

Pediatrician Attitudes, Clinical Activities, and Knowledge of Environmental Health in Wisconsin

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ABSTRACT

Pediatricians can reduce exposures to environmental hazards but most have little training in environmental health. To assess whether Wisconsin pediatricians perceive a relative lack of self-efficacy for common environmental exposures and diseases of environmental origin, we assessed their attitudes and beliefs about the role of the environment in children's health. A 4-page survey was sent to the membership of the Wisconsin Chapter of the American Academy of Pediatrics. We obtained a 35.4% response rate after 1 follow-up mailing. Respondents agreed that the role of the environment in children's health is significant (mean 4.28 ± .78 on 1-5 Likert scale). They expressed high confidence in dealing with lead exposure (means 4.22-4.27 ± 1.01-1.09), but confidence in their skills for pesticide, mercury, and mold was much lower (means 2.49-3.09 ± 1.06-1.26; $P < .001$). Of those surveyed, 88.6% would refer patients to a clinic "where pediatricians could refer patients for clinical evaluation and treatment of their environmental health concerns." These findings indicate that Wisconsin pediatricians agree that children are

suffering preventable illnesses of environmental origin, but feel ill equipped to educate families about many common exposures. Significant demand exists for centers that can evaluate environmental health concerns, as well as for educational opportunities.

INTRODUCTION

Though the public is concerned about environmental threats to children's health,¹ and patients frequently ask their physicians about the health effects of environmental exposures,² pediatricians have little training in environmental health and feel ill-equipped to manage environmental exposures and diseases of environmental origin. A study of Georgia pediatricians found that 53.5% reported seeing patients seriously affected by environmental exposures, but only 1 in 5 had received specific training in environmental pediatrics.³ Pediatricians who do ask about environmental exposures usually limit their inquiry to lead and environmental tobacco smoke.⁴

To bridge the gap in training, a national network of Pediatric Environmental Health Specialty Units (PEHSUs) was established by the US Agency for Toxic Substances and Disease Registry in 1998 and now includes 12 sites across the United States. The PEHSUs are designed to diagnose and treat children with diseases of toxic environmental origin, to reduce environmental health threats to children, to improve practitioner access to expertise in environmental medicine, and to strengthen health prevention capacity.⁵ Several of the PEHSUs have established training fellowships in environmental pediatrics, and they all provide education and training for health care practitioners.⁶ The PEHSU that serves Wisconsin is The Great Lakes Center for Children's Environmental Health at Cook County Hospital in Chicago, IL.

We surveyed the membership of the Wisconsin Chapter of the American Academy of Pediatrics (AAP)

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to assess their attitudes, beliefs, and clinical activities regarding many common environmental exposures and diseases of environmental origin. Our hypothesis is that regionalized Children's Environmental Health Centers might (1) provide pediatricians with additional training they need to prevent and treat environmental exposures in children and (2) serve as a referral network for children with more serious or complex exposures.

METHODS

Sample Development and Data Collection

The Wisconsin AAP sponsored the survey and mailed it to its membership, along with a cover letter from the chapter and the Mount Sinai Center for Children's Health and the Environment encouraging members to participate. A stamped, addressed return envelope was provided, and nonrespondents were sent a second mailing 6 weeks later.

Survey Instrument Development

The questionnaire was divided into 3 sections. The first section ascertained attitudes, beliefs, and self-efficacy on children's environmental health with an emphasis on environmental history taking. The second section asked pediatricians to identify preferred sources of information and sources or methods they would find most helpful in learning more about children's environmental health. The final section queried respondents for demographic and practice information. Pilot testing of the questionnaire was performed (n=2) and modifications made to improve clarity and convenience. The Institutional Review Board of the Mount Sinai School of Medicine reviewed and approved this study. Waiver of signed consent was granted.

In Section 1, pediatricians were asked to rate their beliefs about the environment and children's health on a Likert scale of 1–5, from “strongly disagree” to “strongly agree.” We also asked pediatricians to state how frequently they took a routine environmental history as part of the well-child visit. Respondents were asked to assess whether they routinely inquire about certain categories of environmental exposures (eg, lead, pesticides, mold, etc). We also asked respondents to respond to a series of 3 self-efficacy statements (history-taking skills, discussing exposures with parents, and finding resources to evaluate exposures) for 4 types of environmental exposures (lead, mold, pesticides, and mercury), also using a 5-point Likert scale.

In Section 2, respondents were asked whether they knew about the Chicago PEHSU (the regional PEHSU for Wisconsin) or made referrals to the PEHSU, and how many hypothetical referrals they would make

to a clinic where patients could be referred for clinical evaluation and treatment of their environmental health concerns. Pediatricians were also asked whether they had a copy of either the American Academy of Pediatrics' *Handbook of Pediatric Environmental Health*, which was published in 1999, or the newer *Pediatric Environmental Health*, which was published by the Academy in 2004. They were also asked to check off current preferred sources of information, and check off which new sources or methods would be most helpful in learning more about children's environmental health. They were then asked whether they knew about the National Children's Study, and whether they “supported full federal funding for the National Children's Study, even though it will cost \$2.7 billion over 25 years.”

A third section asked respondents to provide their age, primary setting of practice, practice type, percent of patients on public assistance, years in practice and geographic location (first 3 digits of practitioner ZIP code).

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Statistical Analysis

Statistical analyses were conducted using SPSS 13.0 (SPSS, Inc, Chicago, IL). Routine data entry and cleaning procedures checked for outliers and data entry errors. We randomly sampled and checked 10% of the questionnaires for accuracy.

RESULTS

As of September 1, 2004, the membership in the Wisconsin Chapter was 832.7 Of the 832 questionnaires mailed to Wisconsin pediatricians, 277 were completed (35.4%); none were returned as undeliverable. After excluding 10 of the 277 returned questionnaires because the respondents reported that they were not currently in pediatric practice, the final sample analyzed consisted of 267 practicing pediatricians.

Demographics and Description of Practitioners

Table 1 describes the demographic characteristics and practice profiles of the respondents, who were equally divided between public, community clinics and private, primary care practices. Various specialties were also represented, including neonatology, allergy, adolescent medicine, pediatric nephrology, and gastroenterology. Of the respondents, 16.5% reported that $\geq 50\%$ of their patients were enrolled in Medicaid or public-funded assistance.

Only 1 in 8 respondents reported having had any training in environmental history taking (12.7%). Almost all of the respondents (90.8%) reported a past experience with a patient who had been affected by an environmental exposure, such as a case of lead poisoning. Slightly more than half of the respondents (53.6%) had a copy of either the American Academy of Pediatrics' *Handbook of Pediatric Environmental Health*, or the newer *Pediatric Environmental Health*.

As shown in Table 2, pediatricians agreed that environmental history taking would help parents protect their children from hazardous environmental exposures (mean 3.81 ± .86) and would help identify exposures causing specific symptoms (mean 3.93 ± .82). There was overwhelming disagreement with the statement, "Conducting an environmental history on all my patients would not be necessary" (mean 1.63 ± .69). When presented with the statement, "Conducting an environmental history on all my patients would take up too much time," there was much less agreement (mean 2.51 ± 1.04).

The responses generally indicated that the pediatricians attach considerable importance to environmental exposures. The "role of environmental health impacts on children" yielded a mean score of 4.28, and "assessing environmental exposures through history taking in pediatric practice" yielded a mean score of 3.81. Pediatricians showed a tendency to believe that the magnitude of children's environment-related illness is increasing (mean 3.69). However, the responses suggested little belief that pediatricians have control over environmental health hazards, with the mean score (2.72) just above the midpoint of the continuum.

Respondents voiced high levels of confidence for history-taking, discussing lead exposures with parents, and finding diagnosis and treatment resources related to lead exposures, with all 3 items having mean values >4. However, for pesticide, mercury, and mold exposures, the mean responses were much lower (all $P < .001$ compared with equivalent questions for lead). For history-taking, means ranged from 2.40 to 2.91; for discussing these environmental exposures with parents, means ranged from 2.68 to 3.09; and for finding diagnosis and treatment resources related to environmental exposures, means ranged from 2.49 to 2.89.

Very few pediatricians knew about the National Children's Study, a landmark study led by the National Institute of Child Health and Human Development that will provide invaluable information on preventable risk factors for such chronic diseases as asthma, certain birth defects, neurobehavioral syndromes (dys-

Table 1. Description of Respondents and their Practices

Characteristic		
Age		
Years in practice (mean ± SD)	35.3 ± 18.4	11.9 ± 9.5
	No.	%
Sex		
Male	109	43.3
Female	143	56.7
Practice Type		
Primary care	206	79.8
Specialty	40	15.5
Urgent care/emergency	12	4.7
Practice Setting		
Private without HMO	144	55.0
Public/community clinic	70	26.7
Teaching	24	9.2
Other	5	1.9
Private with HMO	17	6.5
Research	2	0.8
Patients on Medicaid or Public Assistance		
0-24%	153	57.3
25-49%	70	26.2
50-74%	20	7.5
75-100%	24	9.0

lexia, attention deficit hyperactivity disorder, autism, and schizophrenia), and obesity. Although only 8.3% of the practicing respondents knew about it, 71.7% "supported full federal funding for the National Children's Study, even though it will cost \$2.7 billion over 25 years."

Extremely few pediatricians knew about the PEHSU (Table 3) or made referrals to the PEHSU (4.9% and 0.8% respectively). Despite the very low referral rate to the PEHSU, demand for clinical referral resources was extremely high. Of the respondents, 88.6% would refer patients to a clinic "where pediatricians could refer patients for clinical evaluation and treatment of their environmental health concerns." The 267 respondents would make at least 1255 referrals to such a clinical resource. If this sample is representative of the membership, then this suggests that pediatricians would make 3911 referrals annually to a regional clinic system for children's environmental health concerns.

CONCLUSIONS

Wisconsin pediatricians who participated in our survey demonstrated a high level of interest in children's environmental health, a high level of belief that environmental exposures impact their patients' health, and

Table 2. Pediatricians' Self-Reported Attitudes, Beliefs, and Self-Efficacy Regarding Environmental Health

Attitude Statements—(1) Strongly Disagree → (5) Strongly Agree	Mean ± SD (n=267)
<i>Conducting an environmental health history on all my patients would:</i>	
Help parents prevent exposures to environmental threats	3.87 ± .82
Identify the exposures related to health concerns	3.93 ± .82
Take up too much time	2.51 ± 1.04
Not be necessary	1.63 ± .69
Belief Statements	Mean ± SD (n=267)
The role of environmental health impacts on children is of little importance (1) → of great importance (5) (n=267)	4.28 ± .78
Assessing environmental exposures through history-taking in pediatric practice is of little importance (1)→ of great importance (5) (n=267)	3.81 ± .86
The magnitude of children's environmental related-illnesses is decreasing (1)→ increasing (5) (n=267)	3.69 ± .99
The amount of control pediatricians have over environmental health hazards is minimal (1) → maximal (5) (n=267)	2.72 ± .84
Self Efficacy Statements—(1) Not Confident → (5) Very Confident	Mean ± SD (n=267)
<i>How confident are you in taking a patient history on:</i>	
Lead exposure	4.22 ± 1.05
Pesticide exposure	2.59 ± 1.06
Mercury exposure	2.40 ± 1.07
Mold exposure	2.91 ± 1.20
<i>How confident are you in discussing with parents or guardians the impact of:</i>	
Lead exposure on health	4.27 ± 1.01
Pesticide exposure on health	2.68 ± 1.12
Mercury exposure on health	2.72 ± 1.14
Mold exposure on health	3.09 ± 1.16
<i>How confident are you in finding resources to evaluate:</i>	
Lead exposure	4.24 ± 1.09
Pesticide exposure	2.49 ± 1.20
Mercury exposure	2.52 ± 1.21
Mold exposure	2.83 ± 1.26

Table 3. Frequencies of Pediatrician Activities, Attitudes, Beliefs, and Self-Efficacy Regarding Environmental Health

Clinical Activities	% Reporting (n=267)
Routinely discuss housing, parental occupation, and environmental tobacco smoke as part of well-child care	40.5
Routinely take an environmental history as part of well-child visit >60% of time	33.7
Seen a patient affected by an environmental exposure in the past year	90.8
Know about the PEHSU	4.9
Referred to the PEHSU	0.8
Would refer patients to referral clinic for evaluation and treatment	88.6
Have received environmental history training	12.7
Provide patient educational materials in environmental health	51.3
Interested in learning more about environmental health	91.0
Heard about the National Children's Study	8.2
Support full funding for the National Children's Study	71.9
Own an AAP Green Book	53.6

a high level of interest in learning more about the field. They did not frequently find time or effort to be barriers to incorporating the environmental history into their clinical visits.

They also perceived environmental health concerns as significant and common in their practices. Except for lead exposure, pediatricians reported very little prior training in taking environmental histories, and low confidence in discussing environmental exposures with parents and locating diagnosis and treatment resources related to environmental exposures.

Our data point to clear opportunities by which these problems could be addressed. Respondents reported strong trust in the information they received from the American Academy of Pediatrics. The medical literature and government agencies are also preferred sources of information, considerably more than Internet-based sources.

The federally sponsored PEHSU for Region V was infrequently used as a resource. Further work is needed to delineate the specific reason for this phenomenon. Data from the Region II (New York City) PEHSU indicate that the vast majority of referrals to the Region II center derive from the area 1-2 hours driving distance from the referral center. Given that the PEHSUs handle most consultations over the phone, better dissemination of the information regarding the presence of the regional center and/or more centers within the tri-state area might facilitate improved access. However, a telephone resource may not be useful to a pediatrician who evaluates a child with a suspected disease of environmental origin or an environmental exposure. Pediatricians may prefer a nearby clinical site where a complete, in-person evaluation can be performed, just as they might prefer to refer patients to a nearby pediatric cardiologist or endocrinologist rather than a faraway, highly specialized institution.

Our results may overstate the levels of concern about environmental health problems among children, and of interest in learning about environmental health among pediatricians. Similarly, because our results are based on self-report, the social desirability of the "right" answer may overstate the level of interest. Nevertheless, we believe our results indicate a considerable reservoir of interest in pediatric environmental health and considerable opportunity for educating pediatricians about this field.

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