Environmental health concerns in urban and rural family practice

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ABSTRACT

OBJECTIVE To describe environmental health problems encountered in some Ontario family practices and to describe differences between the environmental concerns of urban (small and large) and rural physicians.

DESIGN A self-completed questionnaire was mailed to 536 family physicians with hospital affiliations in three areas of Ontario.

SETTING Family practices (rural, small urban, and large urban) in Ontario.

PARTICIPANTS Of 521 eligible community family physicians with hospital affiliations, 214 returned usable questionnaires for a 41% response rate.

MAIN OUTCOME MEASURES Environmental health problems encountered in practice were measured using questions about physician concerns, reported patient questions, physician-identified high-risk groups, problems related to environmental exposure, self-rated knowledge, and current and preferred sources of information on environmental health effects.

RESULTS Physicians were highly concerned and reported many patient questions about the health effects of environmental exposures. Pregnant women, agricultural workers, and children were considered important at-risk groups. Self-ratings of knowledge were generally very low. Rural physicians were concerned about agricultural pesticide exposure and their patients about moldy hay. Urban physicians had different concerns about lead and reported patient concerns about exposure to Great Lakes fish. All groups used similar sources of current environmental health information.

CONCLUSIONS Family physicians who participated in this study identified important patient and professional concerns about environmental health issues and reported a lack of resources to meet those concerns. This study provides information to family medicine residency programs and continuing medical education providers to help them enhance their focus on environmental health.

RÉSUMÉ

OBJECTIF Décrire les problèmes liés à l'hygiène de l'environnement qui refont surface dans certains cabinets de médecins de famille en Ontario et décrire les différences entre les préoccupations environnementales des médecins en milieu urbain (grandes et petites villes) et en milieu rural.

CONCEPTION Un questionnaire à remplir soi-même a été posté à 536 médecins de famille affiliés à des hôpitaux dans trois régions de l'Ontario.

CONTEXTE Des cabinets de médecins de famille (en milieu rural, et dans de petites et de grandes villes) en Ontario.

PARTICIPANTS Des 521 médecins de famille communautaires admissibles et affiliés à des hôpitaux, 214 ont retourné des questionnaires qui puissent servir à l'étude, donc un taux de réponse de 41%.

PRINCIPALES MESURES DES RÉSULTATS Pour mesurer les problèmes d'hygiène environnementale rencontrés dans l'exercice médical, on s'est servi de questions concernant les préoccupations des médecins, la nature des questions posées par les patients, les groupes à risque élevé identifiés par les médecins, les problèmes liés à l'exposition ambiante, l'autoévaluation du savoir, ainsi que les sources actuelles et préférées d'information sur les effets de l'environnement sur la santé.

RÉSULTATS Les médecins étaient fortement préoccupés par les effets sur la santé de l'exposition ambiante et ont fait état de nombreuses questions des patients à ce sujet. Les femmes enceintes, les travailleurs agricoles et les enfants étaient jugés comme d'importants groupes à risque. Selon l'autoévaluation, les connaissances se révélaient généralement limitées. Les médecins en régions se préoccupaient du contact avec les pesticides agricoles; pour les patients, il s'agissait des moisissures du foin. Les médecins en milieu urbain avaient des craintes différentes, portant plutôt sur le plomb. Les questions de leurs patients concernaient le poisson des Grands Lacs. Tous les groupes consultaient des sources semblables d'information courante sur l'hygiène environnementale.

CONCLUSIONS Les médecins de famille qui ont participé à l'étude ont cerné d'importantes préoccupations de la part de leurs collègues et de la part de leurs patients au sujet des problèmes d'hygiène environnementale. Ils ont fait état d'un manque de ressources pour répondre à ces inquiétudes. L'étude fournit des renseignements aux programmes de résidence en médecine familiale et aux personnes chargées de la formation médicale continue en vue de les amener à se concentrer davantage sur l'hygiène environnementale.

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A 1992 Health Canada survey found that Canadians consider physicians the most credible source of environmental health information.[1] As family physicians are often the first health professionals contacted by patients whose illnesses have environmental factors,[2] they have an excellent opportunity to provide information to patients about environmental health concerns.

The "environmentally competent clinician" has been defined as one who can identify patients with environment-related illnesses and can provide clinical care and advice, including appropriate referral and follow-up assessment.[2,3] In an editorial in *Canadian Family Physician*, Lees[4] identified the need to prepare residents in family medicine to treat illness related to their patients' work environments.

Although many presenting conditions have environmental factors,[5] a 1994 study in the United States found that only 66% of medical schools included occupational and environmental health in their curricula.[6] In a survey of academic deans of medicine,[7] 73% indicated there was too little emphasis on environmental health in their curricula. The study concluded that physicians will acquire environmental health skills "if at all, outside of medical school."[7]

Needs assessments in environmental health for practising physicians have been done in Australia, Connecticut, and Wisconsin.[8-10] No similar studies have been done in Canada. A recent review of CME efficacy has suggested that educational interventions are more effective if based on specific needs analyses.[11] This review suggests the need for resource materials and CME based on environmental health needs assessments.

The objectives of our study were to describe environmental health problems encountered in some Ontario family practices and to describe differences among physicians from urban (small and large) and rural practices. Environmental health problems encountered in family practice were expected to include:

- concerns of physicians (health effects seen in practice),
- reported patient questions,
- identified high-risk groups,
- environmental exposure-related problems,
- self-rated knowledge,
- priorities for public health control of environmental pollutants, and
- current and preferred sources of information.

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METHODS

Sample

Primary care physicians with hospital affiliations were selected, as they were accessible through the hospitals. This method of recruitment also allowed comparisons between urban and rural samples.

Setting

Hospitals in three areas of Ontario were chosen: Grey and Bruce counties (group 1—rural), Kitchener-Waterloo (group 2—small urban), and Mississauga (group 3—large urban). Members and non-members of the College of Family Physicians of Canada were included.

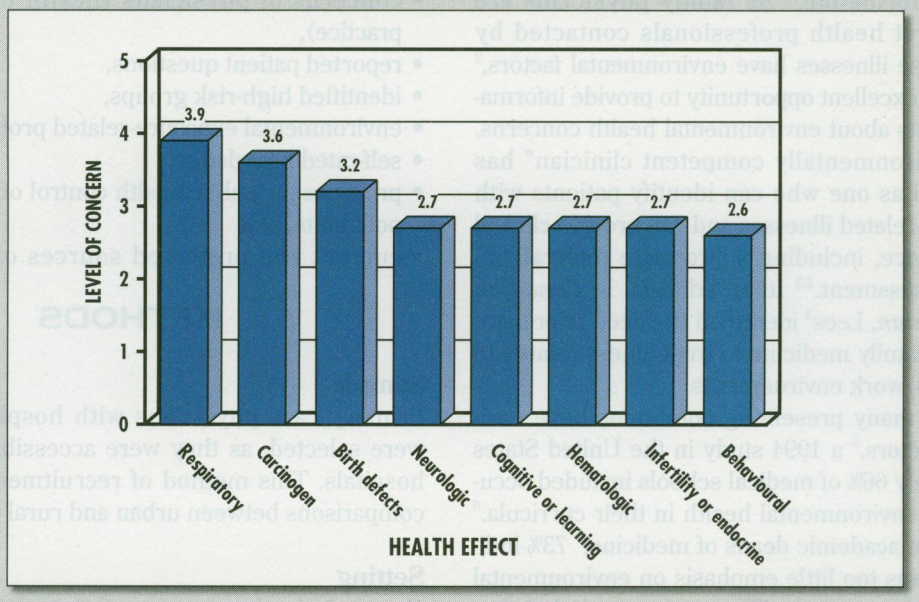
Questionnaire

A questionnaire was developed using some questions derived from the Wisconsin survey[10] to allow comparison of results. A pilot survey was tested, revised, and approved as ethical by the Environmental Health Committee of the Ontario College of Family Physicians, and was reviewed by the health educator and Medical Officer of Health in one of the study areas. The questionnaire employed a 5-point Likert-type scale, yes or no responses, and areas for open-ended responses.

The questionnaire used nine questions including, "How concerned are you about the following health effects of environmental pollutants in your patients?" (5-point scale from 1—not concerned to 5—seriously concerned). For the question, "How concerned are you about the following health effects of environmental pollutants in your patients?" eight responses were offered including hematologic and behavioural. Responses to this question were considered "physician concern" (**Figure 1**).

Another question dealt with patient-initiated concerns about environmental health: "In the past year, have any patients asked you about exposure to lead,

Figure 1. Level of physician concern about environmental health effects



5—*very concerned to* 0—*not at all concerned.*

mercury, etc?" For the question "Which patients in your practice would you consider to be at high risk of exposure to environmental toxins?" respondents were asked to circle from a menu of eight possible at-risk groups (including "lower socioeconomic groups," "fish eaters or fishermen") and two "other" categories: "occupational" and "please specify." The menu was constructed to include groups considered at risk due to specific vulnerability to toxins (eg, pregnant women, children), or due to specific exposures (eg, agricultural workers, fish eaters). The groups chosen by physicians were considered identified high-risk groups.

Frequency of seeing exposure-related problems in practice was assessed with two questions: "How often do you see exposure to the following as a problem among patients in your practice?" and "What are the sources you think are most likely to pose risks for the patients you see?" Respondents were also asked to rate how informed they felt (1—very uninformed to 5—very informed) in answering patients' questions in nine areas of environmental health (12 in urban areas) (**Table 1**). Second-hand smoke was considered an environmental pollutant.

For the two urban samples, 15 items were added to ensure that specific urban concerns were elicited. Examples of additions were aluminum, solvents, and incinerators. To keep the questionnaires relatively short, no demographic information on the physicians or their practices was included. The questionnaire was mailed to all selected physicians in the rural area and was distributed by hospital mail to the urban samples. For the rural sample a telephone follow up and second mailing was done. For urban samples a second distribution only was done. As the physicians consented by returning the questionnaires, no comparison of participants with non-participants was possible except for selected area.

Data management and analysis

Questionnaires returned because of retirement, death, relocation, or different type of practice were excluded from the sample. Data were entered and analyzed using Epi Info, version 6. All data were checked for outlying values by the first author (M.D.S.), and a random sample of 10% of each group was checked for accuracy of data entry. The structured questions were generally completed thoroughly, and there was a 23% average response rate to open-ended questions. Missing values were identified during data entry and were not included in analyses.

RESULTS

A total of 536 questionnaires were distributed; 229 were returned and 15 excluded, to leave 214 of 521 eligible. Overall response rate was 41%. Response rates were 47%, 41%, and 39% for rural, small urban, and large urban groups, respectively.

The adverse health effects of most concern to physicians in all groups are shown in **Figure 1**. Respiratory and carcinogenic effects of environmental pollutants were of most concern, but all effects, including endocrine and cognitive or behavioural, were rated above the median.

Most physicians reported questions from patients in at least seven areas of environmental health during the past year. More than 50% of physicians had answered patient questions about sun exposure, food additives, radiation, and lead during the previous year. **Table 2** shows results for the three groups combined.

In identifying high-risk groups among their patients, physicians also showed no urban-rural differences. Pregnant women, agricultural workers, and children were considered high risk by 72%, 71%, and 64% of physicians, respectively. Overall, lower socioeconomic groups were considered high risk by 41%, and fish eaters by 34%.

Physicians were questioned about the incidence of exposure-related problems in clinical practice. The most common exposure problem, seen by 80% sometimes to frequently, was "UV radiation from sunlight." Problems related to "food additives" and "poor-quality drinking water" were seen sometimes to frequently by 37% and 33%, respectively. Exposures to agricultural and garden pesticides were less frequently seen by physicians, with 15% and 13% reporting some to frequent cases.

Physicians were asked to self-rate knowledge in specific areas of environmental health with the question "How informed do you feel about answering patients' questions in these areas?" The ratings were high for only two areas: sun exposure and second-hand smoke. **Table 1** shows self-ratings of knowledge for all nine areas. The areas of ground water contamination, polychlorinated biphenyls (PCBs), lead, and mercury ($P<.01$) and of pesticides ($P<.05$) showed a positive correlation between frequency of seeing exposure problems in the practice and perceived level of knowledge. For ground water contamination, occurrence of patient questions was also positively related to perceived knowledge ($P<.001$). Family physicians in all groups rated cigarette smoking as the top public health concern.

Table 1. Physicians' ratings of how well informed they feel about environmental exposures

EXPOSURE	SELF-RATING
Second-hand smoke	4.2
Sunlight	4.2
Lead	2.5
Pesticides	2.2
Mercury	2.2
Ground water contaminants	2.1
Polychlorinated biphenyls (PCBs)	2.0
Radon	1.8
Cadmium	1.6

Scores: 1—*not at all informed to* 5—*very well informed.*

Sources of information

There were no differences among groups in currently used sources of environmental health information (**Figure 2**). The public health unit was the primary source of environmental health information, cited by 75% of physicians in all groups; continuing medical education was listed as a source by only 12%.

Preferred sources of information were rated on a scale of 1 to 5 (1—not very useful to 5—very useful). In all areas, the highly rated methods were one-page fact sheets (3.8), speakers at local hospital rounds (3.6), local CME (3.5), and series of articles in *Canadian Family Physician* (3.2).

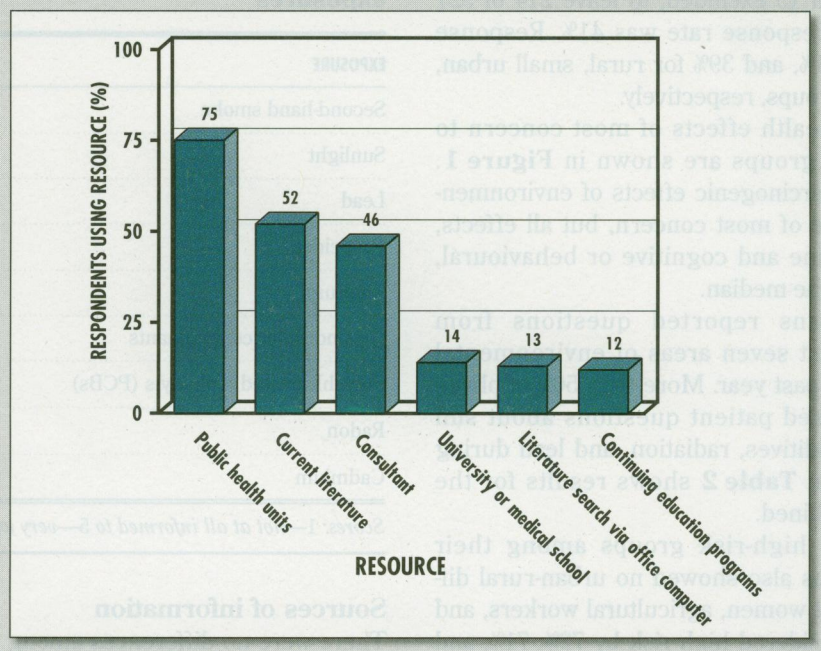
Urban-rural differences

Some differences among groups were found in the results. Rural physicians received more patient questions about exposure to agricultural pesticides and moldy hay ($P<.01$), while physicians in the large urban area received more questions about exposure to Great Lakes fish ($P<.05$).

There were some urban-rural differences in rating the public health impact of environmental health issues (**Table 3**). Exposure to agricultural pesticides was a greater rural concern, while lead exposure was of more concern in urban areas.

In preferences for learning methods, the rural and small urban groups showed a significant preference for local CME and local small-group study ($P<.01$).

Figure 2. Current sources of environmental health information



DISCUSSION

Family physicians surveyed in this study had a high level of concern about a range of health effects of environmental exposures. The two environmental health effects of greatest concern, respiratory and carcinogenic effects, were also rated highest by Canadians in a 1992 survey.[1] Public concern is also reflected in the fact that most physicians handled patient questions about seven different environmental exposures of concern in the previous year.

Physicians in all three groups, however, had low self-ratings for knowledge base in most environmental health issues. Physicians who felt more informed in environmental health were more likely to have seen illnesses related to environmental exposures in their clinical practices during the previous year.

The results of this survey are similar to two previous needs assessments in environmental health. A Connecticut study,[9] which included specialists, found that 31% of practising physicians were questioned by their patients about environmental hazards at least once a month. Most (89%) physicians thought being informed about environmental health hazards was important, but only 38% had reviewed such information in the past year. Most physicians rated their knowledge of specific environmental hazards as below average or average.[9] In an Australian study of general practitioners, 72% said they did not have enough access to environmental health information. Respondents reported that 1% to 4% of all their consultations were related to environmental health concerns and reported more concern about pesticides in rural areas.[8] In the Physicians for Social Responsibility survey in Wisconsin, 80% of family physicians believed they lacked the knowledge to advise patients on the risks of polychlorinated biphenyls and mercury.[10]

Several studies have suggested that family physicians feel inadequately prepared to manage the range of environmental health problems presented to them in practice.[3,8-10] In previous studies, family physicians favoured journal articles, fact sheets, reference guides, and clinical meetings as educational methods for environmental health.[8,9] In the present study, preferred methods were one-page fact sheets, local speakers at hospitals, local CME, and journal articles. The greater interest in local CME and small-group study outside the large urban area could reflect difficulties in accessing university-based CME, such as travel time and practice coverage.

These findings suggest that physicians need more information about specific risk factors and health

effects of environmental exposures to respond to patients' concerns and to screen with exposure histories for environment-related illness. New learning resources and educational experiences are needed to acquire this information.

Making changes

A recent study of how physicians change has shown predictable stages in the decision to change practices in other preventive health areas, such as cancer screening and counseling about smoking and dietary fat.[12] Most physicians were not ready to change screening behaviours, even when audits showed their patients were inadequately screened with mammograms, Pap smears, and skin examinations.[12] Knowledge of risk factors, however, has been identified as a strong predictor of appropriate cancer screening in primary care.[13]

Taking an exposure history has been identified as the critical skill needed for physicians to diagnose environmental health problems in practice.[3,14] Educational efforts need to focus on effective ways to improve screening by selective use of the exposure history. Because readiness to change[12] and knowledge of risk factors[13] appear to be important conditions for practice change, effective educational interventions in environmental health might need to be directed toward these areas as they affect family physicians. A recent publication by Health Canada available to family physicians[15] will provide a valuable office resource in environmental health. An Appendix provides excellent brief fact sheets on 38 "contaminants of concern," including aluminum, dioxins, ground-level ozone, lead, and radon. The public health unit, which in this study is used by 75% of respondents as a source of environmental health information, could provide a cost-effective location for the interpretation and dissemination of such information to general practitioners.

Most trusted source

A survey of Canadians showed that 41% of respondents rate the medical community as the most trusted source of environmental health information, a higher rating than any other source.[1] The same survey found that only 4% of Canadians consider physicians their main source of information on the relationship between the environment and health. This wide divergence between consumer preference and current practice in provision of environmental health information offers family physicians an opportunity. The gap could be effectively bridged by environmentally competent family physicians ready to provide environmental health information and diagnoses for their patients.

Table 2. Patient concerns about environmental exposures

EXPOSURE	PHYSICIANS REPORTING PATIENT QUESTIONS IN PAST YEAR (%)
Sunlight	88
Food additives	71
Radiation	67
Lead	52
Electromagnetic fields	40
Solvents	40*
Aluminum	38*
Home pesticides	38
Ground water contaminants	35
Occupational	34
Moldy hay or grain	32
Agricultural pesticides	29
Mercury	23
Great Lakes fish	21
Radon	6

**Questions included in urban groups only (n = 164).*

Table 3. Physicians' concerns in rural and urban areas

ENVIRONMENTAL CONCERNS	RURAL (GROUP 1)	SMALL URBAN (GROUP 2)	LARGE URBAN (GROUP 3)
Agricultural pesticide exposure	3.5*	3.0	2.9
Lead in water	2.5	2.9*	3.2*
Lead in paint	2.3	2.7†	2.9†

Scores: 1—not at all informed to 5—very well informed.
**ANOVA (across groups) P<.01.*
†ANOVA (across groups) P<.05.

Limitations

This study has several limitations that could reduce its generalizability but not its importance. The survey was sent to all primary care practitioners with hospital privileges in three varied areas of southern Ontario. No demographic information was requested, which limits our knowledge of who this sample represents. The three selected sites contain physicians with strong interests in environmental health (members of the College committee), who could already have

Key points

- Despite strong concerns about a variety of environmental exposures, family physicians rated their knowledge as low.
- They had greatest concern for pregnant women, agricultural workers, and children, especially for respiratory and carcinogenic effects of exposures.
- Physicians were questioned by their patients most often about food additives, radiation exposure, and lead.

raised the concern level of community physicians. By excluding physicians with no hospital privileges, up to 10% of those practising in each community could have been excluded. Although the sample did not include northern or isolated physicians, it did include rural, small urban, and large urban Ontario communities.

The response rate was somewhat low (41%), but those who responded indicated strong concerns and important knowledge gaps. The measures used physician self-report. No validation of these measures was done using chart audit, patient survey, knowledge tests, or CME attendance records. It is unlikely, however, that responding physicians would overestimate concern or lack of knowledge, and the results are consistent with other studies that used different methods.[8-10]

Conclusion

Family physicians surveyed in this study were experiencing serious professional and patient concerns about the health effects of environmental exposures, as well as a perceived lack of knowledge and educational resources to deal effectively with those concerns. Physicians in all three samples identifed similar health effects and risk groups of concern. Rural and urban family physicians reported some different environmental health concerns in their clinical practices.

Applying the needs assessment results to the design of specific CME resources in the future could result in more responsive educational interventions for family physicians in environmental health.

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