CORRESPONDENCE

Measurement of vitamin D_3 metabolites in smelter workers exposed to lead and cadmium

We note with interest the paper of Chalkley *et al*[1] on the measurement of vitamin D metabolites in smelter workers, where they suggest that exposure to both cadmium (Cd) and lead (Pb) increased the concentration of 1,25 dihydroxyvitamin D. We also reported a significant association between blood Pb concentrations and serum 1,25 dihydroxyvitamin D in Pb workers.[2] However, our subjects were not occupationally exposed to Cd and in vivo measurements of tibial Pb, as an index of cumulative exposure, were also made. Our data suggested that the increase in 1,25 dihydroxyvitamin D was associated with blood Pb, reflecting recent or current exposure rather than tibial Pb, and that the relation was not significant in those subjects with blood Pb <60 µg/dl. Our study found no effect on serum calcium, phosphate, or parathyroid hormone concentrations.

We think that it is important to highlight the difference between this Pb induced renal effect in adults and the reported opposite finding in children of a decrease of serum 1,25 dihydroxyvitamin D associated with increasing blood Pb.[3 4] Whatever the cellular or biochemical events that cause such contrary findings between children and adults, it should renew our caution in any sort of extrapolation from dose effect relations or "no observable effect levels" derived from adult, occupational studies to other potentially susceptible groups such as children. It is also feasible that biomarkers of nephrotoxic effect may have different usefulness or applicability in studies of adults and children. The maturing kidney during childhood and lifestyle habits, such as hand-mouth contact, means that children with potential exposure to any nephrotoxin should remain a group of special concern for professionals in environmental medicine or public health.

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1 Chalkley S, Richmond J, Barltrop D. Measurement of vitamin D_3 metabolites in smelter workers exposed to lead and cadmium. *0ccup Environ Med* 1998;**55**:446–52.
2 Mason H, Somervaille L, Wright A, *et al*. Effect of occupational lead exposure on serum 1,25 dihydroxyvitamin D levels. *Hum Exp Toxicol* 1990;**9**:29–34.
3 Rosen J, Chesney R, Hamstra A, *et al*. Reduction in 1,25 dihydroxyvitamin D in children with increased lead absorption. *N Engl J Med* 1980;**302**:1128–31.
4 Mahaffey K, Rosen J, Chesney R, *et al*. Association between age, blood lead and serum 1,25 dihydroxycholecalciferol levels in children. *Am J Clin Nutr* 1982;**35**:1327–31.

Author's reply— I thank Mason and Chettle for their interest in our paper describing the effects of lead (Pb) and cadmium (Cd) on plasma 1α, 25-dihydroxycholecalciferol ($1\alpha,25(OH)_2\ D_3$).[1] We were aware of their excellent paper on the relation between blood Pb and $1\alpha,25(OH)_2\ D_3$ concentrations,[2] but we thought that a direct comparison of our work with theirs was not possible due to the difference in the concentrations of Pb exposure, the fact that they had measured tibial Pb, and also that our subjects were primarily exposed to Cd. Mason and Chettle[2] raise two separate issues, the first about the correlation between blood Pb and plasma $1\alpha,25(OH)_2\ D_3$ and the second draws attention to the need for caution when assuming that values derived from adult studies may be applied to children.

About the correlation between blood Pb and plasma $1\alpha,25(OH)_2\ D_3$, our interest lay in the fact that concurrent exposure to Cd seemed to enhance the positive correlation between blood Pb and plasma $1\alpha,25(OH)_2\ D_3$ at concentrations below the appearance of lead toxicity, with no threshold effect.

The second point raised was not an intentional part of our study, as we only mentioned the results of other studies on children in our discussion to suggest possible mechanisms for these opposite findings. However, we are in full agreement with this suggestion of caution when extrapolating results obtained from adults to children and also that children may be more susceptible to environmental hazards than adults. We found that blood Pb concentrations were significantly increased in children who did not wash their hands before eating compared with those who did (Chalkley SR, Hardman T, Strehlow CD, *et al*; Report on project to study the impact of lead in gasoline regulations in the UK; 1999, manuscript in preparation). In London schoolchildren with concentrations of mean cell volume (MCV), mean cell haemoglobin (MCH), and serum ferritin below the reference ranges, the blood Pb and erythrocyte protoporphyrin (EPP) concentrations were significantly higher than concentrations found in children whose MCV, MCH, and serum ferritin values were within the reference ranges.[3] Monitoring the concentrations of Pb in air in the school playgrounds indicated that these children were all exposed to similar concentrations of Pb in air (Chalkley SR, Hardman T, Strehlow CD, *et al*; Report on project to study the impact of lead in gasoline regulations in the UK; 1999, manuscript in preparation).

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1 Chalkley SR, Richmond J, Barltrop D. Measurement of vitamin D3 metabolites in smelter workers exposed to lead and cadmium. *Occup Environ Med* 1998;**55**:446–52.
2 Mason HJ, Somervaille LJ, Wright AL, *et al*. Effect of occupational lead exposure on serum 1,25- dihydroxyvitamin D levels. *Hum Exp Toxicol* 1990;**9**:29–34.
3 Chalkley SR, O'Donohoe J, Richmond J, *et al*. Blood lead concentrations and indices of anaemia in London schoolchildren. *Clin Sci* 1998; **95**:1–22.

Exposure-response relations of α-amylase sensitisation in British bakeries and flour mills

EDITOR—The publication of this paper by Nieuwenhuijsen *et al*[1] was accompanied by an unusually high level of media interest in the United Kingdom with typical banner headlines that read "exposure to α-amylase is a significant health risk for those employed in bakeries and flour mills". The authors' press release included a comment that "urgent action is needed to reduce these high levels of fungal amylase and the high sensitisation rates of up to 30%". Although the assay for amylase and the data on exposure response are new, the risk of sensitisation to fungal amylase in bread bakeries has been recognised for some time.[2] On the basis of research carried out within one of the large food companies in the United Kingdom,[2–5] the trade organisations representing the milling and baking industries have taken a proactive stance in both proposing exposure standards and producing training material to reduce the risk of sensitisation to fungal amylase. Unfortunately the Anglo-Dutch authors of the paper have not made mention of these facts.

On a slightly more disturbing note, there are two conclusions in the paper which are difficult to justify on the basis of the data presented. The first is the statement that "exposure to α-amylase is a significant health risk". Although there is no dispute about the high prevalence of markers of sensitisation to amylase, in this case a positive skin prick test, or the large numbers with respiratory symptoms, these are essentially independent observations. To show a causal relation between the observations would require detailed history taking (rather than administration of a respiratory questionnaire) to establish the relation between the occurrence of symptoms and working patterns which give rise to high levels of amylase exposure. It is worth noting that there are reasons quite apart from sensitisation which could explain the high level of symptoms. The groups of milling and baking employees with the highest exposures to fungal amylase are also those who may have high total inhalable dust exposures (>10 $mg.m^{-3}$).[2] It is entirely possible that their symptoms (the health effect) may simply be the result of a non-specific irritant response.

The second conclusion which is difficult to defend is that amylase produces a health risk in flour mills. Unlike the data from the dispensing and mixing category in bread bakeries, which show a consistently high exposure in a group who handle fungal amylase in relatively concentrated form (bread improvers), the conclusion on risk in flour mills is based on limited and inconsistent data. Essentially it relates to a small sample with a high arithmetic mean but widely distributed results in a single category (flour mill) at one of the four milling and packing sites, with lesser support from the hygiene group at the same site and at one other site. The authors do not seem to have an understanding of the milling process and hence how amylase exposure may arise. Firstly, not all mills add fungal amylase to flour. Only those which make flour for bread baking add amylase, and even then, only to some of their products. When fungal amylase is added, it goes into the final stream of product from the mill. Thus potential high exposures are limited to a small group of the workforce who make these additions. Subsequent handlers of the flour, such as packers, will be exposed to a concentration of fungal amylase in the final flour mix of around 0.0001% by weight. There is some evidence to suggest that typical exposures to dust from flour that contains amylase do not present a risk of sensitisation.[1] Incidentally, the findings of Nieuwenhuijsen *et al* of low exposures in the packing and warehousing groups support this viewpoint.

In summary, it seems a pity that a paper which presents new and important data on sensitisation in bakery workers should be spoiled by pressing the interpretation of findings too far.

T A SMITH
Ranks Hovis McDougall

N BENNETT
National Association of British and Irish Millers

M T BITHELL
Federation of Bakers

1 Nieuwenhuijsen MJ, Heederik D, Doekes G, *et al*. Exposure-response relations of α-amylase sensitisation in British bakeries and flour mills. *Occup Environ Med* 1999;**56**:197–201.
2 Smith TA, Smith PW. Respiratory symptoms and sensitisation in bread and cake bakers. *Occup Med* 1998;**48**:321–8.
3 Smith T, Lumley KPS. Work-related asthma in a population exposed to grain, flour, and other ingredient dusts. *Occup Med* 1996;**46**:37–40.
4 Smith T, Lumley KPS, Hui EHK. Allergy to flour and fungal amylase in bakery workers. *Occup Med* 1997;**47**:21–4.
5 Smith T, Patton J. Health surveillance in milling, baking, and other food manufacturing operations: five years experience. *Occup Med* 1999 (in press).

EDITOR—You recently reported on this paper by Nieuwenhuijsen *et al*.[1] A great deal of research has been carried out in a range of manufacturing companies in the United Kingdom, particularly in milling and baking. This research highlighted the specific risks of exposure to enzymes such as fungal α-amylase at high concentrations. These high concentrations are present in flour treatment agents (bread improvers) used in bread baking.

As a result bakers have introduced specific controls to minimise the risk of exposure for all our employees, with a recommended exposure of 1mg/m^{-3} or flour treatment agents. The controls include the use of special dust booths, local exhaust ventilation, personal protective equipment, guidance on reducing dust exposure and training packages for handling dusty ingredients.

The guidance and training packages are developed in conjunction with all the industries that use flour and are supported by the Health and Safety Executive, the plant and craft baking industries and the trade unions representing employees. Details of the training package follow.

The Federation of Bakers represents all the leading bakery companies in the United Kingdom who produce 80% of the nation's bread.

ANNE LINEHAN
The Federation of Bakers, 6 Catherine Street, London WC2B 5JW, UK. Telephone 0044 171 420 7190; fax 0044 171 379 0542.

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Tel: 0171 420 7190; Fax: 0171 379 0542

1 Nieuwenhuijsen MJ, Heederik D, Doekes G, *et al*. Exposure-response relations of α-amylase sensitisation in British bakeries and flour mills. *Occup Environ Med* 1999;**56**:197–201.

Authors' reply—Although the statement that "urgent action is needed to reduce these high levels of fungal amylase and the high sensitisation rates of to 30%" was not ours, but that of OEM's press release, we support this conclusion and greatly welcome the initiatives that apparently have already been taken by the bakery industry. We suggest, however, that the organisations take care if they want to use the results of the studies in one of the large food companies to set an exposure standard[1–3] given the limited information on exposure including the representativeness, level, duration, and definition of exposure (workers with "regular" exposure), the labour turnover, including how many left and why, bearing in mind the aims of the studies and the basic statistical analyses. The main aims of the other papers seemed to be to categorise any symptoms or sensitisation into diagnostic categories—for example, respiratory irritation or occupational asthma, and to describe their overall (relatively low) prevalence rather than exploring any exposure-response relation as we aimed for in our work.[4 5] We found that the overall prevalence of sensitisation was relatively low (about 5%) and that only by categorising workers by exposure levels and taking into account movement of workers it became clear that in highly exposed areas a large proportion of the workers became sensitised (about 30%). This is important information for the prevention of sensitisation.

We do not agree with the suggestion by Smith *et al* that sensitisation is not a relevant end point. In the previous study in The Netherlands sensitisation to α-amylase was strongly associated with reported work related respiratory symptoms, of both upper and lower airways.[6] In this study we found no association, but this could, for example, be due to the movement of workers away from exposure or the relatively short duration of exposure. We further know from other studies among workers exposed to typical high molecular weight sensitisers that sensitised workers have more symptoms that non-sensitised workers,[6 7] and that the likelihood of the presence of symptoms in sensitised workers is associated with the level of exposure.[6] Few longitudinal studies are available, but the limited evidence published suggests that sensitised workers develop bronchial hyperresponsiveness and symptoms soon after sensitisation.[8] It is likely that those who become sensitised to α-amylase are more likely to develop occupational asthma (when exposed) than those not sensitised, and reducing the risk of sensitisation will reduce the risk of occupational asthma. We acknowledge that respiratory symptoms occur in the absence of sensitisation. The concentrations at which these symptoms occur are not well described, but it is unlikely that these symptoms occur below the inhalable dust or allergen concentrations at which sensitisation occurs. For risk assessment purposes it seems therefore reasonable to take sensitisation as a critical end point for the risk evaluation.

For exposure-response modelling as performed in our studies, there is no need to include a cross section of the whole industry as long as the study is not hampered by different forms of bias, well known to most epidemiologists. Whether the risk assessment is appropriate for other exposed populations than the study population is a matter of generalisibility and comparability. Other exposure settings, where workers are exposed to the same allergens, but possibly at different concentrations, are usually within the limits of generalisibility. A well designed exposure assessment study throughout the United Kingdom baking and milling industry would be welcomed, and would provide information on exposure levels and for risk assessment. We found detectable, and sometimes high, concentrations of α-amylase at half the flour milling sites, site 1 and site 10, among, for example, flour millers, packers, and cleaners (hygiene). As we stated in our paper the great majority of our population was exposed to non-detectable or very low concentrations of α-amylase, and only a small proportion to high concentrations. We think that these high concentrations of α-amylase should be reduced. This would most likely lead to a reduction in sensitisation in α-amylase.

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1 Smith TA, Smith PW. Respiratory symptoms and sensitisation in bread and cake bakers. *Occup Med* 1998;**48**:321–8.
2 Smith T, Lumley KPS. Work-related asthma in a population exposed to grain, flour and other ingredient dust. *Occup Med* 1996;**46**:37–40.
3 Smith T, Lumley KPS, Hui EHK. Allergy to flour and fungal amylase in bakery workers. *Occup Med* 1997;**47**:21–4.

4 Houba R, Heederik D, Doekes G, *et al.* Exposure-sensitization relationship for α-amylase allergens in the baking industry. *Am J Respir Crit Care* 1996;**154**:130–6.
5 Nieuwenhuijsen MJ, Heederik D, Doekes G, *et al.* Exposure-response relations of α-amylase sensitisation in British bakeries and flour mills. *Occup Environ Med* 1999;**56**:197–201.
6 Houba R, Heederik D, Doeskes G. Wheat sensitization and work related symptoms in the baking industry are preventable: an epidemiological study. *Am J Respir Crit Care Med* 1998; **158**:1499–503.
7 Cullinan P, Lowson D, Nieuwenhuijsen MJ, *et al.* Work related symptoms, sensitisation and estimated exposure in workers not previously exposed to laboratory rats. *Occup Environ Med* 1994;**51**:589–92.
8 Renstrom A, Malmberg P, Larsson K, *et al.* Allergic sensitization is associated with increased bronchial responsiveness: A prospective study of allergy to laboratory animals. *Eur Resp J* 1995;**8**:1514–19.

Health effects among workers in sewage treatment plants

In the May 1999 issue, in the short report on health effects among workers in sewage treatment plants,[1] Professor Rylander refers to the recent study by Brugha *et al*[2] on risk of hepatitis A infection in sewage workers and quotes an odds ratio of 3.7 for risk of hepatitis A in workers in sewage treatment plants. In fact, a significant risk of infection was found only for employees who reported frequent exposure to untreated sewage—that is, employees working regularly underground in the sewers—and not for the employees who work in sewage treatment plants who encounter mainly treated sewage in the course of their work.

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1 Rylander R. Health Effects among workers in sewage treatment plants. *Occup Environ Med* 1999;**56**:354–7.
2 Brugha R, Heptonstall J, Farrington P, *et al.* Risk of hepatitis A infection in sewage workers. *Occup Environ Med* 1998;**55**:567–9.

NOTICE

Medicine in an ageing society. One day conference.

23 November 1999. London.

What are the implications of demographic change for British Medicine?

The *BMJ*, in conjunction with the Debate of the Age, are holding this one day conference to examine the possible effects of an aging society on the practice of medicine, medical education, and medicine's institutions.

With plenary sessions and a choice of six different workshops, this conference will be highly interactive and educational. Contributors include: Sir Donald Irvine, London; Professor Kay-Tee Khaw, Cambridge; Professor David Hall, Sheffield; and Professor Sir John Grimley Evans, Oxford. Topics to be considered include:

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- The young in an older society
- Innovative primary care for older people
- Long term care
- Planning ahead.

Further information from: BMA/BMJ Conference Unit, PO Box 295, London WC1H 9TE. Telephone 00 44 171 383 6819; fax 00 44 171 383 6663; email confunit@bma.org.uk

BOOK REVIEWS

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Guidance on the development of educational and training curricula. Edited by: MARTIN FITZPATRICK, XAVIER BONNEFOY. (Pp 198; Sw.fr45) WHO. ISBN: 92 890 1350 8.

The authors of this book have given themselves a very broad objective which in itself is unachievable: to define content and methods for teaching environmental health in Europe (east and west). The book wants to show the administrators as well as those who want to build up curricula and those who teach in it how to do this. Also it considers all different levels of teaching. In this context the scheme about different levels of training is quite useful.

The book provides background information for the development of training programmes in environmental health, it describes the application of existing methods for teaching envionmental health topics, however, the tables of who teaches what, and who needs what, are sometimes contradictory. The obvious aim of not forgetting anybody in any list about who should be taught what and what should be taught by whom and which fields should be covered, are not completely consistent. For instance, basic areas of attitudinal competence start with "caring attitudes towards people" and "active concerns for public health". In the disciplines covering the field of environmental health, however, medicine and public health are not mentioned (page 33).

The annexes give detailed contents of curricula for different environmental health professionals which might be used as a check list for existing courses or stimulate teachers to expand on certain topics but on the whole remain superficial and do not help to design a teaching programme. The book might also be useful in harmonising some of the environmental health teaching programmes in Europe. It does not help anybody who wants to learn something about environmental health, but this is probably not its purpose. However, in this context it is unable to bridge the gap between what should be taught on which level and the content to be taught, its usefulness therefore will remain restricted to those who want to build up a traditional curriculum for environmental health personnel and are looking for teachers in different fields. There might be a need for such a book in parts of Europe.

URSULA ACKERMANN-LIEBRICH

Analysis of hazardous substances in biological materials, volume 6. Edited by: ANGERER J, SCHOILER K-H. (Pp 277; £65.00) 1999. Weinheim, Germany: Wiley-Jese. ZSSN 0179 7247; ISBN 3 527 27040 X.

This publication is volume 6 of a series on this topic produced by the Deutsche Forschungsgemeinschaft Commission for the Investigation of Health Hazards of Chemical Compounds in the Work Area. The sections of these books are distilled from meetings of a standing working subgroup of the Commission to which numerous guests and ad hoc experts are invited to contribute. As a result, the material presented has been scrutinised and reviewed by many leaders in the field and, therefore, represents an extremely reliable and authoritative consensus of opinion. As with the previous issues, the format consists of a monograph which covers the use and occurrence of each substance or substance group, the associated health hazards, metabolic and excretion data, exposure limits, and biological tolerance values. This is followed by an account of the recommended method for analysis of the compounds in biological fluids. This is presented in great detail such that a laboratory analyst with the requisite equipment to hand should be able to reproduce the method with minimum effort. Each method is also designed to detect the concentration range of interest to environmental medicine and that for occupational medicine.

This volume deals with aluminium, amitrole, triazines, hydrazines, PAH metabolites, pentachlorophenol, phenols and pyrethroid metabolites, thorium, and uranium in the manner already described. Also there is an introductory chapter on inductively coupled mass spectrometry (ICP-MS) which is probably the most powerful technique yet devised for trace element analyses. One important feature of ICP-MS is the facility to screen biological samples for increased concentrations of a whole series of metals simultaneously with the same sample pretreatment procedure and during the same analytical run. An example of this application is described in a later section where a collective method for the analysis of antimony, lead, cadmium, platinum, mercury, tellurium, thallium, bismuth, tungsten, and tin in urine samples. The value of having access to this methodology in environmental medicine investigations is self evident.

The book itself is well produced with high quality diagrams and comprehensive lists of up to date references. The translation into English from the original German version has been carried out with great skill.

This publication, like the previous five volumes in the series, is a valuable work of reference which is aimed primarily at analytical chemists, although much of the review material will interest occupational physicians and provides useful background information on what analyses are possible, hints on sample collection, and guidance on interpreting the analytical data.

BRIAN WIDDOP

1999 TLVs and BEIs: threshold limit values for chemical substances and physical agents and biological exposure indices. (Pp 184; US$19.50) 1999. 1330 Kemper Meadow Drive, Cincinatti, OH 45240-1634, USA: American Conference of Governmental Industrial Hygienists—Worldwide. ISBN: 1-882417-32-1.

The American Conference of Governmental Industrial Hygienists' book of threshold limit values (TLVs) is regarded as an essential reference book for industrial hygienists and occupational physicians worldwide. This new edition is, as before, pocket sized but now ring bound and contains even more information. The book is often used only for looking up TLVs: this is a great pity. The introductory textual material is particularly valuable and provides a concise introduction to the principles of standard setting in regulatory toxicology. For example, an admirably short and clear explanation of the log normal distribution of short term exposure measurements likely to occur in conjunction with well controlled processes is provided. This leads to a transparent explanation of the derivation of excursion limits. The appendices provide further valuable information. Carcinogens, substances of variable composition, PTFE/decomposition products, welding fumes, and mixtures are all considered. Appendix D focuses on particles and defines the descriptors used to describe particle mass functions. The change of the median cut off point for a respirable particulate matter sample (now 4.0 μm compared with 3.5 μm in previous editions) is noted.

The second half of the book deals with biological exposure indices. Biological specimens—for example, urine—are easy to collect and even easier to collect inappropriately—for example at the wrong time of day or over the wrong period. The background information explains the theoretical background to biological sampling.

The third part of the book deals with physical agents: noise, vibration, ergonomic factors, ionising radiation, lasers, non-ionising radiation, and thermal stress. Here too the explanatory notes are clear and concise.

In summary: this is an indispensable book. It is a great deal more than a list of standards and deserves to be read thoroughly. Highly recommended.

R L MAYNARD

Environmental and occupational medicine, 3rd edition. Editor: WILLIAM N ROM. (Pp 1920; £149.00) 1998. New York: Lippincott-Raven.

Reviewing a book of nearly 2000 pages is a challenge. Should one dip and skip, read a series of chapters in detail or simply use it? I've had Rom beside me for 6 months and have used it to look up knotty problems of environmental and occupational medicine: it has proved unfailingly excellent. Looking things up has led to reading many whole chapters and this has been no hardship: chapters are detailed, balanced, and, blessedly, not too long.

This book is organised into three large sections and 136 chapters. A chapter thus averages just over 13 large, double column pages. Reading the thoughtful introductory chapter led me to:

"Importantly, the journal of the faculty of occupational medicine in the United Kingdom has changed its name from the British Journal of Industrial Medicine to Occupational and Environmental Medicine".

Excellent! The first section continues with chapters on our specialty—history, its methods, its successes and its failures. In chapter 9 the pace changes: a series of chapters on the immune system, molecular biology, carcinogenesis, a whole chapter on p53 tumour suppressor gene, and other rather biochemical topics follow. These are hard going in places—but the short chapter format lets the reader reach the end of each without collapse. How many occupational and environmental physicians will read these chapters? My guess is: too few.

The next batch of chapters deals with the lung (chapters 19–44, a monograph in themselves) and then other organ systems (chapters 45–67). The chapters on the lung begin with Lippmann on particle deposition, later on ozone, and cover all the standard areas of occupational pulmonology. Air pollutants are well represented, including Utell on SO_2 and H_2SO_4 aerosols and Guidotti on respiratory irritants. Rom contributes chapters on asbestos related diseases and on silicates and benign pneumoconioses. The coverage is impressive: even volcanic ash is discussed. Picking out individual chapters is always invidious but Becklake's chapter on occupational exposures as a cause of chronic airways disease struck me as a remarkably judicious account of what has been a vexed question: the section on the implications of the recent shift of opinion in this area should be read by all occupational physicians.

Chapters on specific problems: metals, organic chemicals, and radiation follow. Here I've dipped and skipped, as I needed to find out things. Aluminium, lead, and cadmium have all been problems to me and the chapters have helped. Benzene and 1,3-butadiene seem interminable problems in the air pollution field and here, too, the chapters have been helpful. The chapter by Silbergeld and Thomas on dioxins and related compounds was an invaluable find: the links with endocrine toxicology are better explained here than I could reasonably have hoped.

The chapters (113–123) on environmental issues are helpful; well known names abound: Samet, Dockery, Spengler, Devlin. Gulf War syndrome has a chapter to itself, as do the effects of global warming. The book ends with chapters on broader issues including regulatory systems, law, and ethics. Roger McClellan on risk assessment is particularly excellent.

Who is this book intended for? At £149.00 it is expensive but extraordinary value for money and should be considered by anybody training in occupational and environmental medicine. Indeed, 6 months' selective reading would form an excellent course of study! For the consultant dealing with problems a bit outside his or her personal area of expertise it is an outstanding guide; for the toxicologist interested in the health effects of individual compounds it is invaluable. In conclusion then: probably the best reference book currently available on occupational and environmental medicine.

R L MAYNARD

Rapid health assessment protocols for emergencies. WHO, editor. (Pp 97; SWF 31 or developing countries SWF 21.70). 1999. Geneva, Switzerland: WHO. ISBN: 92 4 1545151.

This reasonably priced small book published by the World Health Organisation targets the need for early rapid assessment of health status and needs for all types of disaster. It is designed to be used by local health staff who are described as being unlikely to have a team of experts on hand to give advice. It is a useful document for this purpose but is also helpful for those with an interest in disaster medicine, public health, infectious diseases, epidemiology, environmental health, emergency planning, and toxicology. It is a book for the doers, not the examination candidates.

The opening chapter on rapid health assessment provides detailed guidance of the purpose and process for preparedness for health assessment. The checklist approach is well laid out and helps by listing tasks for preparedness for any health assessment. Details of organisations needing to be included in plans are given but not aids—such as information for contact to international agencies and organisations.

Most of the book concentrates on infectious diseases. Chapters are targeted at epidemics of infectious origin, outbreaks of meningitis, outbreaks of viral haemorrhagic fever, including yellow fever, and outbreaks of acute diarrhoea. Sudden impact natural disasters has an elegant four staged approach of reviewing likely processes and activities in the first 5 days with the likelihood of emergency plans being fully implemented by day 5. This will be reassuring to many local responders who may well be among the casualties and have difficulty in providing a comprehensive response immediately. Chapters on sudden population displacements, nutritional emergencies, and complex emergencies are also included.

The chapter on chemical emergencies provides an excellent start for any acute or chronic incident impact assessment. It covers the process of conducting the assessment by considering the following five issues:

- *The need to confirm the existence of a chemical emergency*—by a quick visit to the site by a person with knowledge of handling dangerous goods or chemical expertise, taking suitable precautions (but not mentioning fire brigade or other trained emergency professionals)—with health personnel undertaking a differential diagnosis and examining sentinel cases (the need for safety is not mentioned here)
- *Identifying the type of chemical and their reaction byproducts*—here mention is made of the help that can be provided by contacting chemical information centres. Internationally

the process through the International Programme of Chemical Safety has been to establish Poisons Information Centres, with few countries having specialist chemical information centres, therefore this advice may be confusing

- *Determining the population at risk and health impact*—includes a valuable comment on the need for a case definition but does not recommend early biological and environmental sampling
- *Assessing the local response capacity*—comments on the vulnerability of health care facilities to chemical contamination. This section does draw attention to the need for protective equipment and decontamination facilities.

A useful checklist of all the many issues that effect health impact assessment in a chemical incident is included. Although detailed, covering 13 different critical issues, it is not complete as it really consideres acute not chronic incidents. This is not surprising considering the complexity of the investigation and management of chemical emergencies.

My main concern is that sources of information and advice are not given for any of these emergencies. The three organisations who collaborated in the preparation of this book are mentioned—interestingly enough none of these were a chemical information centre.

VIRGINIA MURRAY