CORRESPONDENCE

Incidence of cancer among commercial airline pilots

Rafnsson *et al*¹ reported an excess in malignant melanoma especially among commercial airline pilots flying over five time zones. The authors hypothesised that a disturbance of the circadian rhythm might be responsible for this increased risk and suggest that circadian rhythm should be taken into consideration in future studies. The authors are well aware of the problems of their study that included only limited numbers of malignant melanoma ($n = 5$).

We recently performed a cross sectional case-control study on possible risks of night-shift work on the development of malignant melanoma among women in South Germany.

In this interview survey we included 137 cases with histologically diagnosed malignant melanoma from outpatients at the Department of Dermatology and Allergy at the Ludwig-Maximilians-University of Munich, Germany. Also, 137 female outpatients and inpatients of the Department of Surgery at the same university without previous diagnosis of cancer were interviewed.

Besides ever working in nightshifts* and factors related to shiftwork (sleep during night shifts*, lightning at the workplace*, duration of shiftwork*) well established risk factors for the development of malignant melanoma (number and size of nevi, skin type, number of sunburns in childhood (<15 years of age), use of artificial exposure to ultraviolet (UV) light*, occupational and private history of exposure to sunlight*, relatives with skin cancer) were assessed.

Among the cases, 9.5% had ever worked in nightshifts whereas 16.1% of controls had ever been working in night shifts ($p=0.10, \chi^2$). The median duration of nightshift work was 6 years for cases (range 1-34 years) and 13.5 (2-33) years for controls. After adjusting for known risk factors confirmed in univariate analyses (skin type, smoking, >50 nevi, nevi >5 mm, relatives with skin cancer, use of artificial UV light) the odds ratio (95% confidence interval (95% CI)) for nightshift work was 0.48 (0.19 to 1.22). Therefore, we could not confirm an increased risk for the development of malignant melanoma by disturbance of the circadian rhythm among this randomly selected group of women in South Germany. To increase the power a case-control survey with more cases and controls is now going to be performed.

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*At time of diagnosis (cases) / at time of interview-controls).

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1 Rafnsson V, Hrafnkelsson J, Tulinius H. Incidence of cancer among commercial airline pilots. *Occup Environ Med* 2000;57:175-9.

Authors' reply—Referring to our article,¹ Radon *et al* have contributed to the discussion of the significance of disturbance of the circadian rhythm for the risk of malignant melanoma of the skin. We welcome this discussion. Their preliminary results of a case-control study, although it is exclusively about women, does not support the hypothesis that disturbance of the circadian rhythm leads to malignant melanoma after adjusting for different confounding factors. This study may be too small to be considered a negative study; however, the authors state that attempts are being made to increase its power.

Those pilots in our study¹ who experienced travel through five time zones and thus possible disturbance of the circadian rhythm also had the greatest exposure to cosmic radiation. We should like to draw attention to other possible aetiological factors contributing towards our finding, and those of others, of an increased risk of malignant melanoma among pilots.¹⁻⁶ Cohort studies of pilots may be limited due to detection bias, and frequent medical examination of pilots may lead to earlier diagnosis of cancers. Despite that, the studies of pilots uniformly indicate increased risk for malignant melanoma. A documentation of pilots' sunbathing habits and exposure to ultraviolet (UV) radiation, is needed as the importance of the cosmic radiation seems to be increasing. A recently published study of cancer incidence among Norwegian airline pilots² is the first study to show a clear dose-response relation between cumulative block hours and risk of malignant melanoma; and cumulative ionising radiation (mSv) and risk of malignant melanoma. No increased trend was found for rates of non-melanoma skin cancer with radiation dose. These results were interpreted with great caution and the authors concluded that UV radiation other than in the cockpit³—that is, experienced during leisure time—seemed to be a more likely explanation for the increased risk for malignant melanoma, than conditions at the workplace.

Cohort studies on skin cancer are complicated due to the fact that these cancers have good survival (handicapping mortality studies) and skin cancer is assumed to be under-reported to cancer registries (introducing different problems). However, this is not of concern in the preliminary case-control study on shift workers. Nevertheless, the risk of basal cell and squamous cell carcinoma of the skin has been found to be increased by occupational and therapeutic radiation⁴ and among survivors of the atomic bomb in Japan.⁵ There are some indications that the skin susceptibility to radiation carcinogenesis also involves increased risk of malignant melanoma⁶; the survivors of the atomic bomb had, for malignant melanoma, a relatively high point estimate based on only 10 cases, and thus there was a wide confidence interval.⁹ This may, however, be important as the incidence of malignant melanoma is low in the Japanese population compared with European populations.¹⁰

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- 2 Halldorsen T, Reitan JB, Tveten U. Cancer incidence among Norwegian airline pilots. *Scand J Work Environ Health* 2000;26:106-111.
- 3 Gundestrup M, Storm HH. Radiation-induced acute myeloid leukemia and other cancers in commercial jet cockpit crew: a population-based cohort study. *Lancet* 1999;354:2029-31.
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- 5 Band PR, Spinelli JJ, Ng VTY, *et al*. Mortality and cancer incidence in a cohort of commercial airline pilots. *Aviat Space Environ Med* 1990;61:299-302.
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- 9 Ron E, Preston DL, Kishikawa M, *et al*. Skin tumor risk among atomic-bomb survivors in Japan. *Cancer Causes Control* 1998;9:393-401.
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NOTICE

**International course "Clinical Trials".
Lunteren, The Netherlands. 7-10 May 2001.**

This advanced course about principles of clinical trials will be given by Steven Piantadosi from the Johns Hopkins Oncology Center.

The main topics will be: rational and domain of application; trial objectives and its consequences; major issues of trial design, trial conduct and data analysis. The focus of the course is on concepts rather than on technical matters.

Enrolment is open to researchers with basic knowledge of trial methodology, biostatistics, and epidemiology, and some working experience in clinical research. The number of participants is limited to 35, who will be selected according to their professional qualifications. Closing date of enrolment: 12 January 2001.

The Course fee is DFL 2100—including a single room (full board), the textbook "Clinical trials. A methodological approach" and other course materials.

Further information from Ms Astrid van Alst, course secretary, Department of Epidemiology and Biostatistics/252, University Medical Centre Nijmegen, PO Box 9101, NL-6500 HB Nijmegen, The Netherlands. Tel 0031 (0)24 3619132, fax 0031 (0)24 3613505; A.VanAlst@mie.kun.nl

BOOK REVIEWS

Hunter's diseases of occupations, 9th edition. Edited by: P Baxter, P H Adams, T-C Aw, *et al.* (Pp 1001; £155.00). 1999. London: Arnold. ISBN 0340677503 (HB).

"Hunter" has been an institution in the field of occupational medicine since it was first published in 1955. The first six editions were written by Hunter alone and came to reflect the thinking experience and views of this most unusual and distinguished physician. These early editions provided an extraordinary and perhaps eccentric blend of medicine, history, science, and social comment. Hunter's death led to the book being taken over by an editorial team and to chapters being commissioned from recognised experts. The current edition has contributions from more than 60 authors. The book has, therefore, changed and the current edition cannot be considered to be an updating of the "Hunter editions": on the contrary it is a new book.

The editors have divided the book into 11 sections and 44 chapters. Sections dealing with chemical, physical, and microbiological agents are complemented by sections dealing with occupational disorders of organ systems including the lung and the skin. Cancer, mental disorders, reproductive disorders, and effects of occupational exposures to chemicals on the liver, kidney, and haemopoietic system are also discussed. Such an arrangement might have led to repetition but this is remarkably rare. An introductory section dealing with topics including how to take an occupational history, compensation, and medicolegal matters is provided.

The first impression one receives on examining sections of this book is of its readability. The temptation to "turn the page" is unusually strong and I found myself reading late into the night as one excellent chapter followed another. The editing is first class and I failed to detect any errors. I examined a series of chapters in detail. Peter Baxter's chapter on gases is long (56 pages) but remarkably easy to read and interesting. It is much more than simply a catalogue of gases and their effects. Sound advice is provided on patterns of exposure, the dangers posed by major accidental releases of gases and by fires. The author's interest in natural disasters is well shown by the interesting account of carbon dioxide poisoning following the Lake Nyos disaster which killed more than 1700 people. The author's note on the 1832 report of the "Valley of Death" is in the great Hunter tradition! Gases that pose problems at both an occupational and environmental level are considered and thus one can look up common air pollutants—such as ozone and nitrogen dioxide—and find useful advice on the likely effects on health of ambient concentrations. Gibson's chapter on flying is equally absorbing and informative. The physical aspects of high altitude are dealt with clearly as are the problems of acceleration. Spatial disorientation and illusions (not encouraging phenomena for would be fast jet

pilots!) are explained as are the fitness requirements for flying. I looked for a note on the raised concentrations of ozone found in passenger aircraft and failed to find it: perhaps this could be added in the next edition.

A chapter that stands out as a triumph is that by Venitt on "Biological mechanisms and biomarkers in occupational cancer". If you don't read anything else in this book, read this. The explanation of complex issues including oncogenes, p53, free radicals, and hotspots, is unusually lucid and the illustrations, reproduced in the colour section, are a joy. I learnt more about cancer from this chapter than I would have thought possible.

This edition of Hunter stands midway between the shorter handbooks of occupational medicine and the large reference works—such as "Rom" (Environmental and occupational medicine, 3rd edition, 1999). As such it seems an almost ideal book for somebody taking up the specialty of occupational medicine to read for both pleasure and instruction. Candidates for the Faculty examinations should certainly read it.

Is there any "Hunter" left? Yes, the style is unmistakably there. If this is doubted, see Chapter 39 on the clinical aspects of occupational cancer. A deliberate attempt to include some of the history and social comment from the earlier editions is made by Carter in the appendix. This could hardly fail to be interesting and is very well presented. In conclusion then, an excellent book and an important contribution to the literature of occupational medicine. I recommend it strongly. Anything missing? Well, I looked for the picture of the molten metal spattered spectacles that provided such an awful warning in the earlier editions and could not find it. Odd—as our editor has the very spectacles in her keeping!

R L MAYNARD

Contributions to microbiology, volume 2: *Aspergillus fumigatus*. Edited by: A A Brakhage, B Jahn, A Schmidt. (Pp XII + 222; US\$ 172.25.) 1999. Basel, Switzerland: Karger. ISBN 3 8055 6714 6.

The fungus *Aspergillus fumigatus* is a ubiquitous soil organism, the spores of which become airborne and are of a size which makes them readily inhalable. It is an organism of limited interest to occupational physicians, but is one of the agents responsible for farmer's lung while its relative *Aspergillus niger* has important uses in biotechnology and may be a cause of occupational asthma among workers.

This book is a compilation of essays, mainly on the molecular biology and mechanisms relating to the organism's relatively uncommon role as a human pathogen. The individual essays are of interest to a microbiologist and summarise the large amount of fundamental research into the organism. But there is a lack of coordination between the chapters so that each is read as a separate essay unconnected to the others and one gets the impression that the wood has been missed because of all the interesting trees. A pity, because the organism is of interest to a wide range of scientists and interactions between different disciplines will show much of inter-

est, relating for example to the mechanisms of phagocytosis and cell motility. The reason *Aspergillus fumigatus* resists phagocytosis is probably that it prefers to live on other soil organisms rather than to be their food.

The clinical sections add little to what is to be found in standard textbooks while the more basic biological sections shed little light on the central medical issue concerning this interesting organism—why it among all the airborne fungal spores causes such a curious variety of human and animal diseases. In the preface it is stated that this question has not yet been answered—perhaps not, but I think that a decade ago we got closer than the authors are aware (*Lancet* 1989;i:893–4, *J Med Vet Mycol* 1989;27:295–302).

ANTHONY SEATON

Occupational lung disease: an international perspective. Edited by: D E Banks, J E Parker. (Pp 528; £85). 1998. London: Chapman and Hall. ISBN 0412 736 306.

This multi-author text book is divided into four parts. The introduction includes chapters on the world wide problem, lung function, occupational hygiene, compensation, and specific issues in South Africa and Brazil. The second and third parts consider the pneumoconioses and asthma, airway disease and alveolitis, and the fourth lung cancer. Many of the chapters provide useful summaries of current knowledge, including information not readily available elsewhere on, for example, man made fibres, metal exposures, and epidemic urban asthma. Much of the book, however, necessarily repeats what is available elsewhere.

The overall structure is uneven, and the editors' laudable intention of including a truly international perspective is not really achieved. This is largely because in countries where such diseases are most prevalent good data do not exist. However, there are tantalising glimpses of quirky treatment and worker screening practices in several countries, and what we read about developing countries is sufficient to suggest that it will be a long time before the preventive lessons we have so painfully learned (but not always applied) in the rich world are applied elsewhere.

This book continues the tradition of emphasising the mineral pneumoconioses but does give adequate weight to the main problem in the west, asthma. For a book with its expressed intention, it falls short on neoplasia and almost completely ignores mesothelioma. As this disease ranks second only to asthma in incidence and has risen on an epidemic curve, this is a curious omission.

Would I have bought it? I already possess Parkes and another one I part-wrote/edited myself (interest declared!). This one contains information that is not to be found in either, but would probably not be regarded as so well structured or clinically oriented. It is generally sound where views are expressed, and contains much of interest. I do not have to decide, as I have been given a copy and I shall use it for reference. Readers are recommended to look at it and decide if it adds enough to their personal library to make it worth £85.

ANTHONY SEATON