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Pediatrics 2000;106;e84
DOI: 10.1542/peds.106.6.e84

The Role of the Pediatrician in the Oral Health of Children: A National Survey

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ABSTRACT. *Objectives.* **To assess pediatricians' knowledge, attitudes, and professional experience regarding oral health, and to determine willingness to incorporate fluoride varnish into their practices.**

Background. **Poor and minority children suffer disproportionately from dental caries and have limited access to dental care. In a recent analysis of national survey data, the General Accounting Office reported that poor children had 5 times more untreated decay than did children from higher income families. Untreated decay can lead to problems with eating, speaking, and attending to learning. Children who are poor suffer 12 times the number of restricted activity days because of dental problems, compared with more affluent children.**

Despite higher rates of dental decay, poor children had one half the number of dental visits compared with higher income children in 1996. Medicaid's Early Periodic Screening Diagnosis and Treatment (EPSDT) program is intended to provide regular dental screenings and appropriate treatment but has apparently played a limited role in improving access to dental care for poor children. According to a report by the Office of the Inspector General of the Department of Health and Human Services, only 20% of children under 21 years of age, who were enrolled in Medicaid and eligible for EPSDT, actually received preventive dental services.

By increasing their involvement in oral health prevention during well-child care visits, pediatricians may be able to play an important role in improving the dental health of their patients who have difficulty obtaining access to professional dental care. However, it is unclear to what degree pediatricians are knowledgeable about preventive oral health and the extent to which they may already be participating in prevention and assessment. Also, little is known about the incidence of dental problems in pediatric practice, and whether pediatricians perceive barriers to their patients' receiving professional dental care. Finally, it is important to know how pediatricians value the promotion of oral health and whether they would be willing to take on additional activities aimed at its improvement. We addressed these questions in a national survey of pediatricians.

Design. **We surveyed a national sample of 1600 pediatricians randomly selected from the American Medical Association Master File to assess their knowledge, current practice, and opinion on their role in the promotion of oral health; experience with dental decay among patients and in referring patients for professional dental care; and willingness to apply fluoride varnish.**

Results. **Of 1386 eligible survey recipients, 862 returned surveys for a response rate of 62%. Respondents reported seeing dental problems regularly. Two thirds of respondents observed caries in their school-aged patients at least once a month. Of the respondents, 55% reported difficulty achieving successful dental referrals for their uninsured patients and 38% reported difficulty referring their Medicaid patients. More than 90% of the respondents agreed that they had an important role in identifying dental problems and counseling families on the prevention of caries. Moreover, respondents were interested in increasing their involvement: 74% expressed a willingness to apply fluoride varnish in their practices. One half of the respondents, however, reported no previous training in dental health issues during medical school or residency, and only 9% correctly answered all 4 knowledge questions.**

Conclusion. **Access to dental care and unmet dental health needs are serious, underaddressed problems for poor and minority children in the United States. In promoting preventive oral health, pediatricians benefit all children and particularly the underserved. We know of 2 states, Washington and North Carolina, that have acknowledged, through the provision of reimbursement, that pediatricians have a unique opportunity at well-child care visits to provide caries prevention counseling and care to poor children.**

Based on results of this survey, we believe it bodes well for expanding pediatrician involvement in oral health into other states. Specifically, we found that pediatricians overwhelmingly believe that they have an important role and are already involved in providing anticipatory guidance on oral health issues. However, lack of up-to-date information and knowledge as well as the difficulty pediatricians perceive in referring some patients for professional dental care call into question the current level of effectiveness of pediatricians in promoting oral health. We offer several recommendations to begin the dialogue on expanding the role of pediatricians in preventive oral health:

1. **Pediatricians will require adequate training in oral health in medical school, residency, and in continuing education courses. We recommend adding a module on oral health and dental care to the undergraduate medical school physical examination skills courses and an oral health rotation to pediatric residency curriculums. Having dental professionals provide such instruction would enhance acquisition of hands-on**

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Dr Lewis was a Robert Wood Johnson Clinical Scholar while conducting this research. The opinions expressed here are not necessarily those of the Robert Wood Johnson Foundation.

Received for publication Feb 22, 2000; accepted Jul 27, 2000.

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skills and could encourage future professional collaboration and cross-referrals.

2. **Pediatricians will require current information and guidelines on preventive dental care. With the exception of *Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents*, very little is available to guide pediatricians in the promotion of oral health in their practices. The American Academy of Pediatrics (AAP) publication, *Guidelines for Health Supervision*, provides cursory oral health advice limited to fluoride supplementation and dental referral. The scientific literature aimed at pediatricians is also limited. A recent Medline search of the 3 commonly read pediatric journals identified <20 articles with a primary focus on oral health published in the last 10 years.**
3. **Pediatricians must be ensured that all of their patients, Medicaid and uninsured included, can receive timely preventive and restorative dental care. Pediatricians can expand their involvement in oral health prevention, but they can never replace the care that dental professionals provide. Further dialogue with our dental colleagues and joint advocacy efforts by the AAP and American Academy of Pediatric Dentistry are needed to address the serious problem of disparities in access to dental care.**
4. **Pediatricians will require sufficient resources to successfully assume greater involvement in oral health-related activities. Time pressures and inadequate staffing will make it difficult for pediatricians to devote the attention to oral health that all children deserve.**

Pediatrics* 2000;106(6). URL: http://www.pediatrics.org/cgi/content/full/106/6/e84; *pediatrician, oral health, anticipatory guidance, access to care, dental care.

ABBREVIATIONS. EPSDT, Early Periodic Screening Diagnosis and Treatment; AMA, American Medical Association; AAP, American Academy of Pediatrics; AAPD, American Academy of Pediatric Dentistry.

Dental caries comprise the single most common chronic disease affecting children in the United States today.[1] Although the incidence of caries has decreased markedly in the last 50 years, primarily attributable to increasing exposure to fluoride, dental decay remains a serious problem, especially among individuals of low-income and minority status. A report from the National Institute of Dental and Craniofacial Research[2] indicates that 80% of caries occur in only 25% of children. Latino, American Indian, and Alaska Natives are at especially high risk for developing early childhood caries, sometimes called "baby bottle tooth decay." In some Native American communities, 60% to 80% of children are affected.[3]

Limited knowledge about oral hygiene and difficulty accessing preventive dental care are believed to contribute to the racial and income disparity in the frequency of caries. Poor and minority children are more likely to have untreated dental caries, compared with more affluent white children.[4] For example, in a recent analysis of national survey data, the General Accounting Office reported that poor children had 5 times more untreated decay than did children from higher income families.[5] Untreated decay can lead to problems with eating, speaking, and attending to learning. Children who are poor suffer 12 times the number of restricted activity days caused by dental problems, compared with more affluent children.[5]

Despite higher rates of dental decay, poor children had one half the number of dental visits, compared with higher income children in 1996.[5] Medicaid's Early Periodic Screening Diagnosis and Treatment (EPSDT) program is intended to provide regular dental screenings and appropriate treatment but has apparently played a limited role in improving access to dental care for poor children. According to a report by the Office of the Inspector General of the Department of Health and Human Services,[6] only 20% of children under 21 years of age, who were enrolled in Medicaid and eligible for EPSDT, actually received preventive dental services.

By increasing their involvement in oral health prevention during well-child care visits, pediatricians may be able to play an important role in improving the dental health of their patients who have difficulty obtaining access to professional dental care. This approach would offer many advantages over the current model, in which most children do not visit a dentist until after 3 years of age and many poor children are unable to access dental care at all. Regular preventive visits to a pediatrician or other primary care provider, which begin early in infancy and occur on a regular, well-accepted schedule, would allow for early assessment of a child's oral health. In addition, pediatricians and other primary care providers already have an established role in the prevention and early identification of health problems and routinely discuss age-appropriate anticipatory guidance on a variety of topics. This role potentially could be expanded to include counseling on caries prevention, assessment and referral for dental problems, and even provision of a caries control treatment, such as application of fluoride varnish. Fluoride varnish is easily and quickly applied to children's teeth. When used at least twice a year, fluoride varnish has been shown to lead to a 38% reduction in dental decay according to a meta-analysis on the topic.[7] Since 1998, Washington state Medicaid has reimbursed physicians and nurse practitioners $18.18 per visit to apply fluoride varnish 3 times a year to children under 19 years of age. North Carolina Medicaid is currently pilot testing a program to reimburse physicians to provide oral health anticipatory guidance and fluoride varnish to children <3 years of age.

Several sources on health supervision for children advise pediatricians and other primary care providers to counsel families on basic oral hygiene.[8,9] However, it is unclear to what degree pediatricians are knowledgeable about preventive oral health and to what extent they may already be participating in prevention and assessment. Also, little is known about the incidence of dental problems in pediatric practice and whether pediatricians perceive barriers to their patients' receiving professional dental care. Finally, it is important to know how pediatricians value the promotion of oral health and whether they would be willing to take on additional activities

aimed at its improvement. We addressed these questions in a national survey of pediatricians.

METHODS

Using the American Medical Association (AMA) Master File, we recruited a national sample of pediatricians. This list is not limited to members of the AMA and is considered to be the most inclusive source of information on licensed physicians in the United States. The AMA Master File authorized vendor, NDC Health Information Services (Phoenix, AZ), provided us with a randomly selected list of 1600 general pediatricians between the ages of 25 and 65 years, based in hospital or clinic practices. This age range was specified to ensure that the majority of recipients were established in full-time practice. The database provided names and addresses, information on board certification, and year of graduation from medical school.

Participants received a 3-page questionnaire and a prepaid return envelope. A letter from the American Academy of Pediatrics (AAP) endorsing this study was also included. Subjects were instructed to return a blank survey if they were no longer in practice or if they did not include well-child care within their scope of practice. After the first mailing to the entire sample, up to 3 subsequent mailings were made to those who had not responded to the previous mailings using procedures recommended by Salant and Dillman.[10] The institutional review board of the University of Washington approved all study activities.

Survey Instrument

Demographic information collected from the respondents included number of years in practice, number of hours of previous oral health training, number of patients seen per week, number of hours per week providing patient care, and practice type. Information on practice location (urban, suburban, and rural), reimbursement type, and approximate racial/ethnic distribution of respondents' patient populations was also obtained.

The survey questions were divided into 4 domains. These domains were chosen based on review of the literature and important themes that emerged during pilot testing of an earlier version of the survey instrument.

1. Knowledge and familiarity with preventive therapies. Pediatricians were asked to answer true/false questions about knowledge of caries prevention; and yes/no questions about familiarity with fluoride varnish, dental sealants, and whether they were familiar enough with dental sealants to explain them to a patient.
2. Current anticipatory guidance and assessment practices and opinion on the role of pediatrician in promoting oral health. Respondents rated the likelihood that they would currently perform each of 6 oral health-related tasks during a well-child care visit for a child under 5 years of age on a 5-point scale ranging from very likely to very unlikely. Because we were concerned that respondents would overreport preventive activities, we included a question on inquiring about the mother's dental health, a risk factor for dental disease in the child,[11] of which we expected few pediatricians to be aware. Pediatricians also rated their agreement with participating in activities that could potentially be part of routine well-child care on a 5-point scale ranging from strongly agree to strongly disagree.
3. Experience with dental problems and barriers to professional dental care. Pediatricians were asked to rate the frequency with which they saw early childhood caries (the term "baby bottle tooth decay" was also provided for survey recipients unfamiliar with the newer term of "early childhood caries") and caries in school-aged children on a 6-point scale ranging from at least once a week to never. They also rated perceived difficulty in referring various categories of patients to professional dental care on a 5-point scale ranging from very difficult to not at all difficult.
4. Fluoride varnish application. The survey provided the following brief statement about fluoride varnish: "Fluoride varnish is applied to teeth to help prevent cavities and reverse early dental decay. It takes 5 minutes to apply to all of the teeth and can be done by ancillary staff at well-child care visits. Materials cost <50 cents per patient." Respondents were then asked whether respondents would consider having fluoride varnish applied to patients in their practice. If they replied "yes," they were asked to state an acceptable level of reimbursement for the procedure. Pediatricians were also asked to rate their agreement on a 5-point scale ranging from strongly agree to strongly disagree with application of fluoride varnish as a part of well-child care.

Statistical Analysis

Descriptive statistics were generated on demographic variables. χ^2 analysis was used for comparing categorical variables and Student's t test was used to compare means of continuous variables. Using multivariate logistic regression, we sought to determine which factors were independently associated with 2 dependent variables, "see dental problems at least once a month" and "openness to fluoride varnish." These outcome variables were of interest as we anticipate planning targeted interventions. Covariates in the model were chosen based on their hypothesized association with the outcome variable. All statistical analysis was performed on *SPSS for Windows, Version 8.0* (SPSS, Chicago, IL).

Coding for Multivariate Analyses

The "see dental problems once a month" variable was coded as one for those respondents who reported seeing caries on average at least once a month. Those who saw caries less frequently were coded as zero. Three main-effect, dichotomous variables were included: ≥3 hours of education in oral health topics in medical school and residency; having ≥15% Medicaid patients, and ≥5% uninsured patients. These cutoffs were derived from the median value for each of the respective continuous variable. Two control variables—number of years in practice and number of patients seen per week—were also included in the model as continuous variables.

"Openness to fluoride varnish" was coded as a one for those who agreed or strongly agreed that fluoride varnish should be part of well-child care in the pediatric office and as zero for those who were neutral or disagreed. Main-effect variables included in this model were 3 dichotomous variables: familiarity with fluoride varnish, strongly agreeing that pediatricians have a role in counseling and assessing for dental problems, seeing dental problems at least once a month; and 4 continuous variables: proportion of compensation from fee-for-service, fixed salary, and capitation (3 mutually exclusive categories), and the number of patients seen per hour.

RESULTS

Sample

Of 1600 surveys distributed, 40 were returned without a forwarding address and 174 were returned by physicians reporting that they were no longer in practice or did not include well-child care within the scope of their practices. Of the 1386 eligible participants, 854 returned completed surveys giving a response rate of 62%. Respondents were not significantly different from nonrespondents in years since graduation from medical school, board certification, or state of residence.

Demographic information on survey recipients and their practices is summarized in Table 1. Respondents had been in practice for a mean of 13.7 years. On average, respondents reported providing direct patient care for 39.6 hours per week and saw 114.2 patients per week. More than one third reported no instruction in dental health-related subjects in medical school and 42.3% reported no dental health-related instruction in their residency training.

Knowledge and Familiarity With Preventive Therapies

The frequency of correct responses to the 4 knowledge questions is presented in Table 2. Nine percent of respondents correctly answered all 4 questions. Only 60.8% of respondents knew that a 3-month-old did not require fluoride supplementation, a question

TABLE 1. Characteristics of Survey Recipients and Their Practices

Characteristics	Respondents $n = 854$
Years since medical school graduation: mean (SD)	18.8 (9.2)
Board-certified	93%
Years in practice: mean (SD)	13.7 (8.7)
Hour of instruction in dental health: mean (SD)	
Medical school	4.2 (11.1)
Residency	3.0 (6.9)
CME	1.7 (5.5)
Respondents with no instruction in dental health	
Medical school	37.5%
Residency	42.3%
CME	60.1%
Hours per week providing patient care: mean (SD)	39.6 (12.9)
Number of patients seen per week: mean (SD)	114.2 (45.9)
Location of practice (mean)	
Suburban	55.4%
Urban	29.7%
Rural	13.6%
Type of practice (mean)	
Group private practice	57.0%
Solo private practice	17.0%
Staff model HMO	6.3%
Other	17.2%
Compensation (mean)	
Fee-for-service	41.1%
Capitation	27.7%
Fixed salary	23.9%
Other	6.5%
Respondents' report the proportion of their patient panels with the following characteristics (mean)	
Received Medicaid	25.5%
Uninsured	9.6%
Immigrants	13.2%
Non-English-speaking	9.1%
Respondents' report of their patient panels' racial/ethnic distribution (mean)	
White	61.1%
Black	17.6%
Latino	14.1%
Asian/Pacific Islander	5.7%
Native American	1.5%

SD indicates standard deviation; HMO, health maintenance organization; CME, continued medical education.

designed to assess awareness of 1995 recommendations for fluoride supplementation published by the AAP.[12] The majority of respondents (79.5%) reported familiarity with dental sealants and approximately one half (50.9%) said that they were familiar enough that they could explain sealants to a patient. However, only 37.3% correctly answered a basic knowledge question on sealants. Twenty-two percent of respondents were familiar with fluoride varnish.

Current Anticipatory Guidance and Assessment Practices and Opinion on the Role of the Pediatrician in Promoting Oral Health

Greater than 85% of respondents reported that they were likely or very likely to examine a child's teeth for cavities and to provide preventive counseling at well-child care visits for children under 5 years of age. Fewer respondents (72.4%) reported that they assessed fluoride intake to determine the need for supplementation. Only a small number of respondents (7.8%) reported that they were likely or very likely to inquire about the mother's dental health. More than 90% of respondents agreed that assessment for dental problems and preventive counseling should be a part of routine well-child care provided by the pediatrician, but only 14.6% of respondents were in agreement with referral to a dentist by 12 months of age, the current recommendation of the American Academy of Pediatric Dentistry (AAPD)[13] (Table 3).

Experience With Dental Problems and Perceived Barriers to Referral to Professional Dental Care

Forty-seven percent of respondents reported that they saw early childhood caries in their practices at least once a month. Cavities in older children were seen somewhat more frequently; approximately two thirds of the respondents reported that they saw cavities in school-aged children at least once a month. More than one half of respondents reported difficulty referring patients who were uninsured and who needed a sliding payment scale (55.1%) or who were uninsured with an emergent dental problem (50.9%). Fewer respondents reported difficulty referring patients in other categories (Table 4).

Fluoride Varnish Application

Seventy-four percent of respondents would accept reimbursement to have fluoride varnish applied to patients within their practices at a mean of $20.45. An unusually high number of respondents (9%) left the reimbursement question blank. Only 21% agreed that application of fluoride varnish should be a part of well-child care provided by pediatricians. Sixteen percent of participants responded that no amount of reimbursement could induce them to apply fluoride varnish in their practice. Two primary themes arose in the accompanying open-ended question to explain this response: 1) participants reported insufficient time, space, or staff to perform this procedure, or 2) participants believed that this procedure should remain within the scope of professional dental practice.

Multivariate Analysis

In multivariate analysis, respondents with ≥15% Medicaid patients were more likely to report seeing dental problems at least once a month, after adjustment for the number of patients seen per week and the number of years in practice. There was a positive, but statistically not significant, association of 3 or more hours of oral health training in medical school and residency, and 5% or more uninsured patients with seeing dental problems at least once a month (Table 5).

Openness to fluoride varnish was significantly associated with familiarity with fluoride varnish, seeing dental problems at least once a month, and strongly agreeing that pediatricians have a role in promoting oral health prevention. There was a significant negative association with proportion of salary from fee-for-service compensation. There was not a significant effect of proportion of capitated or

TABLE 2. Responses to Knowledge Questions

Question	Correct Response	Percent Responding Correctly
Only bottle-fed children get early childhood caries (baby bottle tooth decay)	False	78.8
A 3-mo-old baby living in nonfluoridated area needs fluoride supplementation	False	60.8
Cavity-causing bacteria can be transmitted between mother and child	True	39.5
Dental sealants are usually applied to child's primary teeth	False	37.3

TABLE 3. Current Anticipatory Guidance and Assessment Practices and Opinion on the Role of the Pediatrician in Promoting Oral Health

At a Well-Child Care Visit How Likely Are You to	Percent Likely or Very Likely
Inquire about bottle to bed	89.3
Examine a child's teeth for cavities	87.9
Counsel on going to dentist	85.5
Counsel on importance of toothbrushing	85.1
Assess fluoride intake	72.4
Inquire about mother's dental health	7.8
Should the Following be a Part of Routine Well-Child Care?	**Percent Agreeing or Strongly Agreeing**
Assessment for dental problems during the physical examination	92.6
Counseling on the prevention of dental problems	90.2
Application of fluoride varnish	20.7
Referral to the dentist at 12 mo of age	14.6

TABLE 4. Perceived Barriers to Referral to Professional Dental Care and Experience With Dental Problems in Practice

How Difficult Is it to Refer Patients Who	Percent Reporting Difficult or Very Difficult
Have private insurance and have an emergent dental problem on night/weekend	27.5
Have significant developmental delay	27.9
Are ≤2 y of age	30.7
Receive Medicaid	38.1
Are uninsured and have an emergent dental problem on night/weekend	50.9
Are uninsured and need sliding payment scale	55.1
In Your Practice Do You See	**Percent Reporting**
Early childhood caries	
At least once a month	47.2
At least once a week	15.9
Caries in school-aged children	
At least once a month	65.4
At least once a week	27.2

TABLE 5. Multivariate Model of Seeing Dental Problems at Least Once a Month*

Variable	OR	95% CI
≥15% Medicaid patients	3.71	(2.7,5.1)
≥5% Uninsured patients	1.28	(.9,1.8)
≥3 Hours of dental training in medical school or residency	1.16	(.9,1.6)

OR indicates odds ratio; CI, confidence interval.
* Model adjusted for number of hours per week seeing patients and number of years in practice.

TABLE 6. Multivariate Model of Openness to Apply Fluoride Varnish

Variable	OR	95% CI
Familiarity with fluoride varnish	2.57	(1.7,3.8)
Strongly agree pediatricians have a role in promoting oral health	1.86	(1.2,2.8)
See dental caries at least once a month	1.79	(1.2,2.6)
% Compensation from (coded as continuous variables)		
Fee-for-service	.99	(.98,.99)
Capitation	.99	(.98,1.00)
Fixed salary	.99	(.98,1.00)
Number of patients seen per hour (coded as a continuous variable)	.95	(.8,1.1)

OR indicates odds ratio; CI, confidence interval.

salaried compensation or of the number of patients seen per hour (Table 6).

DISCUSSION

This survey indicates that pediatricians overwhelmingly believe that they have an important role in the promotion of oral health. The majority of pediatricians report that they are likely to include anticipatory guidance on oral health-related topics at well-child care visits and would be willing to accept reimbursement to provide fluoride varnish. They report encountering dental decay in their patients on a regular basis and have difficulty referring some subgroups of patients for patients for professional dental care. Lack of familiarity with oral health issues may make it difficult for pediatricians to promote oral health and suggests the need for more formalized training and standards for preventive oral health counseling and care.

Most pediatricians reported that they routinely assess a child's dental health and include anticipatory guidance on oral health in their well-child care visits. Relatively fewer pediatricians were likely to assess a child's fluoride intake to determine the need for supplementation, although this has traditionally been one aspect of oral health for which pediatricians have taken responsibility. There are several possibilities for this finding. Pediatricians may assume that there is not a need to make an assessment of fluoride intake if a child lives in a community with fluoridated water. Alternatively, some pediatricians may avoid addressing fluoride out of concern that current recommendations are no longer appropriate, given increasing exposure to fluoride from other sources.

Results of this survey also indicate that pediatricians encounter dental decay on a regular basis. This is not surprising given that >50% of American children have experienced dental decay and in some

groups, such as Mexican-Americans, >45% of children 6 to 8 years of age have untreated dental caries.[4] As expected, pediatricians who care for more patients at risk for dental decay reported seeing caries on a more frequent basis. Given the frequency with which pediatricians encounter dental problems in pediatric practice, additional oral health-related training in pediatric residency should be considered.

Although the majority of pediatricians encounter dental problems on a regular basis and are involved in the prevention of dental problems, this survey identified some barriers that may limit pediatricians' effectiveness in the promotion of oral health in their practices. First, pediatricians' knowledge of and familiarity with basic oral health-related issues were limited, particularly on topics where new information has emerged in the last decade. Other studies have documented similar limitations in dental knowledge among pediatricians.[14–16] Few pediatricians were aware that caries are a transmissible infectious disease that the child can acquire from the mother, although this information has been disseminated in the dental literature for >10 years.[11,17–20] Despite claiming familiarity with dental sealants, many respondents could not answer a basic question about how sealants are used. If pediatricians are to provide adequate counseling to their patients in the area of oral health, they need sufficient knowledge of current preventive practices in dentistry.

A second barrier to greater involvement in oral health by pediatricians is the perception that it is difficult to refer several subgroups of patients. Over one half of the respondents reported difficulty referring uninsured patients and more than one third reported difficulty referring Medicaid patients. Our findings are congruent with recent data that show that unmet dental care needs are the single most frequently reported health need.[21] A recent survey of state Medicaid programs by the General Accounting Office found that, of 39 states providing information, 23 reported that fewer than half of the states' dentists saw any Medicaid patients in 1999.[22] Problems accessing dental care are compounded in rural areas, where the availability of dental providers is more limited. If pediatricians are to play a greater role in promoting oral health in their practices, confidence in their ability to refer patients to professional dental care must be ensured.

Although pediatricians believe that they have an important role in promoting oral health, they seem to be ambivalent about assuming greater involvement. Most were willing to consider reimbursement for application of fluoride varnish, yet few agreed that application of fluoride varnish should be a part of well-child care provided by the pediatrician. The most frequent response to the opinion question on application of fluoride varnish as part of well-child care fell into the neutral category suggesting the possibility that respondents were not familiar enough with fluoride varnish to make a decision about adding it to their practices. In fact, only 22% reported familiarity with fluoride varnish. Although information on the purpose of fluoride varnish, the ease and length of time required for its application, and the inexpensive cost of the supplies was provided in the text of the survey, this may not have been sufficient to allow participants to commit for or against fluoride varnish application. This may also be why a relatively large number of respondents left the question about reimbursement for fluoride varnish blank.

Providers who saw dental problems regularly in their practices were more likely to agree with application of fluoride varnish in pediatric practice. It may be that pediatricians who work with patients at high risk for dental disease and who encounter difficulty accessing professional dental care are motivated to play a more active role in preventing cavities. Those who were familiar with fluoride varnish were more likely to be willing to apply fluoride varnish in practice. This finding demonstrates the potential for wider acceptance with greater familiarity with fluoride varnish. Openness to fluoride varnish was unrelated to proportion of compensation from fixed salary or capitation or from the number of patients seen per hour. We had hypothesized that busier pediatricians and those paid on fixed salary or capitation would be less likely to consider application of fluoride varnish. It is promising that these potential barriers seem less important than anticipated.

Most pediatricians did not agree with the recommendation of the AAPD that children be referred to the dentist by 1 year of age. Several possibilities may explain this finding. Pediatricians may not be knowledgeable of the AAPD recommendation and even if they are aware, they may not agree because this represents a change from that which they are accustomed. Some pediatricians may question whether dental assessment and preventive education for very young children require a visit to the dentist because the AAP has identified pediatricians as capable of providing "basic dental care for children under the age of 3."[23] Pediatricians may be aware that insurance will not routinely cover preventive dental care in their state for children at this age, because the recommended age for referral varies by state. Other comments written on the survey suggested concern as to whether dentists were willing to care for very young children. This concern may be justified, given that, in a survey of pediatric dentists, only 46.6% practiced the AAPD policy of performing the first oral evaluation at 12 months of age or younger.[12]

There are several limitations to this study. As with any survey, there is the potential for responder bias. Although the response rate of 62% is consistent with other surveys of physicians, it is possible that the nonrespondents had different experiences and opinions regarding oral health in pediatric practice. Second, in an effort to provide a more desirable response, respondents may have overestimated the frequency with which they participate in oral health preventive activities in their practices. In addition, some questions asked for providers' perceptions and their responses may not represent patients' actual experiences. Finally, this survey was kept as short as possible, but this limited the use of open-ended questions and the ability to probe participants' responses for greater detail.

CONCLUSION

Access to dental care and unmet dental health needs are serious and underaddressed problems for poor and minority children in the United States. In promoting preventive oral health, pediatricians benefit all children and particularly the underserved. We know of 2 states, Washington and North Carolina, that have acknowledged, through the provision of reimbursement, that pediatricians have a unique opportunity at well-child care visits to provide caries prevention counseling and care to poor children.

Based on results of this survey, we believe it bodes well for expanding pediatrician involvement in oral health into other states. Specifically, we found that pediatricians overwhelmingly believe that they have an important role and are already involved in the providing anticipatory guidance on oral health issues. However, lack of up-to-date information and knowledge as well as the difficulty pediatricians perceive in referring some patients for professional dental care call into question the current level of effectiveness in promoting oral health of pediatricians. We offer several recommendations to begin the dialogue on expanding the role of pediatricians in preventive oral health:

1. Pediatricians will require adequate training in oral health in medical school, residency, and in continuing education courses. We recommend adding a module on oral health and dental care to the undergraduate medical school physical examination skills courses and an oral health rotation to pediatric residency curriculums. Having dental professionals provide such instruction would enhance acquisition of hands-on skills and could encourage future professional collaboration and cross-referrals.
2. Pediatricians will require current information and guidelines on preventive dental care. With the exception of *Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents*,[8] very little is available to guide pediatricians in the promotion of oral health in their practices. The AAP publication, *Guidelines for Health Supervision*,[9] provides cursory oral health advice limited to fluoride supplementation and dental referral. The scientific literature aimed at pediatricians is also limited. A recent Medline search of the 3 commonly read pediatric journals identified <20 articles with a primary focus on oral health published in the last 10 years.
3. Pediatricians must be ensured that all of their patients, Medicaid and uninsured included, can receive timely preventive and restorative dental care. Pediatricians can expand their involvement in oral health prevention, but they can never replace the care that dental professionals provide. Further dialogue with our dental colleagues and joint advocacy efforts by the AAP and AAPD are needed to address the serious problem of disparities in access to dental care.
4. Pediatricians will require sufficient resources if they are to successfully assume greater involvement in oral health-related activities. Time pressures and inadequate staffing will make it difficult for pediatricians to devote the attention to oral health that all children deserve.

ACKNOWLEDGMENTS

Charlotte Lewis received funding from the Robert Wood Johnson Clinical Scholars Program to complete this study.

We thank Joann Elmore, Tom Koepsell, David Grembowski, Peter Milgrom, Wendy Mouradian, and the University of Washington Clinical Scholars for their advice and guidance; Michelle Perez for her assistance in conducting the survey; and Margaret Mitchell for her administrative support.

REFERENCES

1. Edelstein BL. Evidence-based dental care for children and the age 1 dental visit. *Pediatr Ann*. 1998;27:569–574
2. Press Release. Results of National Oral Health Survey. National Institute of Dental Research, National Institutes of Health, Department of Health and Human Services; March 11, 1996
3. Kelly M, Bruerd B. The prevalence of baby bottle tooth decay among two native American populations. *J Public Health Dent*. 1987;47:94–97
4. Vargas CM, Crall JJ, Schneider DA. Sociodemographic distribution of pediatric dental caries: NHANES III, 1988–1994. *J Am Dent Assoc*. 1998; 129:1229–1238
5. General Accounting Office. Oral health: dental disease is a chronic problem among low-income populations. Available at: http://www.gao.gov. Accessed May 19, 2000
6. Office of Inspector General. *Children's Dental Services Under Medicaid*. Washington, DC: Department of Health and Human Services; 1996
7. Helfenstein U, Steiner M. Fluoride varnishes (Duraphat): a meta-analysis. *Commun Dent Oral Epidemiol*. 1994;22:1–5
8. Green M, ed. *Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents*. Arlington, VA: Maternal and Child Health Bureau, National Center for Education in Maternal and Child Health; 1994
9. American Academy of Pediatrics. *Guidelines for Health Supervision III*. Elk Grove, IL: American Academy of Pediatrics; 1997
10. Salant P, Dillman DA. *How to Conduct Your Own Survey*. New York, NY: John Wiley and Sons, Inc; 1994
11. Li Y, Caufield PW. The fidelity of initial acquisition of mutans streptococci by infants from their mothers. *J Dent Res*. 1995;74:681–685
12. American Academy of Pediatrics, Committee on Nutrition. Fluoride supplementation for children: interim policy recommendations. *Pediatrics*. 1995;95:777
13. Erickson PR, Thomas HF. A survey of the American Academy of Pediatric Dentistry membership: infant oral health care. *Pediatr Dent*. 1997;19:17–21
14. Koranyi K, Rasnake LK, Tarnowski KJ. Nursing bottle weaning and prevention of dental caries: a survey of pediatricians. *Pediatr Dent*. 1991;13:32–34
15. Sanchez OM, Childers NK, Fox L, Bradley E. Physicians' views on pediatric preventive dental care. *Pediatr Dent*. 1997;19:377–383
16. Gift HC, Milton B, Walsh V. Physicians and caries prevention: results of a physician survey on preventive dental services. *JAMA*. 1984;252: 1447–1448
17. Berkowitz RJ, Jones P. Mouth-to-mouth transmission of the bacterium *Streptococcus mutans* between mother and child. *Arch Oral Biol*. 1985;30: 377–379
18. Slavkin HC. First encounters: transmission of infectious oral diseases from mother to child. *J Am Dent Assoc*. 1997;128:773–778
19. Berkowitz R. Etiology of nursing caries: a microbiologic perspective. *J Public Health Dent*. 1996;56:51–54
20. Caufield PW, Cutter GR, Dasanayake AP. Initial acquisition of mutans streptococci by infants: evidence for a discrete window of infectivity. *J Dent Res*. 1993;72:37–45
21. Waldman HB. More children are unable to get dental care than any other single health service. *ASDC J Dent Child*. 1998;65:204–208
22. General Accounting Office. Factors contributing to the low use of dental services by low-income populations. September 2000. Available at: http:/www.gao.gov. Accessed: October 11, 2000
23. American Academy of Pediatrics. A guide to children's dental health. Available at: http://www.aap.org/family/dental.htm. Accessed: February 6, 2000

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Pediatrics 2000;106;e84
DOI: 10.1542/peds.106.6.e84