

Letter to the Editor

RE: Mesothelioma and Lung Tumors Attributable to Asbestos Among Petroleum Workers. *Am. J. Ind. Med.* 2000. 37:275-282

Gennaro et al. [2000] report the latest installment in a series of articles on the effects of asbestos in petroleum refinery workers.

Over the past several years, there has been considerable controversy over potential increases in cancer rates in chemical and petroleum refinery workers.¹ Many readers may be curious about the extent and vigor of the debate surrounding potential cancer increases in this small group of workers. Although this debate may seem like a tempest in a teapot, the policy implications that underlie this dispute are momentous.

The Gennaro controversy is part of an oft used tactic, whereby the petroleum and chemical industries use self-generated negative epidemiological studies of their workers to oppose EPA and other regulation of their products and OSHA regulation of workplaces. Their manipulated studies create an aura of controversy around the issue of cause-effect relationships that sows doubt in the minds of regulators, the media, jurors, judges, and the consuming public about potential and real health hazards. They argue that the "absence" of health problems among the workers who are the "most heavily exposed" to chemicals as they are made

and produced, proves that there cannot be a risk to the general population, which is exposed to far lower quantities of these same materials. These industries then use their own negative epidemiological studies to avoid government regulation, and paying compensation to workers and consumers who develop exposure-related diseases.

As early as the 1930's, petroleum and chemical companies recognized that exposure to chemicals they produced (as well as to substances like asbestos) in production plants could cause cancer, pneumoconiosis, and other health problems [Bonsib, 1937; Woody, 1948]. In response to this knowledge, the industry engaged in concerted campaigns to cover up these links and give the public the impression that their products were harmless or even wholesome. These campaigns were devised, organized, and orchestrated by the same firms and individuals who orchestrated the obfuscation of the relationship between tobacco smoke and lung cancer [ATI, 1971; CTR, 1988; Hartnett, 1996; Hoyt, 1955; Humphrey, 1999; Kwitny, 1972; Panzer, 1972; Pepples, 1978; R.J. Reynolds, 1983; Rodgman, 1962; Woody, 1948].

The primary strategic goal of the companies was to create an aura of "controversy" concerning the scientific basis for the alleged health effects by confusing the epistemology of causation, and corrupting medical literature through intentional misdesign, suppression and misrepresentation of research. The companies, their lawyers and consultants fabricated a debate concerning the issue of whether or not disease increases in exposed populations were real or "controversial" [Hill and Knowlton; Solon, 1973; Tweedale, 2000; Wolff, 1998].

(1) FABRICATING A DEBATE ON THE EPISTEMOLOGY OF SCIENCE

The chemical companies have stressed the unique importance of epidemiological studies in establishing

¹ [Dement, 1999; Dement et al., 1998; Divine and Hartman, 2000; Divine and Satin, 1999; Finkelstein, 1999, 2000 a,b,c; Raabe and Wong, 1996; Raabe et al., 1998; Rosamilia et al., 1999; Satin et al., 1996; Schottenfeld et al., 1980; Tsai et al., 1995; Wong, 1995; Wong and Raabe, 1989, 2000; Wong et al., 1999.]

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cause-effect relationships. In general, they claim that animal models, molecular understanding, and pathologic data cannot establish cause-effect relationships. This professed reliance on epidemiological data is due to the fact that such data are difficult to complete and are time- and resource-consuming as many toxics-related diseases have a latency period of 20 to 40 years. By the time the studies are completed, patent rights have expired and the chemical companies have new (possible substitute) chemicals to promote. Like Captain Renault in the movie *Casablanca*, they can feign shock that their products which caused mutations in bacteria, cancer in animals, and are structurally similar to other known human carcinogens, eventually are found to be human carcinogens in epidemiological studies. By claiming that "true causation" cannot be known or established until the epidemiological studies are complete, they can escape liability and regulation. These companies have developed a full legal argument to support the latter proposition called the "state-of-the-art" defense [Weidlein, 1935].

Occasionally, when chemicals or other toxins like benzene or arsenic are found to cause cancer in man, but not in animals, the chemical industry scientists reverse their arguments and, like the tobacco companies, argue that causation in man cannot be established until scientists produce positive animal studies and understand the exact mechanism of carcinogenesis.

(2) "SCIENTIFIC" METHODOLOGIES USED TO EVADE FINDINGS OF ADVERSE HEALTH EFFECTS

Industries have also created or sponsored epidemiological studies that were and are designed to produce results that indicated that their products did not cause adverse health effects. The petroleum industry's studies are the most sophisticated example of this strategy. Specific techniques utilized to generate low or inverse rate ratios included the use of "contract workers," the practice of "tolling" and the use of population controls for the calculation of SMRs (Standard Mortality Ratios). In "tolling", a manufacturer sends its chemical product to another company to have it further processed. The processing company receives a fee, or "toll" for its work and returns the product to its original owner and supplier of the raw material. Throughout the "tolling" process the original supplier of the raw material maintains legal ownership of the material. Like the use of contract workers, tolling was developed to shield large corporations from the discovery of adverse health effects of exposed workers, health and safety regulations, liability and oversight [Goldfarb, 1978]. In some instances, their study design manipulation is so effective that results indicated that exposures to asbestos, benzene, and other known toxins increase life expectancy and reduce disease morbidity.

Chemical industry epidemiologists have access to large unexposed populations in their own workforce, yet they fail to use these populations as controls. The reason for this is obvious. The use of these controls would be far more likely to produce positive epidemiological studies. There can be no doubt that asbestos causes lung cancer and mesothelioma. If a study of asbestos exposed workers fails to find such an effect, doubt should be cast upon this study and not on the relationship between asbestos and disease.

These design defects lead to study results that are counterintuitive. Since 1937, secret petroleum industry studies have found that asbestos exposures in petroleum refineries and chemical plants resulted in excess exposures that lead to asbestos caused disease [Bonsib, 1937]. In 1960, Eisenstadt and Wilson (medical director of Texaco) published a medical report on two mesothelioma cases that occurred in asbestos workers in the Port Arthur, Texas, refinery [Eisenstadt, 1960]. Eisenstadt and Wilson [1956] reported one of the cases, 4 years before JC Wagner "discovered" the relationship between mesothelioma and asbestos. Recent corporate sponsored studies of "refinery workers" in the United States, however, report that these workers do not have increases in asbestos induced disease. In fact, the studies indicate that they have lower asbestos-related disease rates than does the non-exposed general population. Have the industry epidemiologists discovered that Shell, Dow, Texaco, Exxon, Mobil, and Union Carbide badges somehow prevent the development of asbestos disease? We do not think so. The industry researchers, "doth protest too much." If we perform a study and find that smokers have a lower lung cancer rate than non-smokers, should we conclude that the smokers we studied do not have an increased risk of lung cancer from smoking? The answer is "no." This finding reveals a problem in study design, data collection or analysis. Where have all the Texaco petroleum mesothelioma cases gone? Selikoff et al. [1979] reported many of them in his study of the Asbestos Worker's Union, a union that included many of the union "contract workers." The contract workers had the heaviest exposures to asbestos, but were not included in the company studies because they were not "employees" of the asbestos company.

These manipulations help explain why the European epidemiological studies are positive while the American studies tend to be negative. By redesigning the workforce, (rearranging the names on worker badges) American chemical manufacturers and petroleum refinery owners have discovered how to design epidemiological studies that will demonstrate that cause-effect relationships do not exist. All they have to do to forestall regulation, maintain consumer doubt and avoid liability is create the impression that the existence of the cause-effect relationship is "controversial."

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