

I have attempted to summarize some of these studies in a paper that was published in the *Journal of Occupational Medicine* in 1964 and I would like with your permission to enter a copy of this study into the record.

(The paper follows:)

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AIR POLLUTION, LUNG CANCER, AND CHRONIC LUNG DISEASE

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In recent months an increasing amount of publicity has been given to the health effects of air pollution, so much so that Dr. F. Princi was moved to refer to this as "overwhelming, persuasive and deceptive propaganda," in his Chairman's address to the Section on Preventive Medicine of the American Medical Association (1). Most of this publicity revolves around two conditions—namely, lung cancer and chronic pulmonary disease (chronic bronchitis, pulmonary fibrosis, and emphysema). Unfortunately, those who are convinced of the causal relations between air pollution and health effects are prone to ignore those reports that do not support their concepts. The purpose of this brief review is to point out a few reports which are often overlooked, yet which raise serious questions about the state of our knowledge. It is to be recognized that this review emphasizes those reports which throw some doubt on the causal relationships of air pollution and health effects. It should not be assumed, however, that I do not support air pollution control measures or the desirability of reducing general air pollution, or even that I take the view that there is no causal relationship between air pollution and health effects. Essentially the author believes that there is a strong suggestion of such causal relationships, but that much more research is necessary to establish them. In the meantime, I believe reasonable and practical air pollution control measures should be applied wherever possible; if only to control the filth, plant damage, nuisance, and annoyance that air pollution can bring. This report will be divided into two parts—one dealing with lung cancer and the other, with chronic pulmonary disease.

LUNG CANCER

In 1961 a most interesting paper appeared by Gilliam *et al.* (2) of the Field Investigations and Demonstrations Branch of the National Cancer Institute, U.S. Public Health Service. In this paper, mortality rates from lung cancer were carefully analyzed over the period 1930 to 1956. They found that during this period there had been a steady and quite regular decrease in the rate of increase (prevalence) of lung cancer. In their discussion, with the basic assumption that these trends continue, they state:

"The general regularity since 1930 of the declining percentage increase in rates for all ages, particularly among the white population, suggests that the most appropriate method of projection might be to fit a straight line to these percentages of change. When this is done, the rate of increase approaches 0% for the white female population in 1960 and for the male population in 1983. That is to say, then, that if present trends follow this pattern, recorded lung cancer mortality must reach a peak about 1960 for the white female population and about 1983 among the white male population and then decline thereafter."

Even though later, when analyzing the age-specific declines of rates of increase, they conclude that, "The peak would be delayed until about 90 years later and would be about 20 times as high as that predicted by projection of all ages rate of change," nevertheless they add: "No matter what method of projection is employed, a peak with subsequent decline *must* follow a declining rate of increase." (Emphasis theirs.)

The importance of this concept to present thinking lies in the fact that many who believe there is a causal relationship between air pollution and lung cancer have stated that, if air pollution is reduced and the rate of increase of lung cancer declines, this is proof of the causal relationship between the two. Gilliam