

## CORRESPONDENCE

### Coal mining, emphysema, and compensation revisited

Editor,—We are sorry to see that Morgan, in his Forum article in 1993,<sup>1</sup> has repeated criticisms of our study that are totally without foundation and have already been effectively countered. In our reply to earlier remarks along the same lines made by Lapp and Morgan<sup>2</sup> on our paper,<sup>3</sup> we stated that the inclusion of anthracite workers made no difference to the results, the findings being essentially the same when they were removed from the study group. Our earlier response also noted that the dust exposure effect was evident when various indicators of exposure were used (from a surrogate—years of work underground—to exposure estimates derived from data other than that which he questions). As for the smoking effect—we reported what we found. The results differed little when various analytical approaches were used, and are similar to those found by other researchers for cross sectional studies of cohorts of current workers.

Epidemiological studies are hard to do right, and very easy to criticise. The perfect investigation does not exist and may never. In his attempt to further his point of view, Morgan seeks out the inevitable blemishes in studies, while completely ignoring the overall picture. This picture, based on a number of different types of study in several countries, now shows that there is overwhelming evidence<sup>3-13</sup> that loss of lung function is related to dust exposure in coal mining.

MICHAEL D ATTFIELD

*Epidemiology Section,  
Epidemiological Investigations Branch,  
Division of Respiratory Disease Studies  
THOMAS HODOUS  
Science and Policy Coordination Activity,  
Office of the Director,  
Division of Safety Research,  
National Institute for Occupational Safety and  
Health—ALOSH,  
944 Chestnut Ridge Road,  
Morgantown,  
WV 26505-2888, USA*

- Morgan WLC. Forum: coal mining, emphysema, and compensation revisited. *Br J Ind Med* 1993;50:1051-2.
- Lapp NL, Morgan WKC. Letter to the editor. *Am Rev Respir Dis* 1993;147:237-8.
- Attfield MD, Hodous TK. Pulmonary function of US coal miners related to dust exposure estimates. *Am Rev Respir Dis* 1992;145:605-9.
- Attfield MD. Longitudinal decline in FEV<sub>1</sub> in United States coalminers. *Thorax* 1985;40:132-7.
- Gauld SJ, Hurley JF, Miller BG. Differences between long-term participants and non-respondents in a study of coalminers' respiratory health and exposure to dust. *Ann Occup Hyg* 1988;32(suppl 1):545-51.
- Hankinson JL, Reger RB, Fairman RP, Lapp NL, Morgan WKC. Factors influencing expiratory flow rates in coal miners. In: Walton WH, ed. *Inhaled particles IV*. Oxford: Pergamon Press, 1977; 737-55.
- Hurley JF, Soutar CA. Can exposure to coalmine dust cause a severe impairment of lung function. *Br J Ind Med* 1986;43:150-7.
- Love RG, Miller BG. Longitudinal study of lung function in coal miners. *Thorax* 1982;37:193-7.
- Marine WM, Gurr D, Jacobsen M. Clinically important respiratory effects of dust exposure and smoking in British coal miners. *Am Rev Respir Dis* 1988;137:106-12.

- Rogan JM, Attfield MD, Jacobsen M, Rae S, Walker DD, Walton WH. Role of dust in the working environment in the development of chronic bronchitis in British coal miners. *Br J Ind Med* 1973;30:217-26.
- Seixas NS, Robins TG, Attfield MD, Moulton LH. Exposure-response relationships for coal mine dust and obstructive lung disease following enactment of the federal coal mine health and safety act of 1969. *Am J Ind Med* 1992;21:715-34.
- Seixas NS, Robins TG, Attfield MD, Moulton LH. Longitudinal and cross-sectional analyses of coal mine dust exposure and pulmonary function in new miners. *Br J Ind Med* 1993;50:929-37.
- Soutar CA, Hurley JF. Relation between dust exposure and lung function in miners and ex-miners. *Br J Ind Med* 1986;43:307-20.

### Mental retardation and parental occupation: a study on the applicability of job exposure matrices

Editor,—Roeleveld and colleagues identified occupational exposures by the application of job exposure matrices for occupational histories and by asking respondents during their interview to mark their exposures on a checklist.<sup>1</sup> Compared with interviews the method of matrices yielded twice as many exposure categories. This difference can be explained with the inaccuracy of both or one of the methods of data collection. Owing to the rigidity of job exposure matrices, which can obscure real associations, authors considered interview as "the gold standard", although as the time lag between pregnancy and interview was 2-25 years, they were aware of the possibility of underreporting. One of their arguments against exposure data generated by job matrices is that "ORs found by means of the interview could be interpreted logically, whereas those for exposures generated by job matrices could hardly be explained."

Without favouring either of the two methods I wish to call attention to two inaccuracies in this statement. Firstly, ORs given by matrices move randomly around 1 and all the 95% CIs are below 1 indicating no significant differences at this level. Thus the only justified conclusion is that according to matrices mental retardation in the study group was not associated with parental exposure, a not illogical outcome. The second inconsistency is in the statement that the associations between mental retardation and exposures identified through interviews were in agreement with published information. As far as mercury is concerned this statement would be correct only if exposure had been to methylmercury. It is unlikely, however, or even impossible, that this is the case. The salient point is that among mercurials, methylmercury is the only one for which the adverse effect of prenatal exposure on postnatal development has been proved in epidemiological studies and that is why all the supporting references on mercury given by the authors are on this mercury species.

LASZLO MAGOS  
107 Boundary Road,  
Wallington, Surrey SM6 0TE

- Roeleveld N, Zilhuis GA, Gabreëls F. Mental retardation and parental occupations: a study on the applicability of job exposure matrices. *Br J Ind Med* 1993;50:945-56.

### Author's reply

Editor—The opportunity to respond to Magos' comments is greatly appreciated. It is, indeed, very difficult to compare different methods of occupational exposure assessment and to favor one over the other when the true exposure is unknown.<sup>1</sup> In our study, a personal interview was considered the "gold standard" to which job exposure matrices were compared, in the absence of more accurate exposure information. The results suggested a high degree of misclassification on exposures generated by job exposure matrices, that among other results was reflected in some increased ORs that could hardly be explained. Magos argues that "all ORs move randomly around 1 and thus the only justified conclusion is that mental retardation was not associated with parental occupation." The fact, however, that ORs that were increased according to the interview (not due to information bias<sup>2</sup>) varied around unity when using the matrices, is indicative of non-differential misclassification of exposure resulting in bias towards the null value. Therefore, a justified conclusion pertains not to the absence of associations, but to obscuring of true associations when general job exposure matrices are used as an alternative to personal interviews or other methods of exposure assessment. Moreover, job exposure matrices also yield spurious associations that cannot be explained, such as for diesel fuel (OR = 2.0, 90% CI: 1.0-4.1) that had definitely not been used by any of the women in the study population.<sup>3</sup>

After Magos expresses a concern about the association found between mental retardation and exposure to mercury (compounds), which he claims is not in accordance with the scientific literature that exclusively refers to methylmercury. There are, however, a number of publications that report or suggest adverse effects of inorganic mercury compounds and metallic mercury vapour on the fetal central nervous system, as summarised in a review article in this journal.<sup>4</sup> Both maternal exposure to methylmercury, although unlikely, and occupational exposure to other mercurials could thus be potential risk factors for mental retardation in offspring.

NEL ROELEVELD  
Dept of Medical Informatics  
and Epidemiology,  
University of Nijmegen,  
PO Box 9101,  
6500 HB Nijmegen, The Netherlands

- Hémon D, Goldberg M, Mur J-M. Retrospective evaluation of occupational exposures in epidemiology: a European concerted action 1990-1992. *Int J Epidemiol* 1993;22(suppl 2).
- Roeleveld N, Kiemeny L, Schattenberg G, Peer P. Information bias in a case-referent study on mental retardation and parental occupation: colleagues as dual respondents. *Epidemiology* 1990;1:292-7.
- Roeleveld N, Zilhuis GA, Gabreëls F. Mental retardation and parental occupation: a study on the applicability of job exposure matrices. *Br J Ind Med* 1993;50:945-54.
- Roeleveld N, Zilhuis GA, Gabreëls F. Occupational exposure and defects of the central nervous system in offspring: review. *Br J Ind Med* 1990;47:580-8.