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LUNG CANCER AND OTHER CAUSES OF DEATH IN RELATION TO SMOKING

A SECOND REPORT ON THE MORTALITY OF BRITISH DOCTORS

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On October 31, 1951, we sent a simple questionary to all members of the medical profession in the United Kingdom. In addition to giving their name, address, and age, they were asked to classify themselves into one of three groups—namely, (*a*) whether they were, at that time, smokers of tobacco; (*b*) whether they had smoked but had given up; or (*c*) whether they had never smoked regularly (which we defined as having never smoked as much as one cigarette a day, or its equivalent in pipe tobacco or cigars, for as long as one year). All smokers and ex-smokers were asked additional questions. The smokers were asked the ages at which they had started smoking and the amount of tobacco that they were smoking, and the method of smoking it, at the time of replying to the questionary. The ex-smokers were asked similar questions but relating to the time at which they had last given up smoking.

On the basis of their replies to the questionary, we classified the doctors in a few broad groups according to their sex and age, the amount of tobacco they smoked, their method of smoking, and whether smoking had been continued or abandoned. Subsequently we have recorded the deaths occurring in each of these groups. To ensure a high proportion of replies we intentionally made the questionary extremely short and simple. In particular, we did not ask for a life-history of smoking habits, though in studying the incidence of lung cancer, with a long induction period, we realized that the habits of previously have been a light smoker or may since then have given up smoking altogether; we shall have continued to count him, or her, as a heavy smoker. If there is a differential death rate with smoking, we must by such errors tend to inflate the mortality among the light smokers and to reduce the mortality among the heavy smokers. In other words, the gradients we present in this paper may be understatements but (apart from sampling errors due to the play of chance) cannot be overstatements.

In 1954 we published a preliminary report on the results of this inquiry (Doll and Hill, 1954a). The number of deaths from lung cancer was then small (36) and standing alone they would not have justified a firm conclusion. In showing a steadily rising mortality from lung cancer as the amount of smoking increased, they were, however, in close conformity with the figures we had previously found in our extensive retrospective inquiries into the smoking histories of patients with cancer of the lung and other diseases. With the passage of another two years we are now able to present from this prospective inquiry a considerably increased body of data, and, in consequence, a more exhaustive analysis. The four main questions to which we have sought answers are: (1) What are the relative risks of lung cancer associated with the smoking of different amounts of tobacco by different methods? (2) Is there a reduction in the risk if smoking is given up? (3) What is the