

General Dentists' Referral of Children Younger Than Age 3 to Pediatric Dentists

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Abstract

Purpose: The purpose of this study was to assess which variables are associated with Iowa general dentists' referral of children younger than age 3 to pediatric dentists.

Methods: A survey was mailed to all Iowa general dentists (N=1,089). Respondents were asked how likely (never, sometimes, often, always) they were to refer children younger than age 3 to pediatric dentists in the past 12 months. Associations between referral patterns with practice, dentists', and patients' characteristics were determined.

Results: The adjusted response rate was 65%. Nearly 50% of all dentists reported often or always referring children younger than age 3. Dentists who referred were more likely to be males and to have been in practice longer. Dentists who perceived that they had not received adequate exposure to preschool children younger than age 3 in dental school were more likely to refer. Dentists with smaller percentages of children within their practices were more likely to refer. Dentists most often referred children who were uncooperative, had severe decay, or had special needs.

Conclusions: About one half of Iowa's general dentists refer children younger than age 3 to a pediatric dentist. Initiatives need to be undertaken to address dentists' reluctance to care for young children. (Pediatr Dent 2005;27:277-283)

KEYWORDS: REFERRAL PATTERNS, INFANT ORAL HEALTH EXAMS,
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Various professional associations, including the American Dental Association (ADA) and the American Academy of Pediatric Dentistry (AAPD), recommend that children receive their first dental visit around 12 months of age.^{1,2} Furthermore, federally mandated early and periodic screening, diagnosis, and treatment guidelines require that physicians refer all eligible children to a dentist based on the periodicity schedule of their particular state.³ While some states conform to the AAPD's policy,⁴ others have decided to stipulate a later age (usually 3 years of age).⁵ The early establishment of a dental home provides many advantages, such as the child becoming familiar with the dental environment in a non-threatening encounter, the provision of continuity of

treatment, and a better understanding of the risk factors within a family. Additional assessments, such as the child's exposure to fluoride and whether or not the child participates in nonnutritive sucking, should also be conducted at an early age for preventive measures.⁶⁻⁹

Nevertheless, many dentists are unwilling to care for very young children. Dentists' reluctance to treat children at age 1 may be a result of controversy as to whether the first year visit is necessary for all children. The American Academy of Pediatrics (AAP) and others only support the age 1 dental visit for those children who are perceived at a high risk for dental caries (eg, low socioeconomic background, children with special health care needs).^{7,10} Even within the dental community, there is disagreement regarding the timing of the first dental visit. Although national organizations, such as the ADA and the AAPD, profess the advantages of early dental visits, members within those organizations do not necessarily agree with the recommendation.

A national study found that only 15% of responding dentists felt that 12 months is an appropriate age for the first dental visit.¹¹ As a result, nearly 70% of general den-

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tists did not treat children 6 to 18 months old while 28% of general dentists did not treat children 19 months to 3 years old.¹¹ In Iowa, the percentage of dentists who felt that age 1 was an appropriate age for treatment was slightly higher at 26%,¹² yet only 11% of Iowa children in a longitudinal study had received a dental exam by age 2.¹³

It is imperative that young children are able to obtain care. Since general dentists constitute approximately 80% of the dentist workforce, they should be utilized to the maximum extent possible to provide dental care,¹⁴ especially since there is a shortage of pediatric dentists.¹⁵ If general dentists provided screenings, anticipatory guidance for healthy children, and even the basics of preventive and therapeutic care while referring children with more extensive needs to pediatric dentists, then perhaps more caregivers would access care for young children at an earlier age.

It is uncertain how changes in the dental workforce may influence young children's access to dental care. Nationally, the percentage of practicing female dentists is increasing.¹⁶ Studies have shown that female dentists tend to have more children in their practices compared to male dentists.^{17,18} This is important because Klooz and Lewis found that dentists with higher percentages of children in their practice were less likely to refer children to pediatric dentists.¹⁹ Berge, however, reported that female general dentists were more likely to refer adult patients to oral surgeons.²⁰ Furthermore, Atchison et al demonstrated that male and female general dentists' referral patterns varied by procedure.²¹ Thus, it is uncertain how general dentists' referral patterns may change as more female practitioners enter the profession.

The purpose of this study was to assess the percentage of Iowa general dentists who refer children younger than age 3 to pediatric dentists and to determine which variables were associated with referral.

Methods

A written survey was developed to assess the attitudes and practice patterns of all Iowa general dentists ($N=1,089$) toward the referral of children. The survey was based on the significant predictor variables found in the literature (eg, distance)¹⁹⁻²³ and expanded to include other predictor variables that had not previously been studied (eg, satisfaction with income). Prior to distribution, the survey was pilot tested for content and clarity. The 25-item survey, which was approved by the University of Iowa's Institutional Review Board, was first mailed in November 2003. A follow-up survey was mailed to nonresponders in December 2003.

A comprehensive list of all Iowa licensed general dentists was obtained from the Iowa Dentist Tracking System (IDTS). The IDTS serves as a statewide database that semiannually monitors dental practices by collecting practice and demographic information. Items utilized from the IDTS for the study included: (1) no. of hours worked per week; (2) prac-

tice type; (3) alma mater; (4) year of graduation; and (5) age and gender of the dentist. This information was also used to analyze nonresponse bias.

The primary dependent variable was the frequency with which dentists who accept children in their practice referred children to pediatric dentists. This was determined from the question "In the past 12 months, when children came to your practice requesting care, how likely were you to refer those children for care?" Referral pattern information was collected on children: (1) younger than age 3; (2) 3 to 5 years; and (3) 6 to 14 years of age. Because it was hypothesized that dentists who never or sometimes refer children would be different from dentists who often or always refer, the answers were collapsed into "never/sometimes" vs "often/always."

The primary predictor variable of interest in this study was gender. Associations between the frequency of referral of young children with practice and dentist characteristics were also evaluated. Additionally, referrals associated with patient characteristics were queried.

Data were double entered into a database and statistically analyzed using SAS 9 (SAS Institute, Inc, Cary, NC). Means and frequencies were calculated, and the distribution of variables was examined. Bivariate associations were determined with nonparametric tests (chi-square and Mann-Whitney) due to the abnormal distribution of the data. Generalized logistic regression was used to determine which variables were associated with the referral of children younger than age 3 to pediatric dentists. Significant variables ($P<.2$) at the bivariate level, as well as variables that were often cited in the literature (ie, distance),^{19,22,23} were included in a logistic model that used stepwise selection with inclusion criteria set at $P\leq.1$. Because it was assumed that the percentage of children in a dentist's office would be highly correlated with the likelihood to refer children younger than age 3, models were analyzed with and without this variable. Adjusted odds ratios, with 95% confidence intervals, were calculated for statistically significant variables ($P<.05$) found in the final models.

Results

Seven hundred twelve useable surveys were returned for an adjusted response rate of 65%. Comparisons demonstrated that responders were more likely to be University of Iowa graduates than nonresponders ($P<.01$). There were no statistically significant differences between responders and nonresponders in ownership status, hours worked per week, dentists' age, years since graduation, or gender.

Among responders, male dentists were more likely to be sole proprietors than female dentists (Table 1). On average, male dentists worked more hours per week. In contrast, female dentists had higher percentages of children within their practices. Male dentists tended to be older than female dentists, and male dentists had graduated longer ago.

There were some similarities between male and female respondents (Table 1). For example, nearly 50% of all den-

tists, regardless of gender, reported that their offices were located less than 10 miles from the nearest pediatric dentist to whom they referred. Furthermore, approximately one third of all dentists perceived that they had received

adequate exposure to children younger than age 3 in dental school.

Overall, 98% of dentists reported children within their practices. Nearly three quarters of male dentists and 50%

Table 1. Practice and Dentist Characteristics of Iowa General Dentists in the Study (N=712)

Predictor variable	N	Males (N=608)	Females (N=104)	P
Practice characteristics				
Ownership status				
Sole proprietor	462	69%	48%	<.01
Partner/co-owner	162	23%	26%	
Employee/associate	66	7%	23%	
Independent contractor	13	2%	9%	
Total no. of hours worked (mean hours)	712	36.0	33.3	<.01
Total percentage of children within the practice (mean percentage)	702	18.4	24.5	.01
Distance in miles of the nearest pediatric dentist to whom the general dentist refers				
<10	333	49%	50%	.39
11-25	82	11%	18%	
26-50	138	21%	16%	
>50	130	20%	16%	
Percentage of patients (adults and children) with public insurance within the practice				
0%	102	14%	21%	.57
1-5%	329	49%	38%	
6-25%	209	29%	35%	
26-50%	40	6%	2%	
51-75%	9	1%	2%	
>75%	4	1%	1%	
Dentist characteristics				
Age of dentist (mean ys)	712	50	40	<.01
Years since graduation (mean ys)	712	23	13	<.01
Primary income earner				
Myself	614	93%	52%	<.01
Spouse/significant other	34	2%	24%	
My spouse and I make the same amount of money	57	5%	24%	
Perceived adequate exposure to children <3 years in dental school				
Yes	249	36%	32%	.43
No	453	64%	68%	
Satisfaction with income				
Very satisfied	312	45%	41%	.58
Somewhat satisfied	327	46%	49%	
Somewhat unsatisfied	55	8%	7%	
Very unsatisfied	13	2%	3%	
Additional training beyond dental school (eg, AEGD/GPR)				
Yes	186	24%	31%	.18
No	526	76%	69%	

Table 2. Bivariate Analyses of the Likelihood to Refer Children Younger Than Age 3 to a Pediatric Dentist Based on Dentist and Practice Characteristics

Predictor variable*	N	Never/sometimes refer	Often/always refer	P
Gender†				
Males	581	48%	52%	<.0001
Females	100	69%	31%	
Total percentage of children within practices† (mean percentage)	671	21%	18%	<.01
Years since graduation† (mean ys)	678	19	23	<.01
Perceived adequate exposure to children 0-3 ys in dental school†				
Yes	236	59%	41%	<.01
No	436	46%	54%	
Primary income earner†				
Myself	590	50%	50%	.02
Spouse/significant other	32	75%	25%	
My spouse and I make the same amount of money	56	46%	54%	
Satisfaction with income†				
Very satisfied	301	56%	45%	.13
Somewhat satisfied	310	47%	53%	
Somewhat unsatisfied	54	43%	57%	
Very unsatisfied	13	46%	54%	

*Nonsignificant variables ($P \geq .2$) from the bivariate analyses included: distance of the nearest pediatric dentist to whom the general dentist refers, ownership status, the total percentage of patients with public insurance within the practice, the total number of hours worked per week, and additional training beyond dental school (ie, AEGD or GPR).

†Variables that were significant ($P < .2$) in the bivariate analyses and the literature were entered into the logistic regression model.

Table 3. Percentage of General Dentists Who Often or Always Refer Children Because of a Specific Patient Characteristic

	Among dentists who never/sometimes refer children <3 ys	Among dentists who often/always refer children <3 ys
Uncooperative patient	67%	89%
Severe decay	46%	69%
Special needs	39%	66%
Space management concerns	30%	44%
Trauma or infections	12%	27%
Parents are not patients of record	7%	14%
Insurance		
Private insurance	4%	17%
Public insurance	23%	37%
No insurance	4%	17%
Patient type		
Patient of record	2%	6%
Emergency patient	5%	16%

of female dentists, however, reported that children composed 20% or less of their practices. Among dentists who accept children, 52% of male dentists reported often or

always referring children younger than age 3, whereas 31% of female dentists reported the same (Table 2). Many other variables were also found to be significantly associated ($P < .2$) with the likelihood to often or always refer children younger than age 3 (Table 2).

Various patient characteristics were associated with general dentists' referral of children (Table 3). Nearly 90% of general dentists who often or always refer children younger than age 3 and 67% of general dentists who never or sometimes refer children younger than age 3 often or always referred uncooperative children. Dentists who often or always refer children less than 3 years old were also likely to often or always refer children due to severe decay and special needs. In contrast, fewer than 50% of dentists who never or sometimes refer children less than 3 years old often or

always referred children with these characteristics. Regardless of the frequency of referral for children less than 3 years of age, a higher percentage of general dentists often or always referred children with public insurance (Medicaid) compared to private or no insurance. The patient's status within the practice (patient of record vs emergency patient) had much less influence on dentists' likelihood to refer.

Multivariable analysis shows that 4 predictor variables were significantly associated ($P < .05$) with the frequency with which dentists refer children younger than age 3 (Table 4). Male general dentists were 89% more likely to often or always refer children younger than age 3 compared to female general dentists. General dentists who perceived that they had not received adequate exposure to children younger than age 3 while in dental school were 82% more likely to often or always refer, compared to general dentists who perceived that they had received adequate exposure. The odds of often or always referring children younger than age 3 to a pediatric dentist increased by a factor of 1.03 for each year since graduation. In contrast, the odds of often or always referring children younger than age 3 decreased by a factor of 0.98 for each 1% increase in the total percentage of children within the dental practice. There were no statistically significant interactions among the predictor variables. Running an alternative model without total percentage of children as a predictor variable provided the same significant predictor variables (gender, perceived adequate exposure to children younger than age 3, and years since graduation) in the final model, with very little difference in the odds ratios values.

Discussion

The finding that nearly 50% of general dentists often or always referred children younger than age 3 to pediatric dentists corroborates other research, which suggests that few general dentists, even those who treat children, are providing care to very young children.¹¹ If health care professionals are going to recommend that caregivers take children to dentists by 12 months, there needs to be a substantial increase in the number of general dentists who are willing to accept young children into their practices.

As more women enter the profession, very young children might have more access to care. Female general dentists had higher percentages of children within their practices than male general dentists, and females were more likely to maintain very young children in their practices. Consequently, Iowa female dentists may represent a better source of referral for physicians. These findings should be applied cautiously to other child age groups because Archison et al reported that there were no differences between male and female general dentists for the referral of stainless steel crowns or behavior management.²¹ Another consideration is that, on average, female dentists worked fewer hours. Although female dentists may be more willing to accept young children within their practices, it is important to consider the volume of patients that female dentists treat when assessing young children's ability to obtain care. As the percentage of female dentists in the workforce increases, the referral of very young children should continue to be explored and monitored.

Not only is the gender balance changing, the average age of dentists is increasing. Klooz and Lewis reported that older dentists are more likely to refer children.¹⁹ The present study reported the same finding. By 2010, more than 50% of dentists are expected to be 50 years of age or older,²⁴ which could represent a substantial increase in the likelihood to refer. Currently, the percentage of older female dentists is very small.²⁴ As female dentists mature it is uncertain how years since graduation will affect likelihood to refer among dentists—especially female dentists.

Dentists who feel adequately trained in treating children during dental school are more likely to care for children in their practices. Cotton et al found that "general dentists with hands-on training in infant oral health were comfortable managing the behavior of and enjoyed treating young children."²⁵ Seale and Casamassimo found that dentists who had received hands-on training coupled with lectures during dental school were more likely to treat children 1 to 3 years old.¹¹ This study found that dentists who perceived that they had not received adequate training pertaining to children younger than age 3 while in dental school were more likely to often or always refer to pediatric

Table 4. Final Logistic Model Associated With the Likelihood to Often or Always Refer Children Younger Than Age 3 by Iowa General Dentists (N=653)*

Predictor variable	Adjusted odds ratio	95% confidence interval	P
Gender			
Males vs females†	1.89	1.16, 3.11	.0108
Perceived adequate exposure to children <3 ys in dental school			
No vs yes†	1.82	1.31, 2.53	.0004
Ys since graduation	1.03	1.01, 1.04	.0014
Total percentage of children within the dental practice	0.98	0.97, 0.99	.0378

*Gamma=0.31.

†Reference group.

ric dentists. Because dentists' perceptions regarding their exposure to children may change over time, reported perceptions may reflect dentists' current willingness to care for children rather than serving as a true reflection of the education they received.

Nonetheless, dentists may currently be reluctant to care for children in private practice if they did not feel prepared to care for this group at graduation. Consequently, dental educators should consider the association between perceived exposure to very young children and the likelihood to refer when evaluating curricula. Additionally, predoctoral and continuing education initiatives should be developed to address dentists' reluctance to care for young children.

The finding that the percentage of children within the practice is associated with the likelihood to refer young children is consistent with other studies. Klooz and Lewis suggested that dentists who treat more children presumably like children and are less likely to refer.¹⁹ Cotton et al suggested that dentists who enjoy treating children are more likely to have properly equipped offices to treat children,²⁵ which could contribute to limited referrals. Sixty-nine percent of dentists in this study reported that children composed less than 20% of their practices. Given the large range of children within practices, the percentage of children within a practice could become an important influence on the likelihood to refer, especially as the number of female dentists increases.

Among dentists who never or sometimes refer children younger than age 3, two thirds often or always referred children who were uncooperative. While more than 84% of dentists routinely use tell-show-do or firm voice control for behavior management, dentists are more reluctant to use these techniques on young children.²⁵ Hence, the need to refer may increase. Dentists who reported hands-on educational experiences during dental school to children younger than age 3 were "significantly more likely to be comfortable managing the behavior of...Medicaid-enrolled children 3 years of age or younger ($P=.001$)."²⁵ Because a majority of dentists are likely to often or always refer children due to poor cooperation, even when they normally would not refer children younger than age 3, dental schools should try to maximize the amount of hands-on exposure that students receive with children younger than age 3.

In spite of its frequent reference among the literature,^{19,22,23} distance was not significantly associated with the likelihood to refer children younger than age 3. Perhaps distance's effect on referrals was masked by the strong associations of the other variables, many of which were not included in previous studies.

This study has certain limitations. The use of ordinal responses (never, sometimes, often, or always refer) is a limitation because the responses are subjective in their interpretation and they are only estimates, at best. Nonetheless, the findings are compelling enough to suggest that there were differences in referral patterns.

In spite of the reasonable response rate, nonresponse bias could exist. Because data were not available for nonresponders on every variable, it was not possible to perform nonresponse bias testing on some key predictor variables. This study's external validity could also be a limitation. Highly populated states with large urban areas may differ in the number and location of pediatric dentists, thus these results may not be applicable to those states. There are a number of states in the Midwest and throughout the country, however, that have similar rural/urban distributions where these results may be more applicable.

Conclusions

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

1. Nearly 50% of male dentists and 30% of female dentists reported often or always referring children younger than age 3 to pediatric dentists. Thus, many Iowa general dentists are not adhering to the ADA's and AAPD's recommended treatment guidelines.
2. Males, dentists who perceived that they had not received adequate exposure to children younger than age 3 as dental students, dentists who graduated longer ago, and dentists who had smaller percentages of children within their practices were more likely to often or always refer very young children.
3. It is imperative that general dentists become more willing and able to care for children younger than age 3. In the meantime, perhaps the dental community's recommendation should mirror the AAP's recommendation that only high-risk children receive dental exams by 12 months.

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