Demand in Pediatric Dentistry for Sedation and General Anesthesia by Dentist Anesthesiologists: A Survey of Directors of Dentist Anesthesiologist and Pediatric Dentistry Residencies

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This study describes what training programs in pediatric dentistry and dental anesthesiology are doing to meet future needs for deep sedation/general anesthesia services required for pediatric dentistry. Residency directors from 10 dental anesthesiology training programs in North America and 79 directors from pediatric dentistry training programs in North America were asked to answer an 18-item and 22-item online survey, respectively, through an online survey tool. The response rate for the 10 anesthesiology training program directors was 9 of 10 or 90%. The response rate for the 79 pediatric dentistry training program directors was 46 of 79 or 58%. Thirty-seven percent of pediatric dentistry programs use clinic-based deep sedation/general anesthesia for dental treatment in addition to hospital-based deep sedation/general anesthesia. Eighty-eight percent of those programs use dentist anesthesiologists for administration of deep sedation/general anesthesia in a clinic-based setting. Pediatric dentistry residency directors perceive a future change in the need for deep sedation/general anesthesia services provided by dentist anesthesiologists to pediatric dentists: 64% anticipate an increase in need for dentist anesthesiologist services, while 36% anticipate no change. Dental anesthesiology directors compared to 2, 5, and 10 years ago have seen an increase in the requests for dentist anesthesiologist services by pediatric dentists reported by 56% of respondents (past 2 years), 63% of respondents (past 5 years), and 88% of respondents (past 10 years), respectively. Predicting the future need of dentist anesthesiologists is an uncertain task, but these results show pediatric dentistry directors and dental anesthesiology directors are considering the need, and they recognize a trend of increased need for dentist anesthesiologist services over the past decade.

Key Words: Demand for services; Dental anesthesiologist; Pediatric dentist.

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The treatment of preschool children with early childhood caries is recognized as a significant public health issue.^{1–3} For a select few pediatric dental patients, nonpharmacologic and minimal or pharmacologic interventions with moderate sedation are not appropriate or adequate for the pediatric dentist to achieve comprehensive care. In this group of pediatric dental patients, deep sedation or general anesthesia is the treatment of choice because of the patient's extensive treatment needs, acute situational anxiety, uncooperative age-appropriate behavior, limited cognitive functioning, physical disability, or medical conditions that require deep sedation or general anesthesia to complete dental treatment in a safe and humane fashion.⁴ The dental profession has sought to continually develop and improve on previous safety standards in an effort to deliver safe and effective deep sedation and general anesthesia techniques.⁵ The American Academy of Pediatric Dentistry (AAPD) endorses in-office use of deep sedation or general anesthesia administered by a trained, credentialed, and licensed pediatric dentist, dental or medical anesthesiologist, nurse anesthetist, or anesthesia assistant on select pediatric dental patients in an appropriately equipped and staffed facility.⁴

In the report titled *Project USAP 2000—use of sedative agents by pediatric dentist: a 15 year follow-up survey*, it was reported that of the 1778 respondents to the survey, 1224 used sedation other than nitrous oxide. In a typical 3-month period, they performed 77 112 sedations for pediatric dental patients with approximately 80% of sedations being performed by 27% of the respondents. The author concluded that in comparison to his previous surveys (1985, 1991, and 1995), his results demonstrated an overall increased use of sedation by pediatric dentists primarily due to an increase in the number of practitioners who are heavy users of sedation. A heavy user of sedation was defined by one or more sedations each day.^{6,7} Houpt's study demonstrated a significant change in the frequency of sedations performed by pediatric dentists. In the 4 years the surveys were performed (1985, 1991, 1995, and 2000), those who reported a change in their use of sedation reported an overall decrease in the use of sedation with an increased need for sedation services. Pediatric dentists who decreased their use of sedation indicated that they were better able to manage patients without sedation, and that it was easier for them to provide care for patients under general anesthesia as an alternative management technique. The USAP report also documented that increased sedation use in year 2000 was due primarily to a heavier use of sedation by a small percentage of

respondents and did not indicate increased use by the majority of practitioners. There were fewer dentists performing sedation with agents other than nitrous oxide, but the need for sedation to gain management of patient behavior had increased.

One of the reasons for an increased need for sedation in the general patient population is due, in part, to the prevalence of dental fear and anxiety, which has been reported as high as 12.3% of the general US population.⁸ Approximately 18% of junior high and secondary school students reported moderate dental fear.⁸ In a 2005 survey of the Canadian general population by Chanpong et al,⁹ 15.3% of respondents reported being somewhat afraid or highly afraid of dental treatment. Of those surveyed, 12.4% were definitely interested in sedation or general anesthesia for their dental care, and 42.3% were interested depending on the price.⁹

Casamassimo et al¹⁰ reported the effects of changing US parenting styles on dental practices. Ninety-two percent of pediatric dentists indicated that parenting style changes, such as decreased physical discipline/spanking and the increased amount of time children spend in daycare/preschool were probably (54%) or definitely (38%) responsible for changes in patient management. Eighty-five percent of pediatric dentists felt these changes had resulted in somewhat (65%) or much worse (20%) patient behavior in the dental setting. Respondents felt parenting styles had changed because parents were less willing to set limits, less willing to use physical discipline, unsure of their roles as parents, too busy to spend time with their children, and too self-absorbed or materialistic. Practitioners reported using much less assertive behavior management techniques due to these changes. Of the respondents, 38% reported an increase in the number of sedations over a career, while 31% reported no change and 31% reported a decrease in sedations. In the use of medical immobilization (papoose board), only 7% reported an increase in its use, while 40% saw no change, and 56% had decreased its use. The use of hand-over-mouth, as an assertive behavior management technique, had decreased by 82% of respondents, increased by 1%, and remained unchanged by 17% of respondents. Diplomates of the American Board of Pediatric Dentistry indicated that parenting changes had occurred, and they believed these were negative changes that have adversely influenced behavior and caused changes in behavior management by pediatric dentists.

Dental rehabilitation delivered under deep sedation/general anesthesia produces reliable and predictable outcomes. Fear and anxiety are often age-appro-

Table 1. Survey of Graduate Program Directors in Dental Anesthesiology

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1. Are you the Program Director for an accredited Dental Anesthesiology Program?
 2. How many years have you been credentialed to practice dental anesthesiology?
 3. How often do each of the following dental specialties request your residents' services for deep sedation/general anesthesia: oral and maxillofacial surgery, prosthodontics, endodontics, pediatric dentists, periodontics, general dentists?
 4. Which of the following dental specialties request your residents' services for deep sedation/general anesthesia most?
 5. Referring to the previous question, what percentage does this one specialty request your residents' deep sedation/general anesthesia services compared to all other dental specialties?
 6. Compared to 2 years ago, have you seen a change in the request for dental anesthesiologist services by pediatric dentists?
 7. Compared to 5 years ago, have you seen a change in the request for dental anesthesiologist services by pediatric dentists?
 8. Compared to 10 years ago, have you seen a change in the request for dental anesthesiologist services by pediatric dentists?
 9. What percentage of your residents' dental deep sedation/general anesthesia cases are performed on children with special health care needs (SHCN)?¹¹
 10. What percentage of your residents' dental deep sedation/general anesthesia cases are performed on children under 6 years of age?
 11. What do you perceive as the greatest barrier to incorporating the services of a dental anesthesiologist into the treatment of pediatric dental patients?
 12. What do you perceive as the greatest barrier for patient acceptance of the incorporation of services (ie, clinic-based deep sedation/general anesthesia) provided by dental anesthesiologist into the treatment of pediatric dental patients?
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priate impediments that a pediatric dentist must manage. Access to minimal and moderate sedation is in high demand but becoming less available by pediatric dentists. Changes in parents' acceptance of certain assertive behavior management techniques combined with parents' lack of desire to set limits, less willingness to use physical discipline, and parents who are unsure of their roles as parents produce patients unwilling to cooperate in the dental clinic. These trends lead the author to investigate the future need for deep sedation/general anesthesia services for pediatric dentists.

METHODS

Following approval by the Indiana University Institutional Review Board, 10 dentist anesthesiology residency directors and 79 pediatric dentistry residency directors in North America were surveyed. The AAPD supplied current e-mail addresses for 79 pediatric dentistry residency directors after the AAPD designate reviewed and approved the survey instrument. The American Society of Dentist Anesthesiologists (ASDA) supplied current e-mail addresses for the 10 dentist anesthesiology residency directors in North America. Each residency director was sent an invitation to participate in an electronic survey via Zoomerang, an online survey instrument.

Survey Instruments

The surveys were designed to identify and quantify the exposure of pediatric dentistry residents in their graduate level residency training to the area of deep sedation/general anesthesia. The study also aimed to

identify and quantify the experience of dentist anesthesiology residents in providing deep sedation/general anesthesia for multiple dental specialties and to determine which specialties and patients have the highest demand for their deep sedation and general anesthesia services. The survey questions for the 10 directors in dentist anesthesiology graduate programs in North America are listed in Table 1. The contents of the survey sent to the 79 directors of pediatric dentistry graduate programs in North America are listed in Table 2.

Statistical Methods

Data from the responses to the online survey instrument were entered into an Excel spreadsheet. All survey responses were summarized by providing frequencies and percentages.

RESULTS

Of the 79 surveys electronically mailed to graduate program directors in pediatric dentistry, 46 were completed for a response rate of 58%. Of respondents, 54% reported being credentialed to practice pediatric dentistry for more than 20 years, while only 17% were credentialed less than 10 years (Table 3). Multiple questions were asked about the experience pediatric dentistry residents receive in their residency programs, and they are summarized below.

Ninety-eight percent of pediatric dentistry programs treat patients under minimal/moderate sedation, excluding nitrous oxide. Ninety-eight percent of pediatric dentistry programs treat patients under deep seda-

Table 2. Survey of Graduate Program Directors in Pediatric Dentistry

1. Are you the director of a pediatric dentistry residency training program in the USA?
2. How many years have you been credentialed to practice pediatric dentistry as a specialist?
3. Do your residents treat patients under minimal/moderate sedation (excluding nitrous oxide)?
4. Do your residents treat patients under deep sedation/general anesthesia?
5. If yes to question 4; In what setting do your residents treat patients under a deep sedation/general anesthesia?
6. Which sedation procedure do your residents graduate having performed more of: dental cases treated under minimal/moderate sedation (excluding nitrous oxide), dental cases treated under general anesthesia, about equal experience in both, other?
7. On average, how many dental cases under deep sedation/general anesthesia have your residents treated upon graduation?
8. On average, how many dental cases under minimal sedation (excluding nitrous oxide) have your residents treated upon graduation?
9. Do your residents use the services of a dental anesthesiologist?
10. If you answered yes to 9, then which of the following does the dentist anesthesiologist provide? (Check all that apply) Clinic-based mild/moderate sedation, clinic-based deep sedation/general anesthetic, operating room–based deep sedation/general anesthesia, other.
11. Do your pediatric dentistry residents provide dental treatment under clinic based deep sedation/general anesthesia?
12. If you answered yes to question 11, then who administers the deep sedation/general anesthesia in the clinic? (Check all that apply) Anesthesiologist, dentist anesthesiologist, nurse anesthetist, oral maxillofacial surgeon, pediatric dentist, physician other than anesthesiologist, other.
13. Do your residents treat dental patients in the operating room under deep sedation/general anesthesia?
14. If you answered yes to 13, who administers the deep sedation/general anesthesia in the operating room? (Check all that apply) Nurse anesthetist, anesthesiologist (MD), oral maxillofacial surgeon, dentist anesthesiologist, physician other than anesthesiologist, other.
15. Compared to 2 years ago, have you seen a change in the request for dentist anesthesiologist services by pediatric dentists?
16. Compared to 5 years ago, have you seen a change in the request for dentist anesthesiologist services by pediatric dentists?
17. Compared to 10 years ago, have you seen a change in the request for dentist anesthesiologist services by pediatric dentists?
18. Do you perceive a future change in the need for deep sedation/general anesthesia services provided by a dentist anesthesiologist to pediatric dentists?
19. What do you perceive as the greatest barrier to incorporating the services of a dentist anesthesiologist into the treatment of your program's pediatric dentistry patients?
20. What do you perceive as the greatest barrier for patient acceptance of services (ie, clinic-based deep sedation/general anesthesia) provided by dentist anesthesiologists into the treatment of pediatric dental patients. Parent/patient awareness, access to services of a dentist anesthesiologist, costs, travel distance for patients to services, other.

tion/general anesthesia, with 69% of these cases occurring in an operating room environment only; 29% provide treatment under deep sedation/general anesthesia in both clinic-based and operating room settings.

Sedation Providers for Pediatric Dental Residents

Forty-three percent of pediatric dentistry programs use the services of a dentist anesthesiologist. Of the 43% who use dentist anesthesiologists, 26% provide clinic-based minimal or moderate sedation, 68% provide clinic-based deep sedation/general anesthesia, and

37% provide operating room–based deep sedation/general anesthesia (Figure 1). Fifty-two percent of the programs do not have the services of a dentist anesthesiologist.

Clinic-based Deep Sedation/General Anesthesia

Thirty-seven percent of pediatric dentistry programs use clinic-based deep sedation/general anesthesia for dental treatment. Eighty-eight percent of those programs use dentist anesthesiologists for administration of deep sedation/general anesthesia. Programs additionally used physician anesthesiologists, nurse anesthetists, oral and maxillofacial surgeons, pediatric dentists, and physicians other than anesthesiologists 6 to 18% of the time to administer clinic-based deep sedation/general anesthesia (Figure 2).

Table 3. Directors: Years Credentialed to Practice Pediatric Dentistry

N = 46	N	%
Less than 5 years	1	2%
5–9 years	7	15%
10–14 years	10	22%
15–19 years	3	7%
Greater than 20 years	25	54%

Requests for Dentist Anesthesiologists

When pediatric dentistry residency directors were asked, "Compared to 2, 5, and 10 years ago, have you seen an increase, decrease, or no change in the request

Figure 1. Do your pediatric dental residents use the services of a dentist anesthesiologist? What procedures?

for dentist anesthesiologist services by pediatric dentists?" 44% have seen an increase in the past 2 years, 60% have seen an increase in the past 5 years, 71% have seen an increase in the past 10 years, while the remainder in each year group have seen no change in the requests for dentist anesthesiologist services by pediatric dentists (Figure 3).

When pediatric dentistry residency directors were asked if they perceived a future change in the need for deep sedation/general anesthesia services provided by dentist anesthesiologists for pediatric dentists, 64% anticipated an increase in the need for dentist anesthesiologist services, while 36% anticipated no change. When asked what they perceived as the greatest barrier to incorporating the services of a dentist anesthesiologist into the treatment of pediatric dental patients, respondents indicated that state/dental anesthesia regulations, followed by costs associated with the service were the top two barriers to incorporating the services of dental anesthesiologists into treatment. When pediatric dentistry residency directors were asked what they perceived as the greatest barrier for patient acceptance of the services of a dental anesthesiologist into the treatment of pediatric dental patients, costs of the service, followed by a lack of patient/parent awareness of the service were the top 2 responses.

Of the 10 surveys electronically mailed to dentist anesthesiology residency directors, 9 were completed for

Figure 2. Sedation providers during pediatric clinic based deep sedation/general anesthesia dental treatment.

Figure 3. Request for dentist anesthesiologist services by pediatric dentists.

a response rate of 90%. Seventy-eight percent of respondents reported being credentialed to practice anesthesia less than 5 years, while only 11% were credentialed for 5-9 years, and 11% were credentialed for 15-19 years (Table 3). When dentist anesthesiologist residency directors were asked which dental specialty most requested their residents' services for deep sedation/general anesthesia, and how frequently, they indicated that pediatric dentistry requested their services most often when weighed for frequency. When asked about long term trends, dentist anesthesiologist residency program directors responded that 56% have seen an increase and 44% have seen no change from 2 years ago, 63% have seen an increase and 37% have seen no change from 5 years ago, and 88% have seen an increase, while 11% have seen no change from 10 years ago.

When dentist anesthesiologist residency directors were asked what percentage of your residents' dental deep sedation/general anesthesia cases are performed on children with special health care needs (SHCN), 56% reported that 1 to 25% were cases involving patients with SHCN, while 44% of directors reported a range of 26 to 50% (Figure 4). When dentist anesthesiologist residency directors were asked what percentage of your residents' dental deep sedation/general anesthesia cases are performed on children under 6 years of age, 33% reported 1 to 25% of their cases were for children less than 6 years of age. Forty-four percent of dentist anesthesiologist residency directors said 26 to 50% of their residents' deep sedation/general anesthesia cases were performed on children less than 6 years of age. Additionally, 22% of dentist anesthesiologist residency directors indicated that 75 to 100% of their residents' deep sedation/general anesthesia dental cases were on children less than 6 years of age (Figure 5).

Figure 4. Percentage of cases involving dental anesthesiology residents performing deep sedation/general anesthesia on patients with SHCN during training. Percent involving SHCH (n = 9).

When dentist anesthesiologist directors were asked what they perceived as the greatest barrier to incorporating the services of a dentist anesthesiologist into the treatment of pediatric dental patients, dental profession awareness and access to the services of a dentist anesthesiologist were the top 2 responses. When dentist anesthesiologist residency directors were asked what they perceived as the greatest barrier for patient acceptance of the services of a dentist anesthesiologist into the treatment of pediatric dental patients, access to the services of a dentist anesthesiologist, followed by the costs associated with the service were the top 2 responses.

DISCUSSION

The results of this study indicate that children receiving dental rehabilitation under deep sedation/general anesthesia receive their sedation from multiple providers. When children receive general anesthesia in the operating room, the results indicate that they are likely to receive their anesthesia from a physician anesthesiologist or nurse anesthetist. When children receive the

Figure 5. Dental anesthesiology residents' deep sedation/general anesthesia cases performed on patients less than 6 years old during training. Percent involving patients < 6 years old (n = 9).

same level of deep sedation/general anesthesia in a clinic-based setting, the results of who provides that care are not as consistent as for the operating room anesthesia provider. The respondent's list of deep sedation/general anesthesia providers for clinic-based dental rehabilitation included oral maxillofacial surgeons, physicians other than anesthesiologists, dentist anesthesiologists, nurse practitioners, and physician anesthesiologists. What makes this finding interesting is the emphasis on clinic-based deep sedation/general anesthesia for dental rehabilitation in the overall behavior management techniques of graduating pediatric dental residents. When asked which sedation procedures graduating pediatric dental residents performed most often, ie, minimal/moderate sedation (excluding nitrous oxide sedation), deep sedation/general anesthesia, or both, the responses indicated that graduates leave their training programs with the most experience in deep sedation/general anesthesia. The results showed that 52% of pediatric dental residents graduate with deep sedation/general anesthesia as the most frequent case experience, and 26% graduate with equal experience in minimal/moderate sedation and deep sedation/general anesthesia. Only 22% of pediatric dental program directors indicated their residents graduated with more experience in minimal/moderate sedation (excluding nitrous oxide) than with cases under deep sedation/general anesthesia (Figure 6).

The practice of dental providers serving also as the sedation provider has long been evident in the practice of dentistry. This practice though is a particularly delicate one when it comes to deep sedation and the pediatric patient. The potential for life-threatening airway obstruction, hypoventilation, apnea, laryngospasm, and cardiopulmonary impairment have made it standard practice to have a separate sedation provider from the operating pediatric dentist during the treatment of pediatric patients under sedation beyond the level of moderate sedation. This practice of simultaneous operator/anesthesia administrator has been on

Figure 6. Pediatric dentistry residents' average sedation experience during training.

Table 4. Directors: Years Credentialed to Practice Dental Anesthesia

N = 9	N	%
Less than 5 years	7	78%
5–9 years	1	11%
10–14 years	0	0%
15–19 years	1	11%
Greater than 20 years	0	0%

the decline as both recent state regulations and US dental schools begin to limit this practice.^{5,12}

When asked to comment on the historical need for dentist anesthesiologists by pediatric dentists, 44% of respondents said they had seen an increase in requests for dentist anesthesiologist services by pediatric dentists in the past 2 years, 60% reported an increase in the past 5 years, followed by 71% who reported an increase in requests for dentist anesthesiologist services by pediatric dentists in the past 10 years. The expected future demand by pediatric residency directors for dentist anesthesiologist services to pediatric dentists was thought to increase by 64% of the respondents' estimation, while 36% of directors estimated there would be no change in the need for dentist anesthesiologist services. Predicting the future need of dentist anesthesiologist is an uncertain task, but these results show pediatric dentistry residency directors are considering the need and recognize a trend of increased need for dentist anesthesiologist services over the past decade.

Two questions addressed by these findings are where these deep sedation/general anesthesia cases occur and who provides the service. Ninety-eight percent of pediatric dentistry program directors indicated that their residents treat patients under deep sedation/general anesthesia, and 69% percent of those did so in the operating room exclusively. However, it is the remaining 31% of pediatric dentistry residents who are the focus of the following discussion. When pediatric dentistry directors were asked, "*Do your pediatric dentistry residents provide dental treatment under clinic-based deep sedation/general anesthesia?*" 37% answered yes with 88% using the services of a dentist anesthesiologist. Additionally oral and maxillofacial surgeons, physician anesthesiologists, nurse anesthetists, physicians other than an anesthesiologist, and pediatric dentists were used less than 18% of the time (Table 4). These results show that the majority of deep sedation/general anesthesia cases are treated in the operating room by physician anesthesiologists. These results also show that clinic-based deep sedation/general anesthesia is the main environment for dentist anesthesiologists, but only approximately one third of pediatric dental graduates complete their programs

Table 5. Pediatric Dentistry Programs Using Clinic-based Deep Sedation/General Anesthesia and Type of Anesthesia Provider

N = 46	Yes: 17 (37%)	No: 29 (63%)
Dental anesthesiologist	88%	
Oral surgeon	18%	
MD anesthesiologist	12%	
Nurse anesthetist	12%	
MD other than anesthesiologist	12%	
Pediatric dentist	6%	

with experience in this form of behavior management in the clinic environment under the direction of a dentist anesthesiologist (Table 5).

The second survey in this research project focused on dentist anesthesiology residents and what type of patients they treat in conjunction with multiple dental specialties. Dentist anesthesiology residency directors indicated a tie between oral and maxillofacial surgery and pediatric dentistry as the specialties most requesting their residents' services for deep sedation/general anesthesia, with only one director indicating general dentistry as the primary dental specialty requesting those services. Pediatric dentistry residency program directors recognize a trend of increasing need for dentist anesthesiologists' services over the past decade. These responses could be affected by the proximity of other training programs within their hospital or university and not by need-based alone. If the dentist anesthesia residency program was in a hospital that also had an oral and maxillofacial surgery residency and a general practice residency but not a pediatric dentistry program, the data could be swayed to the specialties with easy access to the dentist anesthesiology residents.

Pediatric dentistry by definition is the dental specialty for children and adolescents, but approximately 80% of pediatric dental patients are not referred to a pediatric dentist but are instead managed by general or family dentists. The 20% of pediatric dental patients who are seen by pediatric dentists are often less than 6 years of age and have primary dentitions. When dentist anesthesiology residency directors were asked, "*How many of their residents' deep sedation/general anesthesia patients were under 6 years of age?*" 33% of respondents estimated that less than one quarter of their patients were less than 6 years of age, and 44% estimated that more than a quarter but less than one half were in this category, while 22% believed that greater than three quarters of their deep sedation/general anesthesia patients were less than 6 years of age (Figure 5). The preoperative but often age-appropriate behavior of many pediatric dental patients makes

them candidates for deep sedation/general anesthesia. Indications for deep sedation/general anesthesia in the pediatric dental patient include protection of the developing psyche, negative behavior during an attempt at chair-side treatment, and the need for extensive treatment. In all cases the risk versus the benefits must be weighted and proper behavioral management must be selected in coordination with the patients' and parents' desires.

Pediatric dentists are the specialists most often trained to meet the need of patients with special health care needs (SHCN). SHCN is defined by the American Academy of Pediatric Dentistry as any physical, developmental, mental, sensory, behavioral, cognitive, or emotional impairment or limiting condition that requires medical management, health care intervention, and/or use of specialized services or programs. Given the high degree of exposure that many residents in both pediatric dentistry and dental anesthesiology have to this special population, they become a necessary treatment team in providing dental services to patients with SHCN.^{5,12–14} Wolff et al¹⁵ showed that the more residents are exposed to patients with SHCN during their training, the more positive their feelings were towards being able to treat and meet the challenges these patient presented in practice.^{5,15} Five of 9 dentist anesthesiology residency directors responded that 1 to 25% of their deep sedation/general anesthesia dental cases were administered to patients with SHCN, while 4 of 9 directors estimated that 26 to 50% of their residents' deep sedation general anesthesia dental cases were administered to patients with SHCN.

The evidence presented here indicates the potential for a team approach to dental rehabilitation for this special population of pediatric dental patients. A unique relationship, the authors believe, exists between the patient populations that pediatric dental residents and dentist anesthesiology residents treat. The survey by Boynes et al⁵ on the practice characteristics among dental anesthesia providers indicates that when data were categorized according to their main practice activity, the dentist anesthesiologists and pediatric dentists had the highest mean number of patients with SHCN in a sedation/anesthesia practice per month. The study by Boynes et al⁵ did not limit the sedation to deep sedation/general anesthesia but does show support for this unique sedation-surgery interaction as dentist anesthesiologist and pediatric dentist coordinate their efforts in the dental rehabilitation of patients with SHCN.

The authors recognize the limitations of this survey-based research. Many responses were highly variable and not often centered on one conclusive answer. The response rates for both groups surveyed were above

50%, which is good, but the 9 dentist anesthesiology and 46 pediatric dentistry residency directors contacted provided a relatively small total number of people surveyed.

CONCLUSIONS

Nearly half of the pediatric dentistry residency programs use the services of dentist anesthesiologists, and about one third use dentist anesthesiologists for clinic-based deep sedation/general anesthesia. This study identifies what appears to be an increasing use of deep sedation and general anesthesia provided by dentist anesthesiologists for children treated by pediatric dental residents and an apparent need for increased availability of dentist anesthesiologists for clinic-based deep sedation and general anesthesia in pediatric dental residencies in the future. Additionally, dentist anesthesiologist residencies provide their anesthesia residents with a large number of pediatric dental resident cases involving children less than six years of age and especially for patients with special health care needs.

Suggestions for future studies would include research similar to this topic but with data gathered from practicing dentist anesthesiologists and pediatric dentists to see if the combined experiences received in their training reported here influence the practice of each as specialists years after their training is complete.

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