interest than a negative study of miners or asbestos workers.

Correspondence

Influence of design characteristics on the outcome of retrospective cohort studies

SIR,—Swaen and Meijers (1988;45:624-9) present interesting data in which they relate investigator orientated variables (country, journal, authors' affiliation, and financiers) and study design characteristics to the outcome (positive/negative) of retrospective cohort studies. Their data show that 76% of studies examined that were conducted by epidemiologists employed by governmental agencies were positive, compared with 36% of those conducted by epidemiologists employed by industry. Most negative studies were reported in the chemical industry.

Several possible explanations for the proportions observed are related to the methodological limitations of the authors' approach.

SELECTION BIASES

At least two possible selection biases may be operating, one impacting the type of study conducted and the second related to which studies get submitted and/or published. Industry epidemiologists, as opposed to government or university epidemiologists, have a dual research role: (a) to monitor the health of employees, even in the absence of an "a priori" concern and (b) to identify workplace hazards, if they exist. The former are hypothesis generating rather than hypothesis testing studies. They are typically conducted within industry, through company health surveillance systems. Surveillance studies provide the impetus for further research but are themselves inconclusive. These would be assigned to the category of "negative" outcome using the authors' criteria.

Epidemiologists in industry often undertake studies of their employees response to concern, even when the available pool of study subjects is small. The government funds research on a priority basis, where study power is a major factor.

When an investigator is employed by the government or a university, there may be little interest in publishing negative results, which may be interpreted as less interesting or incompatible with regulatory programme objectives. Also, journal acceptance of a paper for publication may be influenced not only by the study outcome (100% of the papers from the *International Journal of Epidemiology* were positive, 96% of those from the *Scandinavian Journal of Work, Environment and Health* were positive) but also the topic under study. For example, a negative study from the chemical industry (by which most industrial epidemiologists are employed) may be of greater

CONFOUNDING BIASES

Working for the chemical industry may be less hazardous than the other exposures included in this review which showed higher percentages of positive studies. Since most industrial epidemiologists work for chemical companies in the United States, this could explain the greater number of negative studies by affiliation, country, exposure, and financial resources.

A chemical plant is a complex work environment, typically with multiple potential exposures over a working lifetime. A single retrospective plant wide cohort study is unlikely to attribute reliably an excess to the workplace without more detailed study, often in the form of nested case control studies. This may not be so for other occupational groups who may be a more "pure" exposure group. This is both a confounding and selection issue, since case control studies were excluded from the review by Swaen and Meijers.

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Drs Swaen and Meijers reply:

Teta argues that there are several possible explanations for the differences in positive and negative outcomes between epidemiologists affiliated to the chemical industry and other epidemiologists.

The first possible explanation focuses on publication bias and sample size. Perhaps it is true that government epidemiologists are less likely to submit negative studies for publication in a scientific journal. This would be unfortunate because of the potential bias that such a tendency will impose on risk assessment. We have no data, however, to help clarify this issue. The suggestion that epidemiological studies in the chemical industry conducted by industrial epidemiologists have a smaller sample size than studies conducted by other epidemiologists may be investigated by means of the data discussed in our article. After limiting the cohort studies to studies within the chemical industry, the average sample size and average number of expected number of deaths were calculated for studies conducted by epidemiologists affiliated with the chemical industry and for studies conducted by others. The average sample size and the average number of deaths were greater in studies conducted by epidemiologists affiliated with the chemical industry.

The second issue raised by Teta touches on the working conditions in the chemical industry compared

with other industrial operations. We certainly agree that the health risks associated with exposures in the chemical industry may be small relative to health risks associated with mining, radiation, or asbestos. Nevertheless, the relation between affiliation and outcome persisted after limiting the analysis to the chemical industry. Thus better working conditions in the chemical industry as a whole, compared with other industries, cannot satisfactorily explain the relation. It is our impression that the explanation lies rather in differences in policy of the chemical industries. Perhaps corporations that have always given priority to good working conditions are more likely to employ a corporate epidemiologist instead of relying on outside expertise.

We certainly agree with Teta on the need of strict cohort restrictions regarding exposure. The frequently heard statement that every worker with *potential* exposure should be included in the exposure is a threat to the validity of the results. A better approach is to only include those workers who had *definite* exposure. We are not sure, however, if nested case-control studies are a solid approach in respect of defining exposure. We recommend the collection of accurate and specific exposure on each cohort member. Nested case-control studies may be used for those variables that may confound an observed relation between an exposure and an effect, and for which variable data are difficult to collect. A good example is smoking. It will take a great amount of effort to collect smoking data on every cohort member. In this instance a nested case-control study can be a feasible solution.

A retrospective cohort study is a substantial undertaking that requires much work. In general terms, we regard job and workplace history on every cohort member as a prerequisite for a valid study. The tempting approach to compile a list of employees without any job history, regarding this list as the

cohort to be followed up and relying on additional case-control studies to identify risk factor, is inferior to the approach in which a job history is available for every cohort member.

Notices

International conference on bladder cancer screening in high risk groups, Cincinnati, Ohio, 13-14 September 1989

The National Institute for Occupational Safety and Health is sponsoring an international conference of bladder cancer screening in high risk groups. Topics to be discussed include state of the art bladder cancer screening, innovative approaches, feasibility of clinical screening trial, and recommendations for high risk groups. For further information contact Dr Paul Schulte, Chief, Screening and Notification Activities, NIOSH, R-13, 4676 Columbia Parkway, Cincinnati, Ohio 45226, USA.

Rene Barthe International Prize 1990

The Rene Barthe prize is aimed at recognising original work in occupational medicine or occupational hygiene. Authors of any nationality may submit personal, recent, and original research. The prize (15 000 French francs) is awarded every three years and will be presented next in 1990 at the 23rd International Congress on Occupational Health in Montreal. Rules governing the prize may be obtained from: Comite du Souvenir du Docteur Rene Barthe, 22-30 avenue de Wagram, 75328 Paris Cedex 08, France; and submissions should be sent to this address before 15 December 1989.