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for word processing, and Ivy Peck and Suvineetha Wanasundara for consolidation of data files. This update would not have been possible without a research award from the International Lead Zinc Research Organisation (ILZRO). TS receives generous financial support from the Colt Foundation. We thank the company management for access to company records. We acknowledge the importance of the work carried out by the late Dr Harry Holden.

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- blind placebo-controlled trial of tanakin in the treatment of idiopathic cognitive impairment in the elderly. *Human Psychopharmacology* 1987;2:159-69.
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resulting in high cobalt dust contamination of the ceiling, and, at the same time, a higher personal exposure to airborne cobalt than painter "low". The higher airborne exposure may also be reflected in the higher concentration of cobalt in urine of painter "high". It should be emphasised that other routes of exposure may also be relevant—for example, ingestion or absorption through the skin as recently shown by Scansetti *et al.*¹⁴

Conclusions

In conclusion the present study has shown that: (a) the area on geltape prints covered with total dust taken from surfaces inside the cabins correlates well with the amount of cobalt in the dust trapped on the geltape prints; (b) the area on geltape prints covered with total dust taken from the cabin ceilings correlates with the airborne cobalt exposure; (c) the geltape method can distinguish between work processes with different exposure and between people with (significant) differences in exposure.

All in all the present study indicates that, in this industry, geltape prints from the ceiling of the cabins can be applied in a simple and fast routine surveillance of whole day exposure (end of working day) as well as of exposure related to work processes. In plate painting the aerosols are reasonably well defined with a high content of cobalt dye. Hence, one reason for the successful use of the geltape method in this industry may be that the composition of airborne exposures is preserved over time. In other industries in which the composition of airborne pollutants is more complex, and shows a larger variation over time, the geltape method may not be applied to give an indirect measure of airborne exposure to compounds that are constituents of the airborne dust. For each industry, there should be tests to find out if the geltape method produces results that correlate well with the airborne concentration of the compound of interest. Some basic requirements for a valid application of the geltape method in exposure surveillance are, over time the compound must be a notable fixed fraction of the total dust that is collected on the geltape, geltape prints must be taken

from surfaces on which the dust accumulates in proportion to the airborne concentration of dust, and geltape prints must be taken on surfaces that are cleaned at regular intervals so that carry over is limited.

We acknowledge The Danish Work Environment Foundation for supporting the project. We thank laboratory technician Dorrit Meincke for skilful assistance. Chemical engineer Åse Nielsen, Royal Copenhagen, is gratefully acknowledged for help and fruitful discussion in relation to the field measurements.

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Rejected manuscripts

From February 1994, authors whose submitted articles are rejected will be advised of the decision and one copy of the article, together with any reviewers' comments, will

be returned to them. The *Journal* will destroy remaining copies of the article but correspondence and reviewers' comments will be kept.

CORRESPONDENCE

NOTICES

Dimercaptosuccinic acid (DMSA): negligible effect on manganese in urine and blood

Editor—Chelation treatment of chronic manganese (Mn) intoxication is problematic because of the limited effect on Mn in blood (B_{Mn}) and urine (U_{Mn}), the inconsistent association of B_{Mn} and U_{Mn} with intoxication, and most relevantly because neurotoxicity persists after clearance of Mn from the brain and lung. Calcium disodium versenate (EDTA) has a significant effect on U_{Mn} but a minimal effect on clinical symptoms.¹⁻³ In the absence of information on the response to oral dimercaptosuccinic acid (DMSA), the response of B_{Mn} and U_{Mn} to DMSA treatment was tested in two men with occupational exposures to Mn.

Subject number 1 was a 49 year old machine operator with 19 years exposure to Mn dust and fumes from the ambient air of a shop for the cutting, gouging, and welding with 18% Mn alloy rods, and reassembly of railway track connectors (frogs) of 11%-15% Mn alloy steel. His exposure ended one month before the DMSA treatment began. His pattern of cognitive and autonomic dysfunction was similar to that of his coworkers that included an index case of manganese poisoning⁴ and was associated with increased B_{Mn} and U_{Mn} in response to EDTA (2 g intravenously) > 10 $\mu\text{g/day}$. Informed consent was given for DMSA treatment.

Subject number 2 was a 56 year old iron worker with 30 years experience of welding, cutting, and brazing mild steel (1%-2% Mn alloy) that included recently three months work on overhead equipment in a lead smelter. He had a cognitive and autonomic dysfunction profile similar to that of the Mn workers and increased U_{Mn} and U_{Pb} provoked by EDTA. The increased lead burden

was considered to be the primary indication for DMSA treatment.

Both men were treated orally with 1 g/m²/day of DMSA (25 mg/kg/day; three doses/day) for seven days followed by 0.67 g/m²/day (15 mg/kg/day; two doses/day) for 14 days with appropriate monitoring.

The B_{Mn} (reference range 0.4-0.85 ng/ml, 7.2-15.5 nmol/l; Mayo Clinic Laboratory) before, on day 6, and at six days after treatment was unchanged in both subjects (1.1, 1.1, 0.7 ng/ml in subject 1; 0.8, 1.1, 0.9 ng/ml in subject 2). The U_{Mn} (reference range < 0.3 $\mu\text{g/day}$, 5.4 nmol/day; Mayo Clinic Laboratory) increased on day 6 only in subject 2 (fig 1).

The U_{Mn} response to EDTA (2 g intravenously over 30 min) decreased from 25 $\mu\text{g/day}$ before DMSA to 18.7 $\mu\text{g/day}$ after treatment (455 to 340 nmol/day) in subject 1 and from a mean of 34.5 $\mu\text{g/day}$ (628 nmol/day) before DMSA to 14.8 $\mu\text{g/day}$ (269 nmol/day) six days after treatment in subject 2 (fig 2).

No subjective benefits were reported; adverse effects were limited to complaints of dysuria in subject 1. In subject 2, who had also been exposed to lead, the U_{Pb} provoked by EDTA decreased from 228 $\mu\text{g/day}$ (1100 nmol/day) before DMSA to 68 $\mu\text{g/day}$ (328 nmol/day) after treatment.

There is little information on the response of U_{Mn} to an EDTA challenge. Whitlock *et al*¹ reported U_{Mn} to increase from < 5 $\mu\text{g/l}$ to 100 and 950 $\mu\text{g/l}$ after EDTA (2 g intravenously) was given to two workers with advanced Mn intoxication. Cook *et al*² reported U_{Mn} to increase from 1-2 $\mu\text{g/l}$ to 7-44 $\mu\text{g/l}$ on day 1 of EDTA (1 g/day) in five Mn process workers; in two control subjects, U_{Mn} increased from 1-3 $\mu\text{g/l}$ to 10-23 $\mu\text{g/l}$. Smyth *et al*³ reported that average U_{Mn} increased from < 10 $\mu\text{g/l}$ to approximately 30 $\mu\text{g/l}$ in five workers with Mn intoxication who had unprovoked, spot U_{Mn} < 6 $\mu\text{g/l}$. Information defining the U_{Mn} response to DMSA in controls and Mn workers is not available.

Although DMSA might provide an oral challenge test of chelatable Mn, the negligible responses of B_{Mn} and U_{Mn} do not encourage trials of DMSA in Mn poisoning.

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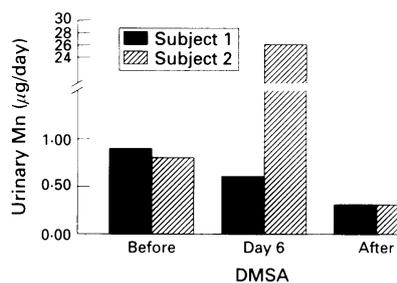


Figure 1 Urinary manganese ($\mu\text{g}/24\text{ h}$).

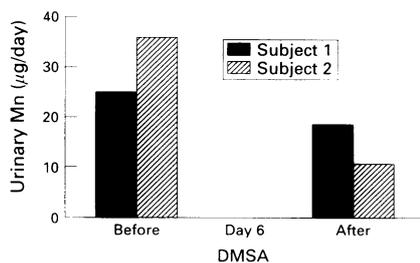


Figure 2 Urinary manganese ($\mu\text{g}/24\text{ h}$) after 2 g intravenous EDTA.

The 9th International Conference on Occupational Respiratory Diseases 13-16 October 1997, Kyoto, Japan.

The International Labour Office intends to convene this conference to be organised by the Japanese National Organising Committee, in collaboration with the Ministry of Labour of Japan and the Japan Industrial Safety and Health Association (JISHA).

International Pneumoconioses Conferences have been held in Johannesburg (1930), Geneva (1938), Sydney (1950), Bucharest (1971), Caracas (1978), Bochum (1983), Pittsburgh (1988), and Prague (1992). At the 7th and 8th Conferences, it was noted that occupational lung diseases other than pneumoconioses and other respiratory diseases related to exposure in the work environment present an increasing burden on the health of workers in many activities. The title of the next Conference has therefore been modified so as to cover the broad spectrum of work related respiratory diseases.

This 9th Conference on Occupational Respiratory Diseases will provide a forum for the exchange of scientific and technical information on the health effects of air pollutants at the workplace on the respiratory system of exposed workers and on the prevention and control of occupational respiratory diseases.

The main themes will be:

- Epidemiology of occupational respiratory diseases
- Health surveillance of workers exposed to respiratory hazards
- Aetiology, pathogenesis, diagnosis and treatment of occupational respiratory diseases
- Health hazard assessment by environmental and exposure monitoring
- Control measures against health hazards at the workplace
- Respiratory protective equipment
- Information, education, and training on occupational respiratory diseases

Further information from:

The 9th International Conference on Occupational Respiratory Diseases, Secretariat: c/o Japan Industrial Safety and Health Association (JISHA), 5-35-1, Shiba, Minato-ku, Tokyo 108, Japan. Tel 81 3 3452 6841; Fax 81 3 3453 8034.

NIVA 1996 Calendar—Advanced Courses and Symposia in Occupational Health and Safety

- *Modern principles of air monitoring*
5-8 February 1996, Sälen's Högfjällshotell, Sälen, Sweden
- *Safety research—safety promotion*
17-22 March 1996, Hotel Hasselbacken, Stockholm, Sweden
- *Bio-aerosol exposures and health problems in relation to waste collection and recycling*
6-10 May 1996, Hotel Frederiksdal, Lyngby (Copenhagen), Denmark
- *Exposure to biological and chemical agents, and health effects in agriculture*
6-10 May 1996, Sem Gjestegård, Asker, Norway

- 1 Whitlock CM, Amuso SJ, Bittenbender JB. Chronic neurologic disease in two manganese steel workers. *Am Ind Hyg Assoc J* 1966;27:454-9.
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- *Worksite health promotion—counteracting stress and burnout*
27–31 May 1996, Hotel Strandbo, Nauvo, Finland
- *Optical radiation in the work environment*
3–7 June 1996, Saariselkä Fell Hotel, Ivalo, Finland
- *Molecular mechanisms of environmental mutagenesis and carcinogenesis*
3–8 June 1996, Novum Research Park, Huddinge (Stockholm), Sweden
- *Epidemiological data analysis and inference*
19–30 August 1996, Hanasaari Cultural Centre, Espoo (Helsinki), Finland
- *Sick-building syndrome in the office environment—measurements and evaluation*
26–30 August 1996, Schaeffergaarden, Gentofte (Copenhagen), Denmark
- *Continuous quality improvement in OHS*
11–13 September 1996, Hotel Långholmen, Stockholm, Sweden
- *Risk assessment of carcinogens*
20–22 September 1996, Silja Serenade (on the ferry Stockholm-Helsinki-Stockholm)
- *Occupational contact and inhalation allergy—exposure, risk assessment and prevention*
4–8 November 1996, Vilvorde Course Centre, Charlottenlund (Copenhagen), Denmark
- *NIVA Baltic courses in occupational health and safety*
Autumn 1996, Institute of Experimental and Clinical Medicine, Tallinn, Estonia
Further information from: NIVA, Topeliuksenkatu 41 a A, FIN-00250 Helsinki, Finland. Tel: +358 0 47471; Fax: +358 0 4747 497.

BOOK REVIEWS

Book review editor: R L Maynard

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Cancer Treatment: fourth edition. Edited by HASKELL. (Pp 1229, price £110.) 1995. Philadelphia: WB Saunders. ISBN 0-7216-4907-6.

The goal of this volume is to provide an authoritative, comprehensive, scholarly appraisal of contemporary treatment, a common aim of the 10 or so such big cancer books available. United States and United Kingdom versions have been quite different but this one seems to be user friendly, as if

the bridge between them is shortening.

In response to the trend for the treatment of people with cancer to become increasingly multidisciplinary, an ever widening variety of team members need access to an overview of each tumour site, and perhaps also to the general principles of the subject, to brief themselves for dialogue with colleagues from other specialties. This book will do such a job and is also suited to students for post-graduate exams; it is technically up to date with plenty of relevant references up to 1994, and good value for money. Nursing and psychosocial interventions are covered in short special chapters rather than integrated into discussion of what can now be offered for specific tumour sites. Mention of aetiology and occupational considerations is rightly (given the title) limited to a brief vehicle for references.

Most of the authors are associates of the University of California at Los Angeles and specialists in treating tumours with chemotherapy; it is in this area that the book is authoritative and useful to practising oncologists. They are sufficiently close to their subjects when discussing specific tumour sites to also summarise diagnostic criteria and the roles and results of surgical and radiation treatment although they give few technical details (beyond radiation dose) of practice in these areas. A major plus is the fresh scholarly approach evident in the text relating to competing chemotherapy schedules. Unfortunately actual data on risk ratios and confidence intervals, as called for in the chapter on interpretation of data, and which are necessary to judge how much difference there may be between treatments, are generally still just not available. Thus although the text is critical, the coy "studies have shown x to be superior to y" recurs all too frequently.

Those with a practice built on evidence based medicine in a socialised system may have some of their conditioning pleasantly challenged by reading that the golden rule "do unto others as you would have them do unto you" is under pressure on the West Coast of the United States from a platinum rule "do unto others as they would have you do unto them". Irrespective of any bias introduced by the transfer of heavy metals, the willingness of patients to become more involved in treatment decisions continues its welcome growth. Accessible information of this quality is not yet available electronically, and this big book is definitely not obsolete.

A BULMAN

Topics in Biological Monitoring (a compendium of essays by members of the ACGIH Biological Exposures Indices Committee). (Pp 99). 1995. Cincinnati: American Conference of Government Industrial Hygienists Incorporated. ISBN 1-882417-10-0.

This collection of essays is dedicated to Dr Vera Fiserova-Bergerova Thomas, founder and first chair of the Biological Exposure Indices Committee of the ACGIH. Many of the essays have been co-authored by Dr Fiserova-Bergerova Thomas and are evidence of her unique contribution in this field. The essays originally appeared in Applied Occupational and Environmental Hygiene.

Biological monitoring is a growth area in both occupational and environmental health. The ACGIH has moved forward to recommend biological exposure indices for several compounds linking these closely with threshold limit values (TLVs).

The collection of essays begins with an introductory essay by Dr Fiserova-Bergerova Thomas which was published in 1987. This deals with the development of biological exposure indices and their implementation. Anyone who needs a quick, and expert, introduction to the subject could not do better than to read this essay. Of particular value are the cautions issued with regard to the use of biological exposure indices (BEIs), and the need for "occupational health personnel . . . to consider pertinent circumstances and exercise professional judgment when using BEIs". A series of essays then follows dealing with absorption through the classic exposure routes and leading to a most helpful essay on pharmacokinetic models used in setting BEIs. Pharmacokinetic models sometimes strike fear in the heart of the non-specialist but this chapter is a most helpful introduction: the mathematics are kept to an acceptable standard and helpful diagrams and graphs are provided. The complexities of physiologically based multicompartmental models are discussed and examples provided for the application of models in setting BEIs. This essay is followed by a shorter account of the use of BEIs (or rather their derivation) for exposures to mixtures. This is an important chapter and bears particularly on exposure to chemicals in the environmental setting where mixtures are the rule. A useful series of examples of synergistic and antagonistic effects is provided. Antagonistic effects are often overlooked, the assumption, at least in the environmental field, often being that effects are likely to be additive if not synergistic.

This short series of essays should be read by all occupational health physicians and occupational hygienists and anyone interested in monitoring exposure to toxic materials. The BEIs have not yet been set for environmental standards: this may yet come.

RL MAYNARD

Age-dependent Doses to Members of the Public from Intakes of Radionuclides: Part two, Ingestion Dose Coefficients. (Annals of the ICRP). (Pp 167; price £60). 1994. ICRP Publication 67. ISBN 008041155X.

This short book comprises a report of a task group of the International Commission on Radiological Protection. Tables of ingestion dose coefficients for 13 elements are provided, details on 12 further elements have already been provided in the first report (1989).

To the non-expert the book is not easy reading although there is much information of interest for the general toxicologist as well as the specialist in radiation. The importance of being able to predict, with acceptable accuracy, the distribution of elements absorbed from the gut to various tissues is obvious and this book provides an important source of data.

RL MAYNARD

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