

Past trends of obesity-attributable mortality in the Netherlands; an application of Age-Period-Cohort analysis

Nikoletta Vidra¹, Maarten J. Bijlsma², Fanny Janssen^{1,3}

1. Population Research Centre, Faculty of Spatial Sciences, University of Groningen, the Netherlands, email: n.vidra@rug.nl
 2. Unit PharmacoEpidemiology & PharmacoEconomics (PE2), Department of Pharmacy, University of Groningen, the Netherlands
 3. Netherlands Interdisciplinary Demographic Institute, the Hague, the Netherlands

Background

- Obesity has dramatically increased over time and constitutes a major health burden¹.
- The health burden of obesity can be estimated by obesity-attributable mortality².
- Previous studies on obesity-attributable mortality did not account for the multiple dimensions of the obesity epidemic: age, period and birth cohort³.
- Next to age and period, a birth cohort effect is likely.
- An effect of birth cohort was previously reported in obesity prevalence in the United States³.
- The observed extended exposure to obesity among younger birth cohorts is likely to also occur in Europe and to affect mortality.

Data & Methods

Data (by age and sex):

- Obesity prevalence (P) (Statistics Netherlands)
- Relative Risks (RR) of dying from obesity from meta-analysis by Wang (2015)⁴
- All-cause mortality (HMD)

Methods:

• Obesity-attributable mortality:

$$\text{Population Attributable Fraction (PAF)} \times \text{All-cause mortality}$$

(based on P and RR)

- **Age-Period-Cohort** analysis: Clayton and Schifflers approach⁵

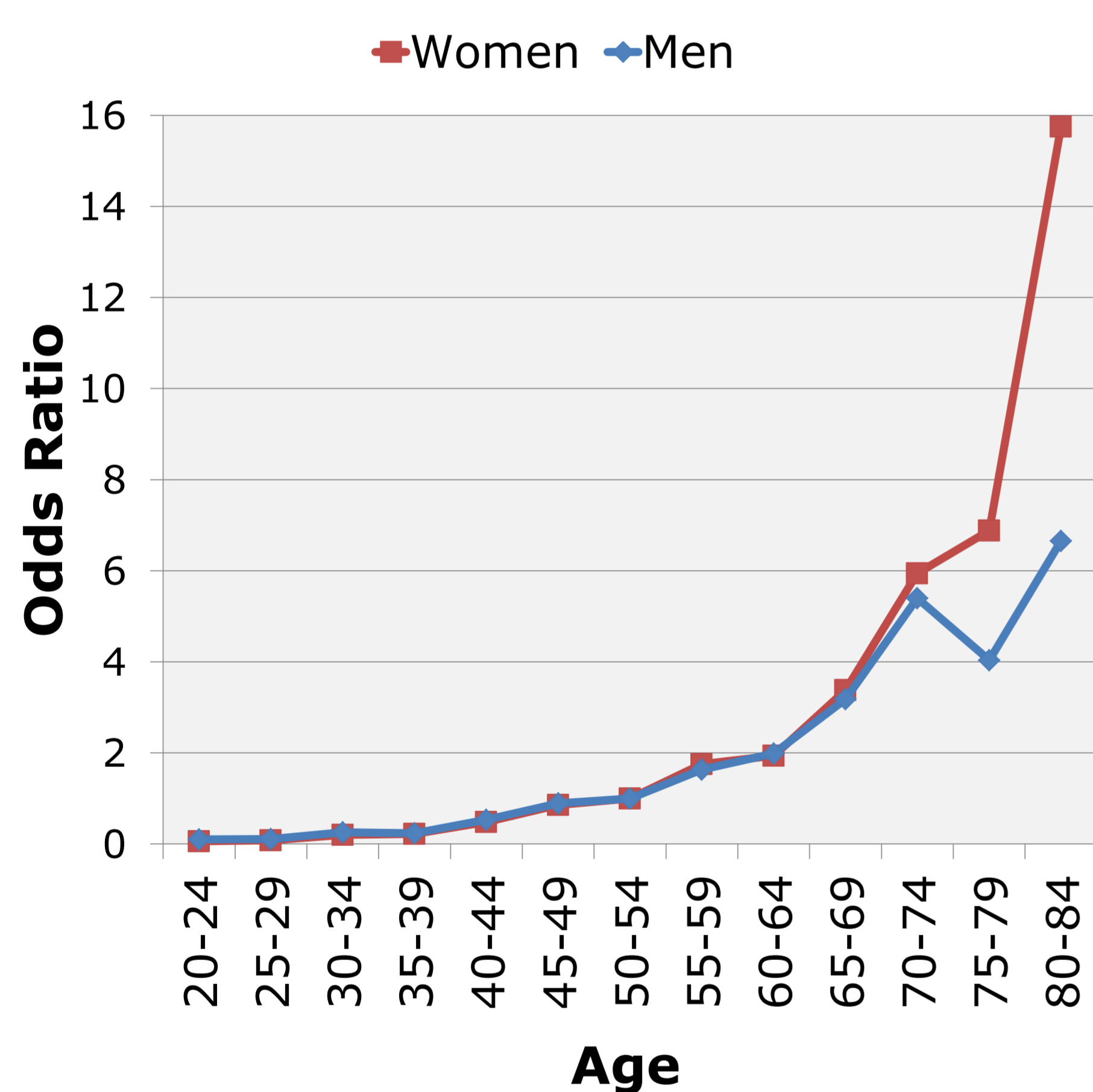
Objective

To better capture the complexity of the obesity epidemic and its impact on mortality **by assessing age, period and birth cohort effects and patterns** in the Netherlands, in the period 1981 to 2010.

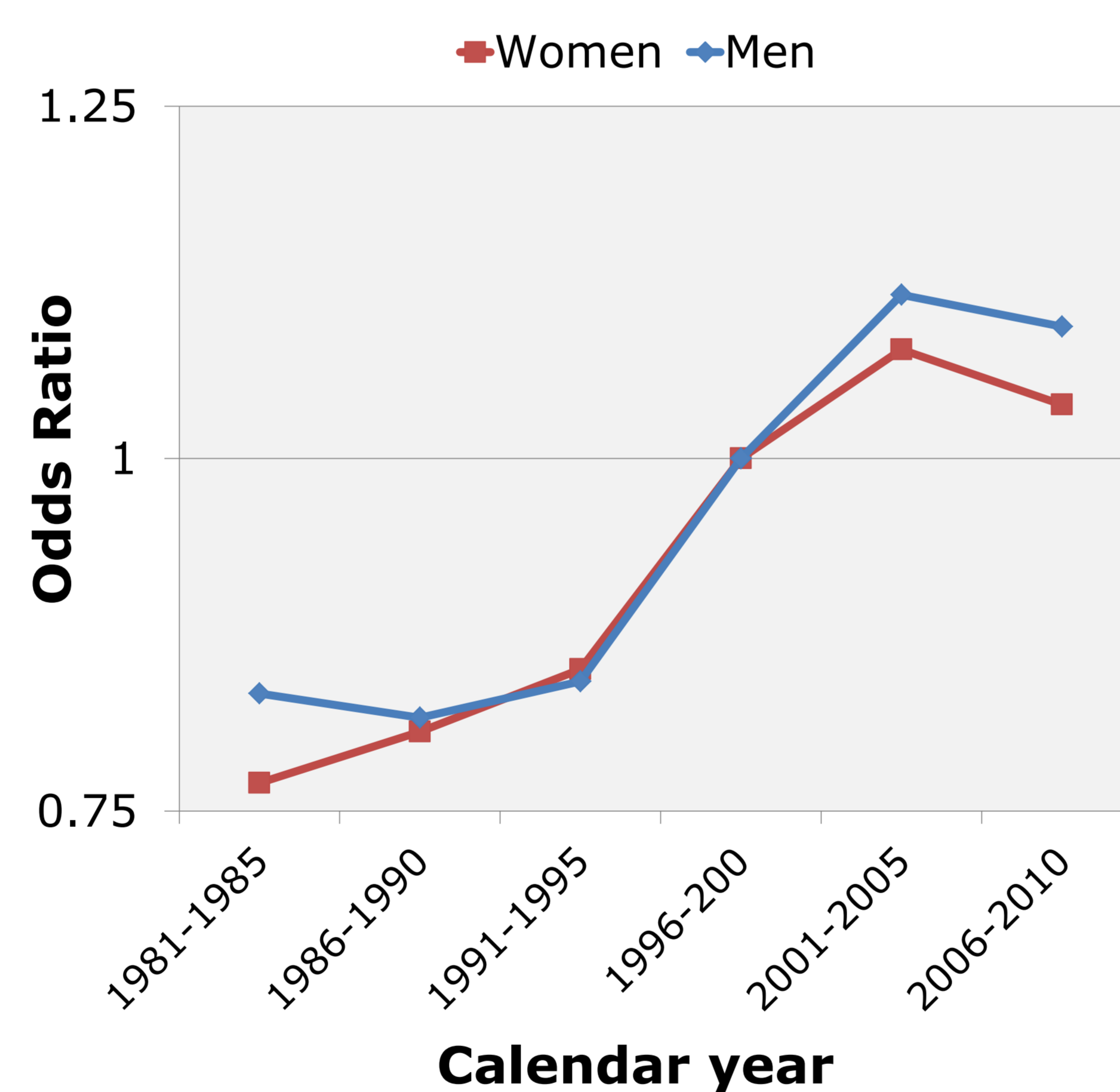
Results

Obesity-attributable mortality in the Netherlands, 1981-2010

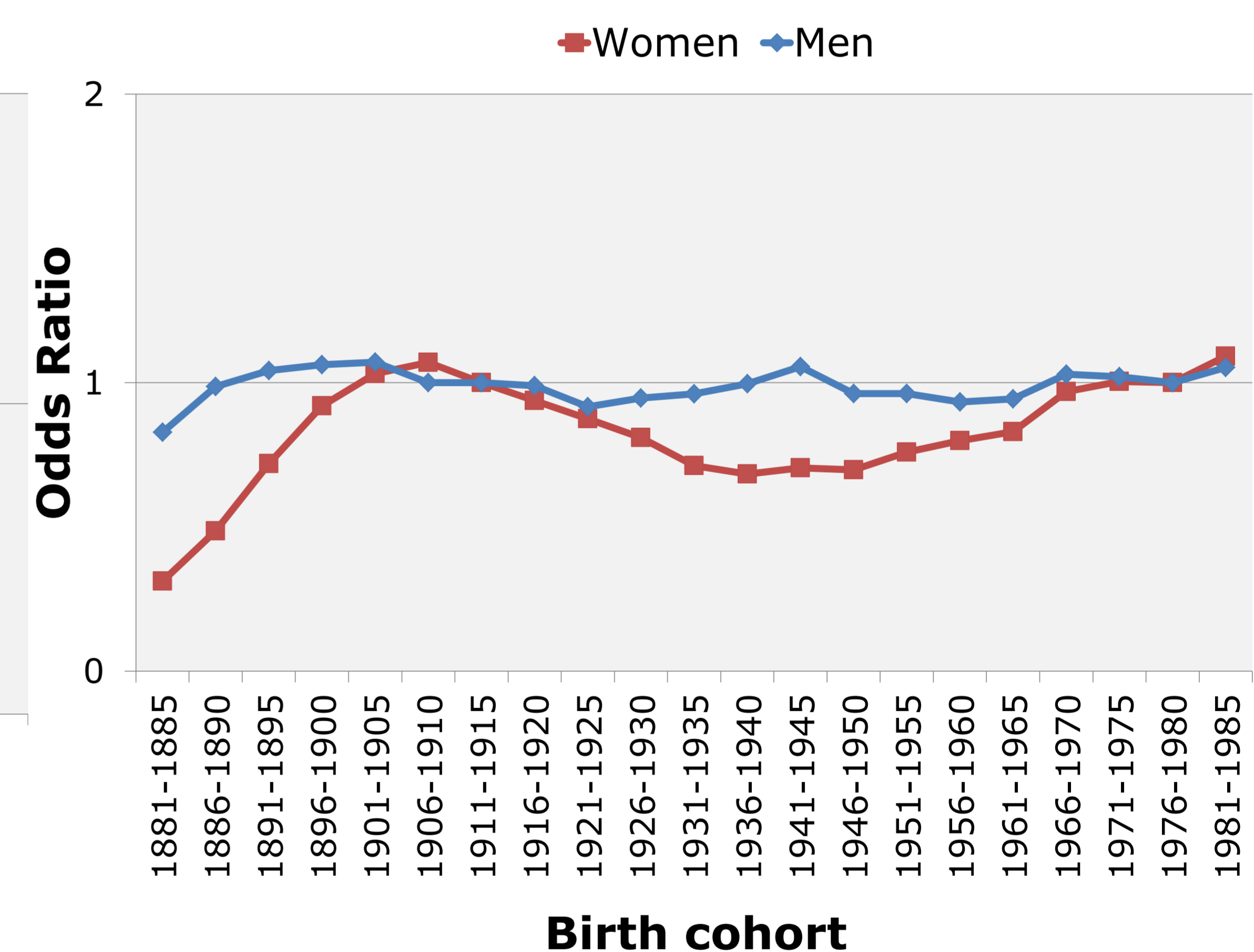
I. Age pattern



II. Period pattern



III. Birth cohorts pattern



- Obesity-attributable mortality doubled in the Netherlands between 1981 and 2010.
 - In men, the fraction of mortality due to obesity rose from 0.7 % to 1.3 %.
 - In women, from 1.0 to 2.0 %.
- In the 1990s the obesity epidemic started to increase substantially **(II)**.
- Patterns for men and women are very similar for age and period but not for birth cohort **(I,II,III)**.
- For women born after 1941-1945, obesity-attributable mortality is increasing with every next generation **(III)**.
- The added effect of birth cohort is larger among women as compared to men, and for women even more important than the effect of period **(IV)**.

IV. Contribution to the deviance reduction

	Percentage reduction	
	Women	Men
Drift	35.50%	76.0%
Period	11.60%	14.4%
Cohort	52.80%	9.5%

Drift: Loglinear change shared between period and birth cohort

Conclusions

Next to age and period a substantial effect of birth cohort on obesity-attributable mortality was shown, especially in women. Future studies on obesity-attributable mortality should not ignore the multiple dimensions of obesity.

References

1. WHO (2015) Obesity and overweight. Fact Sheet No 311.
2. Flegal KM et al. Estimating population attributable fractions to quantify the health burden of obesity. Ann Epidemiol 2015;25(3):201-7.
3. Reither EN. Do Birth Cohorts Matter? Age-Period-Cohort Analyses of the Obesity Epidemic in the United States. Soc Sci Med 2009;69(10):1439-48.
4. Wang Z. Age-dependent decline of association between obesity and mortality: A systematic review and meta-analysis. Obes Res Clin Pract 2015;9(1):1-11.
5. Clayton D et al. Models for temporal variation in cancer rates. II: age-period-cohort models. Stat Med 1987;6(4):469-81.



university of
groningen