

Accuracy of work history obtained from a spouse

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SHALAT SL, CHRISTIANI DC, BAKER EL Jr. Accuracy of work history obtained from a spouse. *Scand J Work Environ Health* 13 (1987) 67-69. In an evaluation of the usefulness of collecting work exposure information from wives of workers, 26 husband-wife pairs were interviewed separately about exposure of the husband to organic solvents. There was 58 % concordance between the husbands and wives for answers to a simple question regarding solvent exposure. Amplification of these answers through the use of a computerized occupation-exposure linkage system yielded 81 % concordance. When the analysis was restricted to those reporting exposure to solvents for more than five years, an 88 % concordance was achieved with the linkage system. It was concluded that wives can accurately recall their husbands' work histories with respect to jobs having solvent exposure. The exposure specificity of such histories is significantly enhanced by the use of an occupation-exposure linkage system.

Key terms: epidemiologic methods, occupational exposure, record linkage, solvents.

No aspect of an epidemiologic study is as crucial to its outcome as the data (4). It is clear that, regardless of how sophisticated the analysis, if the quality of the input is low, the interpretation of the study is obscured. A major problem in retrospective studies of workplace hazards is the ascertainment of exposure status. If exposure records are absent for the work area or if, as in most case-referent studies, the investigator has no access to them, the only recourse is the use of personal interviews. As has been pointed out (3, 7, 8), this information can be difficult to obtain with high reliability and validity. The greatest difficulty occurs where the study subject is unavailable for direct interview. This situation is not only present in the obvious instance of the subject being deceased, but also in the situation where the subject may be mentally impaired. In order to evaluate alternative methods of data collection in preparation for a study of possible etiologies of dementia, we conducted a pilot study to evaluate the quality of work history information obtained from wives regarding their husbands' exposures to organic solvents during prior jobs.

Subjects and methods

Twenty-six men who were seen as outpatients for diseases (occupational lung disease or chronic obstructive pulmonary disease) unrelated to organic-solvent

exposure were contacted by letter. They were advised that they and their spouses would be contacted by phone and a series of questions would be asked relating to their medical and social histories; no specific mention of solvent exposure was made. Every effort was made to interview the wives first. In each case the wives were requested to refrain from discussing the subject of the interview with their husbands, and they were requested not to ask their husbands for information if they were present in the home at the time of the phone call.

Responses were recorded with respect to specific questions on organic solvent exposure in the workplace ("To your knowledge, were(was) you (your husband) ever exposed to solvent in any job?"); no prompting by the interviewers was permitted. The subjects were then asked an open-ended series of questions on work history. This information included name of industry, job title, and dates and lengths of employment.

An occupational exposure linkage system utilizes available information about employment (ie, industry worked in and job title) to approximate prior specific occupational exposures. It does this task through the use of a coding scheme for assigning specific industry/job codes that correspond to a listing of occupational exposures. The result is a unique listing of potential exposures for each industry/job code. A modified version of an occupation-exposure linkage system (5, 6) was used separately to classify each job held with respect to exposure to organic solvents. This specific system utilizes a two-digit industry code for each of 19 industry categories and a three-digit job title code under each industry category. The system utilizes a computer listing of exposures to generate five-digit exposure codes. Each exposure code relates either to a specific chemical compound or class of compounds. Modification of the existing system was undertaken in an attempt to increase specificity through the sepa-

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ration of heterogeneous job titles. For example, in the original system, carpenters were combined with cabinet makers and joiners. While cabinet makers and joiners commonly use a wide range of solvent-containing adhesives, carpenters, for the most part, do not. The intent was to increase the specificity of the system without losing any sensitivity.

Separate contingency tables were developed comparing husband and wife questionnaire responses, as well as comparing the responses to exposure categorization from the linkage system. The percentage of concordance, the percentage of sensitivity, and the percentage of specificity (1), as well as the Kappa measure of agreement (2) and the 90 % two-sided confidence intervals, were calculated (9).

Table 1. Solvent exposure status determined by questionnaire alone.

Wife's report (ever exposed)	Husband's report (ever exposed)		Total
	Yes	No	
Yes	6	3	9
No	8	9	17
Total	14	12	26
Concordance: 58 % (Kappa = 0.18; 90 % confidence interval 0.0–0.46)			
Sensitivity: 43 %			
Specificity: 75 %			

Table 2. Solvent exposure status determined by linkage system alone.

Wife's report (ever exposed)	Husband's report (ever exposed)		Total
	Yes	No	
Yes	10	1	11
No	4	11	15
Total	14	12	26
Concordance: 81 % (Kappa = 0.71; 90 % confidence interval 0.43–0.99)			
Sensitivity: 71 %			
Specificity: 92 %			

Table 3. Solvent exposure (>5 years) status determined by linkage system alone.

Wife's report (>5 years exposed)	Husband's report (>5 years exposed)		Total
	Yes	No	
Yes	10	—	11
No	3	13	16
Total	13	13	26
Concordance: 88 % (Kappa = 0.78; 90 % confidence interval 0.47–1.0)			
Sensitivity: 77 %			
Specificity: 100 %			

Results

Direct questioning of the husbands and wives yielded a concordance of only 58 % (Kappa measure of agreement, $K = 0.18$) and a specificity of 75 % (table 1). Interpretation of the Kappa score has been suggested as follows: < 0.40 poor agreement, 0.40 to 0.60 moderate agreement, > 0.60 considerable agreement (2). Utilization of the computer-generated exposure linkage system yielded a considerable improvement in concordance to 81 % (Kappa = 0.71) and in specificity to 92 % (table 2). A further increase in concordance and specificity was achieved when the consideration of solvent exposure was restricted to a period of five years or more (table 3).

Discussion

The quality of information that is obtained from surrogate interviewees is often suspect. In the absence of records for documenting exposure histories, the use of surrogate respondents can allow for evaluation of the role of work-related factors in the development of debilitating diseases. Since cross-sectional cohort morbidity studies of working populations often fail to evaluate individuals with the severest degree of illness (such individuals may be away from work or on sick leave at the time of the study), the full spectrum of occupationally related disease may be underestimated. A case-referent investigation does not tend to suffer from such bias. Therefore, if exposure history can be accurately estimated, as, for example, in the case of solvent exposure, the long-term consequences of workplace exposure may be better estimated in a case-referent study.

Our current study showed that simply asking wives about specific substances to which their husbands were exposed during work yields poor concordance with the husbands' reports. We observed better congruence of work history between husbands and wives by using an occupation-exposure linkage system. It is clear that a large portion of the improvement was due to the wives being far more familiar with their husbands' occupations than with actual workplace exposure. This combination of wives being more likely to recall accurate information on work histories, together with the information in an exposure linkage system, leads to an improvement in exposure categorization.

There is also the question of the sensitivity and specificity of such a procedure. If, in general, the exposure linkage system tended to classify an overly broad group of people as exposed, more matches might be expected by chance. The improved agreement, in this instance, with increased duration of employment, mitigates against this being the sole explanation. Congruence is particularly good for longer exposures (ie, jobs), which would have greater significance for most disease outcomes. It must be kept in mind, however, that these observations relate solely to that informa-

tion recalled by the husband, leaving the question of true sensitivity and specificity still undefined.

There were of course limitations to the present study. First, because of its limited size, the estimates were unstable, but the apparent magnitude of improvement suggests that some of the increased congruence between husband and wife reporting was real. Second, there is the issue of how even the husbands' reports relate to actual job history and workplace exposure. Unfortunately, it was not possible to evaluate this information in our study. It is, however, a fair assumption that job information is likely to be superior to information recalled on exposures to specific substances.

While the perhaps more important question of how recalled work history relates to reality was not assessed in the current study, we believe that, nevertheless, the study clearly shows that surrogate respondents are likely to be extremely poor sources for exposure histories of specific workplace substances. It would also appear that the use of spouse-generated work histories would be a useful tool in the study of debilitating diseases in which the patient is unable to provide a suitable history.

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