

Scientific Article

Perspectives of Board Certified Pediatric Dentists on Adding a Pediatric Oral Health Therapist to the Dental Team

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Abstract: Purpose: The purpose of this study was to determine the perspectives of board certified pediatric dentists regarding adding a pediatric oral health therapist/dental therapist to the dental team. **Methods:** A 27-item online survey was e-mailed to all diplomates of the American Board of Pediatric Dentistry. Questions assessed knowledge and opinions regarding the concept of a pediatric oral health therapist, as well as perspectives on the parameters under which such a person could practice. Survey results were tabulated and frequency distributions calculated. **Results:** Seventy-five percent of respondents had limited or no knowledge regarding the concept of a pediatric oral health therapist; 79% had limited or no knowledge regarding the use of dental therapists in Alaska. Seventy-one percent disagreed with adding a therapist to the dental team. Pediatric dentists practicing in the public sector were more knowledgeable and supportive. Sixty-six percent indicated they treated children with Medicaid/CHIP insurance. Of those, most disagreed that therapists would enable them to care for more children. **Conclusions:** Pediatric dentists are generally not knowledgeable regarding the role of therapists internationally. Nevertheless, the majority oppose adding such an individual to the dental team in the United States. (*Pediatr Dent* 2010;32:505-12) Received July 8, 2009 | Last Revision September 16, 2009 | Accepted September 17, 2009

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The disparities existing in oral health among children in the United States have been documented in *A Report of the Surgeon General*¹ and the *National Call to Action to Promote Oral Health*.² Oral health care has been identified as the most prevalent unmet health need of US children.³ Dental caries is the nation's most common childhood disease⁴; it affects 59% of 5- to 17-year-old children. Children lose 52 million hours of school each year due to dental problems,⁵ and poor children experience nearly 12 times as many restricted activity days from dental disease as do children from higher-income families.⁶ Eighty percent of the dental disease in children is found in 20% to 25% of children (approximately 20 million children).⁷ The prevalence and severity of dental disease are linked to socioeconomic status across all age groups.^{1,2}

Access to care is the opportunity to receive professional health care in order to improve health. The problem of access to oral health care for children is multidimensional, involving complex social, family, cultural, educational considerations, and barriers. The availability or lack of availability of dentists is a key consideration. Insurance coverage also is

an important consideration, including a lack of dental insurance, and a strong predictor of access to dental care. Children with no dental insurance are 3 times more likely to have an unmet dental need than their counterparts with either public or private insurance.¹ Children from families with incomes below 200% of the federal poverty level (FPL) are 3 times more likely to have unmet dental care needs as children from families at or above 200% of the FPL.³ While almost 90% of poor children have a usual source of medical care, and 74% of 19- to 35-month-old poor children receive all their vaccinations, only 22% of all children under age 6-years receive any dental care.⁸

While multiple barriers to access have been identified,^{1,9-11} dentists are among the more significant barriers to access for disadvantaged populations. The number, distribution, and practice orientation of dentists in the United States contribute to the inadequate access to care for children in greatest need. The dentist/population ratio is declining.^{12,13} Approximately 4,000 dentists graduate annually from the nation's colleges of dentistry,¹⁴ whereas between 2,500 to 4,300 are expected to leave the workforce annually between 1996 and 2021.¹ Therefore, there is a potential decline in the actual number of dentists, in the face of an expanding population. There are relatively few minority dentists compared to the size of the minority population.¹⁵ The overwhelming majority of dentists practice in suburbia, with few practicing in rural and inner city areas where children with the greatest need live. The

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number of federally designated shortage areas has increased from 792 in 1993 to 4,048 in 2008.¹⁶ As a result of the recent expansion of the Children’s Health Insurance Program (CHIP), 40 million (the majority) of America’s 78.6 million children are covered by public insurance.¹⁷ Fewer than 10% of dentists, however, provide any significant amount of care for individuals with public insurance.¹⁸

Nash has advocated adding a pediatric oral health therapist to the dental team as a means of improving access to care for American children and addressing the oral health disparities that exist among children.^{19,20} This proposed new dental team member is based on the model of the school dental nurse (now designated a dental therapist), which originated in New Zealand in 1921.²¹

Dental therapists in New Zealand are trained in a 2-year academic curriculum to provide basic dental care for children in a school dental service, with general oversight by district dental officers.^{19,20} New Zealand’s effectiveness in utilizing school dental nurses/therapists has been well-documented.²¹⁻²⁴ A recent study by Nash et al found that some form of the dental therapist/school dental nurse/pediatric oral health therapist exists in 53 countries, totaling 15,000 therapists.²⁵ Recently, dental therapy was introduced in the United States.²⁶

In 2005, 6 Alaskans returned from their training in dental therapy at the University of Otago School of Dentistry, Dunedin, New Zealand, to practice in Alaska villages. The quality of their care has been evaluated positively in 2 initial studies.^{27,28} Training of dental therapists in Alaska began in 2008.²⁹

The purpose of this study was to determine the perspectives of board certified pediatric dentists regarding the concept of adding a pediatric oral health therapist/dental therapist to the dental team.

Methods

A 27-item survey instrument was developed to query board certified pediatric dentists in the United States. The survey contained an introductory paragraph describing the international concept of dental therapists and their scope of practice. The survey was beta-tested for clarity by a group of board certified pediatric dentists. The survey was transferred to Survey Monkey, a proprietary, Web-based survey instrument (www.surveymonkey.com). An introductory letter describing the research and encouraging participation was developed and accompanied the Web link to the survey. The database of pediatric dentists, certified by the American Board of Pediatric Dentistry (1,673), was obtained from the American Academy of Pediatric Dentistry. No follow-up of nonrespondents was possible, as respondents to the online survey were anonymous. As a result, no characterizations of respondents vs nonrespondents was possible. The research methodology was approved by the Institutional Review Board of the University of Kentucky, Lexington, Ky.

Pediatric dentists were asked to answer questions regarding: their knowledge of the concept of a pediatric oral health therapist/dental therapist; their knowledge regarding the use of dental therapists in Alaska; their opinion regarding the addition of a therapist to the dental team in the United States; what therapist-provided clinical procedures they would support; what level of supervision such a person would require; whether or not their practice cared for children covered by Medicaid/CHIP insurance; and whether or not adding a therapist to the dental team would enable them to care for more publicly insured children. Participants who disagreed with adding a therapist to the dental team were not asked to answer the survey’s questions that assumed being in agreement with or neutral to the concept.

Practice characteristics were also obtained, including: years in practice; gender; type of practice (solo or group); setting of practice (private, academic, hospital, community health center, or public health setting); hours spent practicing/week; size of community; acceptance of public insurance; percentage of gross clinical services attributed to public insurance; and whether dental hygienists were employed in the practice.

	Total N (%)	Therapists should be added to dental team		
		Agree N (%)	Neutral N (%)	Disagree N (%)
	405 (100)	32 (8)	85 (21)	288 (71)
Practice characteristics				
Mean ys in practice (±SD)	15.7±11.1	19.0±12.6	15.0±11.0	15.6±10.9
Male gender	247 (61)	19 (59)	48 (57)	180 (63)
Practice style*				
Solo	152 (38)	6 (17)	34 (40)	112 (39)
Group	253 (62)	26 (81)	51 (60)	176 (61)
Practice setting†				
Private practice	349 (84)	22 (69)	61 (72)	260 (90)
Hospital	31 (7)	4 (13)	9 (11)	16 (6)
University	41 (10)	6 (19)	12 (14)	21 (7)
Public health setting	9 (2)	1 (3)	3 (4)	4 (1)
Community health center	14 (3)	1 (3)	4 (5)	8 (3)
Other	6 (1)	0 (0)	4 (5)	2 (1)
Hours spent in practice/wk*				
<10	14 (3)	3 (9)	6 (7)	5 (2)
11-20	33 (8)	5 (16)	18 (9)	20 (9)
21-30	76 (19)	8 (25)	13 (15)	55 (19)
31-40	243 (60)	13 (41)	51 (60)	179 (62)
>40	39 (10)	3 (9)	7 (8)	29 (10)
Dental hygienists*				
Yes	250 (62)	25 (78)	58 (68)	167 (58)
No	155 (38)	17 (22)	30 (32)	121 (42)

*P<.05.

† Variable had options of “choose all that apply,” so responses are not mutually exclusive.

Respondents were categorized based on their agreement or disagreement with the statement: “A pediatric oral health therapist should be added to the dental team in the United States.” Data were grouped by those who agreed, those who disagreed, and those who were neutral to the concept. Data were downloaded from Survey Monkey, and continuous variables were summarized with means and standard deviations. Categorical variables were described with counts and percentages. Comparisons between agreed, neutral, and disagreed were conducted with chi-square tests and analysis of variance for categorical and continuous outcomes, respectively. All statistical analyses were performed using SAS 9.1 (SAS Institute, Inc., Cary, NC). Differences were considered statistically significant at $P < .05$.

Results

Of the 1,673 surveys e-mailed to board diplomates, 25% (N=428) were completed and returned. Twenty-three of those who completed the survey were excluded from the data analysis because they: were not currently practicing; had incomplete surveys; or practiced internationally. The final sample size used for analysis consisted of 405 respondents, representing a 24% response rate. The practice characteristics of respondents are shown in Table 1. The respondents’ average years in practice were 15.7 (± 11.1). Most respondents were

male (62%) and in private practice (84%), with the remaining respondents practicing in universities (10%), hospitals (8%), community health centers (3%), public health settings (2%), and other settings (1%). Respondents were asked to choose all that apply; hence, the totals do not equal 100%. The majority: were in a pediatric group practice (63%); practiced in communities with populations over 100,000 (64%); spent 31 to 40 hours/week in practice (59%); and employed dental hygienists in their practices (62%).

Respondents’ perspectives on a pediatric oral health therapist in relationship to practice characteristics are also shown in Table 1. A large majority of respondents (N=288, 71%) disagreed with adding a therapist to the dental team; 85 (21%) were neutral to the idea; and 8% (N=32) agreed with the concept. Figure 1 displays the reasons for disagreeing with adding a therapist to the dental team: lack of adequate clinical training (57%); lack of need for such a member of the dental team (26%); and cost of employment (7%).

Respondents indicated a general lack of knowledge regarding the concept of a pediatric oral health therapist/dental therapist (Table 2). Approximately one third (33%) indicated they had no knowledge of the concept; 42% had limited knowledge; while 25% indicated they were knowledgeable. Of those who agreed with the concept, 38% were knowledgeable about it. Of those who did not agree, 27% were knowledgeable; of those neutral, 15% were knowledgeable. Those agreeing with the concept were more likely ($P < .02$) to be knowledgeable of it. When asked about the recent introduction of dental therapists in Alaska, 34% had no knowledge, 45% had limited knowledge, and 21% were knowledgeable. Again, those agreeing with adding a therapist to the dental team were more likely to be knowledgeable about the introduction of therapists in Alaska ($P < .04$).

There were several significant differences between those who agreed with the concept and those who disagreed in relation to practice characteristics. Those respondents who supported the concept of adding a therapist to the dental team were significantly more likely to: practice in public health, academic, or hospital settings ($P < .002$); be in group practice ($P < .03$); spend fewer hours per week treating patients ($P < .02$); have larger percentages of their gross clinical income attributed to Medicaid/CHIP patients ($P < .001$); and employ dental hygienists ($P < .03$). There were no differences in relationship to years in practice.

Nearly all respondents who agreed with adding a therapist to the dental team (94%) agreed doing so would improve access to care. A large percentage of those who disagreed with the concept (75%) believed it would not improve access to care. Those who were neutral to adding a therapist to the team were also neutral (67%) regarding whether adding a therapist to the dental team would improve access to care.

While approximately 66% of the respondents provided care for children insured by Medicaid/CHIP, 34% did not (Table 3). For 19% (N=78) of the practitioners, Medicaid/CHIP billings accounted for over 50% of their annual gross billings. These practitioners were

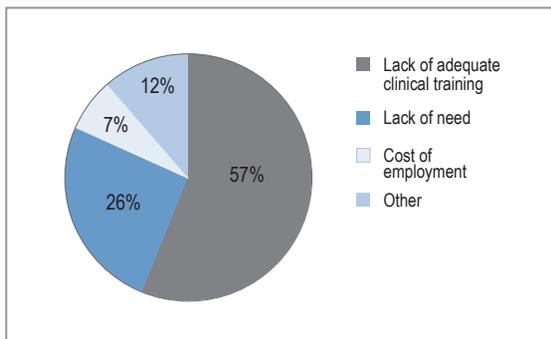


Figure 1. Respondents’ reasons for disagreeing with adding a pediatric oral health therapist to the dental team.

Table 2. KNOWLEDGE OF THE CONCEPT OF A PEDIATRIC ORAL HEALTH THERAPIST RELATED TO SUPPORT FOR ADDING A THERAPIST TO THE DENTAL TEAM

	Therapists should be added to dental team			
	Total N (%)	Agree N (%)	Neutral N (%)	Disagree N (%)
	405 (100)	32 (8)	85 (21)	288 (71)
Knowledge about therapist				
No knowledge	132 (33)	6 (18)	34 (40)	92 (32)
Limited knowledge	170 (42)	14 (44)	38 (45)	118 (41)
Knowledgeable	103 (25)	12 (38)*	13 (15)	78 (27)
Knowledge about dental therapists in Alaska				
No knowledge	143 (34)	6 (19)	37 (44)	96 (33)
Limited knowledge	181 (45)	15 (47)	37 (44)	129 (45)
Knowledgeable	85 (21)	11 (34)*	11 (12)	63 (22)

* $P < .05$.

significantly more likely ($P<.001$) to practice in public health, academic, or hospital settings. Pediatric dentists who reported that greater than 50% of their annual gross clinical income was attributed to Medicaid/CHIP were significantly more likely to agree that a therapist should be added to the dental team ($P<.004$). Of those who had over 50% of their annual gross clinical income attributable to Medicaid/CHIP, 38% agreed with the concept of adding a therapist to the dental team, 25% were neutral and 16% disagreed.

Of respondents who cared for Medicaid/CHIP children and were neutral or agreed to the concept of a therapist ($N=117$), 26% suggested that adding a therapist to the dental team would influence their decision to care for more of these publicly insured children. Of those who disagreed with the concept of therapists, only 12% agreed that having a therapist on their team would influence them positively to begin to see Medicaid/CHIP children. Respondents agreeing with or neutral to the concept were also asked if they would employ a pediatric oral health therapist should such a trained individual be available. Approximately 50% agreed they would, 21% disagreed, and 29% were neutral.

Those who agreed or were neutral to the concept of therapists were asked additional questions regarding which therapist-provided clinical procedures they would support (Table 4). These 2 groups reported similar opinions on allowing therapists to perform clinical examinations (78% and 79%); radiographic examinations (75% and 73%); prophylaxes (91% and 88%); topical fluoride therapy (91% and 95%); and placing sealants (94% and 89%). They differed, however, in opinion on other clinical procedures. Significantly more of those agreeing with the concept were supportive of therapists performing: local anesthesia (78% vs 33%, $P<.001$); intracoronar restorations (72% vs 27%, $P<.001$); pulpotomy of primary teeth (50% vs 9%, $P<.001$); stainless steel crowns (50% vs 13%, $P<.001$); and extraction of primary teeth (66% vs 18%, $P<.001$). Both groups, however, strongly agreed that therapists should not extract permanent teeth.

Of those agreeing with or neutral to the concept, 72% believed that a dentist should be present to provide direct supervision of care by a therapist (Table 5). General supervision, with the dentist not physically present, but available for consultation and referral, was agreed on by 13% of these respondents, while 15% were supportive of either direct or general supervision. When asked what type of oral health professional would be acceptable to provide either type of supervision (direct or general), a pediatric dentist was the most common response (92%), followed by general dentists (59%). Clinical public health dentists were viewed as acceptable by 35% of the respondents. Few (7%) believed, however, that a public health dentist administrator was appropriate for providing supervision.

Of those agreeing with or neutral to the concept, 63% disagreed that a pediatric oral health therapist should be

Table 3. RESPONDENTS' TREATMENT OF MEDICAID/CHIP INSURED CHILDREN RELATED TO SUPPORT OF THE CONCEPT OF A PEDIATRIC ORAL HEALTH THERAPIST

	Therapists should be added to the dental team			
	Total N (%)	Agree N (%)	Neutral N (%)	Disagree N (%)
	405 (100)	32 (8)	85 (21)	288 (71)
Gross clinical income attributed to Medicaid/CHIP				
No Medicaid/CHIP	136 (34)	7 (22)	31 (36)	98 (34)
<25%	115 (28)	9 (28)	21 (25)	85 (30)
25-50%	76 (19)	4 (13)	12 (14)	60 (21)
50-75%	42 (10)	3 (9)*	12 (14)	27 (9)
>75%	36 (9)	9(28)*	9 (11)	18 (6)

* $P<.004$.

Table 4. OPINIONS OF RESPONDENTS SUPPORTIVE OR NEUTRAL TO THE CONCEPT OF A PEDIATRIC ORAL HEALTH THERAPIST REGARDING CLINICAL PROCEDURES TO PERFORM*

	Agree with concept N (%)	Neutral to concept N (%)
		32 (8)
	Support procedure N (%)	
Clinical procedures†		
Clinical examination	25 (78)	67 (79)
Radiographic examination	24 (75)	62 (73)
Prophylaxis	29 (91)	75 (88)
Topical fluoride therapy	29 (91)	81 (95)
Sealants	30 (94)	76 (89)
Local anesthesia*	25 (78)	28 (33)
Intracoronar restorations*	23 (72)	23 (27)
Pulpotomy on primary teeth*	16 (50)	8 (9)
Stainless steel crowns*	16 (50)	11 (13)
Extraction of primary teeth*	21 (66)	15 (18)
Extraction of permanent teeth	3 (9)	3 (4)

* $P<.001$.

† Variable had options of "choose all that apply," so responses are not mutually exclusive.

allowed to practice in a pediatrician's office under the direct supervision of a pediatrician with a consultative or referral arrangement with a dentist. Thirty-seven percent, however, agreed with or were neutral to the idea. Similarly, of the 117 respondents agreeing with or neutral to the concept of a therapist, 55% disagreed that a therapist should be allowed to practice with general supervision in a school setting, community health center, or public health facility; while 45% were not necessarily opposed to therapists doing so.

Discussion

The 24% response rate is slightly below the national median for online surveys of 26%.⁵⁴ While follow-up may have increased participation, such was not possible due to the survey's anonymity. The survey could have been sent a second time;

however, it would have had to be submitted to even those who had responded. To do so would potentially create negative attitudes among pediatric dentists regarding continuing e-mail requests from researchers to participate in surveys. The decision was made not to submit a follow-up survey to the population. It is possible that respondents felt more strongly regarding the issue than nonrespondents, thus introducing a potential bias. Given the magnitude of the difference, between those opposed to the introduction of a pediatric oral health therapist and those who are supportive, a respondent bias is unlikely.

There is a general lack of knowledge among board certified pediatric dentists about the: concept of a pediatric oral health therapist; deployment of dental therapists in Alaska; and international use of dental therapists in providing basic oral health care of children. In spite of this lack of knowledge, most survey respondents were opposed to the concept of adding such a paraprofessional to the dental team in the United States. This response suggests that pediatric dentists are generally satisfied with the current dental workforce and its ability to address the issue of access to care for America's children. However, data documenting disparities in oral health and the lack of access to oral health care by the nation's poor and minority children, indicate that the current workforce is not adequate and changes are required if all children are to gain oral health benefits. Alternatively, they may be satisfied with their status and economic circumstances and find the addition of a dental therapist to the workforce as threatening.

In a 1978 worldwide assessment, Roder suggested that the major factor contributing to the introduction of dental nurses/therapists was an access to care problem related to a shortage of dentists in the workforce.³⁰ Dental therapists have been used effectively internationally for over 80 years,

and have been shown to improve access to care and to provide quality treatment.^{21,31-38} There is a shortage of oral health professionals in the United States willing to care for low-income and minority children. The concept of adding the international dental therapist to the dental team in the United States has been endorsed by the American Public Health Association and the American Association of Public Health Dentistry.^{39,40}

A positive dimension of the results is the finding that those who were supportive of the concept were individuals who were most knowledgeable about the concept, as well as those familiar with the development and deployment of dental therapists in Alaska to care for Native Alaskans. This suggests that further education regarding the concept could improve the acceptance of pediatric dentists. It should be emphasized, however, that support for the concept was essentially from those outside the private practice community. This suggests that support or nonsupport of the concept may be more related to practice environment and orientation than knowledge.

The major objection by respondents was the lack of clinical training. Respondents were not aware, however, of the amount of training international therapists receive in children's dentistry. The traditional curriculum is of 2 academic years following graduation from secondary school. Each year is 32 weeks long, with the total curriculum clock hours being 2,400 devoted to learning to care for children. Approximately 760 clock hours are spent in the clinic providing care for children; this compared to the experience graduating US general dentists have had in children's dentistry.¹⁹ The typical college of dentistry curriculum provides an average of only 177 clock hours of didactic and clinical instruction in dentistry for children.⁴¹

A recent study by Seale and Casamassimo found that 33% of dental school graduates had not had any actual clinical experience in performing pulpotomies and preparing and placing stainless steel crowns—common therapies required for children.⁴² A 2000 ADA House of Delegates resolution called for “a review of the predoctoral education standard regarding pediatric dentistry to assure adequate and sufficient clinical skills of graduates.”⁴³ The background statement supporting the resolution suggested that inadequate educational preparation of general dentists for treating children could be a barrier to access. There is no evidence that there has been an increase in emphasis in children's dentistry in predoctoral education. In fact, Seale and Casamassimo concluded that “results suggest that US pediatric dentistry predoctoral programs have faculty and patient pool limitations that affect competency achievement and adversely affect training and practice.”⁴²

The provision of a number of clinical procedures by therapists was supported by those who agreed or were neutral to the concept of therapists. They were, however, essentially procedures that could be completed by an expanded function dental assistant or a dental hygienist. This suggested that even those who tended to be supportive did not approve of the foundational concept of a dental therapist, which is providing basic restorative services, pulpal therapy, and extraction of

Table 5. OPINIONS OF RESPONDENTS SUPPORTIVE OR NEUTRAL TO THE CONCEPT OF A PEDIATRIC ORAL HEALTH THERAPIST REGARDING TYPE OF SUPERVISOR AND SUPERVISION

	Therapist should be added to the dental team		
	Total N (%)	Agree N (%)	Neutral N (%)
	117 (100)	32 (8)	85 (21)
Supervision level			
Direct	82 (71)	16 (52)	66 (80)
General	15 (13)	5 (16)	10 (12)
Either direct or general	17 (15)	10 (32)	7 (8)
Supervision type*			
Pediatric dentist			
Yes	116 (92)	30 (94)	78 (92)
General dentist			
Yes	55 (59)	16 (50)	38 (45)
Clinical public health dentist			
Yes	44 (35)	13 (41)	28 (33)
Public health dentist administrator			
Yes	9 (7)	3 (9)	6 (7)

* Responses were not mutually exclusive.

primary teeth. While there was some agreement as to being able to treat more children with a dental therapist on their team, it is uncertain as to what this means. Most respondents only approved of therapists performing procedures that could currently be performed by an expanded function dental assistant or dental hygienist.

Evidence from studies in the United States suggests that the perceptual motor skills required to restore children's teeth are no more complex than typically taught to dental hygienists in 2-year dental hygiene curricula and can readily be taught to dental hygienists.⁴⁴⁻⁴⁶ In some countries today, notably New Zealand, The Netherlands, Australia, and Great Britain, dental therapy training is being combined with dental hygiene in a 3-year program.⁴⁷⁻⁴⁹ In Australia and New Zealand, these jointly trained individuals are designated oral health therapists.²⁵

Pediatric dentists working in academic, hospital, and public health settings were more supportive of the concept of a therapist in the United States. This acceptance may be because they were more knowledgeable of the concept, but also because they better understand the access to care problem for children. These individuals were more likely than private practitioners to treat Medicaid/CHIP insurance patients and have practices with larger components of public insurance patients. Many of these academic institutions, hospitals, and public health facilities are located in traditionally underserved settings and often serve as a resource of last resort for the underserved, specifically those with public insurance.

Most respondents believed therapists should be directly supervised by a dentist, preferably a pediatric dentist. The international experience, however, is general supervision by a general dentist and customarily a public health dentist/administrator.^{19,20} Opinions of the respondents seem to parallel the commonly held views of dentists regarding the supervision of dental hygienists.

Respondents did not support therapists practicing in pediatric offices, even though such a setting would improve access to care for very young children and help address the issue of early childhood caries. Twenty-six individuals, however, did support such a concept. Most children are regularly seen by the nation's 57,000 pediatricians. The typical infant/child has had 12 visits to the pediatrician by 3-years-old, providing multiple opportunities for early intervention to affect preventive and therapeutic oral health care.⁵⁰ The Centers for Disease Control funded a study of the dental practice acts of all 50 states and the District of Columbia to determine the limitations individual state practice acts place on individuals, other than licensed dentists, to provide oral health care.⁵¹ This study's results indicate there would be no restrictions on physicians, such as pediatricians, providing dental care in 23 states, and no restrictions in an additional 11 states as long as dentistry was not practiced "as a specialty." In 9 states, physicians would only be allowed to provide emergency care. Three additional state practice acts seemed to suggest physicians would be restricted from providing any oral health services. Pediatricians are now receiving training

in oral health care in a number of settings around the country and are conducting oral exams and applying fluoride varnish to children's teeth, for which they are being remunerated.⁵² Competition in the marketplace of health care could lead to undesirable economic consequences for dentistry, unless the profession of dentistry aggressively addresses the oral health disparities among the nation's children.

Respondents did not believe adding a therapist would improve access to care, yet in New Zealand, Australia, Canada, Malaysia, Great Britain, and other countries, therapists are major contributors to improving access to care. Dental therapists practicing in Alaska are making a contribution to improving access to care of Alaska Natives. In May 2009, Minnesota passed legislation endorsing the training of dental therapists.⁵³ Other states are considering what role therapists could have in addressing identified problems of accessing oral health care.

Conclusions

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

1. Generally, board certified pediatric dentists were not knowledgeable of the international approach to caring for children by pediatric oral health therapists/dental therapists, nor were they aware of the introduction of therapists in Alaska.
2. While not knowledgeable of the concept, board certified pediatric dentists were not supportive of adding such an individual to the dental team in the United States.
3. Pediatric dentists who practiced in the public health sector of academics, public health, and hospital dentistry were more knowledgeable of the concept and also more supportive of adding a therapist to the dental team. They also treated larger numbers of the traditionally underserved population for whom care is publically financed.

References

1. US Department of Health and Human Services. Oral Health in America: A Report of the Surgeon General. Rockville, Md: US DHHS, National Institute of Dental and Craniofacial Research, National Institutes of Health; 2000:308.
2. US DHHS. National Call to Action to Promote Oral Health: A Public-private Partnership Under the Leadership of the Office of the Surgeon General. Rockville, Md: US DHHS, NIDCR, NIH; 2003:28.
3. Newacheck PW, Hughes DC, Hung YY, Wong S, Stoddard JJ. The unmet health needs of America's children. *Pediatrics* 2000;104:989-97.
4. Gift HC, Reisine ST, Larach DC. The social impact of dental problems and visits. *Am J Public Health* 1992;82:1663-8.
5. General Accounting Office. Oral Health: Dental Disease is a Chronic Problem among Low-income Populations. Report GAO/HEHS-00-72. Washington, DC: General Accounting Office; 2000.

6. Greenwall AL, Johnsen D, DiSantis TA. Longitudinal evaluation of caries patterns from the primary to the mixed dentition. *Pediatr Dent* 1990;12:278-82.
7. Kaste LM, Selwitz RH, Oldakowski JA, Brunelle JA, Winn DM, Brown LJ. Coronal caries in the primary and permanent dentitions of children and adolescents 1-17 years of age: United States, 1988-91. *J Dent Res* 1996;75:631-41.
8. Mouradian WE. Addressing disparities through dental-medical collaboration. *J Dent Educ* 2003;57:8.
9. Gehshan S, Straw T. Access to Oral Health Services for Low-income People: Policy Barriers and Opportunities for Intervention for the Robert Wood Johnson Foundation. Denver and Washington: Forum for State Health Policy Leadership, National Council of State Legislatures; 2002:25.
10. American Dental Education Association. Improving the Oral Health Status of All Americans: Roles and Responsibilities of Academic Dental Institutions. Washington, DC: American Dental Education Association; 2003:22.
11. GAO. Oral Health: Factors Contributing to Low Use of Dental Services by Low-income Populations. Washington, DC: GAO; 2000:41.
12. American Dental Association. Dental Workforce Model: 1997-2020. Chicago, Ill: ADA; 1999.
13. US DHHS. Health Profession Shortage Areas. Rockville, Md: Health Resources and Services Administration, US DHHS; 1999.
14. Valachovic RW. Dental workforce trends and children. *Ambul Pediatr* 2002;2:154-61.
15. Brown, LJ, Lazar V. Minority Dentists—Why We Need Them: Closing the Gap. Washington, DC: Office of Minority Health, US DHHS; 1999:6-7.
16. US DHHS, HRSA. Shortage Designation: HPSAs. Available at: "<http://bhpr.hrsa.gov/shortage>". Accessed November 24, 2008.
17. Kaiser Commission, Policy brief: Medicaid and the Uninsured. Oral Health Coverage and Care for Low-income Children: The Role of Medicaid and CHIP. Washington, DC: Kaiser Commission; 2009:6.
18. Gehshan S, Hauck P, Scales J. Increasing Dentists' Participation in Medicaid and SCHIP: Forum for State Health Policy Leadership. Denver, Colo: National Conference of State Legislatures, Denver and Washington; 2001:20.
19. Nash DA. Developing a pediatric oral health therapist to help address oral health disparities among children. *J Dent Educ* 2004;68:8-20.
20. Nash DA. Developing and deploying a new member of the dental team: A pediatric oral health therapist. *J Pub Health Dent* 2005;65:48-55.
21. Fulton JT. Experiment in Dental Care: Results of New Zealand's Use of School Dental Nurses. Geneva, Switzerland: World Health Organization; 1951.
22. National Health Committee. Improving Child Oral Health and Reducing Oral Health Inequalities: Report to the Minister from the Public Health Advisory Committee. Wellington, New Zealand: NHC; 2003:94.
23. Walsh J. International patterns of oral health care: Example of New Zealand. *Harv Dent Alumni Bull* 1968.
24. Walsh J. International patterns of oral health care: Example of New Zealand. *N Z Dent J* 1970;66:143-52.
25. Nash DA, Friedman JW, Kardos TB, et al. Dental therapists: A global perspective. *Int Dent J* 2008;58:61-70.
26. Nash DA, Nagel, RJ. A brief history and current status of a dental therapy initiative in the United States. *J Dent Educ* 2005;69:857-9.
27. Fiset L. A report on quality assessment of primary care provided by dental therapists to Alaska Natives, September 30, 2005. Available at: "www.anthc.org/cs/chs/dhs/cfm". Accessed January 18, 2007.
28. Bolin KA. Assessment of treatment provided by dental health aide therapists in Alaska: A pilot study. *J Am Dent Assoc* 2008;139:1530-5.
29. Dental therapist training program opens in Alaska. *Anchorage Daily News*. January 16, 2007:Alaska Section, page B1.
30. Roder DM. The employment of dental nurses. *J Pub Health Dent* 1978;38:159-71.
31. Roder DM. The effect of treatment planning and referral by school dental therapists. *Aust Dent J* 1973;18:311-9.
32. Roder DM. The effect of treatment planning and referral by school dental therapists: The second report. *Aust Dent J* 1976;21:311-9.
33. Roder DM. Diagnosis, treatment planning and referral by school dental therapists. *Aust Dent J* 1974;19:81-6.
34. Riordan PJ, Espelid I, Tveit AB. Radiographic interpretation and treatment decisions among dental therapists and dentists in Western Australia. *Comm Dent Oral Epidemiol* 1991;19:268-71.
35. Ambrose ER, Hord AB, Simpson WJA. Quality Evaluation of Specific Dental Services Provided by Saskatchewan Dental Plan: Final Report. Regina, Saskatchewan; 1976.
36. Crawford PR, Holmes, BW. An Assessment and Evaluation of Dental Treatment in the Baffin Region: A Report to the Medical Services Branch of National Health and Welfare. Ottawa, Canada; 1989.
37. Trueblood RG. A Quality Evaluation of Specific Dental Services Provided by Canadian Dental Therapists. Ottawa, Canada Medical Services Branch, Epidemiology and Community Health Specialties, Health and Welfare Canada; 1992.
38. Trueblood RG. An Analytical Model for Assessing the Costs and Benefits of Training and Utilizing Auxiliary Health Personnel With Application to the Canadian Dental Therapy Program. Montreal, Quebec, Canada: Department of Health Technology, Concordia University; 1992.
39. American Association of Public Health Dentistry. Resolution on the need for formal demonstration programs to improve access to preventive and therapeutic oral health services. Available at: "www.aaphd.org". Accessed March 1, 2007.
40. American Public Health Association. Resolution on dental therapists in Alaska. Available at: "<http://www.apha-oh.org/ak.res.htm>". Accessed March 1, 2007.

41. ADA. Survey of Dental Education. Chicago, Ill: ADA; 2008.
42. Seale NS, Casamassimo P. US predoctoral education in pediatric dentistry: Its impact on access to dental care. *J Dent Educ* 2003;67:23-30.
43. ADA. Resolution 59H-2000. In: 2000 Transactions for the 141st Annual Session, October 14-18, 2000. Chicago, Ill: ADA; 2000.
44. Lobene R. *The Forsyth Experiment: An Alternative System for Dental Care*. Cambridge, Mass: Harvard University Press; 1979.
45. Spohn EE, Chiswell, LR, Davison DD. *The University of Kentucky Experimental Duties Dental Hygiene Project*. Lexington, Ky: University of Kentucky; 1976.
46. Sisty NL, Henderson, WG, Paule CL, Martin JF. Evaluation of student performance in the four-year study of expanded functions for dental hygienists at the University of Iowa. *J Am Dent Assoc* 1978;97:613-27.
47. Ministerie van VWS. *Capacity Oral Health Care: Recommendations for Short- and Long-term Policy*. The Hague, The Netherlands: Ministry of Health, Welfare and Sports; 2000.
48. *Innovation in Dental Care: Recommendations*. Leiden, The Netherlands: Secretariat of the Innovation in Dental Care Committee, the Institute of Research on Public Expenditure; 2006.
49. Developing the dental team: Curricular frameworks for registerable qualifications for professions complementary to dentistry. General Dental Council. Available at: "www.gdc.uk.org". Accessed June 8, 2009.
50. American Academy of Pediatrics. Recommendations for preventive practice health care. *Pediatrics* 2000;105:626.
51. Center for Health Services Research and Policy. *The Effects of State Dental Practice Laws Allowing Alternative Models of Preventive Oral Health Care Delivery to Low-income Children*. Washington, DC: Center for Health Services Research and Policy, School of Public Health and Health Services, George Washington University; 2003.
52. Lewis CW, Grossman, DC, Domoto P, Deyo RA. The role of the pediatrician in the oral health of children: A national survey. *Pediatrics* 2000;106(6):E84.
53. Minnesota passes legislation. Available at: "http://www.medicalnewstoday.com/articles/". Accessed June 2, 2009.
54. Survey response rates. PeoplePulse. Available at: "www.peopleplus.com". Accessed June 8, 2009.