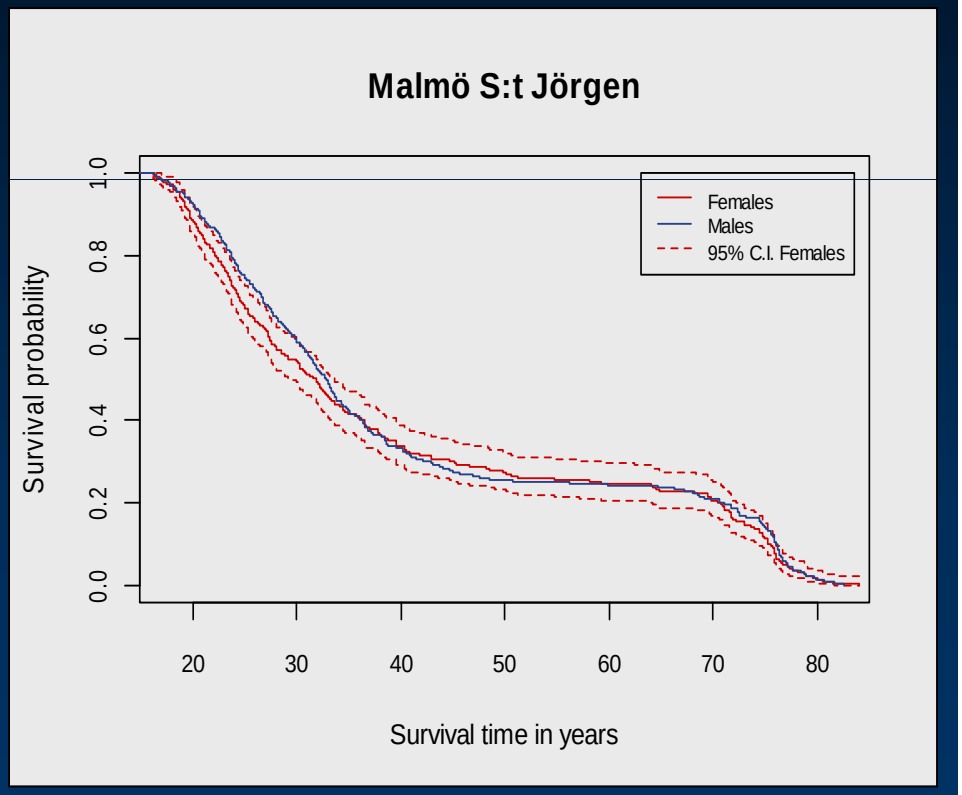


Survival

Survival curves for males and females (Tirup & Malmö)

Conditioned on survival to age 16





Possible explanations

Biology, behaviour, and availability of resources

Biology:

- Competing for mates causes increase in male risk-taking behaviour
- Lower “immunocompetence” - disadvantage in case of immigration

Behaviour:

- Late marriage leads to fewer children and reduced risk of dying due to childbirth in women

Resources:

- Equal distribution of resources for males and females

Summary

Epidemiological transition in mortality patterns over time

Partly market integrated agriculture

Increased female mortality during reproductive years

Urban (partly) market integrated agriculture

Period of equal risk of dying for both sexes

Urban (fully) market integrated agriculture

Excess male mortality

Outlook

'Sex and survival - Mortality differences in the past'

- Sub-project in the framework of
  'Demography of Sex Differences in Health and Survival'
- 20 000 skeletons
- Timeframe: Mesolithic to Late Middle Ages
- Geographically located around the Baltic Sea
- Age estimation using *Calibrated Expert Inference*
- Recording of age, sex, tuberculosis, osteoporosis,
  work-related changes and violent or activity related fractures