AMERICAN JOURNAL OF INDUSTRIAL MEDICINE 40:395–396 (2001)

Letter to the Editor

Re: Response to: Mortality Among Rubber Chemical Manufacturing Workers by M.M. Prince et al. Am. J. Ind. Med. 2000. 37:590–598. I. Reply to Valentgas et al.'s Letter to the Editor

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KEY WORDS: rubber chemical manufacturing; ischemic heart disease mortality; occupational epidemiology

We appreciate the opportunity to respond to comments by Valentgas and colleagues regarding our report examining mortality among rubber chemical manufacturing workers [Prince et al., 2000]. Following are our responses to their comments, focusing on the authors' main points:

The article should emphasize results of county mortality rate comparisons.

Standard epidemiologic methods for comparing rates of mortality in occupational cohorts were used in this study. The analyses using U.S. referent rates are important in view of the fact that the ''healthy worker effect'' (HWE) for ischemic heart disease (IHD) has often been observed in occupational cohort analyses using U.S. referent rates [Sterling and Weinkam, 1986]. Since there is no ideal referent population in this study, data from local (county) and U.S. rates were presented in conjunction with the internal plant comparison and limitations of each approach were discussed in detail.

"The results of this study do not provide compelling evidence of a causal relation between occupational exposures in the rubber chemicals department or other departments at the plant and IHD mortality" and "The data from this study do not strongly support the hypothesis that backward rotating shifts are a risk factor for IHD mortality in this group of workers."

As stated in the discussion, we view our results as suggestive of an occupationally related risk for IHD mortality, particularly among workers under 50. We also note that there are at least two potential occupationally related reasons for the observed excess risk of IHD: (1) chemical exposures which are shared by production workers in the rubber chemicals department and maintenance and janitorial workers (possibly exposed group) and (2) the rotating shift schedule which is shared by both workers in the rubber chemicals department and workers in the ''probably not exposed group'' (consisting of the production workers in the polyvinyl chloride manufacturing department). An internal comparison group of non-exposed plant workers (no rotating shift schedule and no rubber chemical exposure) would be the ideal comparison population but does not exist, reducing the power of internal analyses to detect the relationship of these factors and IHD risk.

"The modeling and analytic strategies employed by the authors throughout the paper chose age category according

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Accepted 20 July 2001

to those which yielded the most statistically significant subgroup differences."

This statement is incorrect. Most analyses reported in the paper used age 50 as the cut-point, while the cut-point at age 45 gave the lowest *P*-value for exposure status. The latter cut-point was used only for analyses of interaction between age and exposure category.

"The authors recommendations include:...3) a plant-based intervention program to monitor and reduce cardiovascular risk factors."...They also note that "Goodyear has had an intervention program consisting of a comprehensive physical examination with evaluation of cardiac risk factors as well as other health parameters for all active employees in the plant since 1975."

The existence of an intervention program with evaluation of cardiac risk factors from 1975 on would appear to make the findings of Oliver and Weber (1984) of increased chest pain and possible/definite IHD among workers in the rubber chemicals department examined in 1980, and our finding of increased IHD mortality in the 1980–1994 time period, of even greater concern.

"However well intended the authors' recommendations, they are not well supported by the results of the study."

We continue to believe that the presentation of results was well balanced in this paper and that the recommendations are reasonable.

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