Lung function decline in laboratory animal workers

In their recent paper Portengen and colleagues have made an important contribution to our understanding of laboratory animal allergy. However, they have omitted to draw attention to an observation of clinical importance to occupational physicians.

They have suggested that the lack of decline in lung function in “experienced” workers may be due to the healthy worker effect. Their suggestion is not supported by their own data: the decline in lung function over two years among newly exposed workers with symptoms of LAA was not significant and surprisingly there was a significant increase in function among the symptomatic experienced workers. This being the case there seems little reason to conclude that the loss of symptomatic workers (due to a healthy worker effect) would adequately explain the absence of a decline in function. An equally valid conclusion is that the effect observed in newly exposed workers is small and may not be sustained in the long term.

Physicians are wise not to preclude sensitised workers and those with symptoms of LAA from work with animals solely on the basis of concern that this may have a deleterious effect on health. Portengen et al. have provided new evidence that supports this.

I agree that the results and conclusions should be interpreted with caution and that further work is needed. However, this is a reassuring study, with important implications for current animal workers and their health providers.

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References

Asthma and swimming pools: statistical issues

Bernard and colleagues’ presented results from several studies investigating childhood asthma in relation to swimming pool use. Though the studies were generally well conducted, there are some respects in which the statistical analysis and interpretation are misleading.

The study of asthma prevalence in relation to swimming pool use was essentially an ecologic design—the unit of analysis was the school. Though the study of correlations between asthma prevalence and indexes of pool use respects this (the p values are appropriate), the logistic regression analysis does not. The analysis is carried out as if there were 1881 independent observations of asthma and swimming pool use. In fact, observations are not independent—there is “clustering” of asthma by school—even after allowing for effects of swimming pool use and other covariates. The extremely low p values in fig 6 therefore cannot be relied on. The analysis applied to the study of chronic effects on lung epithelium is also limited in not allowing for possible clustering by school. Again, the p values presented overestimate the strength of evidence for an association.

Caution is also required in interpreting the correlations and p values in figs 5C and 5D. These do not test the association of asthma with pool use, but with a composite index of pool use, pets, and passive smoking. It is not possible from the results presented to distinguish the contribution of each. The authors acknowledge this, but reader confusion may arise because the term “adjusted” is more usually used in epidemiology to describe adjustment for confounding of one effect by another—this is not the case here.

Finally, the correlations shown in figs 5A and 5B are selected from a wider range of measures of pool attendance, as shown in fig 4. Among these non-independent indices of exposure, the authors have chosen the one showing the strongest correlation with asthma prevalence. For this reason, the “significance” of the p value in fig 5B should be interpreted as suggestive rather than definitive.

We conclude that the epidemiological evidence for an association of asthma with swimming pool use is not as strong as claimed by the authors.

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Reference
Authors’ reply

Although we appreciate the interest of Dr Armstrong and Dr Strachan for our paper on the pool chlorine/asthma risk, we cannot really take on board their reasoning concerning the statistical analyses. When questioning the strength of the associations found in our studies, they seem indeed to attribute much importance to the p values of the associations emerging between cumulated pool attendance and indicators of asthma or lung epithelium permeability. The p values, however, are not reliable indicators to judge of the strength of associations found in epidemiology since they are highly dependent on the number of observations. Our assessment of the strength of these associations was therefore based more on the values of $r^2$ and on the fact that the associations found with pool chlorine exposure were much stronger than those emerging (and a fortiori not emerging) with other variables classically presented as possible contributors to asthma and lung damage in children (for example, environmental tobacco smoke, pets, outdoor pollution).

With regard to the third study linking asthma prevalence and pool attendance, we agree of course that this is a retrospective ecological study carried out by aggregating data from each school, which was made possible by the fact that pool attendance is a compulsory activity in Belgian primary schools. However, since this study was not specifically designed to assess the effects of pool chlorine, in our opinion, its major weaknesses are more related to the weak exposure assessment, rather basic surrogate measures of exposure are applied with very strong assumptions for misclassification of exposure, as this is a personal interest, and the innumerate have little to fear. Hard thinking is, however, needed! The emphasis placed on excluding, as far as possible, causes of bias is very necessary. This is stressed for each design considered: even experienced workers might learn something from this. Of course, no book as short as this can explore difficult areas in depth and in places this has led the authors into employing a didactic approach; one can find points for further discussion. Consider, for example, the following statement (page 17):

“The confounding determines the extent to which observed associations are causal”

Discuss—as the examiners used to say in the days of essay based examinations. Of course, the statement as it stands is incorrect and the authors explain the real effects of confounding clearly.

This is not a cook-book of how to do epidemiological studies but I would have liked to have read a chapter entitled:

“Problems likely to be solved by epidemiological studies and problems unlikely to be solved”

with some examples. The authors might like to consider this for the next edition which will certainly be called for in a few years time.

In summary then, an admirable introductory text, particularly the area of environmental exposures, development of new techniques is at the cutting edge of the subject and this would have been a valuable component of the book. In all other senses I found the book to be a very thorough treatment of the subject, easy to read, and by authoritative authors. It is very up-to-date and accurate. I was only able to find one obvious error. I am not aware of any obviously competitive titles and the book deserves to do well. It is a little on the expensive side for a softback, but nonetheless offers good value for money. I would however question the intended market. I would be surprised to see the book used substantially for undergraduate teaching except perhaps in highly specialised courses. Its readership will lie far more with postgraduate courses and especially with those professionally involved in epidemiology and exposure assessment. For that last group, it will prove a very valuable addition to the private bookshelf and institutional library.

R L Maynard

BOOK REVIEWS

Exposure assessment in occupational and environmental epidemiology

Edited by Mark J Nieuwenhuijsen (pp 283).

While exposure assessment for occupational epidemiology has been developed over many years, the application of exposure assessment, other than of the crudest kind, in environmental epidemiology is relatively new. In the majority of epidemiological investigations, rather basic surrogate measures of exposure are applied with very strong possibilities for misclassification of exposure, and therefore in most instances a weakening of the power of the study. There is, therefore, much to gain from application of improved exposure assessment methods. This book provides the necessary foundation. Mark Nieuwenhuijsen’s book, in the words of the preface, is aimed at a very wide audience including undergraduate and postgraduate courses in a range of disciplines and as a reference book for policy makers and regulators. The book comprises 17 chapters divided into five sections, the first on methods, the second on current topics. The methods range from questionnaires through dispersion modelling, use of geographic information systems, personal exposure monitoring, modelling of personal exposures, retrospective exposure assessment, exposure surrogates, and general exposure assessments, physiologically based pharmacokinetic modelling, biological monitoring, and finally an interesting chapter on the consequences of exposure measurement error. In the second section on current topics there are five individual chapters dealing with allergen exposure, airborne particulate matter (environmental exposures), chlorination disinfection by-products, pesticides, and radio frequency exposures in relation to cancer. Dr Nieuwenhuijsen has assembled an impressive international list of contributors and the individual chapters, although relatively short, mostly present a relatively comprehensive overview of the relevant subject area. I looked particularly closely at sections dealing with airborne particulate matter, as this is a personal interest, and found the subject to arise in a number of chapters in the first section of the book, in addition to the current topic chapter. The latter can be complimented on being especially up-to-date, much of it being based on work published between 2000 and 2002. The one topic which, although touched on is not dealt with in an appropriate level of detail, is the technology for measuring personal exposure, particularly the area of environmental exposures. Development of new techniques is at the cutting edge of the subject and this would have been a valuable component of the book. In all other senses I found the book to be a very thorough treatment of the subject, easy to read, and by authoritative authors. It is very up-to-date and accurate. I was only able to find one obvious error. I am not aware of any obviously competitive titles and the book deserves to do well. It is a little on the expensive side for a softback, but nonetheless offers good value for money. I would however question the intended market. I would be surprised to see the book used substantially for undergraduate teaching except perhaps in highly specialised courses. Its readership will lie far more with postgraduate courses and especially with those professionally involved in epidemiology and exposure assessment. For that last group, it will prove a very valuable addition to the private bookshelf and institutional library.

R M Harrison

Epidemiology for the uninitiated, 5th edition


This well known, short, introductory text has established its place in the literature of epidemiology. The first edition appeared in 1979 and it has been updated regularly. As an introduction it can be warmly recommended.

The authors have set out to explain what epidemiology is and how epidemiological studies should be conducted and interpreted in just 70 pages: a hard task. The chapters are short but cover the field in unexpected detail. Emphasis is placed on why certain study designs are applicable to certain problems and on the strengths and weaknesses of individual approaches. Mathematical details are not included and the innumerate have little to fear. Hard thinking is, however, needed! The emphasis placed on excluding, as far as possible, causes of bias is very necessary. This is stressed for each design considered: even experienced workers might learn something from this. Of course, no book as short as this can explore difficult areas in depth and in places this has led the authors into employing a didactic approach; one can find points for further discussion. Consider, for example, the following statement (page 17):

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Lung function decline in laboratory animal workers

R M Preece

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