

Scientific Article

Infant Oral Health Care: A Survey of General Dentists, Pediatric Dentists, and Pediatricians in Virginia

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Abstract: ***Purpose:** This study's purpose was to examine the current knowledge, attitudes, and experiences related to infant oral health for dental and medical providers in Virginia. **Methods:** A survey of infant oral health care was sent to: (a) 300 randomly selected general dentists; (b) 300 randomly selected pediatricians; and (c) all pediatric dentists in Virginia. Survey respondents were tabulated, and percent frequency distributions for responses to each item were computed. **Results:** The survey's return rate was 48%. A total of 100% of pediatric dentists treated infants and were more likely to recommend that children be seen by age 1 year ($P < .001$). All pediatricians treated infants as well, while only 5% referred for the first dental visit by 1 year of age. Forty-five percent of general dentists surveyed treated infants, and only 12% referred for the first dental visit by 1 year of age. The logistic regression results indicated that there were differences between practitioner type regarding the recommended age of the first dental visit and years in practice. **Conclusions:** The majority of pediatricians and general dentists are not advising patients to see the dentist by 1 year of age. There is a need for increased infant oral health care education in the medical and dental communities. (Pediatr Dent 2008;30:) Received March 7, 2007 / Last Revision May 4, 2007 / Revision Accepted May 5, 2007.*

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Early childhood caries (ECC) has been reported by the Centers for Disease Control and Prevention to be the most prevalent infectious disease among US children. Dental caries is 5 times more common than asthma and 7 times more common than hay fever in children.¹ Decay of the primary teeth can: (1) affect children's physical development; (2) lead to malocclusion; and (3) result in significant pain and potentially life threatening facial swellings.

Unfortunately, caries in children can progress very rapidly in only 6 to 12 months, requiring intervention in a very short time span.² The persistent problem of ECC has spurred the dental profession to adopt the concept of the dental home. This concept was originally developed by the American Academy of Pediatrics (AAP), with the idea that the medical care of infants, children, and adolescents ideally should be accessible, continuous, comprehensive, family centered, coordinated, compassionate, and culturally effective. It should be delivered or directed by well-trained physicians who provide primary

care and help to manage and facilitate essentially all aspects of pediatric care. The physician should be known to the child and family and should be able to develop a partnership of mutual responsibility and trust with them.³

The concept of the dental home is to establish an early relationship between a family and a dental practitioner from whom the family will receive preventive instruction, dental care, counseling, and anticipatory guidance.^{4,5} The establishment of a dental home for children in their first year of life is important for promoting the early detection of high risk individuals and the prevention of dental disease—thereby decreasing the incidence of ECC.

The American Academy of Pediatric Dentistry (AAPD) and the American Dental Association (ADA) advocate that children should be seen by a dentist for dental screening as early as 6 months of age and no later than 6 months after the first tooth erupts, or 12 months of age.⁵⁻⁷ This first dental visit encourages parents to establish a dental home and allows the dentist to use anticipatory guidance to reduce the risk for caries and gingival disease. Anticipatory guidance is an interactive tool that incorporates developmental milestones and functional considerations into caries prevention. This allows the risk for oral conditions of each individual patient to be addressed and includes caregivers in the anticipatory guidance process.^{4,7,8} Typically the 1-year dental visit allows the dentist to examine the child and educate parents about: (1) effective home care; (2) diet; (3) injury prevention; and

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(4) fluoride needs. This first dental visit embraces the importance of early intervention with optimal preventive strategies.

Pediatricians have increased access to new mothers and children 6 to 12 months of age by seeing them regularly for "well child" visits. Therefore, they have an opportunity to directly impact infant oral health care. The AAP has realized the severe problem ECC poses and has recently changed its policies regarding the first dental visit. In 2002, the AAP revised its policy statement and lowered the age of the first dental visit from 3 years to 1 for all children, and as early as 6 months old for children at high risk for dental disease.⁹ The AAP now advocates that all infants receive an oral health risk assessment by 6 months of age using the caries risk assessment tool developed by the AAPD,¹⁰ whose goal is to identify high-risk individuals and refer these individuals for immediate dental intervention.

Medical and dental communities, both separately and in combination, are trying to prevent or at least reduce the effects of oral disease. The policy is extremely new. The literature shows that the majority of children, whether private or publicly insured, are not seeing the dentist by 1 year of age. The Medical Expenditure Panel Survey of 1996 found that 68% of children 18 months old and younger had never been seen by a dentist.¹¹ It is important to understand factors related to the low level of dental utilization for children under 3 years of age. Most likely, neither group understands the scope of dental disease in infants. There are 2 aspects of this issue that affect access to oral health care for infants: (1) pediatricians referring the child to the dentist early enough; and (2) dentists not accepting very young children as regular patients.

Studies as recent as 2003 show that more than half of pediatricians (63%) do not recommend a dental visit until the third birthday.¹² According to the AAPD in 1997, nearly 20% of pediatric dentists do not perform infant evaluations.¹³ To ensure that children can access needed care, there is an obligation for education and collaboration between the medical and dental community.

This study's purpose was to examine the current knowledge, attitudes, and experiences related to infant oral health for both dental and medical providers in Virginia.

Methods

A survey was sent to: (a) 300 randomly selected general dentists; (b) 300 randomly selected pediatricians; and (c) all pediatric dentists in Virginia. The survey assessed their attitudes, experiences, and knowledge of infant oral health care. General dentists, pediatricians, and pediatric dentists were selected because each group shares the mission of providing care to the pediatric population.

The survey was field tested by a group of faculty members at Virginia Commonwealth University, Richmond, Va. The faculty members included: (1) pediatricians; (2) pediatric dentists;

(3) general dentists; (4) general dentists; and (5) a statistician to help identify problems or confusion in the survey. A final version of the survey was created from collected comments. This study was approved for human subjects by the Institutional Review Board of Virginia Commonwealth University.

A list of general dentists was obtained from the Virginia Dental Association (VDA). Similarly, the AAP provided a list of Virginia pediatricians. Lists of 300 pediatricians and 300 general dentists were randomly generated from the provided lists using the "random-generator" function in Microsoft Excel (Microsoft Corp, Redmond, Wash). A list of the 122 practicing pediatric dentists in Virginia was obtained from the AAPD. The 712 surveys sent out represented approximately 10% of all general dentists, 13% of all pediatricians, and 100% of all pediatric dentists in the state at the time of the survey.

All practitioners received an explanation of the study and were given the opportunity to ask questions. If the practitioner agreed to participate in the study, the survey was completed and returned in postage prepaid envelopes. Any responses from doctors who were retired or were not general dentists, pediatricians, or pediatric dentists were not included in the survey. Any written comments or multiple answers to questions were not included in the results. Doctors were given 30 days to respond to the survey. Due to the human subjects' confidentiality requirements, surveys were returned without unique individual identifiers. Therefore, after 30 days a second mass mailing was sent to all doctors with a note explaining the second mailing. Doctors were again given 30 days to respond to the survey. Any responses received after 2 months were excluded. Surveys were identically numbered for both mailings, so multiple responses from a single provider were excluded.

The survey presented a series of 17 questions: 7 multiple choice and 10 yes/no questions (Table 1). Participants were asked several yes/no questions regarding their routine infant oral health care protocol. In addition, demographic data, such as the practitioner's age, gender, and years of practice, were ascertained from the questionnaire. The study sample appeared to be demographically representative of the statewide population of providers, as noted in Table 1. Questionnaire responses were tabulated, and percent frequency distributions for responses to each item were computed. A bivariate analysis was completed for all items based on the percentages of responses and compared across the 3 subgroups (general dentists, pediatricians, and pediatric dentists). The percentage responding to each questionnaire item was compared using an exact chi-square test if cell frequencies were small or a Pearson chi-square test if the cell frequencies were adequate. Continuous variables, such as recommended age, were analyzed using analysis of variance. All tests were performed at $\alpha=.05$. A multivariable logistic regression was used to test practitioner type, gender, and years in practice simultaneously for the outcome of the recommended age of the first dental visit.

Table 1. BI-VARIATE ANALYSIS OF PRACTITIONER TYPE BY SURVEY RESPONSE FOR VIRGINIA PROVIDERS

Question	Response	General Dentist	Pediatrician	Pediatric Dentist	P-value
Do you treat children aged 0-36 months?	Yes	45%	100	100	<.001
	No	55%	0	0	
Do you evaluate proper oral development?	Yes	100%	100	99	1.00
	No	0%	0	1	
Do you examine for oral pathology?	Yes	56%	100	98	.44
	No	1%	0	2	
Do you examine for dental decay?	Yes	100%	100	95	.03
	No	0	0	5	
Do you give oral hygiene instructions?	Yes	98%	100	93	.01
	No	2%	0	7	
Do you give nutritional counseling?	Yes	84%	95	98	.004
	No	16%	5	2	
Do you evaluate fluoride needs?	Yes	95%	98	97	.56
	No	5%	2	3	
Do you discuss baby bottle decay risk?	Yes	100%	99	98	<.001
	No	0	1	2	
Do you educate parents about dental decay?	Yes	95%	96	59	<.001
	No	5%	4	41	
	All	46%	69	37	
	Most	33%	24	47	
Frequency of talking to parents about the first dental visit	Some	20%	8	14	<.001
	Never	1%	0	1	
	≤ 1 yr	12%	74	5	
	2 yrs	26%	24	17	
Recommended age a child go for their first dental visit	3 yrs	49%	1	69	.006
	> 3 yrs	13%	1	9	
	Pediatrician	6%	2	23	
	Dentist	17%	18	2	
Who is responsible for infant oral health care?	Both	77%	80	75	.006
	10 yrs	17%	18	27	
	10-20 yrs	25%	27	26	
Number of Years in Practice	20-30 yrs	35%	46	27	<.001
	> 30 yrs	25%	9	20	
	Female	11%	33	48	
Gender	Male	89%	67	52	

* P-values generated with Pearson's Chi-square

Results

Of the 712 surveys sent, 379 surveys were returned for a response rate of 53%. The return rate was: (a) 128 (43%) for general dentists; (b) 121 (40%) for pediatricians; and (c) 93 (83%) for pediatric dentists. A total of 37 surveys were eliminated:

- a. 32 because the practitioners indicated that they were specialists in an area other than general dentistry, pediatrics, or pediatric dentistry; and
- b. 5 because the practitioners indicated they were retired or no longer in clinical practice.

The number of total usable surveys was 342 out of 712 for an overall response rate of 48%.

Bivariate analysis. Survey responses were compared among the 3 practitioner types. Tabulated responses are listed in Table 1. Practitioners were first asked if they treat children 0 to 36 months old in their office. All pediatricians and pediatric dentists (100%; $P<.001$) responded yes to this question. Only 45% of general dentists responded yes to treating children 0 to 36 months of age with 55% reported not treating this age group.

Practitioners who treated children 0 to 36 months old in their office were asked what was included in a routine infant checkup. General dentists (100%), pediatricians (99%), and pediatric dentists (100%) similarly reported providing evaluations of proper oral development. Likewise, almost all general dentists (98%), pediatricians (98%), and pediatric dentists (100%) examine for oral pathology. There was some evidence that fewer pediatricians examine for dental decay (95%) than general dentists (100%) or pediatric dentists (100%; $P=.03$).

Fewer pediatricians provide oral hygiene instructions (93%) than general dentists (98%) or pediatric dentists (100%). Fewer general dentists (84%) provide nutritional counseling than pediatricians (98%) or pediatric dentists (95%; $P=.004$). All practitioners were found to evaluate fluoride needs equally (95%-98%). In addition, all practitioners discuss the risk of baby bottle decay equally (98%-100%). Fewer pediatricians (59%) provide parent education regarding dental decay ($P<.001$) than do general dentists (95%) or pediatric dentists (96%).

There was also a difference in the pattern of the frequency of talking to parents about an infant's first dental visit ($P<.001$). Pediatricians reportedly speak to parents predominantly "all of the time" or "most of the time" (84%) regarding the first dental visit. Pediatric dentists also reportedly talk to parents about an infant's first dental visit predominantly "all of the time" or "most of the time" (93%). Compared to the pediatricians and pediatric dentists, a smaller proportion of general dentists reported talking to parents about the first dental visit "all of the time" or "most of the time" (79%).

There were clear differences in the practitioner types regarding the recommended age for a child's first dental visit. Seventy-four percent of pediatric dentists recommended that children be seen within the first year. Only 12% of general dentists and 5% of pediatricians made this recommendation ($P<.001$). By contrast, 49% of general dentists and 69% of pediatricians recommended that a child's first dental visit occur by 3 years of age. Using Tukey's honestly significant difference test, there was no significant difference between the mean age recommended by general dentists (2.64 years) and pediatricians (2.83 years) for the first visit. There was a significant difference between each of these two and the pediatric dentists' mean recommended age (1.29 years).

Practitioners were asked who was primarily responsible for infant oral health care. The majority of practitioners (77% of general dentists, 75% of pediatricians, and 80% of pediatric dentists) responded that both dentists and pediatricians were responsible for infant oral health care. Seventeen percent of general dentists and 18% of pediatric dentists felt that only dentists were responsible. Correspondingly, 23% of pediatricians felt that only pediatricians were responsible.

Survey responses for each practitioner type were then analyzed according to gender differences and years in practice. There was a gender difference in the practitioner types with the majority of practitioners being males: 89% of general, 67% of pediatric dentists, and 52% of pediatricians ($P<.001$). There was some evidence that general dentists were older, with more mean years in practice than the pediatricians or pediatric dentists ($P=.006$).

Multivariate analysis. In evaluating the responses for the recommended age of the first dental visit, multivariable logistic regression was used to simultaneously test: (1) practitioner type; (2) gender; and (3) years in practice. The logistic regression results (Table 2) indicate that there were differences among the practitioner types regarding the recommended age of the first dental visit ($P<.001$) and years in practice ($P=.047$). There was no evidence of a gender effect for the recommended age of the first dental visit. ($P=.56$). For the general dentists and pediatric dentists groups, it appeared that practitioners in practice for fewer years or who more recently trained were more likely to recommend the 1-year dental visit than dentists in practice longer (see Figure 1). Among the pediatricians, the number of years in practice did not result in a difference in recommendation.

Table 2. LOGISTIC REGRESSION RESULTS COMPARING THE EFFECT OF VIRGINIA PRACTITIONER TYPE AND THE NUMBER OF YEARS IN PRACTICE ON THE RECOMMENDED AGE OF FIRST DENTAL VISIT BEING 1 YEAR

Practitioner Type	Recommended Age of First Dental Visit (%)		Odds Ratio	95% Confidence Interval	P-value
	1 year	other			
Pediatric Dentist	73	27	1.00		<.001
General Dentist	12	88	.04	.02 - .09	
Pediatrician	5	95	.02	.01 - .04	
Years in Practice (per 10 years)			.71	.03 - .94	.047

The summary statistics were then created for 6 groups formed by these 2 classification variables (practitioner type and years in practice), as shown in Table 3. If years in practice is dichotomized to <25 years and ≥ 25 years, then this split was significant. Using Tukey's honestly significant difference test, there was no significant difference between the general

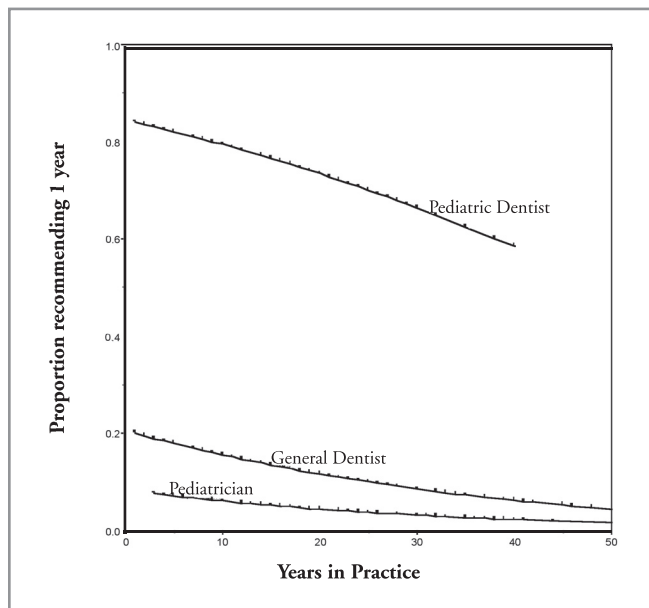


Figure 1. Relationship between years in practice and the proportion recommending the 1-year dental visit, separately for each practitioner group in Virginia.

Table 3. COMPARISON OF AVERAGE RECOMMENDED AGE FOR FIRST DENTAL VISIT BY PRACTICE YEARS WITHIN VIRGINIA PRACTITIONER GROUPS

Practitioner Group	Years in Practice	Recommended Age of First Dental Visit		
		Mean	SD	1 year
General Dentist	<25 years	2.51	0.91	17%
	≥25 years	2.84	0.76	4%
Pediatrician	<25 years	2.82	0.60	5%
	≥25 years	2.85	0.78	6%
Pediatric Dentist	<25 years	1.19	0.40	81%
	≥25 years	1.47	0.71	60%

practitioners’ average recommended age (2.66 years) and that of the pediatricians (2.88 years), but there was a significant difference ($P=.01$) between each of these two and the pediatric dentists (1.32 years).

Discussion

The AAP, AAPD, and ADA all agree that the key to improving infant oral health care and preventing ECC is earlier dental screenings.^{6,9,11} Current research shows, however, that most children are not seeing a dentist by 1 year of age.^{2,11,12} Results from this research suggest that: (1) pediatricians and general dentists are not advising patients to see the dentist by 1 year of age; and (2) concurrently, dentists are not treating patients at 1 year of age. With two thirds of the pediatric population suffering from dental caries by 5 years of age this presents a serious access-to-care issue for pediatric dental care.^{2,14}

Traditionally, the AAP had recommended seeing a dentist by the age of 36 months. In the last 2 years, however, the AAP has changed and expanded its oral health guidelines.⁹ Previously, the AAP focused its oral health policies on fluoride usage and breast-feeding. Only recently are there any policy statements regarding: (1) oral hygiene; (2) diet; (3) visits to the dentist; and (4) ECC. This recent AAP policy aims to establish a dental home for children by 1 year of age through the use of oral health risk assessments at 6 months of age and “referring a child for an oral health examination by a dentist who provides care for infants and young children 6 months after the first tooth erupts or by 12 months of age.” Only 5% of pediatricians surveyed, however, recommended that a child visit the dentist by 1 year of age. Over two thirds of pediatricians (69%) recommended children go for their first dental visit at 3 years of age, and 9% tell parents to wait until their children are older than 3 years of age.

If 100% of the pediatricians surveyed see patients at 0-12 months of age and 95% of pediatricians are not recommending the 1-year dental visit, there is a significant gap in the awareness of caregivers about when to initiate dental care for their children. Furthermore, a study of pediatricians regarding pediatric preventive dental care concluded that respondents received ≤2 hours of preventive dental education during medical and specialty training.¹⁵ Given the newness of the policy changes and the lack of oral health education in medical settings, barriers still exist to educate practicing pediatricians and those in training.

Similar issues are found on the dental side, with only 12% of general dentists following the ADA guidelines and recommending that patients go for their first dental visit by 1 year of age. Furthermore, only 2% of general dentists actually see children by 1 year of age. Over half of the general dentists surveyed (62%) recommended that children go for their first dental visit by 3 years of age or older. Eighty-nine percent of general dentists do not see patients in their office until 3 years of age or older. Survey results suggest that general dentists may not have received proper training or feel comfortable treating children. There are varying degrees of acceptance in teaching infant oral health in dental schools. The average dental school curriculum devotes 2 hours on infant oral health, and only 50% of dental schools provide any clinical experience treating the infant population.¹⁶ One study showed that: (1) as the patient age decreased, fewer general dentists were willing to provide treatment; and (2) the level of training received in dental school was significantly associated with their attitude to treating infants.¹⁷

While pediatric dentists may be more educated about the problems of ECC and infant oral health care than are general dentists, they are also falling short of the recommended guidelines. According to this survey, 26% of pediatric dentists do not follow the AAPD guidelines and instead recommend that children go for their first dental visit at 2 years of age or

older. Only 25% of pediatric dentists surveyed actually see children by 12 months of age.

The majority of practitioners (77% of general dentists, 75% of pediatricians, and 80% of pediatric dentists) agree that both the medical and dental communities are responsible for infant oral health care. Most children, however, are not being seen by dentists by 1 year of age and have greater access to pediatricians earlier in life. Pediatricians are the first and most frequent health care providers seen by infants and young children. They will see a well child perhaps 10 times before he or she is 3 years old.^{4,7} Pediatricians are in the position to make referrals to dentists and provide information about oral health care to parents. Statistics show that, if properly educated, pediatricians can educate parents and accurately identify patients in need of referral.¹⁸ In addition, general and pediatric dentists also need to be educated and understand the importance of assessing oral health and risk for dental disease in patients by 1 year of age and treat or refer appropriately if needed. It is important for the medical and dental community to work together to appropriately educate and train providers to be able to: (1) complete an oral health assessment; (2) provide risk assessment; and (3) provide preventive oral health services such as education and appropriate fluoride regimens.

The long-term approach is to increase the number of dental graduates with infant oral health care competency and pediatric dental specialists. This can be complemented in the short term by: (1) approaches to increase access for preschool-aged children; (2) continuing education courses training general dentists to treat young children; and (3) community organization activities to link families, physicians, dentists, and public programs such as Early Head Start and the Women Infant and Children Nutrition Program.

There are a few limitations of this study, including:

1. It was limited to one state and may not be representative of providers across the country.
2. A question was not included that directly asked whether or not the provider was aware of the AAPD/AAP guidelines on the first dental visit.
3. It did not directly address the barriers to access infant oral health care.

In summary, among pediatricians there is a need for increased infant oral health education and specific training on the provision of an oral assessment. General dentists need increased pediatric dental education concerning infant oral health care. Together, medicine and dentistry need to increase public awareness about the importance of the first dental visit and the establishment of a dental home to prevent early childhood caries.

Conclusions

Based on this study's results, the following conclusions can be made:

1. The majority of pediatricians and general dentists in Virginia are not advising patients to see the dentist by 1 year of age.
2. More recently trained dental practitioners are more likely to refer at 1 year of age for the first dental visit.
3. There is a need for increased infant oral health care education in the medical and dental communities to appropriately handle this infant population.

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