



Survey of Iowa General Dentists Regarding the Age 1 Dental Visit

Jenifer D. Wolfe, DDS¹ Karin Weber-Gasparoni, DDS, MS, PhD² Michael J. Kanellis, DDS, MS³ Fang Qian, PhD⁴

Abstract

Purpose: The purpose of this study was to assess Iowa general dentists regarding the age 1 dental visit.

Methods: A 15-item survey was mailed to 1,521 licensed dentists to address their knowledge, attitudes, and behavior regarding the age 1 dental visit. Chi-square statistics and logistic regression models were used to analyze data.

Results: Seven hundred fifteen (47%) useable surveys were returned from 2 mailings. Five hundred forty (76%) general dentists were familiar with the American Academy of Pediatric Dentistry (AAPD) age 1 dental visit recommendation. Most reported obtaining this information through continuing education (37%). Eleven percent believed the first dental visit should occur between 0 and 11 months of age, and 66% reported seeing children younger than 2. "Prefer to refer infants to a pediatric dentist" (20%) was the most common reason for not seeing children 0 to 23 months old. Bivariate and multivariate logistic regression analyses indicated that dentists who believed children should have their first dental visit at 0 to 23 months and those willing to see children at age 0 to 23 months were younger, more recent graduates, more likely to be female, aware of the AAPD recommendations, and were already seeing children 0 to 23 months.

Conclusions: The majority of Iowa general dentists are aware of the AAPD age 1 dental visit recommendation. (Pediatr Dent 2006;28:325-331)

KEYWORDS: FIRST DENTAL VISIT, KNOWLEDGE, BEHAVIOR, GENERAL DENTISTS

Received September 28, 2005 Revision Accepted February 8, 2006

The American Academy of Pediatric Dentistry's (AAPD) policy on the dental home states, "The AAPD encourages parents and other care providers to help every child establish a dental home by 12 months of age."¹ In Resolution 53H-2005, the 2005 American Dental Association (ADA) House of Delegates spelled out the definition of the dental home policy: "Dental home: The ongoing relationship between the dentist who is the primary dental care provider and the patient, which includes comprehensive oral health care, beginning no later than age 1, pursuant to ADA policy."² The goals of the early visit are to: (1) establish a dental home for the infant; (2) prevent Early Childhood Caries (ECC); and (3) introduce healthy habits to build upon. The visit should include: (1) an oral exam; (2) risk assessment; and (3) anticipatory guidance.³⁻⁵

It has been reported that earlier initial dental visits result in less decay and, therefore, decreased expenditures.^{6,7}

Nainar (1998) found that children who had their initial dental visit at 4 years of age or older had mean dmft scores twice that of children younger than age 4 who were seen.⁶ Conversely, Medicaid-enrolled preschool children who had an early preventive dental visit were more likely to use subsequent preventive services and experienced less dental related costs.⁷

The guideline on infant oral care was first adopted by AAPD in 1986. A decade later, however, only 47% of AAPD members reported seeing infants at or before age 1.⁸ A survey of AAPD members in 1996 found that 78% of respondents felt existing conditions, and not age, should be the reason for seeing these patients. Sixty-four percent felt parents don't see the value of year 1 dental visits.⁸ Iowa dentists have voiced similar reasons for noncompliance, including a lack of understanding of the need for a dental visit at age 1.⁹ Some of them simply prefer not to see very young children, primarily because of difficulties in managing the behavior of young children.⁹

A few studies have revealed the attitudes and practices of pediatric and general dentists regarding the age 1 dental visit. Erickson and Thomas (1997) reported that 73% of AAPD members agreed with the year 1 guideline, but only 47%

¹Dr. Wolfe was a resident, ²Dr. Weber-Gasparoni is assistant professor, and ³Dr. Kanellis is professor, all in the Department of Pediatric Dentistry, College of Dentistry, University of Iowa, Iowa City, Iowa; and ⁴Dr. Qian is adjunct assistant professor, Department of Preventive and Community Dentistry, College of Dentistry, University of Iowa. Correspond with Dr. Weber-Gasparoni at karin-weber@uiowa.edu

Table 1. Summary of Responses of Iowa General Dentists (N=715)

Variable	Mean±SD	
Practitioner's age	48±11	
Hours/wk practicing dentistry	34±6	
Year of graduation	1983±11	
Variable	Frequency	Valid %
Gender		
Male	598	84
Female	113	16
Familiar with AAPD age 1 dental visit recommendation		
Yes	540	76
No	173	24
Source of information (if familiar with AAPD age 1 dental visit recommendation)		
Continuing education	246	37
Dental school	183	27
Journal article	175	26
Study club	16	3
Residency program	8	1
Internet	4	1
Other	34	5
Belief regarding child's age for first dental visit		
Before age 1 (0-11 mos)	77	11
1 y (12-23 mos)	177	25
2 ys (24-35 mos)	188	26
3 ys (36-47 mos)	242	33
4 ys (48-59 mos)	26	4
≥5 ys (>60 mos)	3	1
See 0- to 23-month-old children		
Yes	472	66
No	241	34
Frequency of seeing 0- to 23-month-old children		
~≥1 child/wk	30	6
~1 child/mo	123	27
~1 child every 6 mos	190	41
~≤1 child/y	121	26

General dentists surveyed were less likely to recommend the year 1 dental visit.^{8,10} Approximately 6% of Indiana general dentists recommended that children have their first dental visit by 12 months of age compared to 52% of Indiana pediatric dentists.¹¹

Parental lack of knowledge and motivation is another complication with the year 1 dental visit. Survey data from the Iowa Fluoride Study population showed that of the 340 families surveyed, only 2% had taken their child for a dental visit by age 1, 11% by 2 years of age, and 31% by 3 years of age.¹² A study of kindergarten children in the Iowa City, Iowa, area during the 1999-2000 school year found that only 5% were seen by a dentist at age 1.¹³

It has been noted that dental care is the highest unmet health need of American children.¹⁴ The literature also reflects that lower-income children have the highest proportion of untreated decay.¹⁵ Often, these low-income children have their dental services covered by Medicaid plans. Kanellis et al found that few Medicaid-enrolled children in Iowa age 3 or younger received a dental exam in fiscal year 1994. Only 3% of 1-year-olds, 10% of 2-year-olds, and 27% of 3-year-olds enrolled in the program received an exam that year.¹⁶ The low utilization rate can be attributed to many factors, including intermittent enrollment and a transient population. Medicaid recipients in Iowa may also have trouble finding clinicians who will see them.¹⁶

When examining data collected concerning Iowa pediatric and general dentists in 1994, interesting data was found concerning the recommended age for the first dental visit.⁹ Only 11% of respondents recommended age 1 (0-23 months) for a first dental visit; 35% recommended a child be

seen by age 2 (24-35 months).⁹ Twenty-six percent of Iowa pediatric and general dentists were willing to see a child by age 1 (0-23 months).⁹ Because it has been 10 years since a

put it into practice.⁸ Similar results were found in a survey of Texas pediatric dentists.¹⁰ Both studies found that younger practitioners were more likely to agree with the guideline.

Table 1 Cont.

Variable	Frequency	Valid %
Reasons for not seeing 0- to 23-month-old children		
Prefer to refer infants to a pediatric dentist	143	20
Parents do not request appointments for children this young	111	15
Not comfortable seeing infants	98	14
Parents do not see the value of the first dental visit at 12 mos of age	83	12
Most children don't need dental care at age 1	76	11
Don't enjoy seeing infants	64	9
Not sure what to do at a visit for a 12-month-old or younger	62	9
Infants may disrupt my practice	21	3
My dental practice is too busy	7	1
It is not cost effective seeing infants	20	3
It is too time consuming seeing infants	13	2
It is the physicians' responsibility to perform infant oral health screenings	8	1
Youngest patient age willing to accept		
Before age 1 (0-11 mos)	247	36
1 y (12-23 mos)	112	17
2 ys (24-35 mos)	139	20
3 ys (36-47 mos)	141	21
4 ys (48-59 mos)	18	3
≥5 ys (>60 mos)	21	3

study was conducted concerning Iowa dentists and the age 1 dental visit, a new analysis is indicated.

Some changes have been made in the predoctoral pediatric dentistry curriculum at the University of Iowa, Iowa City, Iowa, to:

1. increase awareness about the importance of the age 1 dental visit; and
2. following a realization that dental students rarely provided care to children under the age of 4 during their dental education.

Currently, the format consists of 5 hours of didactic instruction in infant oral health care and a minimum of 5 hours of clinical experience—including one half-day rotation at the University of Iowa's Infant Oral Health Program at the Johnson County Department of Public Health WIC Clinic, Iowa City, Iowa.

The primary purpose of the current survey was to assess the attitudes, knowledge, behavior, and demographics of general dentists in the state of Iowa with regards to the age 1 dental visit. An additional purpose was to determine where knowledge about the age 1 dental visit was obtained.

Methods

This study was approved by the Institutional Review Board of the University of Iowa.

A survey instrument was designed to assess the awareness of Iowa general dentists concerning the age 1 initial dental visit. The survey comprised 15 questions related to demographics, knowledge, attitudes, behavior, and sources of information concerning the AAPD's and ADA's recommendation that a child have his or her first dental visit by age 1. The survey instrument was pretested by:

1. 2 faculty members in the University of Iowa's Department of Pediatric Dentistry;
2. 2 practicing pediatric dentists; and
3. 5 practicing general dentists.

Names and addresses were obtained from the Iowa Board of Dentistry for all state dentists with a current Iowa dental license. The 1,521 surveys were mailed in November 2004, along with a cover letter and a stamped self-addressed envelope. An additional mailing was sent to 846 nonrespondents 2 weeks later. Chi-square tests, nonparametric Wilcoxon rank-sum tests, and logistic regression models were used to analyze data using SAS software (SAS Institute, Cary, NC). All tests utilized a 0.05 level of statistical significance.

Results

Nine hundred three surveys were returned for a 59% response rate. One hundred eighty-eight surveys out of 903 total returned were excluded from analysis for the following reasons:

1. returned blank or partially filled out (21);
2. dentist practicing in another state (2); and
3. dental specialists (165).

Out of the total surveys sent (1,521), 715 useable surveys (47%) from general dentists were included in the analysis.

Selected demographics for Iowa general dentists who participated in this study (N=715) are found in Table 1. Seventy-six percent of reporting Iowa general dentists were familiar with the AAPD recommendations that a child should have his or her first dental visit no later than 12 months of age. Continuing education (37%), dental school (27%), and journal articles (26%) were the most cited information sources for the AAPD age 1 dental visit recommendation. It was found that most general dentists (34%)

Table 2. Bivariate Results for Dentist Characteristics and Belief Regarding Child's Age for First Dental Visit and Youngest Patient Age Willing to Accept into Practice (N=715)

Variable	Belief regarding child's age for first dental visit			Youngest patient age willing to accept		
	0-23 mos (N=254)	≥24 mos (N=459)	P value	0-23 mos (N=359)	≥24 mos (N=319)	P value
Years since graduation	16.3 (mean)	23.3 (mean)	<.0001*†	16.8 (mean)	24.7 (mean)	<.0001*†
Practitioner's age	43.9 (mean)	50.2 (mean)	<.0001 *†	44.3 (mean)	51.5 (mean)	<.0001*†
Gender						
Male	31%	69%	<.0001*‡	49%	51%	<.0001*‡
Female	58%	43%		73%	27%	
Hours/wk practicing dentistry	33.8 (mean)	33.6 (mean)	.3034†	34.4 (mean)	33.2 (mean)	.0034*†
AAPD knowledge						
Yes	42%	58%	<.0001*‡	60%	40%	<.0001*‡
No	15%	85%		30%	70%	
See 0- to 23-month-old children						
Yes	43%	57%	<.0001*‡	71%	29%	<.0001*‡
No	22%	78%		16%	84%	
Youngest patient age willing to accept						
0-23 mos	56%	44%	<.0001*‡			-
≥24 mos	13%	87%				
Belief regarding child's age for first dental visit						
0-23 mos	-	-	-	79%	21%	<.0001*‡
≥24 mos				59%	41%	

*P<.05.

†Wilcoxon rank-sum test.

‡Chi-square test.

believed children should make their first visit to the dentist at age 3 (36-47 months). While only 36% of general dentist respondents believed that children need to be seen before 2 years of age (0-23 months), 66% reported seeing children this young and 53% reported they were willing to accept them into their practice. The 3 most common reasons for not seeing children before 2 years (0-23 months) were:

1. "prefer to refer infants to a pediatric dentist" (20%);
2. "parents do not request appointments" (15%); and
3. "not comfortable seeing infants" (14%).

Bivariate analysis and multivariate logistic regression models were performed to determine the important variables related to the age 1 dental visit. All bivariate results that showed statistical significance ($P \leq .05$) were included in the model building for the multivariate logistic regression final model. Both forward and backward stepwise regression methods were used. This study assessed general dentists'

beliefs, knowledge, behavior, and intentions (willingness) towards the age 1 dental visit. Accumulated evidence suggests that people's beliefs and intentions are reliable predictors of behavior. While knowledge does not necessarily translate into behavioral change,¹⁷⁻¹⁹ however, only variables on general dentists' belief in the age 1 dental visit and willingness to accept young patients will be reported.

Based on the results of the bivariate analyses, the data provided evidence that there was no statistically significant difference in the dentists' belief in the child's age for the first dental visit and the number of hours per week practicing dentistry ($P = .3034$). There were, however, statistically significant differences regarding:

1. dentist's age ($P < .0001$);
2. year of graduation ($P < .0001$);
3. gender ($P < .0001$);
4. knowledge about the AAPD age 1 dental visit recommendation ($P < .0001$);

Table 3. Multivariate Logistic Regression Final Model Comparing Dentists Believing First Dental Visits Should Occur before 23 Months (N=254) vs after 24 months (N=459)*

Variable	Odds ratio (95% Wald confidence limits)	P value
Years since graduation: 0-23 mos vs ≥ 24 mos 16.3 vs 23.3 (mean yrs)	0.97 (0.95, 0.99)	.0004
Gender: Female vs male (58% vs 31%)	1.65 (1.01, 2.69)	.0466
Having knowledge of AAPD recommendations: Yes vs no (42% vs 15%)	2.42 (1.45, 4.06)	.0008
Youngest patient age willing to accept: 0-23 mos vs ≥ 24 mos (56% vs 13%)	5.88 (3.89, 8.87)	.0001

*Hosmer and Lemeshow's goodness-of-fit test ($P=.8784$).

Table 4. Multivariable Logistic Regression Final Model Comparing Dentists Willing to See 0- to 23-month-old Children (N=359) vs ≥ 24 -month-old Children (N=319)*

Variable	Odds ratio (95% Wald confidence limits)	P value
Years since graduation: 0-23 mos vs ≥ 24 mos (18.9 vs 24.5; mean years)	0.95 (0.93, 0.97)	.0001
Belief in age of the first dental visit: 0-23 mos vs ≥ 24 mos (79% vs 59%)	6.46 (4.01, 10.41)	.0001
Having knowledge of AAPD recommendations: Yes vs no (71% vs 53%)	2.07 (1.29, 3.33)	.0027
See 0- to 23-month-old children: Yes vs no	11.78 (7.34, 18.93)	.0001

*Hosmer and Lemeshow's goodness-of-fit test ($P=.2789$).

5. practice of seeing infants at age 0 to 23 months ($P<.0001$); and
6. the youngest age of patients the general dentist was willing to accept ($P<.0001$).

The results indicated that—compared to those who believed that children should have their first dental visit at age 2 or older (Table 2)—dentists who believed that children should have their first dental visit at 0 to 23 months were:

1. younger (mean age= 43.9 ± 11.2);
2. more recent graduates (mean years since graduation= 16.3 ± 11.2);
3. females (58%);
4. knowledgeable about the AAPD recommendation (42%);
5. seeing 0- to 23-month-old patients (43%); and
6. willing to accept 0- to 23-month-old patients into their practice (56%).

The logistic regression models regarding the dentists' belief in age for the child's first dental visit indicated that the statistically significant predictor variables were:

1. gender;
2. years since graduation from dental school;
3. knowledge of AAPD recommendation; and
4. willingness to accept patients 0 to 23 months old.

The data indicated that the following were significantly more likely to believe that children should have their first dental visit at age 0 to 23 months compared to their counterparts (Table 3):

1. female dentists ($P=.0466$);
2. more recent graduates ($P=.0004$);
3. dentists with knowledge of the AAPD recommendation ($P=.0008$); and
4. dentists' willingness to accept young patients at age 0 to 23 months ($P<.0001$).

Female dentists were 1.65 times more likely than male dentists to believe the first dental visit should occur at a young age of 0-23 months. Those who were aware of the AAPD recommendation and those who were willing to accept young patients (0-23 months) were 2.42 and 5.88 times, respectively, more likely to believe children should be seen at age 0 to 23 months for their initial visit as their counterparts. The odds ratio for the dentists' belief in age for the child's first dental visit decreased by 3% for every 1 year the dentist was further from dental school graduation.

As for the dentists' willingness to accept young patients (0-23 months) in their practice, there were statistically significant differences regarding:

1. dentists' age ($P<.0001$);
2. year of graduation from dental school ($P<.0001$);
3. hours per week practicing dentistry ($P=.0034$);
4. gender ($P<.0001$);
5. belief in the child's age for the first dental visit ($P<.0001$);
6. knowledge of the AAPD's age 1 dental visit recommendation ($P<.0001$); and
7. the practice of seeing children at age 0 to 23 months ($P<.0001$).

The results indicated that—compared to those who were not willing to accept patients into their practice until they were age 2 or older (Table 2)—dentists who were willing to accept a young child (0-23 months) into their practice were:

1. younger (mean age= 44.3 ± 10.9);
2. more recent graduates (mean years since graduation= 16.8 ± 10.7);
3. practicing dentistry more hours per week (mean hours per week practicing dentistry= 34.4 ± 6.0);
4. females (73%);
5. knowledgeable about the AAPD recommendation (60%);
6. seeing children 0 to 23 months old (71%); and
7. of the belief that children should have their first dental visit at age 0 to 23 months (79%).

When multiple logistic regression models were used to identify variables associated with willingness to accept young patients (0-23 months), they indicated that the statistically significant predictor variables (Table 4) were:

1. years since graduation from dental school;
2. belief in the child's age for the first dental visit;
3. knowledge of AAPD recommendation; and
4. experience of seeing infants at age 0 to 23 months.

The data indicated that the following were significantly more likely to be willing to accept the young patients at age 0 to 23 months in their practice compared to their counterparts:

1. more recent graduates ($P<.0001$);
2. dentists who believe that the first dental visit should occur at 0 to 23 months old ($P<.0001$);
3. dentists knowledgeable of the AAPD recommendation ($P=.0027$); and
4. dentists who practice seeing children at age 0 to 23 months ($P<.0001$).

Dentists who believed that children should have their first dental visit at 0 to 23 months old were 6.46 times more likely to be willing to see a young patient (age 0-23 months) compared with their counterparts. Those who were aware of the AAPD age 1 dental visit recommendation and who were seeing children 0 to 23 months old were 2.07 and 11.78 times, respectively, more likely to be willing to accept children 0 to 23 months old. For every year further from dental school graduation, a dentist was 5% less likely to be willing to accept children 0 to 23 months old in their practice.

Discussion

Significant improvements have been made over the last 10 years regarding the age 1 dental visit in Iowa. Comparing data concerning Iowa general dentists from 1994¹⁵ to this current study, it was found that, in 2004 a higher percentage of Iowa general dentists (36%) believe children should be seen for their first dental visit before age 2 compared to only 11% in 1994. The same trend is observed regarding the general dentists' willingness to accept 0- to 23-month-old patients into their practice (53% currently vs 26% in 1994; Table 5).

Some studies have focused on the practices, attitudes, and beliefs of pediatric dentists regarding the care of the young dental patient.^{8,10,20} The literature is scarce, however, when considering the age 1 dental visit among general dentists. One study of interest by Henderson et al surveyed

Table 5. Comparison of Iowa's Current and 1996 Surveys

Belief regarding child's age for first dental visit	Damiano et al 1996 cumulative %	Current 2005 survey cumulative %
1 (0-23 mos)	11	36
2 (24-35 mos)	35	62
3 (36-47 mos)	84	84
4 (48-59 mos)	87	96
≥5 (>60 mos)	100	100
Youngest patient age willing to accept	Damiano et al 1996 cumulative %	Current 2005 survey cumulative %
1 (0-23 mos)	26	53
2 (24-35 mos)	47	74
3 (36-47 mos)	82	95
4 (48-59 mos)	90	98
≥5 (>60 mos)	100	100

Indiana pediatric dentists and general dentists and found that 25% of general dentists recommended an initial appointment under 25 months of age.¹¹ Thirty-six percent of Iowa general dentists in the current study believed that most children should make their first dental visit by 23 months of age. This slight increase, compared to the Indiana study, may be due to the fact that the AAPD age 1 dental visit recommendation had been released 10 years earlier than when the Iowa dentists were surveyed.

The current study found that female dentists were more likely than male dentists to believe the first dental visit should occur at a young age of 0 to 23 months. It is not clear, however, whether this difference is due to gender or the fact that a higher percentage of female graduates responding to the survey were considered "recent graduates" compared to their male counterparts. The study found that more recent graduates were more likely to believe the first dental visit should occur between 0 to 23 months of age and were more likely to be willing to see young patients (0-23 months old). All survey respondents who graduated between 1945 and 1975 were males. The oldest female graduate to respond to the survey graduated from dental school in 1975.

Further advances can be made in the area of educating the general dentists concerning the age 1 dental visit. Continuing education, dental school, and journal articles were the most cited methods for educating Iowa general dentists about the AAPD age 1 dental visit recommendations. Education along these avenues should continue to be encouraged. It is also important, however, to point out the continued need to include early dental intervention in the predoctoral curriculum to hopefully better prepare future general dentists to provide care to infants and toddlers.

This study was subject to the inherent limitations of survey studies that rely on self-reported data collection.

These limitations include:

1. intentional deception;
2. poor memory;
3. misunderstanding questions; and
4. possible differences between respondents and nonrespondents in:
 - a. knowledge;
 - b. attitude; and
 - c. behavior.

This study's findings represent the attitudes, knowledge, and behavior of Iowa general dentists regarding the age 1 dental visit and may not be generalized to other populations.

Conclusions

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

1. The majority of Iowa general dentists (76%) are aware of the American Academy of Pediatric Dentistry's (AAPD) age 1 dental visit recommendations.
2. Continuing education, dental school, and journal articles were the most cited resources regarding the AAPD age 1 dental visit recommendations.
3. Iowa general dentists have made improvements over the last 10 years regarding the age 1 dental visit recommendations.
4. There is still significant room for improvement regarding Iowa general dentist's beliefs, knowledge, behavior, and intentions concerning the age 1 dental visit.

References

1. American Academy of Pediatric Dentistry. Policy on the dental home. 2004-05 Reference Manual. 2004;26:8-19.
2. American Dental Association. House answers questions on access, quality of care. Available at: <http://www.ada.org/prof/resources/pubs/adanews/adanewsarticle.asp?articleid=1691>. Accessed January 31, 2006.
3. Croll TP. A child's first dental visit: a protocol. *Quintessence Int* 1984;15:625-637.
4. Nowak AJ, Warren JJ. Infant oral health and oral habits. *Pediatr Clin North Am* 2000;47:1043-1066.
5. Soxman J. The first dental visit. *Gen Dent* 2002;50:148-155.
6. Nainar S. Longitudinal analysis of dental services provided to urban low-income (Medicaid) preschool children seeking initial dental care. *J Dent Child* 1998;65:339-343.

7. Savage MF, Lee JY, Vann WF Jr. Early preventive dental visits: Effects on subsequent utilization and cost [abstract]. *Pediatr Dent* 2003;2:181-182.
8. Erickson P, Thomas H. A survey of the American Academy of Pediatric Dentistry membership: Infant oral health care. *Pediatr Dent* 1997;19:17-21.
9. Damiano PC, Kanellis MJ, Willard JC, Momany ET. *A Report on the Iowa Title XIX Dental Program*. Iowa City, Iowa: Public Policy Center and College of Dentistry, The University of Iowa; 1996.
10. Kendrick AG, McWhorter AG, Seal NS, Simpson HV. Texas pediatric dentists' attitudes toward practice issues and the role of the component society. *Pediatr Dent* 1996;18:433-439.
11. Henderson H, Dean J, Hatcher E. Indiana Infant-Toddler Dental Care Survey. *J Indiana Dent Assoc* 1991;70:8-13.
12. Slayton RL, Kanellis MJ, Levy SM, Warren JJ, Islam M. Frequency of reported dental visits and professional fluoride applications in a cohort of children followed from birth to age 3 years. *Pediatr Dent* 2002;24:64-68.
13. Gastman DL, Kanellis MJ, Slayton RL, Warren JJ. *Factors Affecting the Timing of the First Dental Visit* [master's thesis]. Iowa City, Iowa: The University of Iowa; 2001.
14. Newacheck P, Hughes D, Hung Y, Wong S, Stoddard J. The unmet health needs of America's children. *Pediatrics* 2000;105:989-997.
15. Vargas C, Crall J, Schneider D. Sociodemographic distribution of pediatric dental caries: NHANES III, 1998-1994. *J Am Dent Assoc* 1998;129:1229-1238.
16. Kanellis MJ, Damiano PC, Momany ET. Utilization of dental services by Iowa Medicaid-enrolled children younger than 6 years old. *Pediatr Dent* 1997;19:310-314.
17. Kay E, Locker D. Effectiveness of oral health promotion: A review. Great Britain: Health Education Authority; 1997.
18. Sheppard BH, Hartwick J, Warshaw PR. The theory of reasoned action: A meta-analysis of past research with recommendations for modifications and future research. *J Consum Res* 1988;15:325-343.
19. Tedesco LA, Keffer MA, Fleck-Kandath C. Self-efficacy, reasoned action, and oral health behavior reports: A social cognitive approach to compliance. *J Behav Med* 1990;14:341-355.
20. McKnight Hanes C, Myers D, Davis H. Dentists' perceptions of selected characteristics of their child patients. *Pediatr Dent* 1994;16:268-271.

Copyright of Pediatric Dentistry is the property of American Society of Dentistry for Children and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.