

OCCUPATIONAL RISK FACTOR ASSESSMENT FOR COMMUNITY-BASED HEALTH PROFESSIONALS

D. Lynn Skillen

The majority of provinces enacted occupational health and safety legislation in the 1970s. Alberta's Occupational Health and Safety Act of 1976 integrated the province's approach to worker protection; however, although safety regulations are universal, statutory requirements did not regulate health services for workplaces with less than 200 on-site employees. Affected employees are required to approach community-based health care practitioners for the identification, evaluation and management of work-related illness and disease. Assuming that occupational health problems are essentially preventable, health professionals hold key positions for influencing worker health outcomes. Nurses and physicians, however, must provide health surveillance and health care that is based on information elicited from the worker-client and without the advantage of worksite observations. This project evolved from the concern that health professionals, who are functioning outside of the workplace, are approached for health services by worker-clients who have diverse experiences and exposures. It is essential that those professionals have comprehensive information about relevant occupational factors.

Description of the Project

The purpose of this project was to expedite the development of a comprehensive data collection instrument for use by community-based health care practitioners in the individualized assessment of occupational risk factors. The following objectives were stated.

1. To conduct an extensive review of the literature focused on: (a) justification of the need; (b) risk categories; and (c) available instruments.
2. To consult with outside experts and centres of occupational health and safety knowledge regarding essential content for assessing risk factors.
3. To consult with experts in the field of instrument development for assistance with the format and design of assessment questions.

D. Lynn Skillen, B.Sc.N., M.H.Sc., O.H.N.C. is an assistant professor in the Faculty of Nursing at the University of Alberta, in Edmonton.
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4. To develop an assessment instrument, which would include a comprehensive history of work exposures and occupations, in order to identify risk factors.

5. To establish content validity of the assessment instrument using a panel of experts in the occupational health and safety field.

Review of the Literature

Justification of the need

The majority of Canadian women and men are in the paid workforce (Statistics Canada, 1988) and are potentially at-risk for work-related illness, disease or injury. Federal and provincial legislation has stipulated approaches to health and safety for Canadian workers (Makdessian, 1987); however, workplaces in Alberta with under 200 on-site employees are without regulated health services.

Many authors recognize that the work-related history is fundamental to an assessment of occupational risk factors by the health professionals who serve as primary care providers (Discher, Kleinman & Foster, 1975; Goldbaum, 1981; Goldman & Peters, 1981; Guidotti et al., 1983; Hainer, 1981; Larsen, Schuman & Hainer, 1983; Rest, Hake & Cordes, 1983). In particular, Guidotti et al. (1983) and Goldman and Peters (1981) have argued articulately in favour of the occupational history. Nonetheless, the review of the literature revealed four types of issues as obstacles to occupational history-taking by community-based practitioners: administrative, occupational, professional and scientific. Administrative issues are principally procedural and instrumental. A history requires time (Gumpel & Mason, 1974), scheduling, an appropriate data collection instrument, follow-up, storage space, available references and mechanisms for consultation (Backett, Davies & Petros-Barvazian, 1984; Becker, 1982; Larsen et al., 1983; Rest et al., 1983; Rom, 1983).

Occupational issues that obstruct history-taking include worker, management and work characteristics. Myths, ignorance, assumptions that the professional knows the obvious exposures to risk, fear of recrimination in the workplace or desire for extra money cause workers to over- or under-report the risks in the workplace thereby complicating data collection (Baumgarten, Siemiatycki & Gibbs, 1983; Coye & Rosenstock, 1983; Goldbaum, 1981; Rest et al., 1983; Shindell & Goldberg, 1981). Data collection is also hindered by the conflict between management's profit motive and the health and safety motive of health professionals. Consequently, risks are downplayed, incentives are offered for hazardous work and recordkeeping of exposures to hazards is neglected (Becker, 1982; Coye & Rosenstock, 1983; Discher et al., 1975; Felton, 1980; Ginnetti & Greig, 1981). Additionally,

data collection is made difficult by the terminology that is used in the work place and the complexity of exposures to hazards at the worksite (Felton, 1980; Larsen et al., 1983; Rosenstock, Logerfu, Heyer & Carter, 1984).

Numerous professional issues were identified for medical personnel: inadequate undergraduate education (Felton, 1980); ignorance of resources and references (Becker, 1982; Coye & Rosenstock, 1983; Rest et al., 1983); time constraints (Guidotti et al., 1983; Hainer, 1981; Pecoraro, Inui, Chen, Plorde & Heller, 1979; Rest et al., 1983); noncompliance with legal requirements for notification of occupational disease (CCOHS, 1984; Discher et al., 1975; Rest et al., 1983); lack of financial remuneration (CCOHS, 1984; Guidotti et al., 1983); and little threat of litigation by clients whose medical diagnosis fails to identify an occupational etiology (Demers & Wall, 1983; CCOHS, 1984; Felton, 1980; Goldbaum, 1981). No equivalent analysis of relevant professional issues for community-based nurses was discovered, although at face value several physician issues could apply to nurses. Furthermore, reports of occupational history-taking by nurses were limited and demonstrated inadequacies. For example, Wilson (1981) describes a Canadian nurse-practitioner's independent practice and focusses on health counselling, without any reference to occupation. Draye and Pezneckner (1980) note that family nurse-practitioners in an American ambulatory care setting neglected to include occupational assessments in their activity-coding instrument, and a performance appraisal tool for hospital-based nurse-practitioners contained no reference to occupational history-taking (Levitt et al., 1985). Lindberg (1980) also reports on an historical data base for determining the relevant screening tests for secondary prevention, and it has no occupational component. In contrast, a proposed health surveillance program for use with hospital employees includes documentation of all previous employment and worker-reported hazardous exposures (Van den Eeden & Wilkinson, 1985). Moreover, Ginnetti and Grieg (1981) propose an occupational history form that would include all employment experience plus data on chemical exposures, psychological stressors, selected physical hazards and the personal protective equipment used. Furthermore, when Alleyne and Orford (1984) reviewed hospital admission records in Edmonton, Alberta, they reported that only 43% of the records had notations about occupation and that 81% of those had been made by nurses.

Scientific issues include lack of reliable and valid data collection instruments for use outside of the workplace (Baumgarten & Oseasohn, 1980; Rosenstock et al., 1984), lack of sensitivity and specificity of clinical laboratory tests (Rest et al., 1983), obscured cause-effect relationships because of long latency periods (Barth & Hunt, 1980; Rosenstock et al., 1984), controlled access to toxicological data (SCC, 1986), interviewer effect on validity (Baumgarten et al., 1983; Gerin, Siemiatycki, Kemper & Begin, 1985), inaccuracies because of extrapolations from animal studies to

humans (Somers, 1979), gender-based differences (Hunt, 1979; NIOSH, 1986; Pell, 1978; Stellman, 1977; Zielhuis, Stijkel, Verberk & van de Poel-Bot, 1984), and the existence of many non-occupational causes for observations made clinically (Rest et al., 1983).

In summary, the barriers to occupational history-taking were considered numerous but not insurmountable. Administrative, occupational, professional and scientific issues were taken into consideration during instrument development.

Categories of risk

In the workplace, comprehensive assessments are generally performed using the industrial hygiene framework (Olishifski, 1979; Ott, 1977). The mandate of salaried or consultant industrial hygienists is to recognize, evaluate and control health hazards that are categorized as biological, chemical, ergonomic or physical (Olishifski, 1979). The literature search identified no exhaustive use of those categories in the community by nurses and physicians, although one or more of the categories was always present in histories. Additionally, psychosocial hazards, home and community exposures to risk, untoward reproductive outcomes, unemployed periods and risks to safety were used frequently, but not consistently, across the instruments in the literature (Felton, 1980; Gerin et al., 1985; Ginnetti & Grieg, 1981; Guidotti et al., 1983; Pannet, Coggon & Acheson, 1985; Rom, 1983; Sandy Hill Health Centre, 1984; Shindell & Goldberg, 1981; Smith, 1986).

Availability of instruments

Many instruments are available for occupational history-taking (Becker, 1982; Coye & Rosenstock, 1983; Ginnetti & Greig, 1981; Goldman & Peters, 1981; Guidotti et al., 1983; Mattila, 1985; Sandy Hill Health Centre, 1984). No one instrument was discovered, however, which incorporated all of the industrial hygiene categories, psychosocial hazards, home and community exposures, reproductive outcomes, safety risks and periods of unemployment for use by the community-based practitioner.

Consultation

Following approval of the application for funding and before the draft instrument was sent to the review panel, the Canadian Centre for Occupational Health and Safety was consulted, with regard to data bases and available instruments. Throughout the term of the research project and during the preparation of the final report, the design and content experts were consulted on a regular basis, in accordance with the research activity. Design issues involved item development and modification, review procedure, review form

development and instrument readability level. Content issues included comprehensiveness and depth and format of items, all of which were discussed at three stages: before completion of the draft; after a preliminary review; and subsequent to the review by the expert panel.

Instrument Development

Two principal issues for instrument development emerged from the review of the literature. Not only was content of major importance, but the administrative, occupational, professional and scientific issues had consequences for format. The decision was made to develop an instrument with two sections: *Section One* was a worker self-administered screening questionnaire, and *Section Two* provided guidelines for a nurse or physician to direct precise questions to relevant items in the completed questionnaire. The instrument contained the four categories of exposure to risk used by industrial hygienists, plus psychosocial hazards, exposures that occur in the home and community, any reproductive outcomes noted, any observed risks to safety in the workplace and documentation of current and previous work history or unemployment. An attempt was made to maintain the readability level of *Section One* at a Grade Eight equivalent, using the SMOG formula (McLaughlin, 1969). Field workers have since suggested that it might be beneficial to strive for a Grade Six level. Before the instrument was considered ready for the review panel, two academic and two non-academic staff members, one graduate research assistant, and one non-university-affiliated worker reviewed the questionnaire. In response to their suggestions about item order and readability level, the instrument was revised and submitted to the review panel of occupational health professionals.

Content validity

A review form was developed for the members of the expert panel. Figure 1 is a reproduction of the first page of the review form.

In order to avoid noncommittal responses, the four point "relevance" scale suggested by Lynn (1986) was used. All reviewers were asked to rate their response to three questions using a four point scale of: (1) "not relevant"; (2) "needs major revisions"; (3) "relevant with minor alterations"; and, (4) very relevant and succinct". The questions were:

1. Does each item or question identify occupational risk factors?
2. Does the instrument contain the categories of occupational risk?
3. Does the instrument adequately represent occupational risk factors for screening purposes?

REVIEW FORM

Occupational Risk Factor Assessment Instrument

Section One: Questionnaire

Section Two: Additional Questions

Instructions:

1. Please circle the number which corresponds to your rating of the question in each section.
2. For questions rated "3" or "2" your suggestion for replacement wording would be appreciated.
3. Please keep in mind the users of the questionnaire and the additional questions.

Question #1. does each item or question identify occupational risk factors?

SECTION ONE

Work Exposures

Chemical Factors

	Not Relevant	Needs Major Revisions	Relevant with Minor Alterations	Very Relevant and Succinct
Question 1.	1	2	3	4
2.	1	2	3	4
3.	1	2	3	4
4.	1	2	3	4
5.	1	2	3	4
6.	1	2	3	4
7.	1	2	3	4

Suggested Replacement Wording?

Physical Factors

Question 1.	1	2	3	4
2.	1	2	3	4
3.	1	2	3	4

Figure 1
First page of the Review Form

Reviewers had only to circle the number to indicate the position of the item on the four point scale. Replacement wording was solicited, and space provided for any items which were rated a "2" or "3".

Fourteen industrial hygienists, occupational health nurses and occupational health physicians agreed to participate on a review panel. A second explanatory letter accompanied the package of materials for the review process. The package included a review form, the instrument and a self-addressed stamped envelope for return within a four-week limit. A total of ten professionals, i.e., two industrial hygienists, six occupational health nurses and two

occupational health physicians were able to complete the review before the deadline. Items that had at least 80% agreement on category (4) "very relevant and succinct" or (3) "relevant with minor alterations" were revised as necessary and retained. Changes of substance were reviewed with the content consultant. Suggested editorial changes were made when judged necessary. On the basis of the scale responses for each item under Question #1 and for Questions #2 and #3, the instrument was considered to have content validity. The final version of the instrument includes a screening questionnaire for self-administration by workers (to be completed in approximately 30 minutes) and a guideline for follow-up questioning by health professionals. Figure 2 contains a sample page of the questionnaire, and Figure 3 presents the guideline.

Ergonomic Factors

1. Do you have to use uncomfortable or repetitive movements at work? (e.g. bending, twisting, lifting, standing). If "Yes", please describe: No ____ Yes ____
2. Is the equipment or machinery used at work comfortable or adjustable to your needs, e.g. height, eyesight, handgrip? No ____ Yes ____
3. At the end of your worktime, does any part of your body hurt or ache? If "Yes", please describe: No ____ Yes ____
4. Do you have pain or discomfort in your back? No ____ Yes ____
Have you been under the care of a doctor/chiropractor/physiotherapist for back problems? No ____ Yes ____
If "Yes", please describe:

Biological Factors

Please check () as many as apply:

1. Which of the following are available at work?
Clean Water ____
Handwashing Facilities ____
Washroom Facilities ____
Shower Facilities ____
Separate Room for Meals and Breaks ____
Separate Change Area or Locker Rooms ____
2. Have you or any fellow workers had infections related to your work? If "Yes", please describe: No ____ Yes ____
3. Do you handle live or dead animals or birds? No ____ Yes ____
4. Do you handle animal or human wastes? No ____ Yes ____

Figure 2

Sample page of the Occupational Risk Factor Assessment Instrument.

INSTRUCTIONS:

These additional questions are to be addressed and phrased as necessary by health professionals in order to elicit more information when reviewing the questionnaire with clients/patients.

1. Is there a temporal relationship of symptoms with work? i.e., are symptoms better or worse after leaving work, on time off, on vacation?
 2. Are co-workers complaining of similar symptoms?
 3. Is there anything out of the ordinary happening at work?
 4. If personal protective equipment is used, does it fit properly? or did the client ever make changes to it to make it feel better? Was client shown how to use it properly and the rationale for it?
 5. How often are hands washed by client at work? Is the client a nailbiter? Does the client have a beard, mustache or long hair? Does the client smoke at work?
 6. Have all the possible routes of entry been considered (inhalation, skin absorption, ingestion, injection)?
 7. Has there been any exposure to spills? Any equipment leaks or malfunction? Poor work practices by co-workers?
 8. If animals or birds are near the workplace, has there been any change in their appearance or behavior?
 9. Where are hobbies carried out at home? Is ventilation appropriate?
 10. Where are work clothes washed for the client and all other adults in the home?
 11. Is there stress related to workload, workplace, job demands, inadequate coping mechanisms, solitary work?
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Figure 3

Guideline for health professional follow-up questioning.

The instrument's purpose is to screen for occupational and environmental exposures. It is to be used by community-based health professionals who have little knowledge of the workplace.

Future research

A research funding proposal is now being developed for more extensive reliability and validity testing of the occupational risk factor assessment instrument. Following that research, the instrument's effectiveness will be tested in community-based health care facilities. The instrument has been translated into Spanish, the author's second language, and will undergo separate reliability and validity testing with Spanish-speaking populations before being tested clinically.

Summary

A screening data collection instrument was developed for self-administration by worker-clients and for follow-up questioning by the

community-based nurses or physicians whom they approach for health care. An attempt was made to maintain a readability level at a Grade Eight equivalent. Content validity was established using an expert panel of ten professionals, which was composed of occupational health nurses, industrial hygienists and occupational health physicians. Reviewers rated all items on a four-point relevance scale in response to the three research questions. No item received less than 80% agreement by reviewers. The instrument was translated into Spanish, the author's second language. The second phase of the research will test the reliability and validity of both versions more extensively and the third phase will test the effectiveness of the instruments in diverse community-based health care facilities.

REFERENCES

- Alleyne, B. & Orford, R. (1984). Employment history valued, but not recorded by MDs. *Canadian Medical Association Journal*, 31, 1014.
- Backett, E. M., Davies, A. M. & Petros-Barvazian, A. (1984). *The risk approach in health care*. Geneva: World Health Organization.
- Barth, P. S. & Hunt, H. A. (1980). *Workers' compensation and work-related illnesses and diseases*. Cambridge, Mass.: The MIT Press.
- Baumgarten, M. & Oseasohn, R. (1980). Studies on occupational health: A critique. *Journal of Occupational Medicine*, 22(3), 171-176.
- Baumgarten, M., Siemiatycki, J. & Gibbs, G. W. (1983). Validity of work histories obtained by interview for epidemiologic purposes. *American Journal of Epidemiology*, 118(4), 583-591.
- Becker, C. E. (1982). Key elements of the occupational history for the general physician. *Western Journal of Medicine*, 137(2), 581-582.
- Canadian Centre for Occupational Health and Safety. (1984). *Notification and surveillance of occupational diseases in Canada and other countries*. Hamilton: CCOHS.
- Coye, M. J. & Rosenstock, L. (1983). The occupational health history in a family practice setting. *American Family Physician*, 28(5), 229-234.
- Demers, R. & Wall, S. J. (1983). Occupational history-taking in a family practice academic setting. *Journal of Medical Education*, 58(3), 151-153.
- Discher, D. P., Kleinman, G. D. & Foster, F. J. (1975). *Pilot study for development of an occupational disease surveillance method*. Rockville, Md.: NIOSH.
- Draye, M.A. & Preznecker, B. (1980). Teaching activities of family nurse-practitioners. *Nurse-Practitioner*, 5(5), 28-33; 62.
- Felton, J. S. (1980). The occupational history: A neglected area in the clinical history. *Journal of Family Practice*, 11(1), 33-39.
- Gerin, M., Siemiatycki, J., Kemper, H. & Begin, D. (1985). Obtaining occupational exposure histories in epidemiologic case-control studies. *Journal of Occupational Medicine*, 27(6), 420-426.

- Ginnetti, J. & Greig, A. E. (1981). The occupational health history. *Nurse-Practitioner*, 6(11), 12-13.
- Goldbaum, R. (1981). Occupational disease: The patient as worker. *Nurse-Practitioner*, 6(6), 8-11.
- Goldman, R.H. & Peters, J.M. (1981). The occupational and environmental health history. *Journal of the American Medical Association*, 246(24), 2831-2836.
- Guidotti, T. L., Cortez, J. H., Abraham, H. L., Hughson, W., Krems, A. D., Neuman, T. S., Bryson, A. L. & Heramb, B. I. (1983). Taking the occupational history. *Annals of Internal Medicine*, 99(5), 641-651.
- Gumpel, J. M. & Mason, A. M. S. (1974). Self-administered clinical questionnaire for out-patients. *British Medical Journal*, 2, 209-212.
- Hainer, B. L. (1981). Family medicine and job related illness. *Journal of Family Practice*, 12(3), 575-576.
- Hunt, V.R. (1979). *Work and the health of women*. Boca Raton, Florida: CRC Press, Inc.
- Larsen, M. E., Schuman, S. H. & Hainer, B. L. (1983). Workplace observation: Key to a meaningful office history. *Journal of Family Practice*, 16(6), 1179-1184.
- Levitt, M.C., Stern, N.B., Becker, K.L., Zaiken, H., Hangasky, S. & Wilcox, P.H. (1985). A performance appraisal tool for nurse-practitioners. *Nurse-Practitioner*, 10(8), 28-33.
- Lindberg, S.C. (1980). Periodic preventive health screening schedule for adult men and women. *Nurse-Practitioner*, 5(5), 9-13.
- Lynn, M.R. (1986). Determination and quantification of content validity. *Nursing Research*, 35(6), 382-385.
- Makdessian, F. (Ed.). (1987). *Occupational health and safety management handbook*. Don Mills, Ontario: Corpus Information Services.
- Mattila, M. K. (1985). Job load and hazard analysis: A method for the analysis of workplace conditions for occupational health care. *British Journal of Industrial Medicine*, 42, 656-666.
- McLaughlin, G.H. (1969). SMOG-grading: a new readability formula. *Journal of Reading*, 22, 639-646.
- National Institute for Occupational Safety and Health (1986). *Draft: A proposed national strategy for the prevention of work-related disorders for reproduction*. Washington: NIOSH.
- Olishifski, J.B. (Ed.). (1979). *Fundamentals of industrial hygiene*. Chicago: National Safety Council.
- Ott, M. G. (1977). Linking industrial hygiene and health records. *Journal of Occupational Medicine*, 19(6), 388-390.
- Pannet, B., Coggon, D. & Acheson, E. (1985). A job-exposure matrix for use in population based studies in England and Wales. *British Journal of Industrial Medicine*, 42(11), 777-783.
- Pecoraro, R.E., Inui, T.S., Chen, M.S., Plorde, D.K. & Heller, J.L. (1979). Validity and reliability of a self-administered health history questionnaire. *Public Health Reports*, 94(3), 231-238.
- Pell, S. (1978). Epidemiological requirements for medical-environmental data management. *Journal of Occupational Medicine*, 20(8), 554-556.
- Rest, K. M., Hake, J. C. & Cordes, D. H. (1983). *The occupational and environmental history*. Tucson, Arizona: University of Arizona.
- Rom, W. N. (Ed.) (1983). *Environmental and occupational medicine*. Boston: Little, Brown and Company.
- Rosenstock, L., Logerfu, J., Heyer, N. J. & Carter, W. B. (1984). Development and validation of a self-administered occupational health history questionnaire. *Journal of Occupational Medicine*, 26(1), 50-54.
- Sandy Hill Health Centre (1984). *Environmental/occupational history form*. Ottawa: Sandy Hill Health Centre.
- Science Council of Canada (1986). *A national workshop on the role of epidemiology in the risk assessment process in Canada*. Ottawa: Author.

- Shindell, S. & Goldberg, H. M. (1981). Surveillance systems: What to include and why. *Occupational Health and Safety*, 50(7), 34-39; 56.
- Smith, K. G. (1986). The hazards of migrant farm work: An overview for rural public health nurses. *Public Health Nursing*, 3(1), 48-56.
- Somers, E. (1979). Risk assessment for environmental health. *Canadian Journal of Public Health*, 70(6), 388-392.
- Statistics Canada. (1988). *Historical labour force statistics: Actual data, seasonal factors, seasonally adjusted data, 1987*. Ottawa: Minister of Supply and Services Canada.
- Stellman, J. M. (1977). *Women's work, women's health: Myths and realities*. New York: Random House Inc.
- Van den Eeden, S.K. & Wilkinson, W.E. (1985). Health screening for hospital personnel exposed to waste anesthetic gases. *Occupational Health Nursing*, 33(2), 63-75.
- Wilson, J.B. (1981). CNJ talks to Shirley Wheatley, independent nurse-practitioner. *The Canadian Nurse*, 77(6), 43-45.
- Zielhuis, R. L., Stijkel, A., Verberk, M.M. & van de Poel-Bot, M. (1984). *Health risks to female workers in occupational exposure to chemical agents*. New York: Springer-Verlag.

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RÉSUMÉ

Evaluation de l'élément de risque occupationnel pour les professionnels de la santé en milieu communautaire

Les services de santé au travail, offerts dans tous les divers lieux de travail, ne sont pas régis par des exigences statutaires, quoique des stipulations aient été établies en ce qui a trait à la sécurité. Les infirmières praticiennes et autres travailleurs de la santé qui oeuvrent dans la communauté à des problèmes reliés à l'occupation du travailleur/client qui les consulte; et ce sans connaître les risques auxquels il est exposé, ou sans avoir une évaluation des dangers encourus dans son milieu de travail. Un instrument de dépistage a été développé pour auto-administration par le travailleur/client, et pour un suivi par le professionnel de la santé consulté. L'instrument a été construit en tenant de le maintenir à un niveau tel, qu'un individu possédant huit ans de scolarité peut le compléter. La validité de contenu a été établie à l'aide d'un groupe d'experts de dix professionnels composé d'infirmières et de médecins en santé au travail, et d'hygiénistes industriels. Chaque membre du comité de révision a évalué tous les items sur une échelle de pertinence de quatre points. Trois questions étaient répondues, pour chaque item, concernant la capacité d'identifier les facteurs de risque, la valeur pour but de dépistage, et la représentation des catégories de risque. basé sur les réponses des membres du comité, le contenu de l'instrument a été considéré valide. La deuxième phase de la recherche s'étendra sur un période de deux ans et inclura une évaluation plus étendue de la fidélité et de la validité des deux versions de l'instrument (anglaise et espagnole). La troisième phase se penchera sur l'efficacité de l'instrument dans divers établissements de santé communautaire.