PostScript

LETTERS

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Are personal and static samples related?

The article by Harrison and colleagues[1] reports on a relation between personal and static microenvironment air sampling for carbon monoxide and nitrogen dioxide and for PM_{10} which include the addition of a "personal cloud increment". Static sampling is also commonly referred to as area or stationary sampling.[2 3] These relations are important because static sampling is more easily achieved than personal measurements and is generally less costly. To achieve a relation for personal and static sampling they must be collected from the same pollutant population.[4–7] Thus, in establishing a microenvironment or personal cloud increment, there must be a relation within the sampling location for the pollutant.

Previous occupational studies have noted no relation[2 4 8–11] and a relation[12 13] between personal and static sample measurements. As mentioned by Harrison *et al*, personal samples are generally higher in concentration than static samples because of people being closer to the source and spending more time within the source location, or in the emission pathway.[4 14] When static samplers are placed at the source location or emission pathway they are similar to the values reported for personal samples,[2 3] and in some incidents may exhibit a higher concentration.[4 13 15]

The relation reported by Harrison *et al*, for CO and NO_2 is likely a result of these pollutants being a gas, their ability to diffuse, low reactivity, and similarity in concentration between indoor and outdoor environments. A personal cloud factor must be incorporated into the PM_{10} measurement because of greater variability of concentration from location to location.[16] A microenvironment represents a similar location and the personal cloud is a correction factor extrapolating for the static exposure to personal measurements. It must be noted that this adds a degree of uncertainty in extrapolating exposure from one sampling method to the other. Even though static samples may be reported as similar, they will ultimately exhibit a lower concentration than personal measurements.

Harrison *et al* provided summation of their data in the form of arithmetic mean (AM) and standard deviation. When data from tables 2 and 3 in their paper were evaluated for form of distribution, using the Shapiro-Wilk test,[17] most exhibited a non-normal distribution (see table 1). However, due to the small number of samples in the data of Harrison *et al*, the actual form of distribution cannot be determined. It is suggested[2 18] that the logarithmic form best represents airborne pollutants, including the data of Harrison *et al*. When providing pollutant data, it has been suggested to include summary statistics representative of its form of distribution.[2] Data should be shown as AM, standard deviation, range, geometric mean, and geometric standard deviation (GSD).[2 12] It has been suggested[19 20] that health effects from exposure are more closely related to AM values, especially for those that are chronic in nature, making AM an important summary value to report. Reporting all summary statistics will allow future investigators to select summary data most relevant to their purpose.

Since many environmental pollutants are distributed throughout a location, such as the home, modelling will prove useful in establishing a relation between personal and static samples. However, this relation may not only depend on sampling locations and emission pathways, but on the actual pollutant as well.[6]

Variability among samples must also be considered when predicting exposure levels. Most sample populations exhibit a GSD (day to day variability) of 2.0 to 3.0.[2] The probability of samples with this variability being "related" is about 17–28%.[21] The GSD for the data reported by Harrison *et al*, ranged from 1.4 to 2.6. Thus, sample variability raises issues with the predictability of accuracy in exposure estimation.[21] This variability may also skew modelling as well, resulting in fallacious interpretations; although as mentioned in Harrison *et al*, when the population sample becomes larger or uses pooled data these influences may become diminished.

Historically, most inferred that there is no relation between personal and static exposures,[2–4 6 9–11] while studies such as that performed by Harrison *et al*, question this concept. Establishment of a relation between these two sampling methods will allow incorporation of additional data into occupational, environmental, and epidemiological studies,[16] although caution must be applied in interpreting any relation based on previous findings.[2 4] Thus, care must be exercised when evaluating studies that solely use static sampling as the method of estimating personal exposure.[7]

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Table 1 Form of distribution for data reported in Harrison *et al.*, tables 2 and 3

	Non-transformed	Transformed*
Nitrogen dioxide	Normal	Normal
Carbon monoxide	Not normal at 5% or 1%	Not normal at 5% or 1%
PM_{10}	Not normal at 5% or 1%	Not normal at 5% or 1%
Nitrogen dioxide	Normal	Normal
Carbon monoxide	Not normal at 5 or 1%	Not normal at 5%, normal at 1%
PM_{10}	Not normal at 5 or 1%	Not normal at 5% or 1%

*Transformation was performed using natural logs.

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Competence at the workplace

The discussion opened by Bertazzi[1] is worth integrating with practical considerations. Until 1996 every physician in Italy had licence to practice health surveillance in the workplace; differences of competence between physicians were obviously present, and this undoubtedly lead to inequalities in workers' safety and health levels.

In 1996 we observed a case of methyl bromide (CH_3Br) induced toxic encephalopathy which was not recognised for a long period.

This patient was a 44 year old man with no significant past medical history. When he was 31 years old, he began working for a firm specialising in agricultural pest control. On his fourth season at this workplace, an accidental leakage from the compressed gas cylinder splashed CH_3Br on to him, causing dermal burns and vesicles on the upper and lower limbs. Immediately after the splashing, he reported heavy headedness and drowsiness. In the following 24 hours he had episodes of vomiting, muscle fatigue (mainly in the lower limbs), together with paraesthesia, unsteady gait, myoclonic jerks of the face, and finally seizure attacks. Liver function testing showed increased ALT, AST, and γ-glutamyltransferase levels. He was treated with clonazepam and carbidopa, and was permitted to continue his work. The accident was not notified to the National Institute of Insurance for Work Injury and Disease (INAIL).

In the following years, periodic medical examinations at the workplace confirmed a mild increase of liver enzymes, while markers of viral hepatitis proved to be negative. The worker continued to do his job, and to be exposed to CH_3Br. Some other overexposures were reported, only one of which (chemical burn of the right foot) was reported to INAIL. He continued to have seizures (five episodes at least, two of which occurred after acute/subacute exposures to CH_3Br), asthenia, and changes in liver function tests. He began to suffer from memory deficit, changes of mood, apathy, headache, leg cramps, and reduction of sexual potency.

He came to our observation nine years after the first seizure attack. He presented with myoclonus of the legs, and bilateral blepharoptosis. Action myoclonus was triggered by auditory stimuli, and increased with emotion.

The electroencephalogram showed bursts of slow anteromedial waves on the left side. The magnetic resonance image of the brain showed signal changes in the left frontotemporal region. Audiometric examination showed marked sensory-neural loss. Somatosensory evoked potentials and motor evoked potentials were normal. Electromyogram of the tibialis anterior and first interosseus showed normal amplitude and duration of the motor units with normal recruitment. A standardised neuropsychological evaluation revealed mild reduction of memory and attention. The serum concentration of bromide was moderately increased (11.7 μg/ml; normal <5 μg/ml).

Neurological effects primarily referable to the central nervous system following severe inhalation of CH_3Br have frequently been reported. Myoclonus and seizures are typical of acute exposure, particularly in patients with previous low level chronic exposure.[2–4]

The most singular aspect of this case is the observation that the physician performing surveillance at the workplace failed to recognise the occupational encephalopathy over a very long period (nine years!). This lack of efficiency is inconceivable and points out the necessity to verify and to accredit the competence of medical doctors practising in this field.

In Italy, the adoption of European Union directives assigned medical surveillance of workers to specialists in occupational medicine, and to other physicians, already experienced in the field. The number of specialists assigned to workers' surveillance (9000) was greater in Italy than in the United States.[5] Strong corporate interests have now obtained the admission into this critical field of 40 000 physicians, with limited theoretical knowledge of occupational medicine, and without any practical training in this field. We wonder how many workers will pay in the future for such a populist decision.

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Mental ill health in workers: observations from a few Indian populations

The article "Mental ill health and fitness for work" by Glozier[1] focused on work related mental ill health issues and discussed various topics such as screening, safety, and legal issues. However, as work environments differ with respect to biopsychosocial factors and different levels of exposure, which are known to increase vulnerability for psychiatric disorders in workers,[2] it would be better to specify the work environments while considering the prevalence of mental ill health.

Data in the article has mostly come from developed countries. It may be relevant here to give similar perspective from developing countries such as India. It would also be interesting to note similar morbidity in specific populations of industrial employees, as they are known to be more vulnerable for mental ill health.[2]

The available information on the prevalence of psychiatric morbidity in industrial workers shows that it is considerably higher than that in the general population.[3] The reported 20–35% prevalence of psychiatric morbidity in working populations in Western countries as reported by Glozier[1] is comparable with that from Indian industrial sites (14–37%).[4] However, comparison would be meaningful if the working environments are similar.

The types of mental illness reported to be common in the Western countries are similar to those observed in various industrial set-ups in India.[4] They are basically anxiety disorders, adjustment disorders, mood disorders (especially depression), somatoform disorders, alcohol and tobacco use, and dependence. As reported by Glozier,[1] comorbidies are also commonly noted in the Indian studies. The most common comorbidities are with substance abuse disorders.

An important observation is that screening for common mental disorders is probably pointless because of the rapid change in illness status, the numbers of persons having problems may overwhelm the occupational health service, and the predictive value is low.[1] In addition, different assessing instruments will give different figures. It was observed in an epidemiological survey that even if around 36.2% of employees had psychiatric problems, only 9.7% of them came for psychiatric services (Kar *et al*, unpublished data). It suggests that various factors influence psychiatric service utilisation, such as unawareness and stigma. Although the clinic population reflected realistically the magnitude of the felt need of the workers for mental health services, periodic screening with standardised and reliable instruments may elucidate the mental health needs of the population, based on which optimum care programmes can be planned.

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BOOK REVIEW

Improving Air Quality: Progress and Challenges for the Auto Industry

John K Pearson (pp 225, £34.00) 2001. Hitchin, UK: American Technical Publishers Ltd. ISBN 0-7680-0236-2

This book is unusual in the air pollution literature on two counts. Firstly, its author was a practising scientist in industry, so we get a refreshingly different slant on the issues. Secondly, while the book is heavily science based, it tackles head on that difficult area where science and policy meet or, more often, collide. Pearson does not shirk from pointing out the difficulties with the science, but also the difficult choices for policy. But this is done in a constructive and positive way—it would have been very easy for someone with the author's background to have delivered a critical polemic; as it is, the book gives a cool critique of the science but then suggests ways through the difficult abatement measures and policy issues in a well balanced final chapter.

The subject of the book is the policy driven science programmes in Europe and the USA, each of which was known as "Auto-Oil". These were programmes designed to provide high quality scientific input on air quality emissions, modelling, and emission reduction techniques (including clean fuels) to studies aimed at producing optimum reductions in urban air quality in a selection of European cities, through agreements on EU regulations on vehicle emissions and on automotive fuel compositions. The European Auto-Oil programme was a major tripartite exercise involving the automotive and oil industries and the European Commission.

The book covers each of the scientific components of this exercise in both the EU and in the USA in a concise, yet comprehensive way. There is an introductory chapter describing the important pollutants, their sources, and effects on health, followed by chapters on air quality legislation in the USA and Europe, on air quality modelling, and on the often "Cinderella" subject of emission inventories. These latter two chapters are particularly good for the non-specialist. Chapters describing the separate European and USA Auto-Oil programmes are followed by one describing the air quality improvements already achieved in the "auto-oil" sector. These have been considerable—the single most significant measure reducing public exposure to air pollutants in the past 10 years has been the catalytic converter. The final chapter has already been mentioned and presents an excellent discussion on the practical steps which could be taken by the automotive and fuel sectors, and by traffic managers in the improvement of air quality.

Although primarily targeted at automotive engineers, the book will appeal to other scientists with an interest in air quality. It also provides a useful aide memoire for the specialist, particularly as the next phase of the process has just begun via CAFE, which is not an acronym connected with European coffee houses, but an important initiative of the European Commission to harmonise EU legislation in providing Clean Air For Europe.

M L Williams

NOTICES

First World Congress on Work-Related and Environmental Allergy (1st WOREAL), and Fourth International Symposium on Irritant Contact Dermatitis (ICD), Helsinki, Finland, 9–12 July 2003

Congress on Work-Related and Environmental Allergy

- Work related and environmental aspects of respiratory and skin allergy
- Specific issues related to pathophysiology and skin allergy
- Management and prevention of allergy

Irritant Contact Dermatitis Symposium

- Occupational irritant dermatitis
- Prevention of irritant dermatitis
- Alternative methods for the assessment of irritants
- Irritant dermatitis from cosmetics

Satellite events

- Satellite Symposia, 9 July 2003
- Allergy School, 9–10 July 2003
- 7th International NIVA Course on Work-Related Respiratory Hypersensitivity, 11–15 July 2003

Congress Secretariat

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NIVA Training Programme 2003: Advanced Courses in Occupational Health and Safety

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Assessment of Psychological Factors at Work
3–6 March 2003, Geilo Hotel, Geilo, Norway

Evaluation and Good Occupational Health Practice
23–27 March 2003, The Fell Hotel, Saariselkä (Lapland), Finland

Principles of Etiologic/Etiodiagnostic Research
11–16 May 2003, Hanasaari Cultural Center, Espoo (Helsinki), Finland

Toxicokinetic and Toxicodynamic Modeling in Occupational Health
15–19 June 2003, Red Cross Educational Training Center, Gripsholm, Sweden

Work-related Respiratory Hypersensitivity
10–15 July 2003, Marina Congress Center, Helsinki South Harbour, and The Sunborn Yacht Hotel, Naantali, Finland

Bullying and Harassment at Work
11–15 August 2003, Hotel Eckerö, Åland, Finland

Good Management Practice—Interaction of Environment, Safety and Quality
31 August–4 September 2003, Hotel Levitunturi, Sirkka (Lapland), Finland

Workplace Health Promotion—Practice and Evaluation
The first part 15–17 September 2003, Hotel Eckerö, Åland, Finland and the second part 19–21 January 2004, The Nordic School of Public Health, Gothenburg, Sweden

Indoor Air Quality Problems—Link between Indoor Pollution, Psychological Factors and Complaints
22–26 September 2003, Vilvorde Course Center, Vilvorde (Copenhagen), Denmark

Occupational Health Risk Assessment and Management
6–10 October 2003, Medical Academy of Latvia, Riga, Latvia

Introduction to Occupational Epidemiology
23–29 October 2003, Hotel Gentofte (Copenhagen), Denmark

Work-related Musculoskeletal Disorders: Current Research Trends
1–7 November 2003, The Sunborn Yacht Hotel, Naantali, Finland