

Sex differences in mortality in Denmark during half a century, 1943–92

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Objective: The emphasis of this study is on the relative mortality of 45–74-year-old men and women in Denmark in 1943–92, following economic and political changes that have affected the social meaning of gender over the last 50 years, and which have diminished former sex differences in health behaviour. **Methods:** Sex ratios of total mortality and mortality from major non-sex-specific causes of death were calculated on computerized mortality data from the Danish National Cause of Death Register that covers all deaths in Denmark since 1943. **Results:** In the early 1940s the sex ratio of all-cause mortality was low, 1.0–1.1, it increased to a peak level in the late 1970s and early 1980s, but has since decreased due to an increase in female mortality and a more favourable trend in male mortality. **Conclusion:** Gender equality, employment, and economic autonomy may have beneficial health effects on both men and women, but the effects are inconsistent. The trend in smoking is the major explanatory factor for the more recent trends in gender differentials in mortality in Denmark.

Key words: cause specific mortality, Denmark, employment, gender equality, health behaviour, mortality, sex ratio.

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INTRODUCTION

It is well known that in all industrialized countries males have shorter life expectancy than females due to biologically and, presumably in large part, gender differences in living conditions and health-related behaviour (1–6).

In the last few decades a number of studies have reported the magnitude of sex ratios of mortality in different populations and in different age groups; sex ratio being defined as male mortality divided by female mortality. The analyses have been based either on World Health Statistics provided by the World Health Organisation (7, 8) or on national or regional population studies (1, 3, 9). The studies have reported that gender differences in mortality generally increased in the 1960s and 1970s and decreased a little during the 1980s.

Early studies, for example the American Cancer Society study in 1959–63, reported the sex ratio for total mortality to be 2.16 among 45–54-year-olds, and 2.45 among 55–64-year-olds (cited from 4). Verbrugge and Wingard (1) reported in 1987 that the sex mortality ratios had increased most dramatically for 55–64-year-olds, from 1.4 in 1940 to 2.1 in 1970, due to increasing mortality from diseases principally affecting men, i.e. cardiovascular diseases

and lung cancer. However, the sex differentials in mortality of 45–74-year-olds was lower in 1980 than in 1970. In a recent analysis based on official British statistics, sex ratios of total mortality were between 1.5 and 1.7 among 35–74-year-olds, and had declined a little from 1986 to 1996 (10).

Sex differentials in mortality vary widely among the developed countries (7, 8, 11). In an analysis of sex mortality ratios in 1975–78, a relatively low mortality differential was found in Denmark compared with, for example, the other Scandinavian countries and southern European countries, which was explainable by a higher than average mortality from breast cancer and suicide among women in Denmark (7). By 1988 the sex ratio of all cause mortality among 45–54-year-olds in Denmark was 1.45 in Denmark, compared with 1.71 in Sweden, 1.92 in Norway and 2.40 in France (8).

Thus, the trend in differentials in male and female mortality in Denmark has differed from that in comparable countries. Furthermore, since the late 1970s life expectancy in Denmark has developed less favourably than in other industrialized countries. In the period 1980–89 most countries have reported an annual increase in life expectancy at birth by 0.1–0.4% for men and 0.1–0.3% for women, compared

with 0.09 and 0.03%, respectively, in Denmark. In 1992 Danish men had the third lowest, and Danish women the lowest life expectancy at birth among men and women in all OECD countries, and the gender difference in life expectancy had declined from 5.1 years in 1970 to 4.8 in 1992 (12).

Recent statistics thus indicate that the previous more favourable trend in female mortality may slow down in response to health-related behaviour. Alternatively, men's health may be improving at a faster rate because they have been exercising more, smoking less, and following healthier diets in recent years (13).

During the last 20–30 years Denmark has been characterized by relatively small gender differences in occupational rate, in exposure to work hazards and work strain, and in health-related behaviour, compared with the 1940s and 1950s, and compared with other countries. We therefore found it of special interest to describe trends in sex ratios of mortality in Denmark over 50 years influenced by major transitions in living conditions of men and women. This study focuses on 45–74-year-olds, thus excluding women of reproductive age, and including the age groups in which trends in mortality adds mostly to the stagnation in life expectancy in Denmark. It was expected that sex ratio of mortality would reflect gender differences in living conditions and health behaviour.

MATERIAL AND METHODS

Data were retrieved from The National Institute of Public Health's Register of Causes of Death, 1943–92, concerning a total of 614,686 deaths among men aged 45–74 years and 449,478 deaths among women aged 45–74 years. This is a computerized register containing all deaths in Denmark since 1943. The information in the register is based on the classification of causes of death in the death certificates by the Danish National Board of Health. From 1943 to 1950 causes of death were classified by the International Bertillon Classification, since 1951 in accordance to the criteria of WHO following the 6th Revision of International Classification of Diseases from 1951 to 1957, the 7th revision (ICD-7) from 1958 to 1968, and ICD8 from 1969 to 1993.

For the age-groups 45–54 years, 55–64 years, and 65–74 years, male and female mortality from cardiovascular diseases (CVD), lung cancer, all other cancers excluding sex-linked cancer (breast, prostate, and genital cancer), external causes and total mortality were calculated for five-year periods.

Descriptive analyses of the trend in sex ratio of mortality were based on calculation of ratios as number of male deaths per 100,000 men/number of

female deaths per 100,000 women in the age group in question and in five-year periods, for 1943–92.

RESULTS

All-cause mortality

The trend in sex ratios of all-cause mortality in the age groups 45–74 years is shown in Figure 1. In 1943–47 the ratio ranged between 1.0 and 1.1, increased among 45–54-year-olds to a peak level of 1.5 in 1963–82, among 45–64-year-olds to 1.8 in 1963–82, and among 65–74-year-olds to 1.9 in 1978–82. During the next five-year periods the ratio declined in all age groups, most among 55–64 and 65–74-year-olds, 11.1% and 10.5%, respectively.

Table I shows the sex ratios and the different trends in male and female mortality in two 20-year periods, and in the 50 years period studied. The increase in sex ratio of all-cause mortality from 1943–47 to 1963–67 was due to a 29–35% decrease in female mortality in the three age-groups and a much lower decrease in mortality among 45–54-year-old men, 11%. Among men aged 55–64 years and 65–74 years the mortality even increased 7% and 4%, respectively. From 1963–67 to 1983–87 the mortality trend among 45–54 and 55–64-year-old men and women was more similar, however, the female mortality increased by 5% and 7% and the male mortality decreased by 1% and 0.5% in the respective age groups. Among 65–74-year-olds there were still major differences in mortality trends, male mortality declined by 4% and female by 21% and

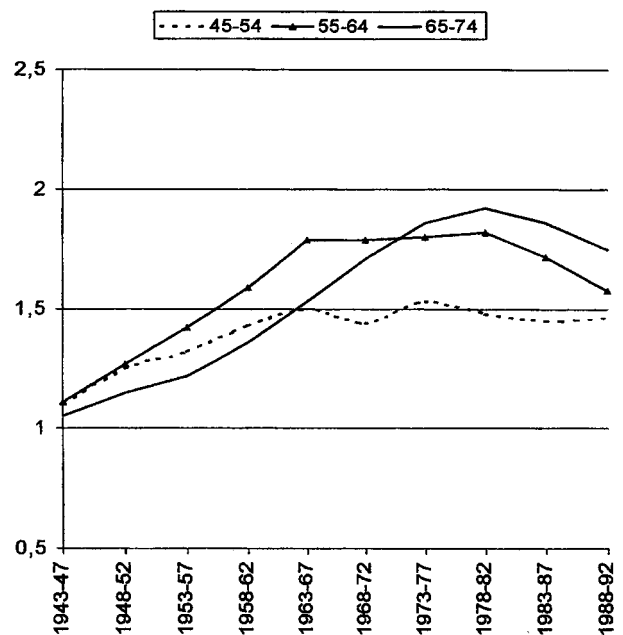


Fig. 1. Sex ratio of all cause mortality, Denmark 1943–92 by period and age group.

Table I. Trends in sex ratio and in male and female mortality during two 20-year periods and in the 50 years 1943–47 to 1988–92

Age-group (years)	Sex ratio				Change in mortality (%)							
	1943–47	1963–67	1983–87	1988–92	1943–47 to 1963–67		1963–67 to 1983–87		1983–87 to 1988–92		1943–47 to 1988–92	
					Male	Female	Male	Female	Male	Female	Male	Female
45–54	1.10	1.50	1.45	1.46	–11.0	–34.9	–1.2	+5.0	–9.9	–10.4	–19.0	–38.8
55–64	1.11	1.79	1.72	1.58	+7.1	–33.4	–0.4	+6.9	–7.5	+0.8	–1.5	–30.5
65–74	1.05	1.53	1.86	1.75	+4.1	–29.8	–3.8	–20.6	–1.2	+2.3	–3.9	–16.7

the sex ratio of mortality remained at the peak level of 1.9.

Cardiovascular diseases

In 1943–47, in all age groups, the sex ratio of mortality from cardiovascular diseases, CVD was low, 1.0–1.5. Among 45–54-year-olds a peak level of 3.1 was reached in 1973–77 and in 1978–82 among 55–64-year-olds, 3.0. In 1988–92 the ratio had decreased by 3 and 15% in the two age groups, to 2.9 and 2.6, respectively. Until 1978–82, among 65–74-year-olds the ratio increased gradually to a maximum of 2.2, and has since declined little (Figure 2).

The trend in female mortality is characterized by a steady fall from the highest level in 1943–47 to the lowest in 1988–92. Contrary to this, male mortality increased to the highest level in 1963–77, and has since decreased by 25% among 65–74-year-olds and by 40% in the three other age groups.

Lung cancer

The sex ratio of mortality from lung cancer is characterized by a steep increase followed by a decline (Figure 3). The highest ratio among 45–54-year-olds was reached in 1953–57, 10 years later among 55–64-year-olds, and in 1968–72 among 65–74-year-olds. A narrowing in the gender difference in mortality started first, and has also been most pronounced in the age group 45–54 years, from a maximum of 7.3 in 1953–57 to 1.2 in 1988–92. Among 55–64-year-olds the ratio has decreased from a maximum of 7.7 to 1.7, and in 65–74-year-olds from 6.9 to 2.7.

Both male and female lung cancer mortality was low in 1943–47, the female mortality being about 20–40% of the male mortality. In the age group 45–54 years the male mortality doubled from 1943–47 to 1978–82, and has since then decreased by 17%, resulting in the same mortality level in 1988–92 as in the 1950s. In the two oldest age-groups the male

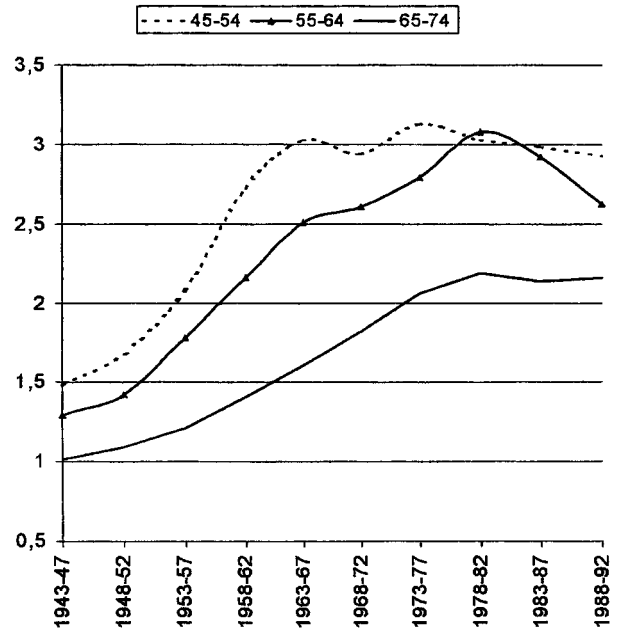


Fig. 2. Sex ratio of mortality from circulatory diseases, Denmark 1943–92, by period and age group.

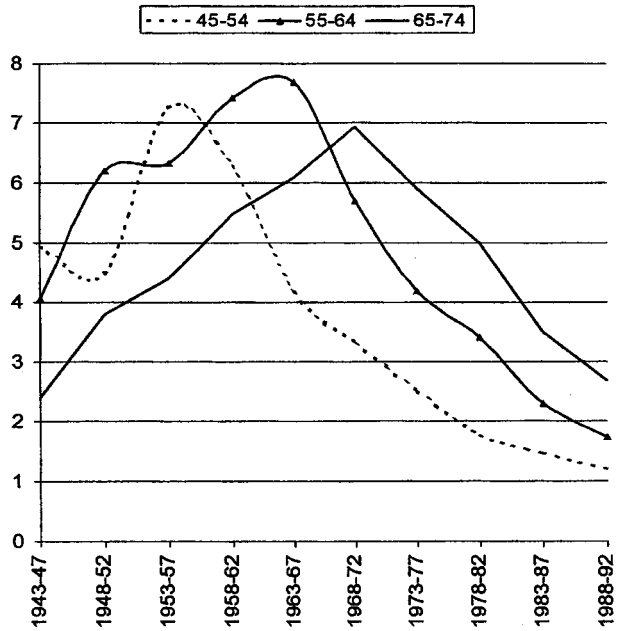


Fig. 3. Sex ratio of mortality by lung cancer, Denmark 1943–92, by period and age group.

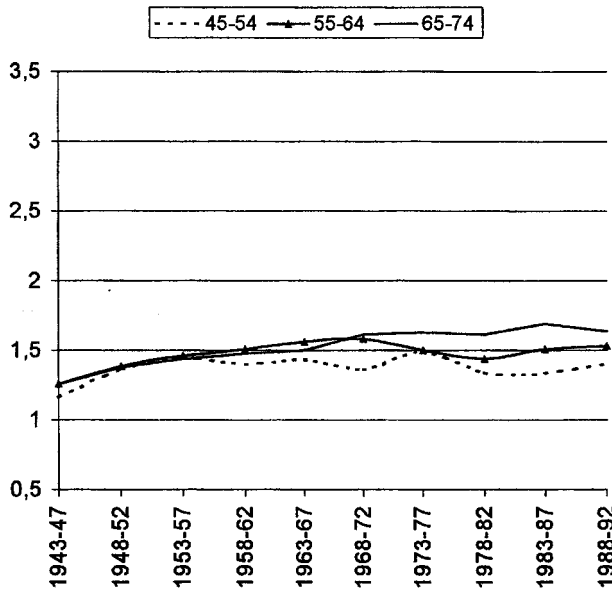


Fig. 4. Sex ratio of mortality from cancer diseases, except sex-specific cancer and lung cancer, Denmark 1943–92, by period and age group.

mortality increased four and eight times, respectively, to a peak level in 1978–87, and has since decreased, while mortality of 45–74-year-old women increased seven to eight times to the highest level in 1988–92.

Cancers except lung and sex specific cancer

Sex ratio of mortality from non-gender specific cancer diseases, omitting cancer of the breast, prostate and genitals, and exclusive lung cancer, remained relatively unchanged in all age-groups, ranging between 1.2 in 1943–47 and 1.6 in 1983–87 (Figure 4).

External causes: accidents and homicides

Sex ratio of mortality from violent death by accidents or homicides among 45–54 and 55–64-year-olds was highest in the early 1940s and more than 2.5 during the first 20 years. It decreased from the late 1960s to about or less than 2 in the 1980s. The sex ratio of mortality from external causes has remained relatively unchanged in the older age-group 65–74 years (Figure 5).

The trend in the younger age groups is explained by the male mortality from war-related accidents and homicides during the early half of the 1940s, and from traffic accidents in the 1950s and 1960s. Since the mid-1970s the number of deaths due to traffic accidents has decreased, relatively most among men.

Suicide

The sex ratio of mortality from suicides of 45–64-year-olds increased from 1.4–1.5 in 1943–47 to about 2.2 in 1948–52, and has since narrowed to 1.5 in the

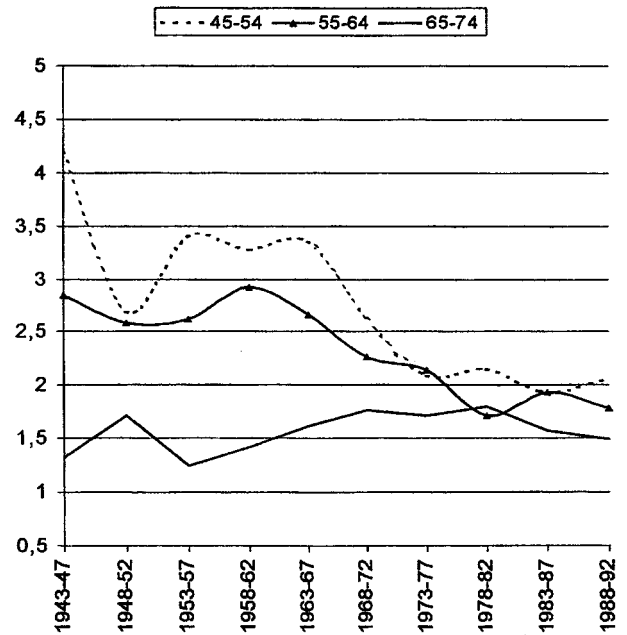


Fig. 5. Sex ratio of mortality from accidents and homicides, Denmark 1943–92, by period and age group.

age-groups over 45 years. In 1943–47 the ratio was relatively high among 65–74-year-olds, and increased relatively little compared with that of the other age groups, but has also been decreasing in the last periods (Figure 6).

Both male and female mortality from suicide was lowest in 1948–52, and highest in 1978–82.

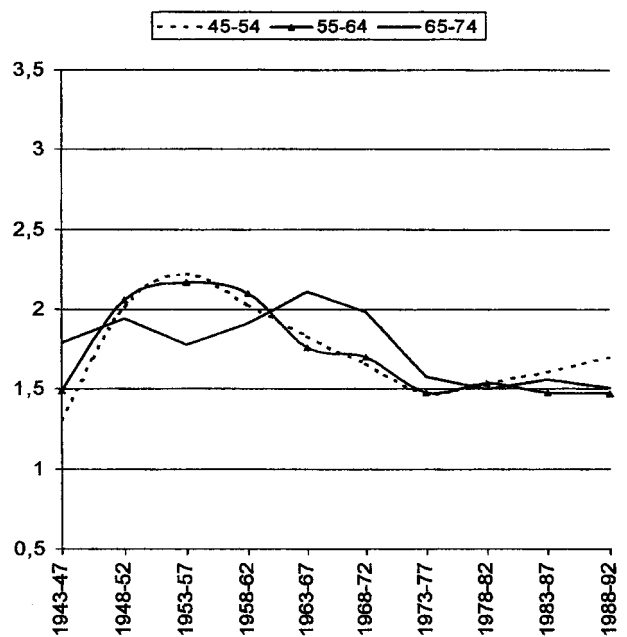


Fig. 6. Sex ratio of mortality from suicide, Denmark 1943–92, by period and age group.

DISCUSSION

Few other studies have analysed trends in sex ratio of cause specific mortality over long periods of time (1, 3, 7). The Danish Register of Causes of Deaths covers more than 50 years and provided cause-specific mortality data for 1943–92. During the period studied, differences in classification of death causes exist, but are not likely to influence calculations of sex ratios of mortality. The present study included age groups that are little influenced by mortality related to reproductive health and excluded sex-specific cancer diseases in the analyses of trends in sex ratio of mortality from cancer.

Three major conclusions can be drawn from the results. First, contrary to expectation the smallest sex ratios of total mortality and from CVD mortality were found in the first decade. Secondly, trends in sex ratio of mortality from lung cancer and external factors were well explained by trends in identified risk factors among men and women. Thirdly, the associations between risk factors and trends in sex ratio of total mortality and of CVD mortality were less evident. Such links may appear in studies of gender differences in mortality covering a more limited time period than the present 50-year period.

Gender differences in life expectancy are in large part due to differences in mortality from CVD, and are related to sex steroids, other genetic factors and different external risk factors. Of these trends in external risk factors would be the major explanation to the trends in sex ratio of mortality

The present study covers periods characterized by men at work and women at home, and periods with apparently greater gender equity with about equally high employment rate among men and women. The 50 years studied may be divided into three periods: 1943–67, 1968–77, and 1978–92 (Table II). In the first period the labour force in Denmark was dominated by men, only about 10% of married women were employed in jobs outside their home, about one-third of all single women were employed in private households. Few men and women remained unmarried; thus only about 5% of all men would

never have been married at age 50 years. The second period was influenced by a growing economic prosperity, accompanied by a steep increase in female employment, a relatively low unemployment rate, and a decline in the number of marriages, about 35% of all men would remain unmarried at age 50 years. In the last period, 1978–92, the unemployment rate more than doubled, on average 10% among women, and 8% among men. In 1988–92 about one-quarter of all men and one-third of all economically active women experienced periods of unemployment in the course of one year. The proportion of men and women getting married had further declined and the number of couples cohabiting did not level out the decline in marriages. The share of housewives among mothers with children younger than 15 years had decreased from 43% in the 1970s to 4% in 1992, and most economically active women, including young mothers, worked full time (14).

In the 1970s few women had any vocational education when they entered the labour market, roughly 15% of all, and the unemployment rate during the 1970s increased most among unskilled workers and was higher among women than among men. In national surveys covering 1976–94, a relatively high share of women in Denmark reported anxiety due to a sense of low job security and expressed concern about their work environment being physically and psychologically stressful (15). Other studies have shown that while employment in general tends to be associated with better physical and mental health in women, its affects are inconsistent when mothers of young children are examined specifically. For physical health, employment has a negative effect for working class mothers contrary to a positive effect for middle-class ones. Two opposing models of the relationship between employment and well-being of women are discussed (16). According to the “role enhancement” model, a paid job is a protective factor for women’s health. According to the “role overload” model, paid work makes too many extra demands on women and has a negative effect on their health primarily due to unhealthy

Table II. Living conditions of men and women in Denmark 1943–92

Years	Proportion of economically active 15–69-year-olds		Unemployment rate		Percentage having experienced unemployment in the course of one year		Marriages per 100 inhabitants	Percentage of divorces per all marriages
	Men	Women	Men	Women	Men	Women		
1943–67	90%	~20%	–	–	–	–	8	4.8
1968–77	85%	65%	2.0	1.5	–	–	7	10.0
1978–92	80%	75%	7.5	10.0	22	30	5	12.0

lifestyle, tobacco smoking, alcohol consumption, and low physical activity. The results of some of the studies are conflicting, partly because the health consequences of doing waged work, raising a child, and carrying out household chores, are likely to differ with the wider cultural and maternal context, and thus differ from country to country. The majority of studies on the health effects of women's participation in paid work derive from anglophone countries where during the 1970s and 1980s the proportion of women in the labour force was far lower than in Denmark. The reported beneficial effect of employment may be the result of a positive self-selection among women fit for work. Based upon trends in sex ratio from total mortality and from workplace accidents, studies in the USA concluded that the trends in women's labour force participation have had little effect on trends in gender differences in health-related behaviour (16–18). Contrary to this, several studies have shown that full-time employment is associated with higher levels of physical illness in mothers, while part-time work has beneficial effects (19, 20).

A number of studies of inequalities in health and gender have pointed to the following characteristic of Scandinavian women: on the macro level of society economic independence is beneficial to women's health, but on the micro level of families the anxiety rate of employed women is relatively high compared with that of employed men and non-employed women (21). This was found more pronounced in Denmark and Norway than in Sweden and Finland, perhaps because of supportive social policies in these countries favouring women's work outside the home (14).

In an early study Ingrid Waldron estimated that about half of the sex difference in total mortality was attributable to smoking, and about 90% were due to lung cancer (4). In the early 1950s in Denmark previous and actual exposure to tobacco smoke differed much more between men and women than in subsequent decades, but the sex ratios of all-cause mortality and ratio of mortality from circulatory disease were low. In the early 1950s, smoking was about twice as frequent among men as among women, 78% versus 40% (Table III). About 90% of all men aged 20–69 years were smoking or had been smoking, compared with about 50% of the women. About 80% of all men older than 50 years had started smoking before the age of 20 years, compared to less than 10% of women. About 90% of cigarette smoking men reported that they inhaled the smoke, fewer women, 65% (22). From the 1950s to late 1980s the proportion of smoking Danish women changed little, but the proportion of smokers among Danish men decreased gradually from 78% in the 1950s to 35% in 1994/95. The gender differences in smoking among 35–49-

Table III. *Trend in tobacco smoking among men and women, 1950–1994*

	16+ -year-olds (%)		35–49-year-olds (%)	
	Men	Women	Men	Women
Early 1950s	78	40	82	35
Early 1960s	71	41		
1970	68	47	49	48
1975	60	45		
1980	57	44	44	44
1985	51	42		
1990	48	39	45	45
1994	41	37		

year-olds disappeared by the 1970s and in the early 1990s only small gender differences existed in daily smoking (Table III).

In recent studies, women with lung cancer were both reported more likely to have been never-smokers than men with lung cancer (23) and to have been exposed to a lower cumulated dose than men, presumably due to a higher susceptibility to tobacco carcinogens among women (24). This factor may partly explain the steep increase in female lung cancer mortality in Denmark and the current trend in sex ratios of lung cancer mortality. However, a recent study found no sex differences in relative risks of smoking related cancers at different levels of smoking (25).

Cirrhosis of the liver is also associated with health behaviour. However, mortality by liver cirrhosis is low in Denmark and does not add any explanation to the trend in sex ratio of total mortality.

Sex ratios of CVD mortality were less associated with the trend in female smoking, hence female CVD mortality decreased steadily in spite of a relatively unchanged smoking prevalence among women during the 1970s and 1980s. Contrary, the relatively recent decrease in men's mortality from CVD may be linked to the decline in the share of male smokers, and contributes significantly to the trend in sex ratio of mortality from CVD. Other risk factors of CVD mortality add further explanation to the trend in sex ratio of mortality. A number of studies have shown an increased risk of CVD in job positions characterized by low esteem, low job influence and control (26), and among persons with high work stress and irregular working schedules (27, 28). Recently, a population-based follow-up study found that men who showed stress-induced blood pressure reactivity and who reported high job demands experienced the greatest atherosclerotic progression (29). Men's vulnerability to CVD has been hypothesized to be due to a specific male catecholamine reactivity, and it has been

postulated that oestrogens inhibit catecholamine secretion. Analyses based upon manipulations of hormone levels did not support these hypotheses, but found the same neuroendocrine reactivity patterns among women entering men's occupations (30, 31). In the Whitehall II prospective cohort study both men and women with low job control had an increased risk of coronary disease (32). Other studies have accordingly found an increased risk of CVD among middle-aged women in employment compared with those who are unemployed (33). The low sex ratio of mortality in the early 1940s may reflect more similar living conditions of men and women, even though men were economically active and women cared for home and family. A high proportion of men worked in agriculture, close to their home, and may have been less strained than employees and unskilled blue-collar workers in the following decades. Furthermore, it is possible that during the following decades Danish women have increasingly acquired similar stress from the work environment as men, and thus have been exposed to the same levels of risk factors for CVD.

The living conditions in Denmark deteriorated in many social groups during the 1980s, and possibly more among women than men (34). It is postulated that women's status also strongly predicts male mortality. Kawachi et al. argues that a society that tolerates gender inequalities is also likely to be a more unhealthy place to live for both men and women compared with more egalitarian ones (35). The high level of gender equity in Denmark, however, has not improved the health of men and women in Denmark, as measured by the relative unfavourable trend in life expectancy compared with other Western European countries.

CONCLUSION

The trend in sex ratio of mortality from CVD, lung cancer, and external causes in Denmark during the 50-year period demonstrates the impact of external factors upon mortality and reflects the narrowing in Danish men and women's health behaviour. The study also illustrates difficulties in ecological analyses of trends over long time periods. To the extent that men's and women's social position, such as employment status, family roles, and social relations approach each other, in the future further convergent trends in gender differences in mortality can be expected. The Danish trend in sex ratio of mortality may be a forerunner for a development that has begun or will begin in other European countries where gender differences in living conditions and health behaviour also are narrowing.

REFERENCES

1. Verbrugge LM, Wingard DL. Sex differentials in health and mortality. *Women Health* 1987; 12: 103–45.
2. Wingard DL, Suarez L, Barrett-Connor E. The sex differential in mortality from all causes and ischemic heart disease. *Am J Epidemiol* 1983; 117: 165–72.
3. Waldron I. Sex differences in human mortality: the role of genetic factors. *Soc Sci Med* 1983; 17: 321–33.
4. Waldron I. The contribution of smoking to sex differences in mortality. *Public Health Rep* 1986; 101: 163–73.
5. Hunt K, Annandale E. Relocating gender and morbidity: examining men's and women's health in contemporary Western societies. *Soc Sci Med* 1999; 48: 1–5.
6. Koskenvuo M, Kaprio J, Lonqvist J, Arma S. Social factors and the gender differences in mortality. *Soc Sci Med* 1986; 26: 605–9.
7. Lopez AD. Using national mortality data to study the changing sex differential in mortality. *Soz.Praventivmed.* 1984; 29: 258–64.
8. Zhang XH, Sasaki S, Kesteloot H. The sex ratio of mortality and its secular trends. *Int J Epidemiol* 1995; 24: 720–9.
9. Passannante MR, Nathanson CA. Women in the labor force: are sex mortality differentials changing? *J Occup Med* 1987; 29: 21–8.
10. Dunnell K, Fitzpatrick J, Bunting J. Making use of official statistics in research on gender and health status: recent British data. *Soc Sci Med* 1999; 48: 117–27.
11. Waldron I. Recent trends in sex mortality ratios for adults in developed countries. *Soc Sci Med* 1993; 36: 451–62.
12. Juel K. Hvorfor har danskerne problemer med mid-delleveitiden? Rygningens betydning i de seneste 50 år. (Why is life expectancy a problem for the Danes? The influence of smoking during the last 50 years). *Ugeskr Laeger.* 1998; 160: 6800–5.
13. Macintyre S, Hunt K, Sweeting H. Gender differences in health: are things really as simple as they seem? *Soc Sci Med* 1996; 42: 617–24.
14. Helweg-Larsen K, Petersson B, Knudsen L. Women in Denmark why do they die so young? *Scand J Social Welfare* 1998; 7: 26675.
15. Hansen EJ. Inequality in the welfare state. In: Erikson et al., editors. *The Scandinavian model* 1987.
16. Waldron I. Employment and women's health: an analysis of causal relationships. *Int J Health Serv* 1980; 10: 435–54.
17. Waldron I, Jacobs JA. Effects of multiple roles on women's health-evidence from a national longitudinal study. *Women Health* 1989; 15: 3–19.
18. Waldron I, Weiss CC, Hughes ME. Interacting effects of multiple roles on women's health. *J Health Soc Behav* 1998; 39: 216–36.
19. Arber S, Ginn J. The mirage of gender equality: occupational success in the labour market and within marriage. *Br J Sociol* 1995; 46: 21–43.
20. Lennon MC. Women, work, and well-being: the importance of work conditions. *J Health Soc Behav* 1994; 35: 235–47.
21. Kata K. On anxiety in the Scandinavian countries. In: Sarason IG, Spielberger C, editors. *Stress and anxiety II*. Washington DC, 1975.
22. Lindhardt M. The sickness survey of Denmark 1951–

1954. Copenhagen; The committee on the Danish national morbidity survey, 1960.
23. Zang EA, Wynder EL. Differences in lung cancer risk between men and women: examination of the evidence. *J Natl Cancer Inst* 1996; 88: 183–92.
 24. Prescott E, Osler M, Hein HO, et al. Gender and smoking-related risk of lung cancer. The Copenhagen Center for Prospective Population Studies. *Epidemiology* 1998; 9: 79–83.
 25. Nordlund LA, Carstensen JM, Pershagen G. Are male and female smokers at equal risk of smoking-related cancer: evidence from a Swedish prospective study. *Scand J Publ Health* 1999; 1: 56–62.
 26. Siegrist J, Peter R, Cremer P, Seidel D. Chronic work stress is associated with atherogenic lipids and elevated fibrinogen in middle-aged men. *J Intern Med* 1997; 242: 149–56.
 27. Møller L, Kristensen TS, Hollnagel H. Social class and cardiovascular risk factors in Danish men. *Scand J Soc Med*. 1991; 19: 116–26.
 28. Siegrist S. Adverse health effects of high effort-low reward conditions. *J Occup Health Psychol* 1996; 1: 27–41.
 29. Everson S, Lynch JW, Chesney MA, Kaplan GA, Goldberg DE, Shade SB, et al. Interaction of workplace demands and cardiovascular reactivity in progression of caroti atherosclerosis: population based study. *Br Med J* 1997; 314: 553–8.
 30. Lundberg U, Frankenhaeuser M. Pituitary-adrenal and sympathetic-adrenal correlates of distress and effort. *J Psychosom Res* 1980; 24: 125–30.
 31. Frankenhaeuser M, von Wright MR, Collins A, von Wright J, Sedvall G, Swahn CG. Sex differences in psychoneuroendocrine reactions to examination stress. *Psychosom Med* 1978; 40: 334–43.
 32. Marmot MG, Bosma H, Hemingway H, Brunner E, Stansfeld S. Contribution of job control and other risk factors to social variations in coronary heart disease incidence. *Lancet* 1997; 350: 235–9.
 33. Haynes SG, Feinleib M. Women, work and coronary heart disease: prospective findings from the Framingham heart study. *Am J Public Health* 1980; 70: 133–41.
 34. Nordisk Ministerråd. Fattigdom i Norden (Poverty in the Nordic countries, trends and structure). TemaNord 1996: 583.
 35. Kawachi I, Kennedy BP, Gupta V, Prothrow-Stith D. Women's status and the health of women and men: a view from the States. *Soc Sci Med* 1999; 48: 21–32.