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# An Epidemiological Study of Lung Cancer in Asbestos Miners

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Ever since the pronounced increase in the incidence of lung cancer among males became apparent, there have been attempts to associate it with one or another of the various elements in the environment of man. The approach used by some workers has been to suspect one or several substances and then set about in an intensive search for lung cancer among persons who have had any exposure to those materials. In this connection, Smith[82] writes: "The tendency of authors reporting the coincidental occurrence of primary lung cancer with silicosis or with any other theoretical etiologic conditions, has been to emphasize the percentage relationship in extremely small series of cases, with control cases which are not in any way comparable."

It would seem inevitable that asbestos should come under scrutiny in this manner, because prolonged exposure to this material is known to cause a specific type of pneumoconiosis, and because persons who show this form of pneumoconiosis often come to autopsy and provide a ready source of material for study. It was in this way that reports of the simultaneous occurrence of lung cancer and asbestosis began to accumulate after the report of a case by Lynch and Smith[68] in 1935. Within the next 10 years, about 15 additional cases were reported, and in 1954 Merewether[70] reviewed all deaths from asbestosis recorded in England since March, 1924. Lung cancer occurred in 16% of these cases. Gloyne,[41] whose work is also frequently referred to as establishing a connection between asbestosis and cancer of the lung, reported in 1951 that cancer of the lung was present in 14.1% of asbestosis cases examined by him. In 1941, Nordmann and Sorge[75] claimed to have produced lung cancer in mice which they exposed to asbestos dust.

Since 1951, additional cases of cancer of the lung coexisting with asbestosis have been reported, and, according to Hueper[35] about 100 such cases had been reported up to 1955. As a result, an association between the two diseases appears to have been accepted by many authors, and several writers were using the term "asbestosis cancer" of the lung. Werber,[80] in 1952, stated categorically that in 7% to 17% of cases of asbestosis, after a latent period of about 1½ to 20 years, carcinoma becomes established in the lung.

On the other hand, not all authors accepted this alleged association without reservation. Saupe[80] in 1939 reported that he had discovered no cases of lung cancer among 620 cases of asbestosis which he had examined; and in 1942, Holleb and Angrist[48] expressed the opinion that the number of cases of asbestosis with lung cancer was too small for statistical evaluation. In 1947, Wegelius[88] reported 126 radiologically diagnosed cases of asbestosis among 476 workers in Finland, and found no cases of lung cancer in this group. Goldblatt and Goldblatt in their section of Merewether's latest book,[44] state: "But at no stage in all these impressive researches was any clue obtained which might have offered any support to the possibility that asbestos could act as a carcinogen. There

Accepted for publication Jan. 20, 1958.

This study was made possible through a grant from the Quebec Asbestos Mining Association.

Medical Director (Dr. Braun) and Statistical Consultant (Mr. Truan), Industrial Hygiene Foundation.



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