

# Life expectancy in Danish women and men related to smoking habits: smoking may affect women more

Eva Prescott, Merete Osler, Hans Ole Hein, Knut Borch-Johnsen, Peter Schnohr, Jørgen Vestbo

Studies reporting increased mortality in smokers are abundant but only a few have directly estimated survival prospects of smokers in terms of lost years of life or probability of living until retirement.<sup>1-3</sup> None of these have included large numbers of heavily smoking women.

A study of mortality in Danish women is particularly informative because the female smoking epidemic started early in Denmark and both prevalence of smoking and mortality from smoking related diseases remain among the highest in Western Europe.<sup>4</sup> We report survival prospects of women and men randomly sampled from the general population followed up for up to 30 years.

### Methods

The study is based on pooled data from three population studies conducted in Copenhagen: The Copenhagen City Heart Study (CCHS), the Glostrup Population Studies (GPS), and the Copenhagen Male Study (CMS). Most subjects were recruited in the 1970s (first examination between 1964 and 1992) and examinations were repeated at intervals varying from one to 10 years. The combined study population consisted of 17 669 men and 13 525 women. The overall response rate at first examination was 77% (range 69-88) and mean age at study entry was 50.2. The study population was followed up until January 1995 for all cause mortality.

At each examination, subjects were asked about smoking status, that is never, ex, or current smoker, daily tobacco consumption, degree of inhalation, and duration of smoking.

### STATISTICAL ANALYSIS

Subjects were analysed in the smoking category in which they most recently described themselves. This implies that people who changed their smoking habits contributed person years at risk in several tobacco categories. If information on smoking was missing at any examination, the smoking status from the preceding examination was used.

We applied standard life table techniques. Subjects were not included in the life table until they reached age 35. Ex smokers were excluded because of the heterogeneous composition of this group.

### Results

At study entry, 55.1% of women and 68.0% of men were smokers. Male smokers were more heavily exposed to tobacco: mean daily tobacco consumption was 18.2 g in men versus 13.8 g

in women, mean age of smoking debut was 18.4 years in men versus 24.1 in women and 78% of male smokers inhaled versus 74% of female smokers. These differences increased with age. During the period of observation 8644 subjects died, 2900 women and 5744 men.

To ease comparison between sexes, survival curves are shown for never smokers and light and heavy smokers who inhale (fig 1). Of women alive at 35, an estimated 65% (95% confidence intervals 62% to 68%) of inhaling heavy smokers and 71% (68% to 74%) of inhaling light smokers would be alive at age 70, compared with 86% (83% to 89%) of lifelong non-smokers. Corresponding prospects for men were 54% (52% to 56%), 65% (62% to 67%), and 81% (78% to 84%), respectively. For comparison with other studies, probability of surviving to age 70 for current smokers irrespective of depth of inhalation and quantity smoked was 71% for women (70% to 73%) and 60% for men (59% to 62%).

The risk can also be quantified in "lost years of expected life"; that is, the difference in median survival between smokers and non-smokers. Female inhaling heavy smokers lost 9.4 years and inhaling light smokers lost 7.4 years in comparison with female never smokers. Corresponding loss of life expectancy in

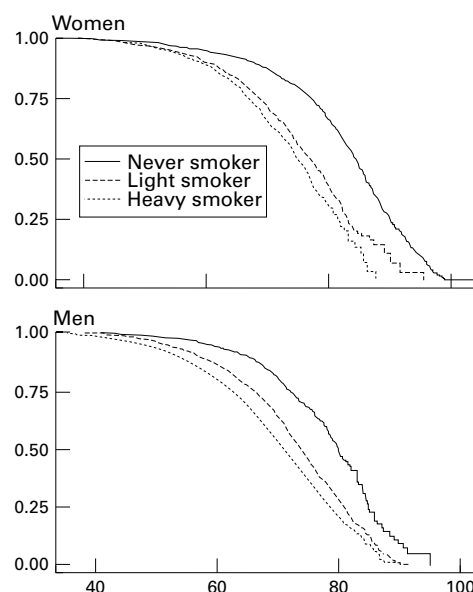


Figure 1 Probability of survival to given ages for never smokers, light smokers (<15 g/day), and heavy smokers (>=15 g/day) given survival to age 35. Only smokers who inhale are included.

**The Copenhagen Centre for Prospective Population Studies at the Institute of Preventive Medicine, Copenhagen Hospital Corporation, Denmark**  
E Prescott  
J Vestbo

**Department of Social Medicine, University of Copenhagen, Denmark**  
M Osler

**Epidemiologic Research Unit, Rigshospitalet, University of Copenhagen, Denmark**  
H O Hein

**Copenhagen County Centre of Preventive Medicine, Glostrup University Hospital, Copenhagen, Denmark**  
K Borch-Johnsen

**Copenhagen City Heart Study, Department 7117, Rigshospitalet, University of Copenhagen, Denmark**  
P Schnohr

Correspondence to:  
Dr E Prescott, Institute of Preventive Medicine, Kommunehospitalet, DK-1399 Copenhagen K, Denmark.

Accepted for publication  
12 June 1997

male heavy smokers was 9.2 years and in light smokers 6.0 years.

### Discussion

Surprisingly few studies have focused on life expectancy for cigarette smokers and non-smokers, yet it could be argued that life expectancy shows differences by smoking status more directly than do death rates and relative risks. This study is the first with a sufficient number of heavily smoking women to quantify impact of smoking on life expectancy and to compare this impact in men and women.

The difference in median life expectancy for male smokers and non-smokers was similar to that found in other studies.<sup>1-5</sup> As a whole, women continuous smokers lost less of median life time than men but adjusting for inhalation and daily tobacco consumption eliminated this sex difference: a heavy smoker who inhaled, whether man or woman, lost more than nine years of median life expectancy. Although we have attempted to adjust for sex related differences in smoking habits, survival in female smokers is still somewhat overestimated because the analyses are mainly based on birth cohorts in which the women started smoking at a considerably higher age than the men.

Women today take up smoking when they are younger and their survival prospects are probably even less favourable.

In conclusion, the estimates given here supplement other studies<sup>1-2</sup> in showing survival prospects in both men and women in relation to smoking in a way that is easily communicated. Our results also indicate that women who smoke like men run a relatively higher risk in terms of reduced life expectancy.

Funding: this study was supported by grants from The Danish Ministry of Health, The Health Insurance Fund, The National Union against Lung Diseases, The Danish Heart Foundation and The Danish Medical Research Council (12-1661-1).

Conflicts of interest: none.

- 1 Doll R, Peto R, Wheatley K, Gray R, Sutherland I. Mortality in relation to smoking: 40 years' observations on male British doctors. *BMJ* 1994;**309**:901-11.
- 2 Phillips AN, Wannamethee G, Walker M, Thomson A, Smith GD. Life expectancy in men who have never smoked and those who have smoked continuously: 15 year follow up of large cohort of middle-aged British men. *BMJ* 1996;**313**:907-8.
- 3 Rogers RG, Powell Griner E. Life expectancies of cigarette smokers and nonsmokers in the United States. *Soc Sci Med* 1991;**32**:1151-9.
- 4 Peto R, Lopez AD, Boreham J, Thun M, Heath Jr C. *Mortality from smoking in developed countries, 1950-2000*. Oxford: Oxford University Press, 1994.
- 5 Basavaraj S. Smoking and loss of longevity in Canada. *Can J Public Health* 1993;**84**:341-5.