

the substantive findings of this research. Perhaps the general "tone" of these findings can be stated in the words of the authors' comment concerning the shifting picture of disease and death (in the Chapter on Health) which "shows that there are no frontiers to our health problems, only a succession of horizons."

This carefully prepared and well-written report performs the very useful service of bringing together in a single volume an up-to-date series of succinct summaries of social trends in all areas of the world in a form which facilitates international comparisons.

CHARLES F. WESTOFF

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A STUDY OF THE AETIOLOGY OF CARCINOMA OF THE LUNG¹

FROM 1948–1952, a large-scale investigation was conducted in England to obtain a better understanding of the etiology of carcinoma of the lung. The first results of this study were reported in a paper written by Doll and Hill in 1950. At this time the authors came to the conclusion that smoking was a factor in the production of lung cancer. In 1950 the study was extended to other parts of the country and more detailed information on smoking habits was obtained. This second paper presents an analysis of all of the material collected by the authors.

During the four years of the study nearly 5,000 patients were interviewed in hospitals in Bristol, Cambridge, Leeds, Newcastle-upon-Tyne, London, Dorset, and Wiltshire. The authors were notified of all patients admitted to these hospitals who had cancer of the lung, stomach, or large bowel. At the beginning of the study, patients with carcinoma of the stomach or large bowel comprised one control group; another group of controls consisted of patients who had diseases other than cancer. Since these two groups were found to be quite similar in their smoking histories, in the second half of the study the

¹ Doll, Richard and Hill, A. Bradford: A Study of the Aetiology of Carcinoma of the Lung. *British Medical Journal*, December 13, 1952, II, p. 1271.

control group was comprised of patients drawn from both of these groups.

Each control patient was chosen to match a lung-carcinoma patient in the same hospital. The control had to be of the same sex and within the same five year age group as the lung-cancer patient.

The major part of the article presents a comparison between 1,465 cases of carcinoma of the lung and their 1,465 matched controls.

All patients were asked a series of questions to see if there was a marked difference in smoking habits between persons with carcinoma of the lung and those who had other diseases. Patients were asked if they had ever smoked; the age at which they began to smoke; the amount they smoked before the onset of the illness which caused them to be hospitalized; the changes, if any, that occurred in their smoking history; if they had ever stopped smoking; the maximum amount they had been in the habit of smoking and whether they inhaled or not.

The authors present an analysis which shows the most recent amount of tobacco smoked regularly before the onset of the patients' present illness. It was found that there were fewer non-smokers and considerably more of the heavier smokers among the lung-cancer patients than the control patients. Of the 1,357 males with carcinoma of the lung, 7 or 0.5 per cent were non-smokers; the corresponding figure among the 1,357 males who had other diseases was 61 or 4.5 per cent. Twenty-five per cent of the males with lung carcinoma had smoked twenty-five or more cigarettes a day, whereas only 13.4 per cent of the control patients smoked that amount. Among the 108 females with carcinoma of the lung, 37.0 per cent were non-smokers compared with 54.6 per cent of their matched controls. For females with lung cancer, 11.1 per cent had smoked twenty-five or more cigarettes a day; for females with other diseases, the corresponding figure was 0.9 per cent.

Doll and Hill then present comparisons of the ages at which patients reported they had started to smoke, the total number of years they had been smoking, and, when applicable, the number of years since they had stopped smoking. On the average, lung-carcinoma patients began smoking earlier, con-

tinued smoking for a longer period of time, and were less inclined to stop than the control patients with other diseases. Among males these differences were all statistically significant. Among females the differences were not significant but showed the same trend and therefore were accepted as real by the authors.

Various methods of smoking are discussed. It was found that 64.6 per cent of the lung-carcinoma patients inhaled as compared with 66.6 per cent of the control patients. The difference was not statistically significant. However, the authors feel that the site of origin of a tumor in the lung may, in some way, be related to inhaling. Males who had peripheral growths inhaled more regularly than did males who developed central growths in the lungs.

Of the 1,350 male lung-carcinoma patients who smoked, 3.9 per cent smoked a pipe only, whereas 74.4 per cent smoked cigarettes only. For male control patients with other diseases, 6.9 per cent were "pure-pipe smokers" and 69.4 per cent smoked cigarettes only. The differences were highly significant and the authors conclude that pipe smoking is not as closely associated with the development of lung cancer as is cigarette smoking. It was also found that the proportion of smokers who used cigarette-holders was significantly smaller among patients with lung cancer than among the control group. The authors believe that a pipe-stem or cigarette-holder may act as a partial filter of a carcinogenic agent.

Doll and Hill also include an analysis of the differences in smoking habits between town and country. As place of residence becomes more urbanized, the proportion of heavy smokers and "pure-cigarette smokers" increases, and this leads to a higher death rate from lung cancer in the towns. However, the authors do not think that smoking ". . . can wholly explain the different mortality rates between town and country."

The validity of this carefully controlled study is apparent. The data collected subsequent to their preliminary report merely confirm Doll and Hill's previous conclusion that there is a very real association between smoking and carcinoma of the lung.

KATHERINE SIMON