in the lower exposure group. We did point out that at Deer Park the higher exposure group was first exposed earlier than the lower exposure group.

Ross also feels that we made no effort to distinguish between the effects of ECH alone from those of ECH in combination with allyl chloride. We did, in fact, do this. On page 276 of our article where we point out that the only raised cardiovascular disease SMR was for workers with moderate to heavy exposure to ECH and who had probable exposure to allyl chloride (SMR = 120.7). For workers without probable exposure to allyl chloride the SMRs were much lower.

Finally, Ross quotes from page 276 of our article "There is little in human or animal experience to suggest a relation between allyl chloride and cardiovascular disease." The context for this was our review of the very few publications relating to allyl chloride. It remains to be seen what further research might add.

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Asbestos: a chronology of its origins and health effects

Sir,—We were interested in Murray's article (1990;47:361-5) about asbestos. Recently we have completed the first part of a study on mesothelioma deaths in Leeds and through our research have become aware of the important contribution of Leeds' doctors to the asbestos story.

Dr Ian M D Grieve, a general practitioner working in the Armley area of Leeds in the 1920s, was aware of the detrimental effect of asbestos on the health of some of his patients who worked at a local factory that produced insulation mattresses for steam engines. These were made from blue asbestos, which had been in use at the factory from 1906. He submitted an MD thesis to Edinburgh University on the subject of asbestosis in September 1927.¹

In this he defined asbestosis as "a chronic pneumokoniosis affecting all asbestos workers within five years, the fibrosis being basal, beginning on the right side and being accompanied by

diffuse pleural adhesions, whilst the upper lobes are emphysematous, the symptoms being early dyspnoea with dry cough followed by wasting, anorexia and weakness, without fever, night sweats or Tubercle Bacilli in the Sputum, and terminating fatally in 20 to 30 years from exhaustion and inter-current disease." Grieve described 15 cases of asbestosis at various stages including one woman who had died and for whom there was available postmortem material. In nine of the 15 cases, he was unable to find evidence of tuberculosis which led him to the conclusion that "pulmonary tuberculosis does not supervene and is not the ultimate cause of death."

This conclusion was documented in 1927² in a report of the BMA annual meeting in Edinburgh, where Professor Stuart McDonald, professor of pathology at the University of Durham, commenting on Grieve's case, declared "there was in the sections examined a considerable degree of fibrosis without apparent tuberculosis. The immediate cause of death in that case was a terminal bronchopneumonia," This case would predate the case of Seiler to which Murray makes reference.

Interestingly Dr A C Haddow, Grieve's senior partner, described the clinical aspects of asbestosis¹⁵ at a BMA meeting in 1929³ and quoted a case "in which the curious bodies were found in a man who was not employed in the industry, but who lived next door to an asbestos factory. The result was confirmed by Prof J M Stewart (Leeds)."

As Professor of Pathology at Leeds University, Stewart's interest in asbestosis included the development of techniques for demonstrating the peculiar bodies in material from lung puncture about which he published a paper together with Haddow in 1929.⁴

The contribution of Grieve, Stewart, and Tattersall, a Leeds radiologist, to his understanding of the nature of asbestosis¹⁵ was formally acknowledged by E R A Merewether in his influential "report on the effects of asbestos dust on the lungs and dust suppression in the asbestos industry" published in 1930.⁵

We are about to start the second phase of our research into mesothelioma deaths in Leeds in which the relative contributions of differing types of exposure to asbestos in the development of mesothelioma will be examined.

A copy of the report "Leeds mesothelioma deaths 1971-87" can be obtained from Dr Martin Schweiger, medical officer for environmental health and consultant in public health medicine, St Mary's House, St Mary's Road, Leeds LS7 3JX.

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- 1 Grieve IMD. Asbestosis. Edinburgh: University of Edinburgh, 1927. (MD thesis.)
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- 4 Stewart MJ, Haddow AC. Demonstration of the peculiar bodies of pulmonary asbestosis ("asbestosis bodies") in material obtained by lung puncture and in the sputum. *Journal of Pathology and Bacteriology* 1929;32:172.
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Blood lead concentration, renal function, and blood pressures in London civil servants

Sir,—The paper of Staessen *et al* (1990;47:422-7) is typical of a widening gulf between North American and European views as to the validity and importance of the relation between exposure to lead in the general population and blood pressure. Europeans have described positive relations between blood pressure and the concentration of lead in blood, but tend to dismiss them as trivial and unimportant—mainly because the relations become attenuated upon control for various confounders.^{1,2} Reports originating from North America basically report the same magnitude of relation,³⁻⁵ but interpret the findings as being of significant public health importance because of the morbidity potentially attributable to the levels of lead exposure observed in the population.⁶ I suggest that both views are missing the mark.

With respect to controlling for confounders, I have previously alluded to

a confusing problem in controlling for factors such as alcohol when it is unclear whether one is controlling for a true confounder or a factor in the chain of causality.⁷ The analysis reported by Staessen *et al* has this problem. Their use of stepwise multiple regression methods to determine the important independent predictors of blood pressure is suspect; the method is fraught with inferential hazards due to the vagaries of statistical model assumptions, multicollinearity, measurement error, and construct validity.⁸⁻¹⁰

Lastly, recent studies suggest that use of tobacco may negatively confound a relation between blood pressure and concentration of lead in blood.^{11,12} Tobacco users tend to have higher blood lead concentrations, but lower blood pressures. Indeed, it may be necessary to not only take into account usual smoking habits, but also smoking behaviour proximate to collection of data.¹¹ With such a strong relation between concentration of lead in blood and use of tobacco in their data, what is the joint relation with blood pressure?

With respect to attributable risk, the North Americans suffer from too narrow a perspective. One of the difficulties in interpreting data from epidemiological studies examining this relation is that designs and statistical analyses have ignored the results of experimental research pointing to a biological mechanism by which lead probably exerts its effect. This mechanism suggests that lead acts as a potentiator, or effect modifier, of a causal relation between a triggering agent and the blood pressure response.^{13,14}

If true, then relations described by large cross sectional population studies are probably the wrong design to disentangle the nature of this relation. Indeed, they may even lead to a false impression as to the public health importance of lead as a causal factor in the development of raised blood pressure. This is due to the failure of such methods to take into account the effects of these triggering agents, and particularly a failure to distinguish between the acute and the chronic effects of such triggers.

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Glomerulonephritis, renal carcinoma, and solvent exposure: bias from choice of referents

Sir,—Harrington *et al* (1989;46:643-50) claim that their case-referent study of renal disease and exposure to organic solvents is superior to

previous studies; they consider their study methodologically relevant, whereas previous ones (concerning glomerulonephritis) almost without exception, they argue, had serious methodological flaws.

With their phrase "almost without exception" Harrington *et al* mean five of seven, but to reach this number they have ignored two strong case-referent studies.^{1,2} That their results are contrary to eight of nine previous studies does not bother them because they obviously think that studies, the designs of which are open to bias, are automatically wrong. The claimed superiority of their work is open to discussion, however.

Firstly, although not stated directly, it apparently concerned only acute glomerulonephritis as they excluded non-acute cases. There is only one such study previously. In that, the exposure was time related to a streptococcal infection in ten of fifteen patients, but in most the exposure was of short duration.³ Bearing its rareness in mind I doubt that Harrington *et al* have collected 50 patients with acute poststreptococcal glomerulonephritis; neither was it mentioned in the paper. Thus what they have found is that acute non-streptococcal glomerulonephritis is not associated with long term exposure to solvent, a finding of dubious value for excluding a causal association.

Even if we assume that patients with chronic glomerulonephritis were included, the design and the conclusions of their study are questionable. It is elementary that occupational referents should represent the general population. Community based referents from the same socioeconomic group and the same geographic location may automatically include many people with the same occupation and thus with a similar degree of exposure as the cases, especially in an area with an industrial bias such as the West Midlands. The presence of this bias is suggestive judged from the high degree of exposure in the referent group. Thus an exposure index of greater than 1-100 in 60% of the referents by far exceeds the degree of exposure of the referents in previous studies. An exception is the unblinded study of van der Laan⁴ who found that 54% of the referents had had moderate to severe exposure to organic solvents for 400 hours or more. Anyone familiar with the working conditions