FILE NAME: Brakes (BRK)

DATE: нллп

DOC#: BRKмрл

DOCUMENT DESCRIPTIONY [ŜűűŜNJ ű2 úKŜ 9ŘλűƨNΣ ! Y ŜNJλŎl·y WƨdzNJyl·f ƨŦ LyŘdzăúNJλl·f
a ŜŘλŎλyŜ w9 ! ăōŜăűƨă λy . NJl·ļŜăY 9ÈLJƨădzNJŜ l·yŘ wλăļ ƨŦ 5λăŜl·ăŜ óLyŎfdzŘŜŘ λy Iмпoú

AMERICAN JOURNAL OF INDUSTRIAL MEDICINE 46:312–314 (2004)

**Letter to the Editor**

# RE: Asbestos in Brakes: Exposure and Risk of Disease

## To the Editor:

In a recently published review article, Dr. Lemen attempted to summarize the data on asbestos exposure from brake work and the risk of mesothelioma [Lemen, 2004]. He concluded that the epidemiological evidence is equivocal. My colleagues and I conducted a study in the early 1980s that Dr. Lemen cited as one of the studies that supported this opinion [Teta et al., 1983]. We identified one case and five controls employed in the category "automotive repair and related services" (OR = 0.65; 95% CI: 0.08–5.53). Ours is one of a large number of epidemiological studies that have examined mesothelioma risk among vehicle mechanics or those involved in brake repair [McDonald and McDonald, 1980; Petersen and Milham, 1980; Spirtas et al., 1985; Olsen and Jensen, 1987; Woitowitz and Rödelsperger, 1994; Coggon et al., 1995; Hodgson et al., 1997; Teschke et al., 1997; Agudo et al., 2000; Milham and Ossiander, 2001; NIOSH, 2002]. While individual studies, such as ours, may be imprecise as a result of small numbers of individuals with a history of vehicle repair, the best estimates of risk from the available analytical studies are consistently below the null value for this occupation. This does not justify a conclusion that the evidence is "equivocal."

We acknowledged in our study the fact that our work histories were based on city directories and death certificates and may not be complete; but we went to great lengths to show comparability of completeness between cases and controls. We did not conclude: "that lack of detailed information regarding the residual cases could obscure the true number of occupationally exposed cases," as stated by Dr. Lemen. We did discuss, however, that we may have missed occupationally exposed cases and controls and the issue of random misclassification. Bias toward the null (OR = 1.0), if it existed, would imply an unlikely "true" OR of less than 0.65 that we reported for the auto repair category. This is in contrast to categories with ORs greater than 1.0, such as plumbers and pipefitters, in which the "true" OR may be greater than the 3.87 we reported, if bias toward the null had been operating for this group. It is reassuring that the large number of studies that came after our 1983 report were consistent with ours in reporting no increased risk for vehicle mechanics, using an interview approach to ascertain work history.

Rather than relying on a weight-of-evidence evaluation of the epidemiological data, Dr. Lemen emphasized well-recognized challenges in conducting occupational case-control studies, such as small numbers of cases and incomplete work histories in selected individual studies. As epidemiologists, we recognize the inherent limitations of human observational data and, therefore, require that conclusions be drawn from a body of evidence, not from a single study.

Other relevant studies, in addition to ours, have been mischaracterized in Dr. Lemen's review He discussed the study by Woitowitz and Rödelsperger [1994] that also showed no increased risk for "motor vehicle mechanics"

- He attributed to them the conclusion that: "if there was a mesothelioma risk it could not be detected by their methodology."
- But what the authors really said was: "From these results there is no evidence that car mechanics are exposed to an increased risk of mesothelioma even if they do brake repairs, but asbestos exposure in other employment is an important confounding factor, so that if there is a mesothelioma risk for car mechanics but it were small it would not be detectable" [Woitowitz and Rödelsperger, 1994]. This is a fair statement by the authors that their study alone could not rule out a small risk.

Dr Teta has served as an expert witness in friction brake litigation Her employer, Exponent, Inc., receives funding for her work in this area from Ford, General Motors and Daimler Chrysler

*Correspondence to: M Jane Teta, Exponent Health Group, 420 Lexington Avenue, Suite 408, New York, NY 10172 E-mail: Jteta@exponent.com

Accepted 26 May 2004
DOI 10.1002/ajim.20060 Published online in Wiley InterScience (www.interscience.wiley.com)

© 2004 Wiley-Liss, Inc.

Another negative case-control study that took potential confounding exposures into account also reported no increased risk for vehicle mechanics, and specifically, those who were involved in brake installation and repair [Teschke et al., 1997].

- The authors clearly stated: "One a priori at-risk occupation had a reduced risk estimate: vehicle mechanics" and "as in the previous analysis, brake installation and repair did not appear to be associated with mesothelioma."
- Dr. Lemen summarized this study with the statement: "The authors. . .acknowledge their findings are based on small numbers of cases and any judgments about any causal associations would be speculative." Teschke et al. [1997] did make such a statement, but in reference to some of their positive findings. The statement was not referring to occupations not associated with mesothelioma in their study; e.g., vehicle/brake mechanics.

Two other negative case-control studies were not discussed, both of which examined the risk of mesothelioma in vehicle mechanics, excluding men who also worked in occupations known to pose a mesothelioma risk due to asbestos exposure [McDonald and McDonald, 1980; Agudo et al., 2000]. The numerous studies based on surveillance databases, all of which reported PMR/PIRs less than 1.0, were also not included in his review [Petersen and Milham, 1980; Olsen and Jensen, 1987; Coggon et al., 1995; Hodgson et al., 1997; Milham and Ossiander, 2001; NIOSH, 2002].

Dr. Lemen placed greater weight on case reports of mesothelioma in vehicle mechanics, including case counts ("at least 165") from negative case-control studies of vehicle mechanics and from friction products manufacturing and asserted that these cannot be due to chance or ambient air exposures. He apparently dismissed: (1) some cases who also worked in some classic asbestos-exposed occupations, and (2) the known occurrence of cases with no documented asbestos exposure. First, in our 1983 investigation, we identified an average of over three jobs for study subjects from city directories and death certificates [Teta et al., 1983]. Dr. Lemen himself noted that an "overwhelming majority" of those who did brake repair work in the Spirtas et al. [1985] study had also worked as insulators and shipbuilders. My colleagues and I obtained the data from the Spirtas et al. [1985] study and examined this issue, looking at brake work both occupationally and non-occupationally, while adjusting for other occupational exposures [Hessel et al., 2004 (in press)]. The results were negative overall and showed no evidence of increased risk with increasing duration of brake work. Second, "idiopathic" mesotheliomas and those due to non-occupational or unrecognized occupational exposures are known to exist. The presence of these cases is particularly relevant for those in common occupations. Nicholson et al. estimated that, in 1984, there were five million people in the US who had been vehicle mechanics at some time in their careers [Nicholson et al., 1984]. Whether case reports of mesothelioma, in men who at some time worked as vehicle mechanics, are indicative of an occupational risk related to this occupation is best determined from epidemiological studies that include comparison populations and, ideally, the ability to address confounding by other asbestos-related occupations. These studies have been conducted, and the results are not consistent with the implications of this review article. Reliance on case reports of mesothelioma among men who worked at some time as a vehicle mechanic while ignoring or misrepresenting the available evidence from epidemiological studies cannot be defended.

M. Jane Teta, DrPH, MPH*
Exponent Health Group
420 Lexington Avenue
Suite 408, New York
New York 10172

## REFERENCES

Agudo A, González CA, Bleda MJ, Ramirez J, Hernández S, López F, Calleja A, Panadès R, Turuguet D, Escolar A, Baltrán M, González-Moya JE. 2000 Occupation and risk of malignant pleural mesothelioma: A case-control study in Spain. Am J Ind Med 37:159–168.

Coggon D, Inskip H, Winter P, Pannett B 995 Differences in occupational mortality from pleural cancer, peritoneal cancer, and asbestosis. Occup Environ Med 52.775–777.

Hessel PA, Teta MJ, Goodman M 2004 Mesothelioma among brake mechanics: An expanded analysis of a case-control study Risk Analysis 24(3):547–552.

Hodgson JT, Peto J, Jones JR, Matthews FE. 1997. Mesothelioma mortality in Britain. Patterns by birth cohort and occupation Ann Occup Hyg 41:129–133.

Lemen RA. 2004 Asbestos in brakes Exposure and risk of disease Am J Ind Med 45:229–237.

McDonald AD, McDonald JC 1980 Malignant mesothelioma in North America Cancer 46(7):1650–1656

Milham S, Ossiander E 2001. Occupational mortality in Washington State 1950–1999. Epidemiology Office, Washington State Department of Health.

Nicholson WJ, Daum SM, Lorimer WV, Velez H, Lilis R, Selikoff IJ, Miller A, Anderson HA, Fischbein SA, Holstein EC, Rom WN, Rosenman K, Todaro JD, Cheng W, Li V, Tart DT 1984 Investigation of health hazards in brake lining repair and maintenance workers occupationally exposed to asbestos National Institute for Occupational Safety and Health (NIOSH), prepared by Mt. Sinai School of Medicine, CUNY, New York. August.

NIOSH. 2002 Letter to MJ Teta from JT Walker regarding inquiry about PMRs for auto mechanics, with attached data sheets Department of

Health and Human Services (DHHS), Public Health Service, National Institute for Occupational Safety and Health.

Olsen JH, Jensen OM. 1987 Occupation and risk of cancer in Denmark. An analysis of 93,810 cancer cases, 1970–1979 Scand J Work Environ Health 13(Suppl 1):1–91

Petersen GR, Milham S 1980. Occupational mortality in the state of California 1959–1961. National Institute for Occupational Safety and Health Research Report NO1-CP-33353

Spirtas R, Keehn R, Wright W, Stark A, Beebe G, Dickson E. 1985. Mesothelioma risk related to occupational or other asbestos exposure: Preliminary results from a case-control study. Am J Epidemiol 122(3):518.

Teschke K, Morgan MS, Checkoway H, Franklin G, Spinelli JJ, van Belle G, Weiss NS. 1997 Mesothelioma surveillance to locate sources of exposure to asbestos Can J Public Health 88(3):163–168.

Teta MJ, Lewinshon HC, Meigs JW, Vidone RA, Mowad LZ, Flannery JT. 1983. Mesothelioma in Connecticut, 1957–1977 occupational and geographic associations J Occup Med 25(10):749–756.

Woitowitz HJ, Rödelsperger K 1994. Mesothelioma among car mechanics? Ann Occup Hyg 38(4):635–638.