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EDITED BY

H. A. SHAPIRO

Ph.D., M.B., Ch.B., F.R.S.S.Af.

Visiting Professor of Forensic Medicine

University of Natal, Durban

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hood areas or in family exposures. It probably is very much less than we think.

I have discussed this with Dr. Newhouse, whose data alerted us to this problem, because in our own studies in New York, in attempting to study families, family exposure and neighbourhood exposure, we find that people who live in the neighbourhood of an asbestos plant tend to have worked in that plant many years ago and, unless you know their entire occupational histories, you will never be able to spot those cases who 30-35 years ago worked on an asbestos plant for 1, 2 or 3 months when their own trade was slow. Moreover, who is more likely to have worked 30-35 years ago in an asbestos plant than the family member of somebody who has already worked in that plant? He would most likely have known when an opening existed. Therefore, unless we can identify true absence of occupational exposure, we have to regard labels of pure family or neighbourhood exposure with caution.

I think this is very important. All of us here are faced with a very important practical problem. What exactly is the exposure with which asbestos disease is associated? We must define this. At the present time our definition is only that, in specific industrial circumstances, a significant risk occurs. This, I think, can be controlled if we put our minds to it. On the other hand, much more data are necessary before we can label the magnitude of non-occupational exposures with any degree of accuracy.

Dr. L. J. Cralley: I am impressed with how little knowledge we have of the environmental exposures of the asbestos workers. We have little information about the levels of exposure. We took samples of respirable fibres at various textile plants processing chrysotile, and tested for biologically active metals such as nickel, chrome, cobalt and manganese. We found the levels of these metals were often 5 times greater in the airborne dust than in the parent material. We found some of the metals in more than one valency form, e.g. chromium was in both trivalent and hexavalent form. This could be very important.

It is essential that the nature, extent and pattern of exposure of the different asbestos workers be defined and that this be used in biological research models. We are not going to get all the answers from the UICC samples. We must go out to the worker and find out about his exposure, otherwise the data from animal research and data from epidemiological studies cannot be correlated.

Dr. H. Bohlig: Until now no adequate epidemiological studies on asbestosis have been done in the German Federal Republic. At present we are doing investigations in Hamburg, an important centre for asbestos factories. Between 1958 and 1968 we found 319 cases of mesothelioma in 4 medical institutions. There may be many more in other hospitals. Only 119 cases could be investigated fully. The prevailing wind in Hamburg is from the west, and most of the cases were found to the east of the shipyards and in a small suburb east of the largest asbestos plant. Here, among 53,000 inhabitants, there were 53 cases of mesothelioma and a high incidence of pleural plaques. A paper will be published shortly.

Dr. J. W. S. Uys: Dr. Webster mentioned 3 cases of amosite exposure. Is it not possible that these may have been cases of mixed exposure? The histological reports mention numerous fibres. From the material available, can you determine whether these are amosite or crocidolite or both?

Dr. I. Webster: At the time these cases came to us we were not able to distinguish the different types of fibres. We can do so now. In 2 of these cases the exposure was doubtful. One case worked at Penge for 28 years, but is known to have visited the Northern Cape when working as a driver, and may have been exposed to blue asbestos. A second case worked at Penge for 13 years and there is no record of his later service. We are certain that the third case had asbestos exposure only at Penge.

Prof. L. Noro: Dr. Kiviluoto, in his paper, discussed only the asbestos problems of the miners in the anthophyllite mine which employs 130 workers or $\frac{1}{5}$ of all asbestos workers (approximately 1,200) in Finland. In the last 15 years we have followed the situation in most asbestos trades. Until now we have collected 306 cases of asbestosis in the Pneumoconiosis Centre of the Institute of Occupational Health; 244 are from the asbestos industry, 53 are insulators and 9 are from other trades. The first mesothelioma from the asbestos cement industry was diagnosed only a few weeks ago. Asbestos exposure is followed not only in mines, mills and industry but also around the mine and factories using, for example, the snow method developed in the air pollution department of the Institute.