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Regulatory barriers to dental anesthesia services for special populations

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Abstract

Aims: Sedation and general anesthesia are necessities for the treatment of many individuals within special populations such as those with physical and intellectual disabilities, fear/anxiety, or individuals requiring extensive procedures. This study aims to discover regulatory factors that may be contributing to the limited access to anesthesia services provided by dentist anesthesiologists.

Methods and Results: The study included an online survey completed by self-reported dentist anesthesiologists with 2 or more years of formal anesthesia training. The survey was distributed at the April 2019 American Society of Dentist Anesthesiologists national meeting in Chicago. Participants responded to questions regarding the effect of specific state regulations on decisions to practice in a particular state and how such regulations influenced patient safety and barriers to care. Rules and regulatory restrictions on the mobility of dentist anesthesiologist equipment/supplies and additional state narcotic transportation regulations were deemed statistically significant in failing to improve safety. Requiring airway and sedation training for a facility's provider and staff were not barriers to care. Rules and regulations were not a factor to establishing clinical practice in one state over another state.

Conclusion: Individuals and organizations responsible for influencing the regulatory environment of anesthesia services should improve regulations to facilitate the mobility of dentist anesthesiologists.

KEYWORDS

Anesthesia, Dental, Dental Anxiety, Dental Care for Disabled, Health Services Accessibility, Healthcare Disparities, Legislation, Dental, Legislation, Drug

1 | INTRODUCTION

Marginalized populations of low-income, racial/ethnic minority groups and those with developmental or acquired disabilities are profound in the United States and disproportionally affected by dental diseases.[1-3] These needs require not only provider, but also certain additional services for successful dental treatment.[4] Sedation and general anesthesia are necessities for the treatment of many within such populations.[5] While many dentists have acquired complex skills through various residency programs, the most difficult barrier to care is finding a dentist willing to treat complex patients.[6,7]

Access to a dentist anesthesiologist and their services increases the availability of treatment for those patients who would otherwise face significant barriers to care.[8] Dentist anesthesiologists are specially trained to safely provide comprehensive anesthesia services for dental treatment in all settings including those office-based environments.[9] Pediatric dentists account for the largest percentage of anesthesia cases rendered by dentist-anesthesiologists, but of those pediatric dentists who do not use such a provider, the second most common rationale was due to a lack of access to one.[10,11] Numerous and widely distributed, general dentists are positioned to treat the needs of special populations, yet they continue to know little about the use and availability of dentist anesthesiologists' services.

An unequal distribution of dentist anesthesiologists across the country, and significant regional differences in the use of general anesthesia by dentists, hint at an external force limiting access to dentist anesthesiologists.[10,12] While financial factors are often the focus of access to care discussions, the literature has recognized that "nonfinancial barriers were more common reasons for unmet need or delayed care than affordability barriers and most adults who experienced affordability barriers that led to an unmet need or delayed care also experienced nonfinancial barriers."[13,14] It is becoming more recognized that financial, cognitive, and structural barriers are "reciprocally reinforcing and affect health care access individually and in concert" and that minor changes in the regulatory environment can have some meaningful impact on all levels of accessibility of care.[15]

The limited access to the services of a dentist anesthesiologist prevents the skills of general dentists and specialists from reaching the needs of patients within special populations. This study aims to discover factors that may be contributing to the limited access to anesthesia services provided by dentist anesthesiologists. The rules and regulations examined in this study were selected by the authors after a comprehensive review of state regulations and dental practice acts regarding the delivery of general anesthesia services in dentistry and were constrained to those that may pose substantial barriers to the mobility of appropriately trained dentist anesthesiologists that could prevent a dental patient's access to general anesthesia services at a dental office. The rules and regulations examined in this survey were also selected, in part, because of the variability and stance noted between states.

2 | METHODS

2.1 | Study design

This IRB exempt cross sectional pilot study was performed in April of 2019 and was designed to take a snapshot of the current practice characteristics and opinions of dentist anesthesiologists in North America. No personal identifiable information was requested or collected. Participation was voluntary. Special populations in this survey were defined as those with physical and intellectual disabilities, psychiatric illness, fear/anxiety, and failed local anesthesia. Medically complex patients and those requiring extensive procedures were also included in this category.

The survey was comprised of seven sections including consent and exclusions. Other sections gathered participant demographics and type of practice (i.e., fixed or mobile). This was followed by a section on treatment frequencies by the ages of patients, ASA categories, type of special need, patient location, method of payment, and which branch of dentistry received general anesthesia services. The fifth section included three specific questions regarding state regulations' effect on the type of clinical practice, which branch of dentistry received general anesthesia services, and decisions to practice in a particular state. The final two sections of the survey asked participants to rate the level of barrier and the level of safety for specific office-based anesthesia related regulations on a modified Likert scale. A PDF copy of the described survey is available for viewing.

2.2 | Setting

This study included an anonymous voluntary survey for dentist anesthesiologists that was distributed electronically at the April 2019 American Society of Dentist Anesthesiologists meeting in Chicago.

2.3 | Participants

A total of 172 dentist anesthesiologist members of the American Society of Dentist Anesthesiologists were

present at the 2019 meeting in Chicago (E. Baker, 2021). The inclusion criteria of participants consisted of self-reported dentist anesthesiologists providing consent to participate in the survey with 2 or more years of formal anesthesia training. Self-reported non-dentist anesthesiologists and those that had completed the survey previously were excluded.

2.4 | Statistical methods

After exclusionary criteria was used to remove invalid responses, data was imported into JMP Pro 15 statistical software for analysis. The quantitative evaluation included descriptive statistics, one-tailed two-sample proportion hypothesis testing, and Fischer's Exact Test. Due to the small sample size of this pilot cross sectional study, results were deemed significant at an alpha of .1.

3 | RESULTS

3.1 | Participants

Of the 172 dentist anesthesiologists in attendance at the 2019 annual meeting of the American Society of Dentist Anesthesiologists, 48 completed the survey. Two survey responses were eliminated from data analysis due to exclusionary criteria, resulting in a total response rate of n = 46.

3.2 | Descriptive data

Respondent demographics included a diverse group representative of all aspects of the community of dentist anesthesiologists across North America. Notable exceptions (states with five or more dentist anesthesiologists registered with the American Society of Dentist Anesthesiologists) included the tri-state area of New York, New Jersey, and Connecticut. Nearly 65% (n = 30) of the 46 respondents in our study were involved in mobile office-based anesthesia practice. A total 35% (n = 16) of the 46 respondents were involved in a fixed anesthesia practice (i.e., ambulatory surgical center, hospital, etc.).

3.3 | Barriers to care

Omitting uncertain responses, barriers were found among state narcotic handling/transporting regulations ($p = .008$) and equipment permanence (Alpha = .1 with $p = .0614$) (Figure 1). Additionally, it was found that the requirement of airway/sedation continuing education for general dentists ($p = .019$), educational and training requirements for facility's staff ($p = .003$), and the specified number of staff for general anesthesia ($p = .001$) were not barriers to care (Table3)

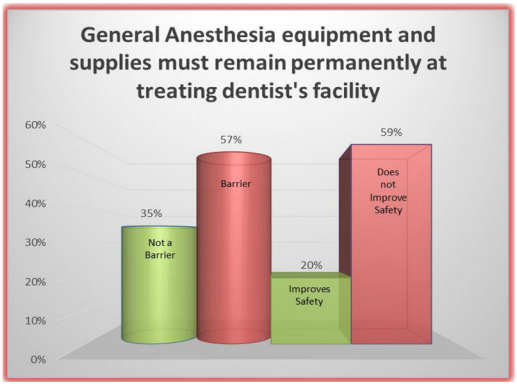

FIGURE 1 Facility permanence of GA equipment/supplies is a barrier that does not improve safety. Dentist anesthesiologist participants indicated their opinion on the laws of equipment permanence and how such regulations pose or do not pose barriers to care and whether such laws improve or do not improve patient safety. Responses of "possible barrier" and "may improve safety" are not represented in this figure.

3.4 | Use of anesthesia services by specialty, location, ASA class, age

The results determined 28% (n = 13/30) of mobile dentist anesthesiologists reported they often worked with general dentists while 37% (n = 17/30) reported they rarely worked with general dentists. (Table 1). Nearly half of all participants most often accepted Medicaid/Medicare (48%, n = 22/46) as payment, but differences were seen between mobile and fixed facility dentist anesthesiologists. Services were most often provided in suburban locations, however, mobile dentist anesthesiologists (23%, n = 7/30) were more likely than fixed dentist anesthesiologists (6%, n = 1/16) to provide services often in rural locations. Conversely, fixed dentist anesthesiologists (69%, n = 11/16) were more likely to rarely provide services in rural locations than mobile dentist anesthesiologists (37%, n = 11/30). Participants reported that they treat patients of all ages and each ASA physical status, but 89% (n = 41/46) most often treated children ages 2–12, and 72% (n = 33/46) rarely treated infants under age 2.

3.5 | Special populations

Special populations in this survey included those with physical and intellectual disabilities, psychiatric illness,

TABLE 1 Frequency of providing general anesthesia for dentist/specialist types

Frequency of working with types of dentists					
		General dentist	Pediatric dentists	Oral surgeon	Other dentists
All n = 46	Often	28% (13)	83% (38)	35% (16)	30% (14)
	Sometimes	35% (16)	7% (3)	33% (15)	43% (20)
	Rarely	37% (17)	11% (5)	33% (15)	26% (12)
Fixed n = 16	Often	38% (6)	69% (11)	19% (3)	31% (5)
	Sometimes	31% (5)	6% (1)	38% (6)	38% (6)
	Rarely	31% (5)	25% (4)	44% (7)	31% (5)
Mobile n = 30	Often	23% (7)	90% (27)	43% (13)	30% (9)
	Sometimes	37% (11)	7% (2)	3% (9)	47% (14)
	Rarely	40% (12)	3% (1)	27% (8)	23% (7)

TABLE 2 Treatment frequency of special population categories

Special populations								
		Physical disability	Intellectual disability	Psychiatric illness	Fear/anxiety	Failed LA	Extensive procedure	Medical complexity
All n = 46	Often	52% (24)	80% (37)	52% (24)	91% (42)	37% (17)	76% (35)	41% (19)
	Sometimes	46% (21)	20% (9)	39% (18)	7% (3)	46% (21)	24% (11)	46% (21)
	Rarely	2% (1)	0% (0)	9% (4)	2% (1)	17% (8)	0% (0)	13% (6)
Fixed n = 16	Often	81% (13)	94% (15)	56% (9)	94% (15)	44% (7)	81% (13)	56% (9)
	Sometimes	19% (3)	6% (1)	44% (7)	6% (1)	44% (7)	19% (3)	31% (5)
	Rarely	0% (0)	0% (0)	0% (0)	0% (0)	13% (2)	0% (0)	13% (2)
Mobile n = 30	Often	37% (11)	73% (22)	50% (15)	90% (27)	33% (10)	73% (22)	33% (10)
	Sometimes	60% (18)	27% (8)	37% (11)	7% (2)	47% (14)	27% (8)	53% (16)
	Rarely	3% (1)	0% (0)	13% (4)	3% (1)	20% (6)	0% (0)	13% (4)

fear/anxiety, and failed local anesthesia. Medically complex patients and those requiring extensive procedures were also included in this category. The special populations commonly treated by dentist anesthesiologists were those with fear/anxiety (91%, n = 42/46), followed closely by intellectual disability (80%, n = 37/46) and those requiring extensive procedures (76%, n = 35/46). It is important to note that a very limited number of dentist anesthesiologists indicated that they rarely treat any of the special populations listed (Table 2).

3.6 | Safety

Rules and regulations that were perceived to improve safety included the requirement of airway/sedation continuing education for general dentists ($p = .0003$), structural requirements for the facility ($p = .047$) educational and training requirements for facility's staff ($p = < .0001$), and specified number of staff for general anesthesia ($p = < .0001$). Conversely, rules and regulatory restrictions on mobility of dentist anesthesiologist equipment/supplies ($p = .0013$) and additional state narcotic handling/transporting regulations ($p = < .0001$) were deemed statistically significant in failing to improve safety (Table 3).

3.7 | State of practice

One-tailed hypothesis testing with an alpha of .1 indicated that rules and regulations were not a factor in establishing the clinical practice in that state over another state ($p = .058$). There was no difference ($p = .397$) if state rules and regulations were a factor in selecting the type of clinical practice (i.e., mobile, private dental practice, ambulatory surgical center, etc.) that the dentist anesthesiologist chose. A total 93% (n = 43/46) of dentist anesthesiologists surveyed stated that the state rules and regulations were not a factor in choosing the type of dentist (specialist) with whom the dentist anesthesiologist worked.

TABLE 3 Perception of barriers and influence on safety of specific rules and regulations

Perception of barriers and influence on safety of listed rules/regulations												
		The treating general dentist is required to have a general anesthesia permit in order for a dentist anesthesiologist to deliver general anesthesia at the treating dentist's facility	**The treating general dentist is required to have a sedation permit of any level in order for a dentist anesthesiologist to deliver general anesthesia at the treating dentist's facility**	**The treating general dentist is required to have airway or sedation continuing education in order to treat patients under general anesthesia**	**General anesthesia equipment and supplies must remain at the treating general dentist's facility permanently**	**State narcotic handling and trasporting regulations in addition to federal requirements**	**A facility permit is required for the treating general dentist's treatment facility before a dentist anesthesiologist can deliver general anesthesia**	**Specific structural requirements are dictated regarding the treatment facility where general anesthesia will be delivered**	**An inspection of the treatment facility where gneral anesthesia will be delivered is required**	**Observation of a general anesthesia procedure at the treatment facility is required**	**The treating general dentist's staff must comply with specific educational and training requirements in order for general anesthesia to be rendered at the facility**	**The delivery of general anesthesia must include a specified number of additional staff plus the dentist anesthesiologist and treating general dentist**
All n = 46	Not a barrier	43% (20)	46% (21)	57% (26)	35% (16)	26% (12)	41% (19)	35% (16)	41% (19)	46% (21)	54% (25)	61% (28)
	Uncertain barrier	2% (1)	13% (26)	15% (7)	9% (4)	15% (7)	11% (5)	17% (8)	17% (8)	17% (8)	26% (12)	20% (9)
	Barrier	54% (25)	41% (19)	28% (13)	57% (26)	59% (27)	48% (22)	48% (22)	31% (19)	37% (17)	20% (9)	20% (9)
	Improves safety	35% (16)	35% (16)	54% (25)	20% (9)	9% (4)	37% (17)	41% (19)	48% (22)	30% (14)	65% (30)	57% (31)
	Uncertain safety	22% (10)	28% (13)	33% (15)	22% (10)	24% (11)	26% (12)	37% (17)	22% (10)	26% (12)	28% (13)	28% (13)
	Does not improve safety	43% (20)	37% (17)	13% (6)	59% (27)	67% (31)	37% (17)	22% (10)	30% (14)	43% (20)	7% (6)	4% (2)

(Continues)

TABLE 3 (Continued)

Perception of barriers and influence on safety of listed rules/regulations												
		The treating general dentist is required to have a general anesthesia permit in order for a dentist anesthesiologist to deliver general anesthesia at the treating dentist's facility	The treating general dentist is required to have a sedation permit of any level in order for a dentist anesthesiologist to deliver general anesthesia at the treating dentist's facility	The treating general dentist is required to have airway or sedation continuing education in order to treat patients under general anesthesia	General anesthesia equipment and supplies must remain at the treating general dentist's facility permanently	State narcotic handling and trasporting regulations in addition to federal requirements	A facility permit is required for the treating general dentist's treatment facility before a dentist anesthesiologist can deliver general anesthesia	Specific structural requirements are dictated regarding the treatment facility where general anesthesia will be delivered	An inspection of the treatment facility where gneral anesthesia will be delivered is required	Observation of a general anesthesia procedure at the treatment facility is required	The treating general dentist's staff must comply with specific educational and training requirements in order for general anesthesia to be rendered at the facility	The delivery of general anesthesia must include a specified number of additional staff plus the dentist anesthesiologist and treating general dentist
Fixed n = 16	Not a barrier	44% (7)	44% (7)	50% (8)	38% (6)	31% (5)	38% (6)	44% (7)	50% (8)	44% (7)	69% (11)	75% (12)
	Uncertain barrier	0% (0)	13% (12)	19% (3)	6% (1)	19% (3)	19% (3)	6% (1)	6% (1)	13% (2)	6% (1)	13% (2)
	Barrier	56% (9)	44% (7)	31% (5)	56% (9)	50% (8)	44% (3)	50% (8)	44% (7)	44% (7)	25% (4)	13% (2)
	Improves safety	44% (7)	50% (8)	63% (10)	38% (6)	19% (3)	69% (11)	63% (10)	75% (12)	38% (6)	81% (13)	94% (15)
	Uncertain safety	19% (3)	25% (4)	25% (4)	31% (5)	13% (2)	13% (2)	25% (4)	13% (2)	19% (3)	19% (3)	6% (1)
	Does not improve safety	38% (6)	25% (4)	13% (2)	31% (5)	69% (11)	19% (6)	13% (2)	13% (2)	44% (7)	0% (0)	0% (0)
Mobile n = 30	Not a barrier	43% (13)	47% (14)	60% (18)	33% (10)	23% (7)	43% (13)	30% (9)	37% (11)	47% (14)	47% (14)	53% (16)
	Uncertain barrier	3% (1)	13% (4)	13% (4)	10% (3)	13% (4)	7% (2)	23% (7)	23% (7)	20% (6)	37% (11)	23% (7)
	Barrier	53% (16)	40% (12)	27% (8)	57% (17)	63% (19)	50% (15)	47% (14)	40% (12)	33% (10)	17% (5)	23% (7)
	Improves safety	30% (9)	27% (8)	50% (15)	10% (3)	3% (1)	20% (6)	30% (9)	33% (10)	27% (8)	57% (17)	53% (16)
	Uncertain safety	23% (7)	30% (9)	37% (11)	17% (5)	30% (9)	33% (10)	43% (13)	27% (8)	30% (9)	33% (10)	40% (12)
	Does not improve safety	47% (14)	43% (13)	13% (4)	73% (22)	67% (20)	47% (14)	27% (8)	40% (12)	43% (13)	10% (3)	7% (2)

3.8 | Fixed versus mobile anesthesia

Fisher Exact testing was performed to discover differences in perceptions between the mobile and fixed groups. There was no statistically significant result for the difference with which the groups agreed concerning barriers to care. However, there was a statistically significant variation between the way the two groups perceived several laws with the fixed groups perceiving an improvement in safety on the following laws: equipment permanence ($p = .0165$), the requirement of facility permit ($p = .0084$), the requirement of inspection ($p = .0369$), and the requirement of additional staff ($p = .0122$).

4 | DISCUSSION

4.1 | Study limitations/strengths

The profession of dental anesthesiology itself is a small group. Among anesthesia providers, dentist anesthesiologists are a relatively modest company of 427 compared to 11,313 oral surgeons, over 54,000 physician anesthesiologists, and 55,653 nurse anesthetists.[16–19] While the number of completed surveys in this study was also small (n = 46), the sample size was representative of approximately 10% of all practicing North American dentist anesthesiologists.

4.2 | Key results

The purpose of the study was to discover factors that may be contributing to the limited access to anesthesia services provided by dentist anesthesiologists. This is the first study to analyze the unique perspective of dentist anesthesiologists in a context which may assist regulatory bodies in negotiating the intersectionality of the public welfare and access to care.

Our results indicated that rules and regulations were not a factor that caused dentist anesthesiologists to practice in one state over another state. However, there were two regulations that mobile providers consistently indicated as posing barriers to care without the improvement of safety. First, regulations of narcotic transportation and second, the requirement that sedation equipment and supplies permanently reside at the treating dentist's facility.

4.3 | Regulation purpose and mobility laws

Similar to findings in other studies, nearly 65% of the respondents in this study were involved in mobile office-based anesthesia practice.[10] Mobility is paramount to enabling the skills of general dentists and specialists to reach the needs of patients within special populations. Unfortunately, dentists not using sedation and general anesthesia services commonly attribute this to a lack of access to dentist anesthesiologists.[10,11]

The purpose of dental regulation, as it is in all healthcare, is to "ensure that only licensed practitioners perform the defined tasks of a particular profession, to protect the public from unprofessional, improper, unlawful, fraudulent, or incompetent practice."[20] It is vital to the longevity of dental anesthesiology and the capability of special populations to receive care that the regulatory environment is frequently evaluated for its efficacy to protect the public while simultaneously promoting an environment conducive to adequate access to care.

Laws that dentist anesthesiologists in this study reported they must abide by yet create barriers to care without improving safety are evidenced in rule 150-13-01 of the "Rules and Regulations of the State of Georgia" which states the following:

> "*All of the aforementioned equipment, drugs, and supplies must be stationary and not subject to transfer from one facility to another.*"[21]

In contrast, Rule 4715-5-05 of the Ohio Administrative Code specifies which equipment "must be immediately available" for sedation but does not place restrictions on the transfer of such equipment from one facility to another.[22]

Requiring that sedation equipment, drugs, and supplies be stationary not only adds unnecessary cost and space requirements to an already infrequently used treatment modality in general practice dentistry, but also itself produces the very consequence that it is intended to prevent- the lack of control to ensure the safety of said items by the most highly trained anesthesia personnel.

4.4 | Further investigations

Our study found statistically significant differences in the opinions of mobile anesthesiologists compared to fixed-facility anesthesiologists regarding the rules and regulations governing dentist anesthesiologists. While most dentist anesthesiologists are engaged in a mobile environment, the majority of other anesthesia professions with far more numerous providers comparatively (e.g., physician anesthesiologists, CRNAs, etc.), practice in a fixed-facility environment. Further

studies are warranted to better understand how the current regulatory environment of dentist anesthesiologists may be influenced by the practice characteristics and lobbying power of other professional anesthesia organizations.

5 | CONCLUSION

This study aimed to discover factors that may be contributing to the limited access to anesthesia services provided by dentist anesthesiologists. It was discovered that although the current regulatory environment does not influence the distribution of dentist anesthesiologists across North America, there are currently rules and regulations that dentist anesthesiologists identified as barriers to care and do not improve patient safety—namely equipment permanence and state narcotic handling/transporting laws. Individuals and organizations responsible for influencing the regulatory environment of anesthesia services should improve regulations to facilitate the mobility of dentist anesthesiologists to reduce barriers to care for special populations within dentistry.

CONFLICT OF INTEREST

The authors of this manuscript declare no conflict of interest.

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