

LETTER TO THE EDITOR

Chrysotile Asbestos, Mesothelioma and Garage Mechanics: Response to Dr. Wong

Key words: case reports, brake-lining exposures, fiber dimensions, asbestos

In his letter [1992], Dr. Wong correctly points out that the decisive mesothelioma patients presented in Figure 1 of our publication do not form part of an epidemiological study and it is not possible without further information to infer an increased incidence of mesothelioma from these case figures [Woitowitz and Rödel-sperger, 1991]. However, part of his criticism is based on an inadequate distinction between the two patient groups we discussed.

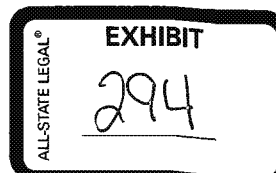
1. CASE REPORT

The 10 mesothelioma patients listed in Figure 1, who died in the 6 consecutive calendar years 1980 to 1985, were garage mechanics who specialized in brake servicing and for whom there was no evidence of any other exposure to asbestos dust. The duration of their exposure was at least 10 years, and more than 20 years in most cases. In the case of 8 of 9 of these mechanics, the work began between 1945 and 1960, during a period when the number of garage mechanics in the Federal Republic of Germany was between 100,000 and 200,000, including part-time operations [Rödel-sperger et al., 1988]. When it is assumed that the number of garage mechanics still surviving from this population between 1980 and 1985 is ca. 500,000, then this amounts, over the 6 years, to the observation of ca. 3 million person years. Doll [1987] estimates the number of mesotheliomas not due to asbestos as 2-3 cases per million adults per year. If these figures are applied to the total number of garage mechanics, it can be seen that the expectation would only be insignificantly less than the observation.

However, there are two indications of a significantly increased incidence of mesothelioma: on the one hand, the previously estimated number of garage mechanics is subject to a considerable, but unquantifiable restriction to those who were specifically involved in brake servicing, and did not show indications of other asbestos exposure at the workplace; on the other hand, the inclusion of mesothelioma patients from this group of persons in the register compiled by Prof. Otto in Dortmund

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and in the case collection of our outpatient clinic for the Federal Republic of Germany cannot be regarded as being complete.

2. CASE-CONTROL STUDY

In addition to the case study concerning ten mesothelioma patients, our letter to the editor also referred to a case-control study underway here. The fact that 14 (8%) of the 175 mesothelioma cases observed by the participating hospitals had worked as garage mechanics, but that only 3 (1.7%) of these patients did not have any history of asbestos exposure at other places of work, underscores the influence of the above-mentioned limitation. Dr. Wong correctly points out that calculations of odds-ratios from this study are not yet published. In a further analysis, it is intended to take account of the time spent in brake servicing as well as the actual job title.

We are in agreement with Dr. Wong that the case-control studies cited were "properly designed." However, with one exception, they refer exclusively to the job description "car mechanic" and do not explicitly refer to work in brake servicing nor take into account the amount of time involved in this work. The small numbers of cases for garage mechanics in the studies make each individual study relatively insensitive. In our opinion, only an overall analysis of all the findings, taking into account the strengths and weaknesses of these studies, could justify the description "consistent and convincing." However, such an analysis would certainly fall outside the scope of a letter to the editor. Neither could the demonstration of *negative evidence* with respect to the job description "car mechanic" be extended to cover an epidemiological study limited to the selected group of more exposed persons especially involved in brake service [Herenberg, 1980].

The physical and biological counter-arguments discussed by Dr. Wong are initially based on the premise that chrysotile fibers induce few or no mesotheliomas. Our letter to the editor in part questioned this view on account, among other things, of the "hit and run phenomenon" and the questionability of applying the results obtained in mines and mills to the working conditions in the asbestos industry or to users of asbestos products. Our industrial hygiene measurements, which were also cited by Dr. Wong, only yielded a low mean cumulative fiber dose of $0.54 \text{ F/ml} \times \text{year}$. However, this dose value is not modified by the physical reasons mentioned by Dr. Wong, since this value refers to fibers with a length $>5 \mu\text{m}$ and the crystalline transformation in the dust from braking abrasion is evidently associated with a loss of fibrous form. Further, it should be noted that a large proportion of the asbestos fibers are not produced by braking abrasion, but by turning and grinding work in new linings.

According to Doll and Peto [1985], the risk of mesothelioma from 25 years' exposure can be estimated from an exposure largely to chrysotile fibers from the 20th to the 80th year of age. An asbestos fiber concentration of 0.02 F/ml at the workplace, corresponding to a cumulative fiber dose of $0.5 \text{ F/ml} \times \text{year}$, yields a mesothelioma rate of about 1 per 10,000 exposed persons. For the 60 year period of observation, this yields about five asbestos-caused mesothelioma cases per 50,000 exposed persons or per 3 million person years. On the basis of this estimate, the expectation of mesothelioma cases not due to asbestos stated with respect to case report 1 has been exceeded by a factor of less than 2, that is, would scarcely be detectable. However, it must be remembered that our dust measurements were made in the 1980s. It is

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justified to assume that the fiber concentrations during the mechanical manipulation of brake linings were higher in earlier decades on account of lack of dust protection and the absence of prefinishing.

We are of the opinion that the question of the mesothelioma risk to car mechanics employed specifically in brake servicing requires clarification in further epidemiological studies. Unfortunately, we are not yet in a position to bring the results of our case-control study, with respect to the risk of mesothelioma to car mechanics, into the discussion as a whole since the diagnostic confirmation of mesothelioma is not yet complete.

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