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COMMENTARY

Public Health and Epistemology

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In his recent article, Dr. Enterline states that the asbestos-cancer relationship was not established until 1965 because of the delay in epidemiological studies [Enterline, 1991]. I disagree: 1) epidemiological studies were available long before 1965 [Merewether, 1949; Doll, 1955]; 2) epistemological attitudes change with time, but between 1930 and 1950, pathological studies carried more weight than epidemiological studies. Pathological studies conducted during this time period established the asbestos-cancer relationship [Hueper, 1942; Editorial, 1949]; 3) public health action should not await a complete "consensus."

Attitudes toward various type of information change over time. The relevant question, however, is what the attitudes were at a particular point in time towards different types of information (pathologic, epidemiological, case reports, animal studies, mechanistic theories). Between 1930 and 1950, from an epistemological standpoint, pathological data were far more important than epidemiological data [Hueper, 1942; Higgins, 1977]. Dr. Enterline is aware of this. Dr. Higgins, who was Dr. Enterline's coworker in the research, wrote the following to him [Higgins, 1977]: "I think it is important to emphasize the non-statistical biological reasons for concluding that asbestos caused lung cancer. I refer particularly to the high proportion of females, lower lobes, multicentric origin, earlier age of onset than ordinary lung cancer, etc. My reading of the literature is that these things determined many people's conclusions far more than the statistical evidence." Occupational epidemiology was in its infancy, and such studies necessarily followed case studies and pathological reports. By 1942, there were enough pathological data to support a causal link between asbestosis and lung cancer [Hueper, 1942]. The epidemiological question was settled by Doll in 1955.

Epistemological issues are complex. One view of epistemological perspectives on cause-effect relationships in occupational and environmental health as they have developed over time is sketched in Figure 1. At different points in time, different types of information are more relevant and/or more available to medical scientists.

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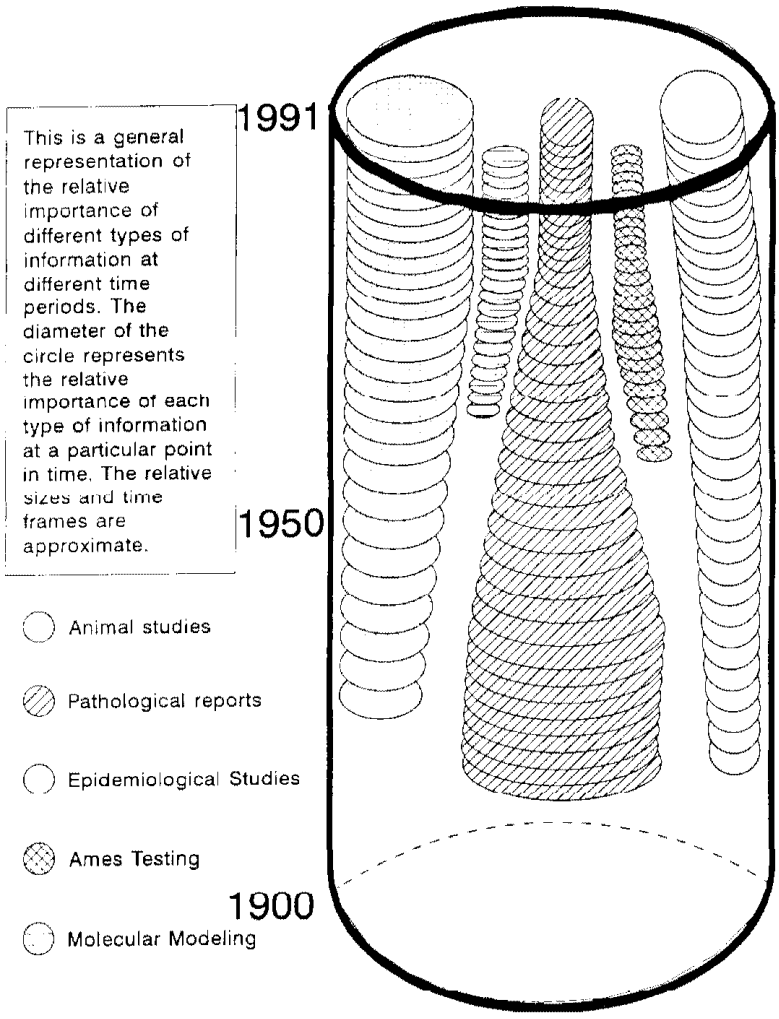

Fig. 1. Knowledge through time.

Despite this fact, important information of a single type could establish a likely cause-effect relationship, even if other kinds of information were not available. This remains true today. For example, dioxin has been found to be highly toxic to some animals, and animal studies led to a banning of dioxin-containing products even though human epidemiological studies were not available. Smoking and lung cancer offers another example. In the 1950s, it was established that smoking causes lung cancer even though animal studies were not available until the 1970s. In the case of asbestos and lung cancer, epidemiological data were lacking until 1949, but pathological data were convincing by the early '40s.

With regard to Dr. Enterline's emphasis on "consensus," public health deci-

sions do not, should not, and cannot wait for a complete consensus in the scientific community. There is never complete consensus. As knowledge accumulates, scientists will shift their positions, and a general position may emerge. This general position does not represent a consensus, but public health officials must still respond to it. A conservative scientist may hold on to the null hypothesis to his deathbed. A conservative public health official or concerned corporation takes action when there is reasonable suspicion that a public health problem is imminent. Reasonable suspicion for the asbestos-cancer relationship was available by the early 1940s [Hueper, 1942].

In addition, public health actions are not all-or-nothing propositions. There is a spectrum of actions that can be implemented to protect workers, ranging from warnings to product removal. This spectrum is subdivided further by the various levels of the actions taken. Warnings, for example, can identify a suspect carcinogen, a probable carcinogen, or a definite carcinogen. The force of the public health intervention should be determined by three variables: the strength of the association between the product and certain health effects, the severity of the health effects, and the importance of the product. The interaction of these variables will determine the appropriate response to health risks.

These public health concepts existed at the time decisions were made about asbestos. Asbestos product manufacturing companies chose not to warn workers or test their asbestos-containing products despite overwhelming evidence that the products were hazardous. There is a danger that Dr. Enterline's view will be used as an explanation for the health hazards imposed upon asbestos workers. This revisionist historical view may encourage companies to justify irresponsible behavior until a "consensus" or an unknown mechanism is established. We should act on what we know now, so that a scientist in the year 2050 will not attempt to justify what we did not do in 1992. The lack of a single type of information should not make us blind to overwhelming evidence of another type.

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