

STANFORD UNIVERSITY MEDICAL CENTER

DEPARTMENT OF GENETICS

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Dr. John F. Finklea
Director
National Institute for Occupational
Safety and Health
Parklawn Building
Rockville, Maryland 20852

Dear Dr. Finklea,

Thank you very much for sending me the material on asbestos that I had requested. The document "RE-EXAMINATION AND UPDATE OF INFORMATION ON THE HEALTH EFFECTS OF OCCUPATIONAL EXPOSURE TO ASBESTOS", December, 1976, was particularly valuable to me in the preparation of my lectures for my course on health. It also appropriately complicated my understanding of our present knowledge of dose/adverse health consequences of exposure to asbestos. I am fully sympathetic with the difficulties of establishing useful criteria and standards in the face of a hazard which has already such a tragic history of abuse and in the absence of more reliable quantitative information. In such circumstances it may be inevitable that political judgments must be made to accomplish any useful purpose at all and that these will unavoidably be bereft of a complete rational justification. And this may be the best of possible outcomes if there has been a careful consideration of all of the side-effects of this kind of decision-making process.

What I have in mind is what appears to me a fundamental inconsistency between the method finally used to support the standard of 0.1 fiber and the statement, page VI-2, "This recommended standard poses some difficulties in that specific work practices and innovative engineering control or process changes are needed. However, because of the well documented human carcinogenicity from all forms of asbestos, these difficulties should not be cited as cause for permitting continued exposure to asbestos at concentrations above 100,000 fibers per m³." I understand the thrust of that sentence to mean that issues of convenience or economic cost should play no role in the establishment of their standard.

However, when I try to discover the basis on which the 100,000 number was reached, I find that what I can only describe as analytical convenience was the fundamental argument. Nowhere could I find even an approximate answer to the question: (1) on the one hand, what adverse health effects would be averted by the reduction of the standard to .1 fiber; and (2) what residual health effects from exposure to asbestos can be predicted from the approval of a standard higher than the concentration of asbestos in the ambient air.

My own reading of the literature does not permit me to take either a highly aroused or a highly conservative position with respect to the possible health consequences of low asbestos exposure. I am concerned that in the face of uncertainty, that standard setting should be accomplished in a way that allows the maximum freedom of action to incorporate the results of further knowledge and which minimizes adverse social and economic side-effects, always while

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respecting the health requirements of workers. On these criteria I would suggest that there may be more constructive options than publishing a 0.1 fiber standard; although I do not have the legal expertise to understand all the other constraints under which the standard setting may operate.

In particular, I would suggest that the standard be a zero increase over the ambient air, which strikes me as the only logical position that can be taken if you disregard economic costs and in the face of the assertions that "any level" of asbestos is harmful. Of course, I understand all the complications of a "zero tolerance approach" but these in my view should not be incorporated into the standard but rather into the regulations concerning its matter of implementation. You could, for example, mandate that factories employing asbestos monitor the air concentrations periodically with their own air sampling and monitoring equipment and that this have a sensitivity of at least .1 fiber. You could also require that large samples be periodically collected and submitted to some central laboratory from time to time for more refined examination, or to do this in the face of explicit suspicions that there may be exposure in excess of the ambient air.

This may seem like a more draconian step than the 0.1 fiber standard, but in fact I believe it leaves more room for further inquiry about what constitutes a "health-significant" increase of exposure. It would be quite possible to refine my definitions to make them statistically meaningful by specifying the sampling rate and the percentile of the ambient air density distribution that had to be achieved as the mean value in the factory - for example, that the mean value not exceed the 95th percentile of community exposure.

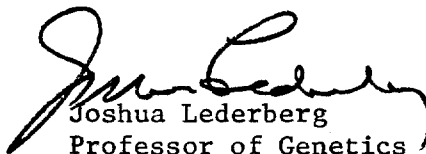
Some of the unanticipated side-effects of publishing a specific 0.1 fiber standard will be the inevitable public misunderstanding of such a standard as signifying that this is known to be a dangerous level for human health. We have seen innumerable examples where well meaning efforts to provide a very large margin of protection in one context have resulted in exactly that misunderstanding. If you publish a 0.1 fiber standard, what possible rationale is there to apply this only to manufacturing locations that explicitly use asbestos? Will it not be necessary also to protect the employees (not to mention the patrons) of theaters that may have asbestos curtains? Can you foresee the possibility of the erosion of the value of private homes that have incorporated asbestos in their construction? These are not empty speculations: this morning's paper carried news of a California State inquiry on exposure of school children to asbestos that may have been used in the construction of public buildings. The 0.1 fiber "standard" appears to be a critical judgment about what constitutes a hazard. I think the no increase over ambient is much less likely to be misunderstood as reflecting such a judgment at a time when it has no firm basis in scientific analysis.

I had some difficulty in understanding the thrust of the report with respect to the synergism of asbestos with cigarette smoking but the existing data still appear to me overwhelming. In that context, do you know if any special effort has been made to inform workers who are exposed to asbestos of the multiplied hazard that they bring upon themselves by the use of tobacco? Is such a pattern of education within the scope of OSHA in circumstances like the present one?

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Finally, I have wondered whether there might be genetic factors in individual susceptibility to asbestos. I have been quite unable to find any literature that would bear on this question. If you know of any pertinent studies, I would be most interested to get the references. One, but not the only, point that I had in mind was the possibility of an interaction with alpha-1-antitrypsin defect with the fibrotic reaction to asbestos which would be a possibly plausible analog to the known role of that genetic defect in emphysema.

Sincerely yours,



Joshua Lederberg
Professor of Genetics

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