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British Journal of

# INDUSTRIAL MEDICINE

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Papers are accepted on the understanding that they are contributed solely to this journal and are subject to editorial revision. The editor cannot enter into correspondence about papers rejected as being unsuitable for publication, and his decision is final. Papers should follow the requirements of the International Steering Committee of Medical Editors (*Br Med J* 1979;i:532-5). **Papers should be prefaced by an abstract of the argument and findings which should be more comprehensive than a summary. Papers and references must be typewritten on one side of the paper only, both in double spacing, and with a wide margin. Both SI units and their equivalents must be given throughout** (Baron *et al*, *J Clin Pathol* 1974;27:590-7). Photographs and photomicrographs on glossy paper should be submitted unmounted. Charts and graphs should be carefully drawn in black ink on tracing linen or Bristol board or stout white paper. Legends to figures should be typed on a separate sheet of paper.

**References will not be checked by the editorial office; responsibility for the accuracy and completeness of references lies with the author.** Number references consecutively in the order in which they are first mentioned in the text. Identify references in texts, tables, and legends by Arabic numerals above the line. References cited only in tables or in legends to figures should be numbered in accordance with a sequence established by the first identification in the text of a particular table or illustration. The number of references should be kept to the absolute minimum and only those essential to the argument being developed by the authors or to the discussion or if they describe methods which are being used

when the original is too long for inclusion. Usually one reference per typed page of manuscript should be sufficient.

Use the form of references adopted by *Index Medicus*—for instance, for a standard journal article: authors (list all authors when six or fewer, when seven or more, list only three and add *et al*), title, abbreviated title of journal, year of publication; volume number: **first and last page numbers**.

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- 1 Becklake MR, Fournier-Massey G, McDonald JC, Siemiatycki J, Rossiter C. Lung function in relation to radiographic changes in Quebec asbestos workers. *Bull Eur Physiopathol Respir* 1970;6:637-43.
- 2 Becklake MR. Asbestos-related disease of the lung and other organs: their epidemiological implications for clinical practice. *Am Rev Respir Dis* 1976;114:187-227.
- 3 International Labour Office/UC. International classification of radiographs of pneumoconiosis. Geneva: ILO, 1980. (Occupational safety and health series. No 22 (rev 80).)
- 4 Kilburn KH, Warshaw RH. Correlation of pulmonary functional impairment with radiographic asbestosis (ILO category). *Am Rev Respir Dis* 1989;139:A210.
- 5 Katz D, Kreel L. Computed tomography in pulmonary asbestosis. *Clin Radiol* 1979;30:207.
- 6 Staples CA, Gamsu G, Ray CS, Webb WR. High resolution computed tomography and lung function in asbestos-exposed workers with normal chest radiograph. *Am Rev Respir Dis* 1989;139:1502-8.
- 7 Strickland B, Brennan J, Denison DM. Computed tomography in diffuse lung disease: improving the image. *Clin Radiol* 1986;37:335-8.
- 8 Lozewicz S, Reznick RH, Herdman M, Dacie JE, McLean A, Davies RJ. Role of computed tomography in evaluation of asbestos related lung disease. *Br J Ind Med* 1989;46:777-81.
- 9 Kuwano K, Matsuba K, Ikeda T, Murakami J, Araki A, Nishitani H, et al. The diagnosis of mild emphysema. Correlation of computed tomography and pathology scores. *Am Rev Respir Dis* 1990;141:169-78.
- 10 Bergin C, Muller NL, Nicholas DM, Lillington G, Hogg JC, Mullen B, et al. The diagnosis of emphysema—a computed tomographic-pathologic correlation. *Am Rev Respir Dis* 1986;133:541-6.
- 11 Cotes JE. *Lung function: Assessment and application in medicine*. 4th ed. Oxford: Blackwell, 1979.
- 12 Liddle FDK. Radiological assessment of small pneumoconiotic opacities. *Br J Ind Med* 1977;34:85-94.
- 13 McLeod TC, Carrington CB, Gaensler EA. Diffuse interstitial lung disease: a new scheme for description. *Radiology* 1983;149:353-63.
- 14 Friedman AC, Fiel SB, Fisher MS, Radecki PD, Lev-Toaff AS, Caroline DF. Asbestos-related pleural disease and asbestosis: a comparison of CT and chest radiography. *American Journal of Radiology* 1988;150:269-75.
- 15 Aberle DR, Gamsu G, Ray CS, Feuerstein IM. Asbestos related pleural and parenchymal fibrosis: detection with high resolution CT. *Radiology* 1988;166:729-43.
- 16 Yoshimura H, Hatakeyama M, Otsuji H, Maeda M, Ohishi H, Uchida H, et al. Pulmonary asbestosis: A CT study of subpleural curvilinear shadow. *Radiology* 1986;158:653-8.
- 17 Al Jarad N, Poulakis N, Pearson MC, Rubens MB, Rudd RM. Assessment of asbestos-related pleural disease by computed tomography, a comparison with the chest radiograph. *Respir Med* 1991;85:203-8.
- 18 Muller NL, Staples CA, Miller RR, Abboud RT. "Density mask"—an objective method to quantitate emphysema using computed tomography. *Chest* 1988;94:728-87.
- 19 Kinsella M, Muller NL, Abboud RT, Morrison NJ, DyBuncio A. Quantitation of emphysema by computed tomography using a "density mask" program and correlation with pulmonary function tests. *Chest* 1990;97:315-21.
- 20 Gould GA, MacNee W, Mclean A, Warren PM, Redpath A, Best JJK, et al. CT measurements of lung density in life can quantitate distal airspace enlargement—an essential defining feature of human emphysema. *Am Rev Respir Dis* 1988;137:380-92.

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### Destruction of manuscripts

From 1 July 1985 articles submitted for publication will not be returned. Authors whose papers are rejected will be advised of the decision and the manuscripts will be kept under security for three months to deal with any inquiries and then destroyed.

- leukemia. I. Establishment of type C virus producing cell lines. *Zentralbl Veterinarmed (B)* 1974;21:602-17.
- 56 Kettmann R, Portetelle M, Mammerickx M, et al. Bovine leukemia virus: an exogenous RNA oncogenic virus. *Proc Natl Acad Sci USA* 1976;73:1014-8.
- 57 Priestler WA, Mason TJ. Human cancer mortality in relation to poultry population, by county, in 10 southeastern states. *J Natl Cancer Inst* 1974;53:45-9.
- 58 Hardell L, Eriksson M, Lenner P, Lundgren E. Malignant lymphoma and exposure to chemicals, especially organic solvents, chlorophenols and phenoxy acids; A case-control study. *Br J Cancer* 1981;43:169-76.
- 59 Hoar SK, Blair A, Holmes FF, et al. Agricultural herbicide use and risk of lymphoma and soft-tissue sarcoma. *JAMA* 1986; 256:1141-7.
- 60 Kociba RJ, Keyes DG, Beyer JE, et al. Results of a two-year chronic toxicity and oncogenicity study of 2,3,7,8-tetrachloro-dibenzo-p-dioxin in rats. *Toxicol Appl Pharmacol* 1978;46: 279-303.
- 61 Pitot HC, Goldsworthy T, Campbell HA, et al. Quantitative evaluation of the promotion by 2,3,7,8-tetrachlorodibenzo-p-dioxin of hepatocarcinogenesis from diethylnitrosamine. *Cancer Res* 1980;40:3616-20.
- 62 van Miller JP, Lalich JJ, Allen JR. Increased incidence of neoplasm in rats exposed to low levels of 2,3,7,8-tetrachlorodibenzo-p-dioxin. *Chemosphere* 1977;6:537-44.
- 63 National toxicology program, National Cancer Institute. *NIH bioassay of a mixture of 1,2,3,6,7,8 and 1,2,3,7,8,9-hexachloro dibenzo-p-dioxins for carcinogenicity (gavage study)*. (Natl Toxicol Program tech rep ser No 198; DHHS publ No (NIH)80-198.) Research Triangle Park, NC: Natl Toxicol Program, 1980.
- 64 National toxicology program, National Cancer Institute. *Toxicology and carcinogenesis studies of two penta-chlorophenol technical-grade mixtures B6C3F<sub>1</sub> mice*. (Natl Toxicol Program tech rep ser No 349; DHHS publ No (NIH)89-2804.) Research Triangle Park, NC: Natl Toxicol Program, 1989.
- 65 Eriksson M, Hardell L, Adami H-O. Exposure to dioxins as a risk factor for soft tissue sarcoma: A population-based case-control study. *J Natl Cancer Inst* 1990;82:486-90.
- 66 Kashyap SK, Nigam SK, Karnick AB, et al. Carcinogenicity of DDT (dichlorodiphenyltrichloroethane) in pure inbred Swiss mice. *Int J Cancer* 1977;19:725-29.
- 67 Rossi L, Ravera M, Repetti G, et al. Long-term administration of DDT or phenobarbital Na in Wistar rats. *Int J Cancer* 1977; 19:179-85.
- 68 Cabral JRP, Hall RK, Rossi L, et al. Effects of long-term intakes of DDT on rats. *Tumori* 1982;68:11-7.
- 69 Persson B, Dahlander AM, Fredriksson M, Noorlind Brage H, Ohlson C-G, Axelson O. Malignant lymphomas and occupational exposures. *Br J Ind Med* 1989;46:516-20.
- 70 Flodin U, Fredriksson M, Persson B, Axelson O. Chronic lymphatic leukaemia and engine exhausts, fresh wood, and DDT: a case-referent study. *Br J Ind Med* 1988;45:33-8.

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## Vancouver style

All manuscripts submitted to the *Br J Ind Med* should conform to the uniform requirements for manuscripts submitted to biomedical journals (known as the Vancouver style).

The *Br J Ind Med*, together with many other international biomedical journals, has agreed to accept articles prepared in accordance with the Vancouver style. The style (described in full in *Br Med J*, 24 February 1979, p 532) is intended to standardise requirements for authors.

References should be numbered consecutively in the order in which they are first mentioned in the text by Arabic numerals above the line on each occasion the reference is cited (Manson<sup>1</sup> confirmed other reports<sup>2-5</sup> . . .). In future references to papers submitted to the *Br J Ind Med* should include: the

names of all authors if there are six or less or, if there are more, the first three followed by *et al*; the title of journal articles or book chapters; the titles of journals abbreviated according to the style of *Index Medicus*; and the first and final page numbers of the article or chapter.

Examples of common forms of references are:

- 1 International Steering Committee of Medical Editors. Uniform requirements for manuscripts submitted to biomedical journals. *Br Med J* 1979;1:532-5.
- 2 Soter NA, Wasserman SI, Austen KF. Cold urticaria: release into the circulation of histamine and eosino-phil chemotactic factor of anaphylaxis during cold challenge. *N Engl J Med* 1976;294:687-90.
- 3 Weinstein L, Swartz MN. Pathogenic properties of invading micro-organisms. In: Sodeman WA Jr, Sodeman WA, eds. *Pathologic physiology: mechanisms of disease*. Philadelphia: W B Saunders, 1974:457-72.

That hearing diminishes with age, especially at high frequencies, has been known for many years.<sup>5,6</sup> This suggests that the younger segment of our control group may have some hearing loss. Their ability to hear human conversation, however, and the absence of the use of hearing aids were consistent with minor hearing impairment. On the other hand, many older iron workers wore hearing aids and interviewing them was difficult because of their impaired hearing. They portray the usual course of noise induced hearing loss.<sup>7</sup> For balance or control of sway to show age deterioration before age 75 or 80 is unusual.<sup>4</sup> Balance seems to develop rapidly between ages 6 to 9 and remains intact until the eighth decade. Studies of senior army officers with a long history of exposure to impulse noise from firearms showed noise induced hearing loss and balance dysfunction.<sup>8</sup> Many of these men had had dizziness and spinning vertigo resembling Ménière's disease and the mechanism was postulated as delayed endolymphatic hydrops. Cochlear damage has been produced in experimental animals by acoustic overstimulation, extending even to complete disappearance of the organ of Corti.<sup>9</sup> Damage to hearing has been associated recently with exposure to lead<sup>10</sup> and toluene combined with noise has adverse effects on both hearing and balance.<sup>11</sup> Other studies beginning nearly 50 years ago have shown effects of ethyl alcohol on balance, which was detected in a similar manner to that used in the present study.<sup>12</sup> Furthermore, xylene and alcohol were shown to have additive effects on impairing balance.<sup>13</sup> These findings suggest that it will be

important to check for possible confounding exposures before concluding that noise is solely responsible for defects in hearing and balance in construction or shipyard workers.

- 1 Juntunen J, Matikainen E, Ylikoski J, Ylikoski M, Ojala M, Vaheri E. Postural body sway and exposure to high-energy impulse noise. *Lancet* 1987;ii:261-3.
- 2 Kilburn KH, Seidman BC, Warshaw R. Neurobehavioural and respiratory symptoms of formaldehyde and xylene exposure in histology technicians. *Arch Environ Health* 1985;40:229-33.
- 3 Kilburn KH, Warshaw R. Formaldehyde impairs memory, equilibrium, and dexterity in histology technicians: effects which persist for days after exposure. *Arch Environ Health* 1987;42:117-20.
- 4 Sheldon JH. The effect of age on the control of sway. *Gerontologica Clinica* 1963;5:129-38.
- 5 Burns W, Robinson JW. Hearing and noise in industry. London: HMSO, 1976.
- 6 Glorig A, Davis H. Age, noise and hearing loss. *Ann Otol Rhinol Laryngol* 1961;70:556-71.
- 7 Schneider EJ, Mutchler JF, Hoyle HR, Ode EH, Holder BB. The progression of hearing loss from industrial noise exposure. *American Industrial Hygiene Association Journal* 1970;31:368-76.
- 8 Ylikoski J. Delayed endolymphatic hydrops syndrome after heavy exposure to impulse noise. *Am J Otol* 1988;9:282-5.
- 9 Spoenclin H. Anatomical changes following various noise exposures. In: Henderson D, Hamernik RP, Dosanjh DS, Mills JH, eds. *Effects of noise on hearing*. New York: Raven Press, 1976:69-87.
- 10 Schwartz J, Otto D. Lead and minor hearing impairment. *Arch Environ Health* 1991;46:228-35.
- 11 Morata TC, Dunn DE, Kretschmer LW, Lemasters GK, Santos UP. Effects of simultaneous exposure to noise and toluene on workers' hearing and balance. *Archives of Complex Environmental Studies*, 1991 (in press).
- 12 Goldberg L. Quantitative studies on alcohol tolerance in man. *Acta Physiol Scand* 1943;5:28-55.
- 13 Savolainen K. Combined effects of xylene and alcohol on the central nervous system. *Acta Pharmacologica et Toxicologica* 1980;46:366-72.

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## Correspondence and editorials

The *British Journal of Industrial Medicine* welcomes correspondence relating to any of the material appearing in the journal. Results from preliminary or small scale studies may also be published in the correspondence column if this seems appropriate. Letters should be not more than 500 words in length and contain a minimum of references. Table and figures should be kept to an absolute minimum. Letters are accepted on the

understanding that they may be subject to editorial revision and shortening.

The journal now also publishes editorials which are normally specially commissioned. The Editor welcomes suggestions regarding suitable topics; those wishing to submit an editorial, however, should do so only after discussion with the Editor.

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## CORRESPONDENCE

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### An update of cancer mortality among chrysotile asbestos miners in Balangero, northern Italy

Sir,—Following the update by Piolatto *et al* on cancer mortality among chrysotile miners in Balangero, northern Italy (1990;47:810-4), we report on a further case of pleural mesothelioma in a man who worked at Balangero.

NSR, born in 1921, had no major disease until 68 years of age, except for an episode of dyspnoea and right sided chest pain when he was 38; both cleared spontaneously. In August 1989, because of rapidly increasing dyspnoea without chest pain, he was admitted to a chest hospital (San Luigi Gonzaga, Orbassano, Turin). After the evacuation of copious haemorrhagic fluid, right parietobasal pleural opacities were evident on chest x ray film; a sample of pleural fluid showed large atypical cells. A thoracoscopy was performed revealing many mamillary whitish masses on the diaphragmatic and visceral right pleura; a small sample from one of the diaphragmatic masses was taken for histological examination and showed scanty strings of atypical cells of mesothelial appearance inside hyaline fibrous strands; a diagnosis of pleural mesothelioma was considered. Later, an ascitic effusion appeared and a sample of this fluid also showed atypical cells. The patient died on 2 May 1990. Unfortunately, no necropsy was carried out.

Recently, one of us carried out a revision of the only available biopsy and at immunocytochemical examination the atypical cells were positive for vimentine and cytokeratin and showed a membrane positivity for EMA, confirming the mesothelial nature of the lesion.

The occupational history was obtained with the help of the patient's work documents. NSR worked at Balangero from 4 July 1936 to 26 April 1944 with a gap of about 15 months (1941-1942) for military service. During the first two and a half years he was employed in supplying drinking water to the miners. During the next two years he was employed partly in sweeping gravel and dust after each blast, partly (for about six months) in auxiliary jobs building a new part of

the mill. Finally, for two years, despite the title of "rock driller", he worked not only quarrying the mineral with a dry hammering pneumatic drill, but also inside the mill, riddling the milled mineral to separate fibres from dusts, and mixing fibres of different lengths chosen among preselected batches. He had noted that all his working areas were extremely dusty, but the last was the worst.

Afterwards he worked, from 1944 to 1945, as a farmer, cultivating hay and attending to cows and horses, from 1945 to 1981 for five and a half years as a street sweeper, then as a white collar worker.

NSR lived from birth to 1944 in a village close to Balangero; he remembered frequent "snowfalls" of white powder, spread from the mine and the mill, that covered the sills of his house, and the leaves of the trees around it. From 1944 to 1945 he lived in a farm near Turin; thereafter he always lived in Turin. He denied any exposure to asbestos from hobbies or other activities. The possibility of asbestos exposure from factories near his houses in Turin was repeatedly investigated by us in the public archives without producing any positive evidence.

A 300-600 pack-year smoking history was noted from the age of 28-38 years; after that he stopped smoking.

We considered this case to be of some epidemiological relevance because the patient was substantially exposed only to chrysotile in mining and in the first treatment of the mineral and, in addition, he lived near Balangero until 1944. An exposure to amphiboles cannot be entirely ruled out only because it was the common urban environmental pollutant while he lived in Turin and he possibly handled asbestos cement coverings during the short period spent in building the new part of the Balangero mill.

NSR's work at Balangero was neither his main nor his last occupation, so it is likely that, in epidemiological studies other than cohort studies, he would have been classified as "not occupationally exposed."

Because he worked in Balangero from 1939 to 1944, he was not included in the cohort of Balangero miners and millers studied by Rubino *et al* (1979;36:187-94) and by Piolatto *et al* (1990;47:810-4). A 50 year latency elapsed from the beginning of exposure to asbestos to the clinical presentation of mesothelioma. This suggests that an extension of the

cohort study, including workers employed before 1946, and an extension of the follow up period would be useful.

The case adds to the short list of mesotheliomas occupationally related to Balangero (two cases mentioned by Piolatto *et al* and perhaps a third unpublished one of a manager who directed the mine and the mill from 1958 to 1985; this last case was mentioned to us by a relative).

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## NOTICES

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### First announcement: First Congress of the European Society of Contact Dermatitis

The First Congress of the European Society of Contact Dermatitis will be held in Brussels, Belgium, 8-10 October 1992. For further information please contact the Congress organiser: Professor J M Lachapelle, Unit of Occupational and Environmental Dermatology, Louvain University, UCL 3033, 30, Clos Chapelle-aux-Champs. B-1200 Brussels. Tel 32.2.764.3335; Fax 32.2.764.3334.

### International Symposium on Biological Monitoring

To be held by the Committee on Occupational Toxicology of the International Commission of Occupational Health, 12-16 October 1992, at Kyoto, Japan.

The scope and purpose of the Symposium is to exchange knowledge and discuss problems of biological monitoring of humans, the increasingly important approach in evaluating internal doses in humans exposed to hazardous chemicals in occupational, as well as in general environments.

For further information including the first circular, write to: Professor M Ikeda, Chairman of Committee on Occupational Toxicology, c/o Department of Public Health, Kyoto University Faculty of Medicine, Kyoto 606-01, Japan.