

# MORTALITY AFTER FIRST HOSPITALIZATION FOR CHRONIC OBSTRUCTIVE PULMONARY DISEASE: CHANGES IN 1980-1998

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## SUMMARY

*The prognosis of a hospitalized patient for chronic obstructive pulmonary disease (COPD) is poor. The aim of this study was to determine changes in the prognosis for patients entering hospital for the first time on account of COPD in ten years.*

*Data were gathered from the hospital treatment records maintained by the National Research and Development Centre for Welfare and Health in Finland on periods spent in hospital by persons over 44 years of age with a principal diagnosis of COPD over the interval 1972-1994. Two groups of patients were then distinguished separately, those first treated in 1980-1984 and those first treated in 1990-1994, and mortality data sought for these persons in the records of Statistics Finland up to the end of 1998*

*A total of 11,739 men and 3,048 women were found to have been admitted to hospital with a diagnosis of COPD for the first time in the period 1980-1984. The corresponding figures for the interval 1990-1994 were 8,941 men and 3,628 women. The Cox regression model standardized for age showed mortality to have increased in ten years among both the men [Hazard Ratio 1.093 (95 % CI 1.055 - 1.133)] and the women [HR 1.138 (95 % CI 1.061 - 1.221)]. This worsening of the prognosis was most pronounced in the age group 45-64 years, where the men had an HR of 1.145 (95 % CI 1.060 - 1.236) and the women of 1.412 (95 % CI 1.208 - 1.650).*

*The prognosis for men and younger women in particular entering hospital for the first time for COPD deteriorated significantly over a period of ten years. This may partly be attributed to the increased frequency of diagnosis and treatment of COPD in outpatient departments and to the reduction in rehabilitation. The apparent more rapid worsening of the prognosis for women relative to men can largely be attributed to their increased smoking.*

**Key words:** COPD, hospitalization, mortality, prognosis

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## INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is one of the leading causes of hospitalization and mortality in the world (1). We set out here on the basis of hospital discharge records and registers of deaths to trace changes in the prognosis for patients entering hospital for the first time on account of COPD over the period 1980-98, by age and sex.

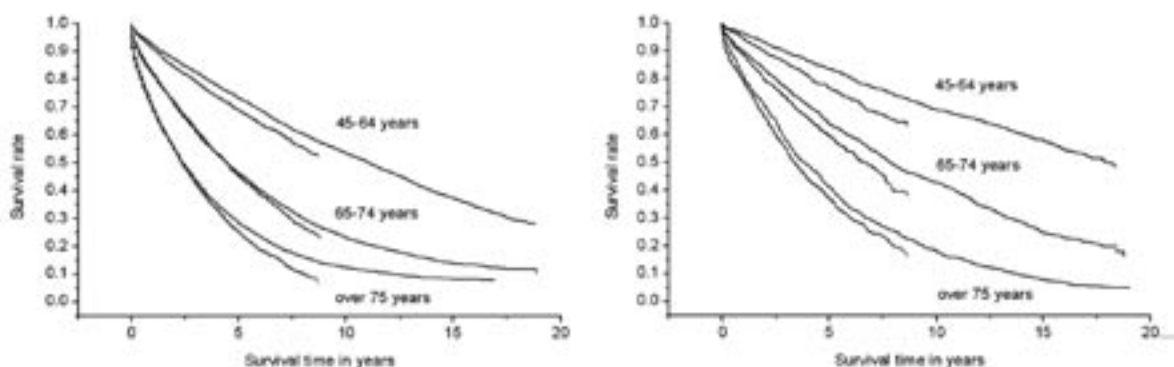
## MATERIAL AND METHODS

Data were gathered from the hospital treatment records maintained by the National Research and Development Centre for Welfare and Health in Finland (2) on periods spent in hospital by persons over 44 years of age with a principal diagnosis of COPD (ICD 8, International Classification of Diseases: 491, 492, ICD 9: 491, 492 and 496; ICD 10: J41-J44) over the interval 1972-1994. Whenever the patient had not been treated in hospital previously for this disease, the case was regarded as a first hospitalization. Two groups of patients were then distinguished separately, those first treated in 1980-1984 and those first treated in 1990-1994,

and mortality data were sought for these persons in the records of Statistics Finland up to the end of 1998, comprising the date and principal cause of death. Differences in survival between the groups were assessed by Kaplan-Meier survival analysis and Cox regression analysis, and differences in their prognoses with the Log-Rank and Wilcoxon Signed Rank tests.

## RESULTS

A total of 11,739 men and 3,048 women were found to have been admitted to hospital with a diagnosis of COPD for the first time in the period 1980-1984, the men having a mean age of 67.4 years on admission and the women of 67.3 years. The corresponding figures for the interval 1990-1994 were 8,941 men and 3,628 women, with mean ages of 69.8 and 70.6 years, respectively. Altogether 9,414 of the men and 2,090 of the women first treated in 1980-1984 had died by the end of 1998, of whom 29.6 % of the men and 21.9 % of the women had had COPD as the principal cause of death. Out of those first treated in 1990-1994, 5,528 of the men and 1,868 of the women had died by the end of 1998, 31.6 % of the men and 30.0 % of the women with COPD as the principal cause.



**Fig. 1.** Kaplan-Meier survival rates for male (left) and female (right) COPD patients in three age groups (indicated beside the curves). The longer curves refer to persons first admitted to hospital for COPD in 1980-1984 and the shorter ones to those first admitted in 1990-1994.

Kaplan-Meier survival indices without standardization for age are present in the Fig. 1. It is seen that 44.3 % of those presenting in 1980-1984 and 50.9 % of those presenting in 1990-1994 had died within five years. Among the women aged 45-64 years, 16.5 % of those presenting in 1980-1984 and 23.3 % of those presenting in 1990-1994 had died within five years. The Cox regression model standardized for age showed mortality to have increased among both the men [Hazard Ratio 1.093 (95 % CI 1.055 - 1.133)] and the women [HR 1.138 (95 % CI 1.061 - 1.221)]. This worsening of the prognosis was most pronounced in the age group 45-64 years, where the men had an HR of 1.145 (95 % CI 1.060 - 1.236) and the women of 1.412 (95 % CI 1.208 - 1.650). The corresponding differences among those over 74 years of age were not statistically significant.

## DISCUSSION

The figure in the results shows that the prognosis for patients entering hospital for the first time for COPD deteriorated significantly over a period of ten years. This may partly be attributed to the increased frequency of diagnosis and treatment of COPD in outpatient departments and to the reduction in rehabilitation courses over the interval in question, as a consequence of the increasing numbers of patients. These factors combined have led to demands for more efficient use to be made of the beds available in hospitals for the treatment of patients with serious illnesses. This would allow less serious COPD cases to return home after observation in the first aid department, without hospitalization. The numbers of hospital beds available in Finland for somatic cases increased up to 1987, after which they began to decrease. Also, the population as a whole became older over the same interval, the proportion of elderly people in particular increasing markedly, and as the relative incidences of many other diseases increase with age, this can be expected to detract from the overall prognosis.

The definition of COPD employed in this series was based on the principal diagnosis indicated after hospitalization for an average of almost 10 days, mostly in a department for respiratory diseases. Thus the clinical diagnosis can be regarded as reliable, especially as no change in diagnostic practises is known to have taken place of the time interval in question.

The apparent more rapid worsening of the prognosis for women relative to men can largely be attributed to changes in smoking

habits, as these constitute the main risk factor for COPD, leading to disease cases with a time lag of several decades. With 30% of men in Finland and 20% of women reported as smokers in 1998, the proportion of women smoking can be said to have doubled over the last fifty years while the proportion of men has decreased by a factor of three (3). Also, it may well be that women smokers develop COPD more easily than do men smokers (4). These observations are corroborated by an increase in female mortality from COPD reported elsewhere (5) and the claim that this increase has been sharper than in men (6).

## CONCLUSION

The prognosis for men and for younger women in particular entering hospital for the first time for COPD deteriorated significantly over a period of ten years. With the current increase in home care services, it is likely in the future that patients will be admitted to hospital on account of the exacerbation phase of COPD only in the very last years of their life. It will be interesting to see whether the prognosis for female patients under such conditions proves to be even poorer than for males.

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