



Contributions of General and Specialty Dentists to Provision of Oral Health Services for People With Special Needs



Center for Health Workforce Studies
School of Public Health
University at Albany, State University of New York

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PREFACE

The Oral Health Workforce Research Center (OHWRC) at the Center for Health Workforce Studies (CHWS) at the University at Albany's School of Public Health completed a study to evaluate the attitudes and willingness of general and specialty dentists to treat people with special needs and to identify the barriers to greater participation by dentists in the care of these patients.

This report was prepared for OHWRC by Simona Surdu, Margaret Langelier, and Chelsea Fosse, with layout design by Leanne Keough. Qiushuang Li completed the data analyses.

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The mission of OHWRC is to provide accurate and policy-relevant research on the impact of the oral health workforce on oral health outcomes. The research conducted by OHWRC informs strategies designed to increase access to oral health services for vulnerable populations. OHWRC is based at CHWS at the School of Public Health, University at Albany, State University of New York (SUNY), and is the only HRSA-sponsored research center with a unique focus on the oral health workforce.

The views expressed in this report are those of OHWRC and do not necessarily represent positions or policies of the School of Public Health, University at Albany, SUNY.

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This material is based upon data provided by the HPI, ADA. The views expressed herein are those of the authors and do not necessarily reflect the position or policy of the HPI, ADA.

Institutional Review Board

The plan for this study was reviewed and designated exempt from further review by the Institutional Review Board of the New York State Department of Health (Study No. 1474988).

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EXECUTIVE SUMMARY

BACKGROUND

The World Health Organization (WHO) describes disability as an “umbrella” term for a range of physical and cognitive impairments and other limitations that affect activity or restrict participation in daily life. WHO discusses disability as more than just a health problem, but rather as a complex interaction of the body, the environment, and society.¹ While individuals with disabilities have many health care needs common to others, many live at the “margin” of health because of numerous factors, including increased susceptibility to medical comorbidities, greater prevalence of poverty, and increased likelihood of experiencing barriers to needed health services. A national surveillance survey of adults in the US found that 1 in 4 noninstitutionalized adults reported a disability in 2016.²

The American Academy of Pediatric Dentistry estimates that, as of 2012, approximately 14.6 million children in the US had a special health care need.³ Families of children with special health care needs have identified oral health as the most common unmet health care need for their child.^{4,5}

Due to recent advances in medicine, available therapeutic interventions, and supportive technologies, many people with birth or disease conditions or acquired disabilities that result in physical, emotional, or cognitive limitations will live longer than in the past; many diagnoses that were once considered fatal are now managed as chronic conditions over the life span.⁶ For these and other reasons, it is important to ensure that people with special needs are provided with appropriate health and oral health care services beginning early in life and continuing throughout adulthood into their elder years.

People with disabilities present special challenges for medical and dental providers, who may have limited training or knowledge of their various medical, behavioral, and emotional conditions. This is especially true in dentistry. Pediatric dentists complete extensive training related to the treatment of children with special health care needs during their specialty residency programs; however, most general dentists, who constitute the majority of practicing dental professionals, do not receive appreciable training in dental school relative to people with special needs.

This study assesses the contributions of general and specialty dentists to care for people with special needs. Another goal is to describe sources of training for dentists relative to treating people with special needs. Study findings are useful to many oral health stakeholders interested in expanding access to oral health services for these populations. This report will henceforth refer to “special needs” consistent with conventional terminology and recognizable by our survey respondents. Our definition includes those with intellectual and developmental disabilities, those with physical disabilities, and those with acquired disabilities. It is important to note that many communities have transitioned the vernacular to person first language, and prefer classifications such as ‘child with special needs’ or ‘adult with intellectual disability.’

METHODOLOGY

The survey was sent via email to 3 groups of dentists. The first was a random sample of general practitioners and pediatric dentists created by the Health Policy Institute (HPI) (n=18,521). In addition, the survey was fielded to all members of the Special Care Dentistry Association (SCDA) with available email addresses (n=350) and to dentist members of the American Academy of Developmental Medicine and Dentistry (AADMD) with email addresses (n=26).

Overall, 766 dentists responded to the survey. Responses were collected from 623 dentists from the HPI sample, a response rate of 3.4% (adjusted response rate excluding bounced emails was 3.5%). Responses were collected from 130 SCDA members for a response rate of 37.1%. Responses were collected from 13 AADMD members for a response rate of 50.0%.

The survey instrument, which was developed jointly by the HPI and Oral Health Workforce Research Center (OHWRC), involved a series of skip-logic questions about any formal didactic or clinical training specific to people with special needs, where the dentist received relevant training, the proportionate contributions of general and specialty dentists to the provision of oral health services to people with special needs, and perceived barriers to provision of this care. The survey tool was pilot-tested using a convenience sample of dentists comprising members of the SCDA and AADMD whose practices predominantly serve people with

special needs as well as a convenience sample of general dentists who were not members of either organization.

The data analyses included descriptive statistics and statistical significance tests assessing differences in provision of oral health services to people with special health care needs by dentists' demographics, education, and training as well as practice characteristics. Results from the surveys are presented in both graphical and narrative format. All analyses were conducted using SAS v9.4.

KEY FINDINGS

Characteristics of Responding Dentists

- About half of survey respondents were male dentists (51.1%). The majority were between 25 and 54 years of age (61.7%) and were non-Hispanic white (74.7%). The respondents were more gender and racially/ethnically diverse and slightly younger than the population of US dentists.
- About a third (30.9%) of respondents were recent graduates (<10 years since dental school graduation), 96.3% graduated from dental schools in the US and Canada, nearly half (46.4%) completed a residency training program, 9.3% completed a fellowship, and 16.5% completed both a residency and a fellowship.
- Two-thirds (65.8%) of respondents worked as general practitioners in their primary practice, 31.2% worked as pediatric dentists, and 3.0% practiced in another dental specialty.
- Although the majority (61.2%) of survey respondents worked in private dental practices, 11.0% worked in community health clinics, 8.6% in academic dental centers, and 7.1% in hospitals.

Provision of Dental Care to People With Special Needs

- The majority (96.2%) of dentists who responded to a survey question (n=605) about treating people with special needs provided care to these patients in their primary practice during 2018.

- The majority of dentists who treated people with special needs treated some patients with intellectual and/or developmental disabilities (89.9%), with physical disabilities (90.9%), and/or with acquired disabilities (ie, dementia, traumatic brain injury, or other types of injuries; 75.7%).
- The majority of respondents who provided any dental services to people with special needs served one or more children less than 18 years of age (86.7%), working-age adults (91.9%), and/or adults 65 years of age and older (74.0%) with special needs in a typical month.
- Most respondents treated between 1 and 10 people with special needs in all age groups (46.5% to 63.3%), one-fifth to one-quarter (19.6-26.2%) provided dental care to between 11 and 50 patients, and about 1 in 10 respondents (7.6%-11.4%) treated 51 or more people with special needs in a typical month.
- More than one-quarter (27.8%) of dentists reported that they treated "none or few" people with special needs, while the remainder (72.2%) treated "many" in a typical month. Respondents who treated up to 10 people with special needs in 1 or 2 of the 3 age groups (children, working-age adults, and adults 65 years of age and older) in a typical month were categorized as treating "none or few."

Facilitators of Dental Care Provision to People With Special Needs

- Dentists who provided dental care to people with special needs reported that the main referral sources for these patients were a patient's family or friends (59.9%), self-referral by the patient or their family (59.2%), and referral by a general dentist (54.1%).
- The majority of dentists indicated the presence of practice accommodations for patients, including increased time allotted for appointments (77.2%), wide hallways/corridors (76.3%), wheelchair ramps (56.3%), easy transfer to dental chair (54.7%), equipment to treat patients in their own wheelchair (54.1%), and/or appropriately trained or experienced staff (53.4%).

- The most common psychotherapeutic or pharmacologic interventions for people with special needs were behavior management techniques (80.4%), followed by nitrous oxide/oxygen inhalation (63.9%), oral premedication (42.7%), general anesthesia (41.4%), and protective stabilization (38.8%).

Education and Training in Providing Dental Treatment to People With Special Needs

- A majority of respondents indicated that they received education, training, or other experience working with people with special needs during didactic education in dental schools (58.7%), didactic education (54.2%) and/or clinical training (53.5%) in residency programs, and/or continuing education (56.1%).
- Those who received no training in special needs in dental school or residency indicated receiving relevant training through continuing education (6.4%) and/or from other sources (4.0%), including personal experience, community involvement, and familial or other relationships.
- The majority strongly agreed or agreed that education, training, or other experiences working with people with special needs increased their awareness (92.2%), confidence (82.4%), and willingness (81.0%) to treat people with special needs and that it provided practical information (82.9%) and/or enhanced their skills (81.8%) in treating people with special needs.
- Most survey respondents strongly agreed or agreed that residency programs (98.4%), dental schools (95.9%), and/or continuing education programs (91.7%) should offer education and training on treating people with special needs.

Barriers to Providing Dental Care to People With Special Needs

- The most important barriers identified by survey respondents were not being a Medicaid provider, not having appointment requests from these patients, and not having a dental office that was properly equipped to accommodate people with special needs.

- Survey respondents ranked a lack of proper training of their staff and concerns about the use of behavior management techniques required when working with people with special needs as the least important barriers.

Factors Associated With Provision of Dental Treatment to People With Special Needs

- Survey respondents who reported having at least one accommodation in their primary practice for people with special needs were 2 times more likely to serve “many” people with special needs than those who had none (76.9% vs 40.0%).
- Practice accommodations such as wide hallways or corridors, being equipped to treat patients in their own chairs, and assignment of trained or experienced staff had the highest impact on dentists’ decisions to treat “many” people with special needs.
- Survey respondents who reported using at least one psychotherapeutic or pharmacologic intervention were 1.5 times more likely to serve “many” people with special needs than those who used none (78.8% vs 52.3%).
- The use of behavior management techniques and protective stabilization when treating people with special needs were the factors with the highest influence on the provision of dental care for “many” patients with special needs among survey respondents.
- Training or experience working with patients with special needs through continuing education, community involvement, and didactic education and clinical training in residency programs had the highest impact on the provision of dental care for “many” people with special needs.
- Survey respondents who reported having at least one of these sources of education, training, or experience in working with populations with special needs were 1.7 times more likely to serve “many” people with special needs than those who had none (75.8% vs 45.5%).
- Proportionally more dentists who agreed that education and training increased their awareness, willingness, or confidence and/or provided practical in-

formation and enhanced their skills to treat people with special needs treated “many” patients than did the other survey respondents.

DISCUSSION & CONCLUSIONS

The data from our survey support the hypothesis that many dentists are treating at least a small number of people with special needs. A survey of general practice dentists in Michigan found that most responding dentists treated some individuals with developmental disabilities; 77.3% treated some adults and 48.4% treated some children with special needs.⁷ Our survey found that about 90% of respondents treated some patients with intellectual and/or developmental disabilities and patients with physical disabilities. Moreover, 75.7% treated some patients with other acquired disabilities, such as dementia, traumatic brain injury, or another type of injury or condition.

In our survey, only a few dentists indicated not treating one or another cohort of children, working-age adults, or elders with special needs. The majority (63.3%) of dentists treated between 1 and 10 working-age adults with special needs in a typical month, 49.1% treated between 1 and 10 children with special needs, and 46.5% of respondents provided dental care to between 1 and 10 adults 65 years of age and older with special needs.

Although the number of dentists in our survey who did not treat people with special needs was small, they identified the main barriers to including special populations in their practices as not being Medicaid providers, not having appointment requests from such patients, and not having a dental office properly equipped to accommodate special needs. These respondents also expressed concerns about not feeling properly trained to treat patients with psychotherapeutic and pharmacologic needs. One study in Michigan found that concerns about behavior management, inadequate training and experience, and severity of a patient’s condition were among the most common reasons for not treating patients with behavior management problems.⁸

Our study results indicated that the most common accommodations provided for people with special needs were allowing increased time to complete the patient appointment for a scheduled patient with special needs

and structural features including wide hallways and corridors, wheelchair ramps, easy transfer to dental chairs, and an office properly equipped to treat patients in their own chairs. This was not an unexpected finding in that the Americans with Disabilities Act (ADA) requires certain structural features at initial construction of a building or upon renovation. Thus, accessible entries and hallways are rapidly becoming standard features of both medical and dental practices. The next most common accommodation indicated by survey respondents was the assignment of appropriately trained staff to provide services (53.4%).

Dentists who served “many” people with special needs in a typical month were proportionally and significantly more likely than dentists who treated “none or few” to indicate that their practices were designed with the necessary accommodations to provide treatment, including wide hallways/ corridors, the ability to treat patients in their own wheelchairs, and the assignment of appropriately trained or experienced staff. Other practice accommodations with significant impacts on the likelihood of treating patients with special needs included easy-transfer dental chairs, sensory-sensitive environments, a dedicated time or day for appointments, and increased time for treatments.

Survey respondents who provided dental care to “many” people with special needs were proportionally more likely than dentists who treated “none or few” to indicate that they used behavior management techniques and/or protective stabilization when treating these patients. Dentists’ ability to use other interventions such as general anesthesia, oral premedication, and nitrous oxide or oxygen inhalation also had a positive impact on the provision of dental care to people with special needs.

In 2004, the Commission on Dental Accreditation (CODA) added Standard 2-25 charging dental education programs with integrating a new competency into predoctoral curricula.⁹ That standard was “graduates must be competent in assessing the treatment needs of patients with special needs.” Stakeholders commented that the directive was not as specific as needed, as it did not require competency in treating these patients. In 2019, CODA standards were modified to include a directive that dental students must be prepared to assess and *manage* the treatment of people with special needs.

Approximately 81% of dentists who completed a postdoctoral residency, specialty training, or fellowship (such as a general practice residency, advanced education in general dentistry, pediatric dentistry residency, or another dental specialty) treated “many” people with special needs compared with about 66% of those who did not indicate a residency program as a source of their personal education in special needs. Dentists who provided dental care to “many” people with special needs were also more likely than dentists who treated “none or few” to indicate continuing education and community involvement with people with special needs or advocacy organizations as sources of education, training, and experience in working with these patients.

A significantly higher proportion of dentists who strongly agreed that their education provided them with increased awareness of special needs provided services to “many” people with special needs compared with other survey respondents. Moreover, a significantly higher proportion of dentists who strongly agreed that their education and training increased their willingness to serve people with special needs, that it increased their confidence to treat, that it provided practical information about treating such patients, and that it enhanced their skills to treat these patients were also dentists who provided services to “many” people with special needs compared with other dentists.

A recent study suggested that inequalities in didactic training and clinical experience during the pediatric dental residency affect pediatric dentists’ ability or willingness to treat some types of patients with special needs.¹⁰ Some dentists may still need to refer certain patients to other settings to accomplish treatment. The authors suggested that the reasons may be complex and may range from the adequacy of the facility to accommodate the special need to financial reimbursement issues to uncooperative patient behavior making it difficult to complete treatment.

Exposure to the complexities of treatment of special-needs populations appears to be critical at all levels of dental education. Subar and colleagues surveyed alumni dentists and found that dentists who completed any postdoctoral residency (which was in and of itself predictive of providing services to people with special needs) were also more likely to report predoc-

toral training and experience in treating patients with developmental disabilities.¹¹

LIMITATIONS

The results of this survey were encouraging in that many responding dentists were treating at least some patients who required treatment modifications. However, the low overall response rate among those in the random sample and the use of convenience sampling to reach dentists known to treat people with special needs make it difficult to generalize results to the larger population of dentists. Nonetheless, the findings are of interest as they contribute to the literature describing the contributions of dentists to services for special populations.

The high rate of response among dentists providing services to people with special needs suggests the possibility of response/selection bias among survey participants. While the generic survey solicitation letter requested that all dentists in the sample complete the survey, the authors surmise that the topic may have been a deterrent to those who do not treat people with special needs. Recent literature discussing survey response rates suggests that the relevance of a topic to the potential respondent is a predictor of survey completion, which may or may not result in nonresponse bias.

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TECHNICAL REPORT

BACKGROUND

The World Health Organization (WHO) describes disability as an “umbrella” term for a range of physical and cognitive impairments and other limitations that affect activity or restrict participation in daily life. WHO discusses disability as more than just a health problem, but rather as a complex interaction of the body, the environment, and society.¹ While individuals with disabilities have many health care needs common to others, many live at the “margin” of health because of numerous factors, including increased susceptibility to medical comorbidities, greater prevalence of poverty, and increased likelihood of experiencing barriers to needed health services. A national surveillance survey of adults in the US found that 1 in 4 noninstitutionalized adults reported a disability in 2016.²

The Maternal and Child Health Bureau defines the term “special health care needs” as inclusive of a range of medical, behavioral, developmental, mental, cognitive, emotional, and sensory conditions or impairments that require a child to receive health and related services in amounts greater than those generally required for other children.³ These conditions affect medical management decisions, selection of health care interventions, and the types of equipment, services, and programs necessary to address individual needs. The American Academy of Pediatric Dentistry estimates that, as of 2012, approximately 14.6 million children in the US had a special health care need.⁴ Families of children with special health care needs have identified oral health as the most common unmet health care need for their child.^{5,6}

The National Center for Education Statistics indicates that, in the 2015-2016 academic year, 6.7 million children aged 3 to 21 years were receiving special education services in public schools due to an identified special need.⁷ About 34% had a learning disability, 20% had a speech or language impairment, 14% had another type of health impairment (inclusive of a range of disease and birth conditions), and 9% had autism, with the remainder falling within other categories.⁷ The percentages of students with identified special needs were highest for American Indian/Alaska Native children (17%), black children (16%), white children (14%), children of 2 or more races (13%), and Hispanic (12%) or Pacific Islander (12%) children.⁷ Many of these racial

and ethnic groups are at greater risk for being medically underserved or for being economically disadvantaged. Children with special health care needs are also less likely to graduate from high school than others, placing them at risk for poverty in adulthood.⁷

Special health care needs can also impoverish an individual or a family due to the high cost of health services and intensive use of specialty providers. These factors suggest that children and adults with special needs are more likely to be Medicaid or Children’s Health Insurance Program (CHIP) eligible than their peers, further impacting the availability of health and oral health services because of limitations in the number of providers who participate in these programs.

Due to recent advances in medicine, available therapeutic interventions, and supportive technologies, many people with birth or disease conditions or acquired disabilities that result in physical, behavioral, or social limitations will live longer than in the past; many diagnoses that were once considered fatal are now managed as chronic conditions over the life span.³ For these and other reasons, it is important to ensure that people with special needs are provided with appropriate health and oral health care services beginning early in life and continuing throughout adulthood into their elder years.

People with special needs present special challenges for medical and dental providers, who may have limited training or knowledge of their various medical or behavioral conditions. This is especially true in dentistry. Pediatric dentists complete extensive training related to the treatment of children with special health care needs during their specialty residency programs; however, most general dentists, who constitute the majority of practicing dental professionals, do not receive appreciable training in dental school relative to people with special needs. The supply of pediatric dental specialists compared with general dentists is small, and the metropolitan locations of many of these specialty dental practices further restricts access to their services. Although pediatric dentists treat both children and adults with special needs, it is not possible for them to meet the needs of the ever-growing population of people with disabling conditions. Therefore, it is important to understand whether general dentists, particularly those in smaller population areas, are providing services to people with special needs.

This study assesses the contributions of general and specialty dentists to care for people with special needs. Another goal is to describe sources of training for dentists relative to treating people with special needs. Study findings are useful to many oral health stakeholders interested in expanding access to oral health services for these populations.

METHODOLOGY

The survey of dentists about people with special needs was conducted by the American Dental Association's Health Policy Institute (HPI) on behalf of the Oral Health Workforce Research Center (OHWRRC). The goal of the survey was to learn more about how general practitioners and pediatric dentists accommodate people with special needs. For the purposes of this survey, people with special needs were defined as those presenting with one or more of the following:

1. Intellectual and/or developmental disabilities (eg, those with autism spectrum disorder, seizure disorders, cerebral palsy, genetic conditions like Down syndrome, etc)
2. Physical disabilities (eg, mobility or movement disorders such as those requiring the use of a wheelchair, involuntary or uncontrollable movements)
3. Other acquired disabilities (eg, those with dementia, traumatic brain injury, or other type of injury or condition)

The study also included an extensive literature review of peer-reviewed journal articles and other relevant publications describing dentists' provision of oral health care to populations with special needs, the readiness of the dental workforce to provide these services, the barriers to providing care, and the opportunities for dental education and professional training programs to support improvements in the oral health delivery system for populations with special needs.

Survey and Sample

Survey questions were developed by the OHWRRC team in collaboration with HPI staff. HPI staff prepared the online questionnaire and managed data collection.

The survey was sent via email to 3 groups of dentists. The first was a random sample of general practitioners and pediatric dentists created by the HPI team (n=18,521). In selecting this sample, HPI staff excluded dentists who had recently been solicited to complete other contemporaneous surveys sponsored by HPI. In addition, the survey was fielded to dentist members of the Special Care Dentistry Association (SCDA) with available email addresses (n=350) and to dentist members of the American Academy of Developmental Medicine and Dentistry (AADMD) with email addresses (n=26). Dentists included in the HPI sample each received a unique link to the survey. In contrast, SCDA member dentists received an anonymous survey link distributed by SCDA staff and AADMD member dentists received an anonymous survey link distributed by AADMD staff.

The survey was deployed via email to the HPI sample on April 25, 2019. A total of 4 reminders were sent (on April 27, May 6, May 18, and June 1), and data collection ended on June 14. The survey was deployed via email to SCDA members on June 6, 2019. Two reminders were sent (on July 3 and July 6), and data collection ended for this group on July 18. Finally, the survey was deployed via email to AADMD members on August 1, 2019. The survey link was posted on Facebook on July 30, and Family Voices Indiana posted the survey link on their website on August 1. Data collection ended for this group on August 13.

Respondents

Overall, 766 dentists responded to the survey. Responses were collected from 623 dentists from the HPI sample, a response rate of 3.4% (adjusted response rate excluding bounced emails was 3.5%). Responses were collected from 130 SCDA members for a response rate of 37.1%. Responses were collected from 13 AADMD members for a response rate of 50.0%.

Survey Instrument

The survey instrument, which was developed jointly by the HPI and OHWRRC, involved a series of skip-logic questions about any formal didactic or clinical training specific to populations with special needs, where the dentist received relevant training, the proportionate contributions of general and specialty dentists to the provision of oral health services to people with

special needs, and perceived barriers to provision of this care. The survey tool was pilot-tested in April 2019 using a convenience sample of dentists comprising members of the SCDA and AADMD whose practices predominantly serve people with special needs as well as several general dentists who were not members of either organization. A copy of the survey instrument is included in the Appendix.

Data Analysis

The data analyses included descriptive statistics, cross tabulations, and statistical significance tests assessing differences in provision of oral health services to people with special needs by dentists' demographics, education, and training as well as practice characteristics. The data analyses conducted for this project aimed to evaluate:

- The extent to which general and specialty dentists serve people with special needs
- Differences in contributions to the care of people with special needs by dentists' gender, age cohort, specialty, practice location, and other individual and practice characteristics
- History of dentists' training and education relative to special treatment techniques and adaptations in current practice for patients with special physical, behavioral, or developmental challenges
- Dentists' perceptions of barriers and facilitators to serving people with special needs

Results from the surveys are presented in both graphical and narrative format. All analyses were conducted using SAS v9.4.

FINDINGS FROM THE LITERATURE REVIEW

The number of children with developmental disabilities is on the rise, as is the number of adults in the US with disabilities.^{2,8} Individuals with disabilities generally have a greater prevalence and severity of periodontal disease, higher rates of unmet dental needs, and

lower-quality oral home care and experience greater barriers to care than the general population.^{8,9}

Families and caregivers, as well as community-based organizations serving this population, overwhelmingly report difficulty in identifying dentists in their communities who are trained, willing, and able to treat people with special needs.^{10,11}

The objective of this literature review was to better understand existing research on the current contributions of general and pediatric dentists to the provision of oral health care services for people with special needs. This review will henceforth refer to "special needs" consistent with conventional terminology for most years in the window of research. However, it is important to note that current terminology has transitioned to more acceptable language, such as individuals with intellectual and developmental disabilities (IDD), people with autism, and so on.

This literature review was conducted to inform the survey development process for the primary data collection activity that was a part of this project. Two factors were of particular interest in performing the literature review:

- Variations in treating people with special needs based upon the source of education and training, such as predoctoral programs, postdoctoral advanced education programs, and continuing education offerings
- The impact of specialty status, or, more specifically, the comparative contributions of general dentists and pediatric dentists in working with this population in terms of segments of the population served and management techniques utilized

Methods

MedLine via PubMed was the primary search engine utilized. Medical Subject Heading (MeSH) search terms included "dental care for disabled" and "dentists." Filters were applied to limit search results to publications dated between 2009 and 2019 and published in the United States. Because of the relatively low volume of research in this area, studies pertaining to workforce research in specific states and dental school alumni populations were not excluded.

The initial search returned 64 results. Forty-six publications were excluded after title and abstract review for the following reasons:

- Being a commentary, opinion piece, organizational policy statement, or narrative review rather than primary or secondary research (25)
- Taking place outside the US (8)
- Irrelevance to the research question (6)
- Study population limited to nonpediatric dental specialists, such as endodontists or orthodontists (3)
- Focus on dental hygienists and hygiene students (2)
- Studies of parents of those with special needs (2)

The 18 remaining publications consisted primarily of survey-based studies, typically garnering information on educational and training history and current professional attitudes and behaviors with respect to treating populations with special needs. Survey respondents included general dentists, pediatric dentists, dental residents, residency directors, and hospital administrators. The dentists were most often recruited via their membership in professional organizations, such as the American Academy of Pediatric Dentistry or local dental societies and state associations, or due to their alumni status with a dental school. Qualitative research was also included, with one study performing key informant interviews of community-based organization leaders regarding the types of oral health services offered to their clients/constituents, and another involving semistructured interviews with both general and pediatric dentists about patients' transitions from pediatric to adult-level care. One study analyzed Medicaid claims data, comparing utilization information for children with intellectual or developmental disabilities with data on peers in the general population.

Results

Source of Training

Predoctoral: Dental School

In a survey of alumni of a dental school, dentists who

reported having more opportunities to treat patients with complex needs as dental students were treating a significantly higher percentage of those patients as practicing dentists. This same group also had more positive perceptions of their dental school educational experiences.¹²

A survey of alumni dentists who graduated between 1970 and 2011 found that community-based dental education (CBDE) programs had a positive impact on preparation of dentists to serve people with special needs in their future practice. When comparing dentists who participated in CBDE with those who did not (based on year of incorporation of CBDE into the curriculum), there were slight increases in terms of "feeling confident treating people with special needs" (62% vs 60%) and "liking to treat people with special needs" (48% vs 44%) among those with CBDE. Dentists who felt their CBDE experiences were well structured also had more positive attitudes about treating underserved patients. However, when asked specifically about the ability of their CBDE program to prepare them to treat people with special needs, only 27% reported feeling well prepared. The alumni reported overall that only 1% of their current patient pool consisted of people with special needs.¹³

Another study, which surveyed dental residents and their residency program directors, reported disparate findings among respondents. At entry to postdoctoral training programs (first year), 28% of residents felt adequately prepared to treat children with intellectual disabilities. In contrast, only 11% of their program directors believed that these first-year residents were adequately prepared to do so, indicating shortcomings in education at the predoctoral level.¹⁴

Postdoctoral: General Practice and Pediatric Dental Residencies

In a survey of postdoctoral general practice residency directors, 91% indicated agreement that both the profession of dentistry and the patients served would benefit from more postgraduate training opportunities in the care of people with special needs.¹⁵

Among pediatric dental residents who responded to a survey, confidence in treating children with special needs was high. Nearly three-quarters (71.3%) of residents were confident and 15.4% were very confident

using non-pharmacologic treatments for this population. Confidence in using pharmacologic methods was lower, with 30.1% indicating that they did not feel competent with such interventions. Fifteen percent of responding pediatric dental residents reported no didactic training and 11.2% reported no specific clinical training in their programs specific to special care dentistry.⁹

Continuing Education

There is minimal literature evaluating the effectiveness of continuing education programs in terms of the attitudes and behaviors of providers relative to serving people with special needs. Although some professional “niche” organizations regularly offer these programs at annual meetings, presumably the majority of continuing education opportunities sought by dentists are provided at the local level by small organizations (eg, local dental societies, study clubs) that may not currently have the capacity or resources to study outcomes and educational impact.

Conclusion

Predoctoral experiences appear to “set the stage,” providing motivation and confidence for further skill development and continued service to populations with special needs in residency programs and eventually in practice. Those who treated statistically more patients with complex needs in practice also reported more predoctoral and postdoctoral experience with people with special needs. Those who completed a postdoctoral residency, regardless of whether they took advantage of other continuing education courses in this area, reported greater predoctoral experience treating patients with developmental disabilities than those who did not pursue advanced dental education.¹²

Generalists vs Specialists

Pediatric Dentists

Survey data showed that nearly all pediatric dentists (99%) treated children with IDD; nevertheless, more than half (55%) reported a need to refer some patients to other settings for various reasons, including a need for dental treatment with advanced pharmacologic management (oral or intravenous sedation or general

anesthesia) or for specialty services (eg, endodontics, orthodontics). Ninety-six percent of pediatric dentists were confident with their skills in nonpharmacologic behavior management, while 84.5% were confident utilizing pharmacologic techniques. In both pediatric residency training and subsequent practice, nitrous oxide and general anesthesia were more common pharmacologic techniques than oral or intravenous sedation.⁹

Pediatric dentists receive additional education and training on aspects of the “dental home,” including the need for care to be accessible, family centered, continuous, comprehensive, coordinated, compassionate, and culturally competent. These concepts are important not only for pediatric populations, but also for those with special needs across the lifespan.¹⁶

General Dentists

A survey of general dentists in Michigan found that 77.3% of respondents served some adult special-needs patients, but fewer (48.4%) treated any children with special needs. When asked “How well did your undergraduate dental education prepare you for managing patients with special needs?” only 12.2% reported “well” or “very well.”¹⁷

Other studies have found inadequacies in predoctoral education that affect general dentists’ willingness to treat certain populations.¹⁵ One study of general dentists assessed dentists’ willingness, perceived barriers, and training needs relative to treating children and adults with IDD. Nearly three-quarters of survey respondents reported that their predoctoral program did not prepare them well for treating patients with developmental disabilities, and about 80% reported that “more training needs to be included in the dental school curriculum.” More than 90% agreed that “it is important to increase access to dental care for patients with developmental disabilities,” while nearly 70% expressed interest in relevant training opportunities. Among those who did not treat people with special needs, 58% said that they would be interested in providing care to individuals with IDD if the barriers were addressed. The barriers that were most commonly identified included behavior management concerns, inadequate training, and lack of clinical experience. Factors identified as most promising to improve

the ability of dentists generally to care for patients with developmental disabilities were further training and better reimbursement.¹⁸

In a similar study of general dentists in Nebraska, the most common reasons for not seeing people with special needs were the level of the patient's disease, the patient's behavior, and insufficient training/experience. The most commonly cited measures for improving practitioners' ability to care for these populations were improved reimbursement (35%) and more continuing education (36%).¹⁹

Transition From Pediatric to Adult Care

Barriers to care increase with age among people with special needs. In a study of families and caregivers, 14% of parents/caregivers with children under 6 years of age reported difficulty finding a dental provider. At the same time, 44% of caregivers of family members with special needs between the ages of 23 and 26 years expressed difficulty finding dental providers to care for these adults. Financial concerns and distance to providers were identified as barriers to access for people with disabilities aged 23 to 26 (30% and 21%, respectively). These factors were not cited as barriers for children less than 6 years of age.²⁰ The medical community has a long-standing interest in addressing the challenges of transition from pediatric to adult care for people with special needs, and this issue is now receiving emphasis in dentistry.

Another study engaged general and pediatric dentists to explore the pediatric-to-adult-care transition for people with special needs, focusing on adolescents who were referred to a general dentist by their existing pediatric dentist and examining whether completion of follow-up with the general dentist occurred.²¹ Both general and pediatric dentists noted 2 primary barriers to effective transitioning: low reimbursements from Medicaid and a shortage of general dentists who were comfortable, experienced, and willing to treat people with special needs. Nationally, 66% of pediatric dentists participate in Medicaid, while only 39% of general dentists do so.²² Respondents suggested incorporating more training into dental school curricula to better prepare dentists and to offer additional training opportunities to those already in practice.²¹

Geography: US Regional and Rural, Suburban, and Urban Variations

Minimal comparative research has been done across US regions based on rural, suburban, or urban setting status and the treatment of patients with special health care needs. Regional variations might be deduced by comparing studies conducted in different US states, such as those involving dentist populations in California, Michigan, Nebraska, and Washington.^{11,12,17-19,21}

Implications

This review was unable to identify any comprehensive study describing the contributions of general and pediatric dentists to the oral health care of people with special needs at a national level. Common themes from the literature review include the need to:

- Enhance predoctoral didactic education and clinical training to include working with people with special needs (which serves as a dual motivator for pursuit of advanced education and willingness to serve the population with special needs once in practice)
- Increase the quality and frequency of continuing education opportunities for practicing dentists while also evaluating effectiveness of these programs
- Better understand geographic and regional variations in care to maximize the workforce and meet varying needs across populations and settings
- Foster collaboration among providers, patients and families/caregivers, community-based organizations, and payers (especially in terms of payment and reimbursement structures) to optimize access to and receipt of high-quality oral health care for people with special needs

This work is particularly timely, as 2020 marks the 30th anniversary of the Americans With Disabilities Act.²³ In 2018, the American Dental Association updated its Code of Ethics, which now explicitly "prohibits dental care providers from denying care to patients because of their disability."²⁴ Additionally, the Commission on Dental Accreditation (CODA) updated its predoctoral education standard requiring that dental schools train students to not only assess (ie, recognize and refer) but also *manage* (ie, provide treatment to) people with special needs.²⁵

RESULTS FROM THE RESEARCH STUDY

Demographic, Education, and Practice Characteristics of Responding Dentists

Just over half of survey respondents were male dentists (51.1%) (Table 1). The majority were between 25 and 54 years of age (61.7%) and were non-Hispanic white (74.7%). Dentists who responded to the survey were more gender (48.9% vs 32.3% female) and racially/ethnically (7.3% vs 5.3% Hispanic; 3.1% vs 1.0% American Indian/Alaska Native or other) diverse and slightly younger (42.9% vs 40.1% between 25 and 44 years of age) than the population of professionally active dentists in the US in the American Dental Association's Masterfile. The large representation of pediatric dentists among respondents is likely responsible for the higher proportion of females and the greater racial/ethnic diversity among those who completed the survey.

TABLE 1. Demographic Characteristics of Dentists

Demographic Characteristics	Survey Sample		Dentists in the US ^a
	n	%	%
Gender			
Male	318	51.1%	67.7%
Female	304	48.9%	32.3%
Total	622	100.0%	100.0%
Age (years)			
25-34	132	18.6%	16.9%
35-44	172	24.3%	23.4%
45-54	133	18.8%	21.1%
55-64	168	23.7%	22.8%
65+	104	14.7%	15.8%
Total	709	100.0%	100.0%
Race/ethnicity			
White	451	74.7%	73.6%
Asian	65	10.8%	15.8%
Underrepresented minority			
Hispanic, Latino/Spanish	44	7.3%	5.3%
Black or African American	25	4.1%	4.3%
American Indian or Alaska Native, other	19	3.1%	1.0%
Total	604	100.0%	100.0%

Note: Totals may vary due to missing responses.

^a Source: American Dental Association Health Policy Institute analysis of ADA Masterfile, 2018, 2019.

More than 3 in 10 survey respondents (30.9%) were recent graduates (less than 10 years since graduation from a dental school) (Table 2). About 96.3% of dentists graduated from dental schools in the US and Canada. Nearly half (46.4%) of respondents completed a residency training program, 9.3% completed a fellowship, and 16.5% completed both a residency and a fellowship.

TABLE 2. Dental Education and Training of Dentists

Dental Education and Training Characteristics	n	%
Years since graduation		
0 to 9	222	30.9%
10 to 19	136	18.9%
20 to 29	125	17.4%
30 to 39	168	23.4%
40+	68	9.5%
Total	719	100.0%
Predoctoral education in dentistry		
US or Canada trained	208	96.3%
Foreign trained	8	3.7%
Total	216	100.0%
Postgraduate training in dentistry		
Residency program	110	46.4%
Fellowship or certificate program	22	9.3%
Both programs	39	16.5%
None	66	27.9%
Total	237	100.0%

Note: Totals may vary due to missing responses.

Two-thirds (65.8%) of survey respondents worked as general practitioners in their primary practice, 31.2% worked as pediatric dentists, and 3.0% practiced in another dental specialty (Table 3). We oversampled pediatric specialists in order to provide an adequate number of survey responses for statistical comparisons. Pediatric dentists represented 4.0% of all dentists in the US in 2018.²⁶

About half (51.7%) of respondent dentists were sole owners of or partners in their practices. The percentage of owner dentists in the sample was smaller than in the US dental workforce (77.5% in 2017).²⁷ This difference is partly attributable to the high percentage of responding dentists who were working in settings other than private practice. Although the majority (61.2%) of survey respondents worked in private dental practices, 11.0% of respondents worked in community health clinics, 8.6% in academic dental centers, and 7.1% in hospitals. The large percentage of female respondents also may have contributed to this finding, as female dentists appear to have a preference for employment rather than dental practice ownership.²⁸

TABLE 3. Practice Characteristics of Dentists in 2018

Primary Practice Characteristics in 2018	n	%
Specialty		
General practice	478	65.8%
Pediatric dentistry	227	31.2%
Other ^a	22	3.0%
Total	727	100.0%
Employment situation		
Owner		
Sole proprietor (ie, the only owner)	307	40.3%
Partner (ie, one of 2 or more owners)	87	11.4%
Employee		
Employee (on a salary, commission, percentage, or associate basis)	295	38.7%
Independent contractor	29	3.8%
Other ^b	44	5.8%
Total	762	100.0%
Practice setting		
Private dental practice (full or part time)	469	61.2%
Community health center/safety net clinic, IHS, VA facility	84	11.0%
Academic dental center	66	8.6%
Hospital	54	7.1%
Large group practice (specialty, multispecialty)	48	6.3%
Dental management/support organization	24	3.1%
Other ^c	21	2.7%
Total	766	100.0%

Abbreviations: IHS, Indian Health Service; VA, Veterans Affairs.

Note: Totals may vary due to missing responses.

^a “Other specialty” includes dental anesthesiology, oral surgery, endodontics, prosthodontics.

^b “Other employment situation” includes dental school/faculty staff member, graduate dental student/intern/resident, armed forces, other federal services (Veterans Affairs, Public Health Service, federally qualified health center), hospital staff dentist.

^c “Other practice setting” includes retirement center, nursing home, other long-term care facility, residential facility for people with disabilities.

Two-thirds of survey respondents worked as general practitioners in their primary practice, 31.2% worked as pediatric dentists, and 3.0% practiced in another dental specialty.

The distribution of survey respondents was similar across US Census Regions (Table 4). The lowest proportion practiced in the Midwest Region (21.9%), while the highest proportion practiced in the South Region (29.3%). The South is the largest region, incorporating 3 geographic divisions. The distribution of dentists varied by geographic division, from a low of 5.4% in the East South Central Division to a high of 17.6% in the Pacific Division.

TABLE 4. Practice Location (US Census Regions and Divisions) of Dentists in 2018

Primary Practice Location in 2018	n	%
Northeast Region	166	22.6%
New England Division	48	6.5%
Mid-Atlantic Division	118	16.1%
Midwest Region	161	21.9%
East North Central Division	99	13.5%
West North Central Division	62	8.4%
South Region	215	29.3%
South Atlantic Division	114	15.5%
East South Central Division	40	5.4%
West South Central Division	61	8.3%
West Region	193	26.3%
Mountain Division	64	8.7%
Pacific Division	129	17.6%
Total	735	100.0%

Provision of Dental Care to People With Special Needs

The majority (96.2%) of dentists who responded to a survey question (n=605) about treating people with special needs provided dental services to these patients in their primary practice during 2018 (Table 5). Only 3.8% of respondents indicated not providing dental care to any people with special needs in 2018. However, 21.0% of survey respondents did not answer the question, and we cannot ascertain whether they treated any people with special needs. Thus, the proportion of survey respondents who did not provide dental care to patients with special needs in 2018 may be as high as 24.8%.

About 9 in 10 dentists who treated people with special needs treated some patients with intellectual and/or developmental disabilities (89.9%) and/or patients with physical disabilities (90.9%) in 2018. Three-quarters (75.7%) of dentists indicated that they provided dental services to some patients with acquired disabilities such as dementia, traumatic brain injury, or other types of injuries.

TABLE 5. Provision of Dental Services to Patients With Special Needs by Type of Disability in 2018 (n=605)

Patients With Special Needs Treated in 2018	n	%
Intellectual and/or developmental disabilities (eg, autism spectrum disorder, seizure disorders, cerebral palsy, genetic conditions like Down syndrome)	544	89.9%
Physical disabilities (eg, mobility or movement disorders such as those requiring the use of a wheelchair, involuntary or uncontrollable movements)	550	90.9%
Other acquired disabilities (dementia, traumatic brain injury, or other type of injury)	458	75.7%
I did not provide care to any patients with special needs	23	3.8%

The majority of respondents who provided any dental services to people with special needs served one or more children less than 18 years of age (86.7%), working-age adults (91.9%), and/or adults 65 years of age and older (74.0%) with special needs in a typical month (Table 6). Most respondents (46.5% to 63.3%) treated between 1 and 10 people with special needs, while one-fifth to one-quarter (19.6% to 26.2%) provided dental care to between 11 and 50 people, in a typical month in 2018. Less than 12% of respondents treated 51 or more people with special needs monthly in their primary practice during 2018.

In a typical month during 2018, 27.8% of dentists treated “none or few” people with special needs. “None or few” is defined as provision of dental services for up to 10 people with special needs in 1 or 2 of the 3 age cohorts described in Table 6. Nearly three-quarters (72.2%) of dentists reported that they treated “many” people with special needs. “Many” is defined as provision of dental services for 1 to 10 patients with special needs in all age groups or provision of dental care for 11 or more people with special needs in at least 1 age group (data not shown).

TABLE 6. Provision of Dental Services to Patients With Special Needs by Patients’ Age in 2018

Number of Patients With Special Needs Treated Monthly in 2018	n	%
Birth to 17 years of age		
None	72	13.3%
1 to 10	266	49.1%
11 to 50	142	26.2%
51 or more	62	11.4%
Total	542	100.0%
18 to 64 years of age		
None	41	8.1%
1 to 10	319	63.3%
11 to 50	99	19.6%
51 or more	45	8.9%
Total	504	100.0%
65 years of age and older		
None	120	26.0%
1 to 10	215	46.5%
11 to 50	92	19.9%
51 or more	35	7.6%
Total	462	100.0%

Survey respondents reported that, on average, they worked 45.6 weeks and treated 2,590 people in their primary practice in 2018 (Table 7). The dentists who responded to the survey treated proportionally more children (44.2%) and working-age adults (36.5%) than patients 65 years of age and older (19.3%). The majority of these patients were covered by private insurance (44.1%), followed by public insurance (38.2%). Approximately 1 in 5 patients (17.7%) treated by survey respondents was uninsured.

TABLE 7. Practice Capacity of Dentists in 2018

Practice Capacity	n	Mean
Number of weeks worked in 2018		
Weeks worked per year	750	45.6
Number of patients treated in 2018		
Patients treated per year	660	2,590
Percentage of patients treated by age group		
Birth to 17 years of age	607	44.2%
18 to 64 years of age	607	36.5%
65 years of age and older	607	19.3%
Percentage of patients treated by insurance		
Covered by a private insurance program that pays or partially pays for their dental care	607	44.1%
Covered by a public assistance program that pays or partially pays for their dental care	607	38.2%
Not covered by an insurance program	607	17.7%
Note: Totals may vary due to missing responses.		

Facilitators of Dental Care Provision to People With Special Needs

Dentists who provided dental care to people with special needs reported that the main referral sources for these patients were a patient’s family or friends (59.9%), self-referral by the patient or their family (59.2%), and referral by a general dentist (54.1%) (Table 8).

TABLE 8. Referral Sources for Patients With Special Needs Treated by Dentists in 2018 (n=569)

Referral Sources for Patients With Special Needs Treated in the Primary Practice	n	%
Family/friends of patient	341	59.9%
Patient/family/caregiver self-selected my practice	337	59.2%
General dentist	308	54.1%
Medical provider	259	45.5%
Case manager (eg, community-based organization, state agency, group home)	225	39.5%
Specialty dentist	171	30.1%
Other ^a	47	8.3%
Note: Totals may vary due to missing responses.		
^a “Other referral sources” include health/dental insurance companies, state Medicaid programs, nursing homes, other long-term care facilities, residential treatment facilities, school-based programs, hospitals.		

The majority of dentists providing care to people with special needs indicated the presence of practice accommodations for patients, including increased time allotted for appointments (77.2%) and/or wide hallways/corridors (76.3%) (Table 9). More than half of survey respondents indicated having wheelchair ramps (56.3%), easy transfer from wheelchair to dental chair (54.7%), equipment to treat patients in their own wheelchair (54.1%), and/or appropriately trained or experienced staff (53.4%).

TABLE 9. Accommodations or Features in the Primary Practice Offered for Patients With Special Needs Treated by Dentist in 2018 (n=545)

Accommodations or Features in the Primary Practice Offered for Patients With Special Needs	n	%
Increased time allotted for appointments	421	77.2%
Wide hallways/corridors	416	76.3%
Wheelchair ramps	307	56.3%
Easy transfer (eg, from wheelchair) to dental chair	298	54.7%
Equipped to treat patients in their own chairs (eg, long tubing and other fixtures that move to the patient's chair)	295	54.1%
Assignment of appropriately trained or experienced staff	291	53.4%
Dedicated operatory	174	31.9%
Dedicated time/day	165	30.3%
Sensory-sensitive room/environment	158	29.0%
Other ^a	54	9.9%
None	20	3.7%
Note: Totals may vary due to missing responses. ^a "Other accommodations or features" include hospital operating room, anesthesia suite, anesthesiologist.		

The most common psychotherapeutic or pharmacologic interventions for people with special needs were behavior management techniques such as tell-show-do, voice control/modulation, desensitization, modeling, and cognitive strategies (80.4%), followed by nitrous oxide/oxygen inhalation (63.9%) (Table 10).

TABLE 10. Psychotherapeutic and/or Pharmacologic Interventions for Patients With Special Needs Treated by Dentist in 2018 (n=560)

Psychotherapeutic and/or Pharmacologic Interventions When Treating Patients With Special Needs in the Primary Practice in 2018	n	%
Behavior management techniques (eg, tell-show-do, voice control/modulation, desensitization, modeling, cognitive strategies)	450	80.40%
Nitrous oxide/oxygen inhalation	358	63.90%
Oral premedication	239	42.70%
General anesthesia	232	41.40%
Protective stabilization	217	38.80%
Intravenous/intramuscular sedation	100	17.90%
Other ^a	18	3.20%
None	44	7.90%
Note: Totals may vary due to missing responses. ^a "Other psychotherapeutic and/or pharmacologic interventions" includes general anesthesia in a hospital operating room, general anesthesia in an oral surgeon office, intravenous/intramuscular sedation in the office by an anesthesiologist.		

Education and Training in Providing Dental Treatment to People With Special Needs

Dentists indicated that their education and training to provide dental treatment to people with special needs came from multiple sources. A majority of dentists reported that they received education, training, or other experience working with patients with special needs during didactic education in dental schools (58.7%), didactic education

(54.2%) and/or clinical training (53.5%) in residency programs, and/or continuing education (56.1%) (Table 11).

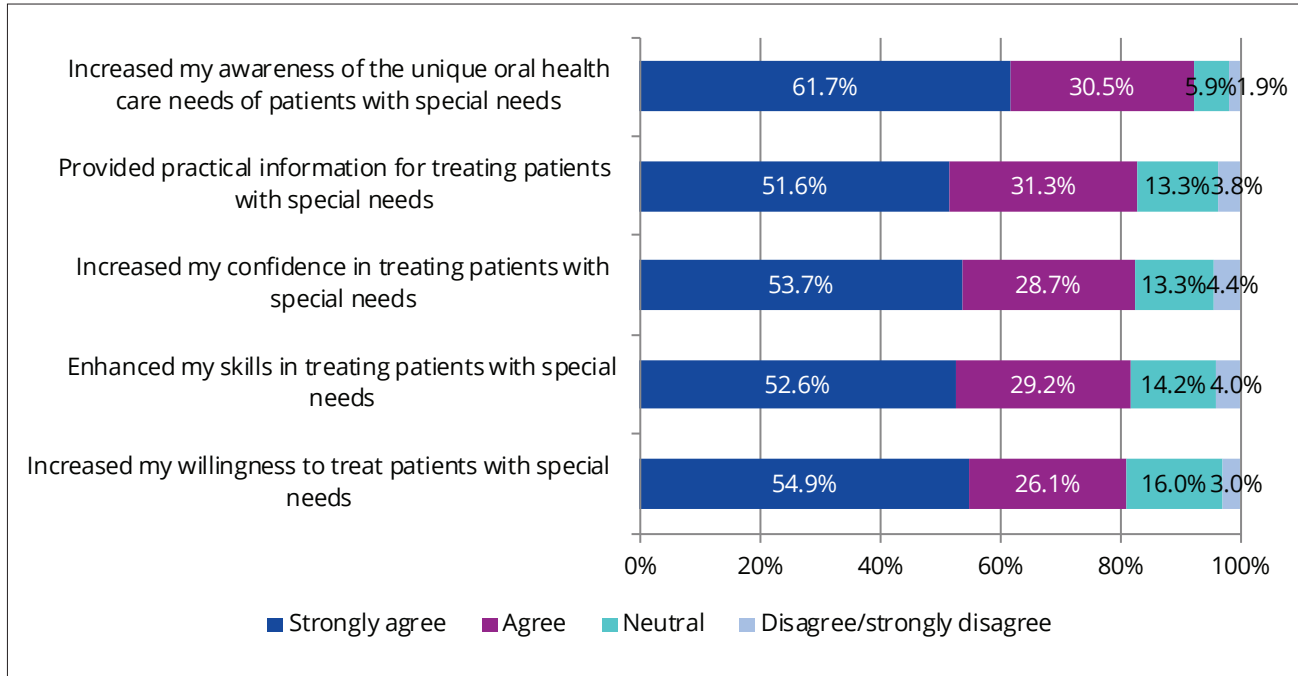
More than half of survey respondents (59.5%) reported education and training relevant to people with special needs during dental residency programs (solely or in combination with other sources of education and training). Those who received no training in special needs in dental school or residency indicated receiving relevant training through continuing education (6.4%) and/or from other sources (4.0%), including personal experience, community involvement, and familial or other relationships.

Table 11. Sources of Education, Training, or Other Experience in Providing Dental Treatment to Patients With Special Needs

Education, Training, or Other Experience Working With Patients With Special Needs	n	%
Sources of education and training (n=576)		
Dental school didactic education	338	58.7%
Dental school clinical training	276	47.9%
Residency, specialty, or fellowship program didactic education	312	54.2%
Residency, specialty, or fellowship program clinical education	308	53.5%
Continuing education	323	56.1%
Community involvement (eg, Special Olympics, Dental Lifeline, Mission of Mercy)	212	36.8%
Friends, family, or neighbors with special needs	170	29.5%
Other ^a	39	6.8%
None	33	5.7%
Main sources of education and training		
Residency, specialty, or fellowship program	343	59.5%
Dental school, <i>no</i> residency program	140	24.3%
Continuing education, <i>no</i> dental school or residency program	37	6.4%
Other sources, <i>no</i> dental school, residency program, or continuing education	23	4.0%
None	33	5.7%
Total	576	100.0%
Note: Totals may vary due to missing responses.		
^a "Other sources of education and training" include courses and fellowships through the Special Care Dentistry Association (SCDA), Applied Behavior Analysis (ABA) training, other professional training, experiential learning.		

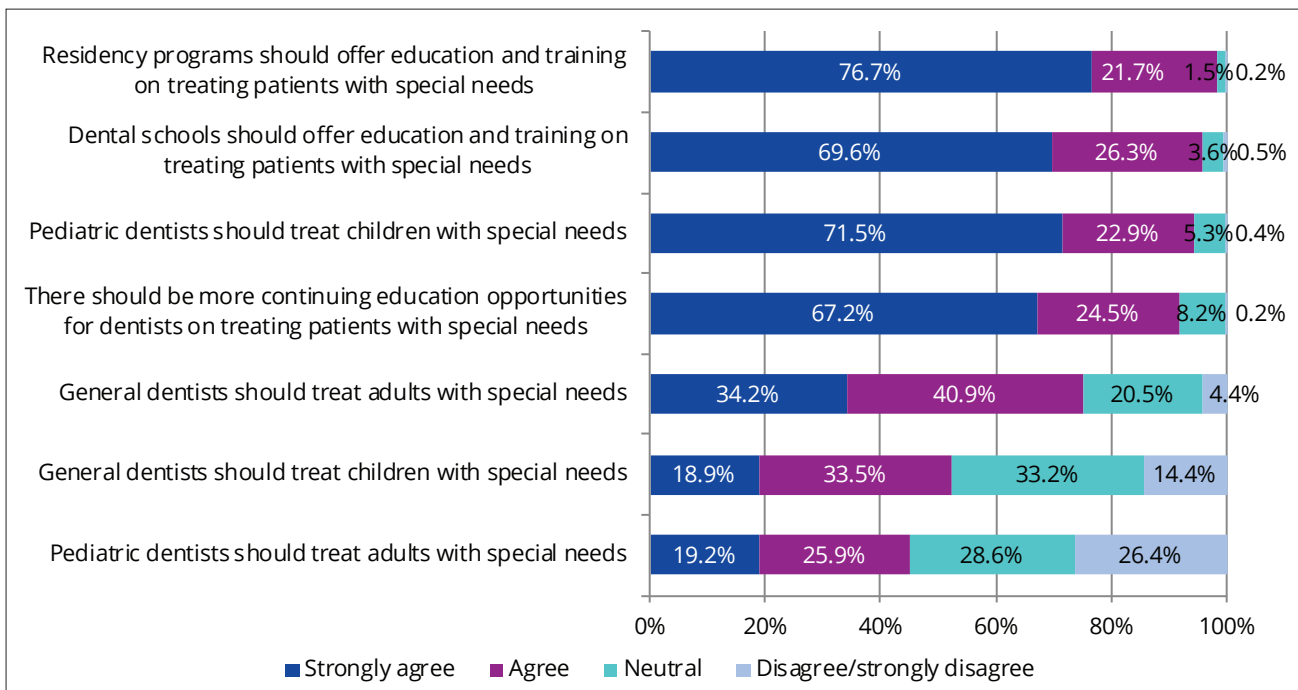
The majority of survey respondents strongly agreed or agreed that education, training, or other experiences working with people with special needs increased their awareness (92.2%), confidence (82.4%), and willingness (81.0%) to treat people with special needs and that it provided practical information (82.9%) and/or enhanced their skills (81.8%) in treating people with special needs (Figure 1).

FIGURE 1. Dentists' Perceptions of Education and Preparedness to Provide Treatment to Patients With Special Needs (n=529)



More than 9 in 10 survey respondents strongly agreed or agreed that residency programs (98.4%), dental schools (95.9%), and/or continuing education programs (91.7%) should offer education and training on treating people with special needs (Figure 2). Some 94.4% of respondent dentists also strongly agreed or agreed that pediatric dentists should treat children with special needs, while 75.1% of respondent dentists strongly agreed or agreed that general dentists should treat adults with special needs. The highest levels of disagreement or neutrality expressed by survey respondents were to the statements that pediatric dentists should treat adults with special needs (26.4% and 28.6%, respectively) and general dentists should treat children with special needs (14.4% and 33.2%, respectively).

FIGURE 2. Dentists' Perceptions of Opportunities for Education and Training on Treating Patients With Special Needs and Types of Providers Who Should Treat These Patients (n=527)



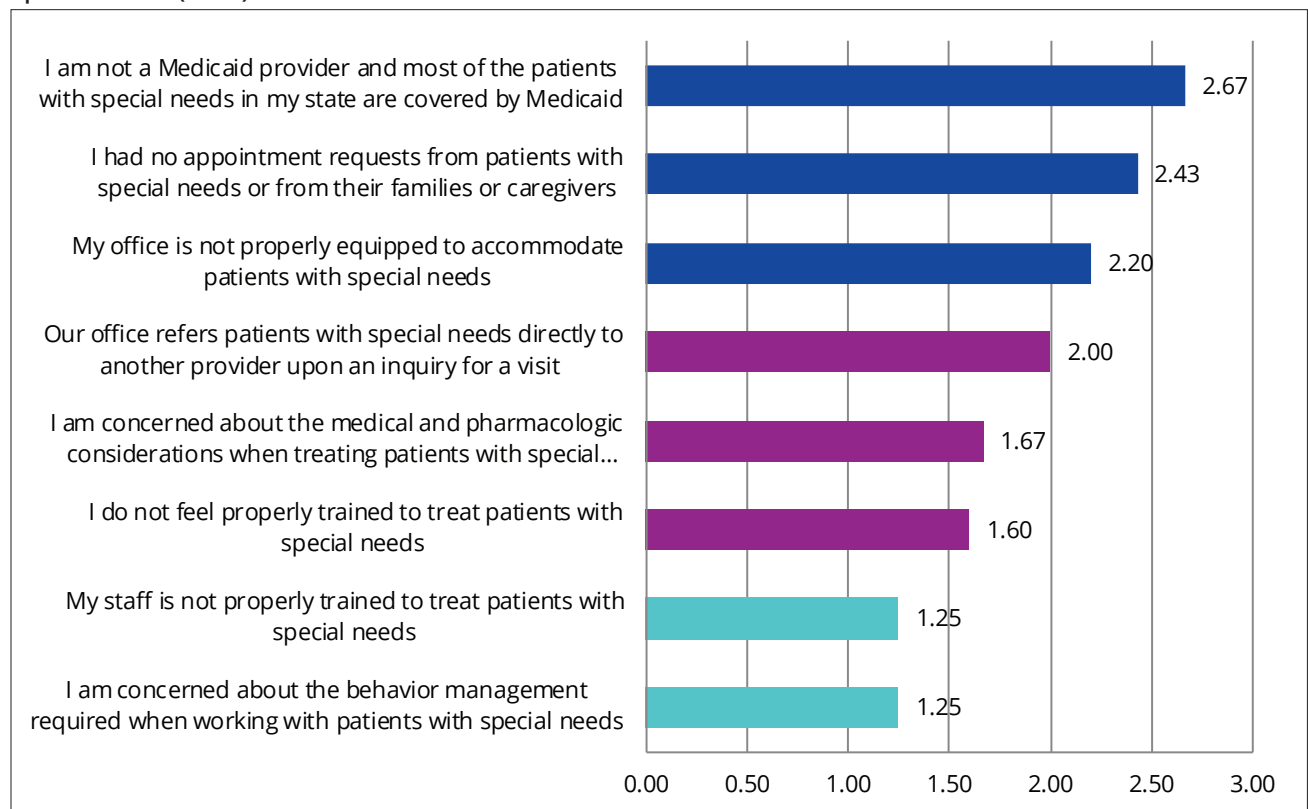
Barriers to Providing Dental Care to People With Special Needs

Survey respondents who reported that they did not provide dental care to people with special needs in their primary practice in 2018 (n=20) were asked to rank the top 3 barriers to treating these patients (Figure 3). The average rankings, reported below, were calculated by applying weights. The most important barrier was given the largest weight of 3, the second most important barrier was allocated an intermediate weight of 2, and the least important barrier was given the lowest weight of 1.

The most important barriers to provision of dental care to people with special needs identified by the respondents were not being a Medicaid provider, as most people with special needs are covered by Medicaid (average ranking, 2.67); not having appointment requests from these patients (average ranking, 2.43); and not having a dental office that was properly equipped to accommodate people with special needs (average ranking, 2.20). Respondents also noted concerns about their office referring people with special needs directly to another provider (average ranking, 2.00), medical and pharmacologic considerations when working with people with special needs (average ranking, 1.67) and not feeling properly trained to treat these patients (average ranking, 1.60).

Survey respondents ranked a lack of proper training of their staff (average ranking, 1.25) and concerns about the use of behavior management techniques required when working with people with special needs (average ranking, 1.25) as the least important barriers.

FIGURE 3. Dentists' Perceptions (Average Ranking Scores) of Barriers to Providing Dental Care to Patients With Special Needs (n=20)



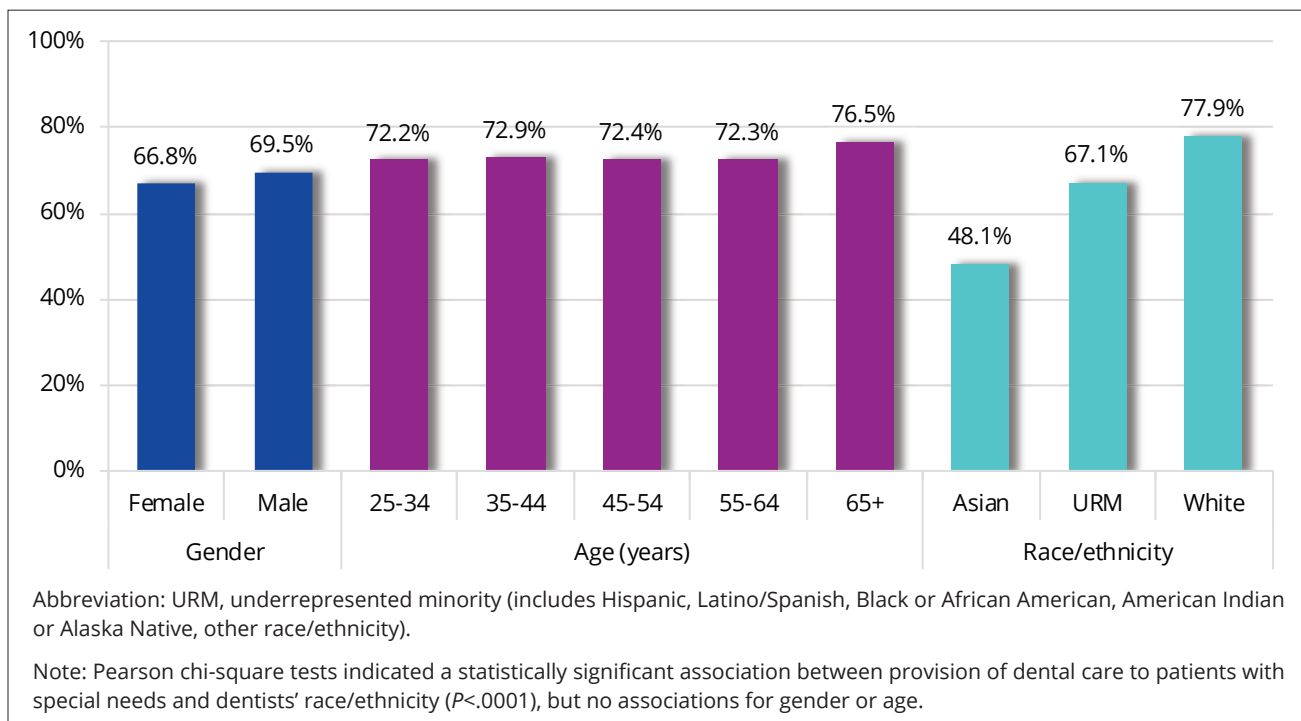
Factors Influencing Dentists' Decisions to Treat People With Special Needs

More than one-quarter (27.8%) of dentists reported that they treated “none or few” people with special needs, while the remainder (72.2%) treated “many” people with special needs in a typical month during 2018. Survey respondents who treated up to 10 patients with special needs in 1 or 2 of the 3 age groups (children, working-age adults, and adults 65 years of age and older) were categorized as treating “none or few.”

Associations With Dentists' Demographic, Education, and Practice Characteristics

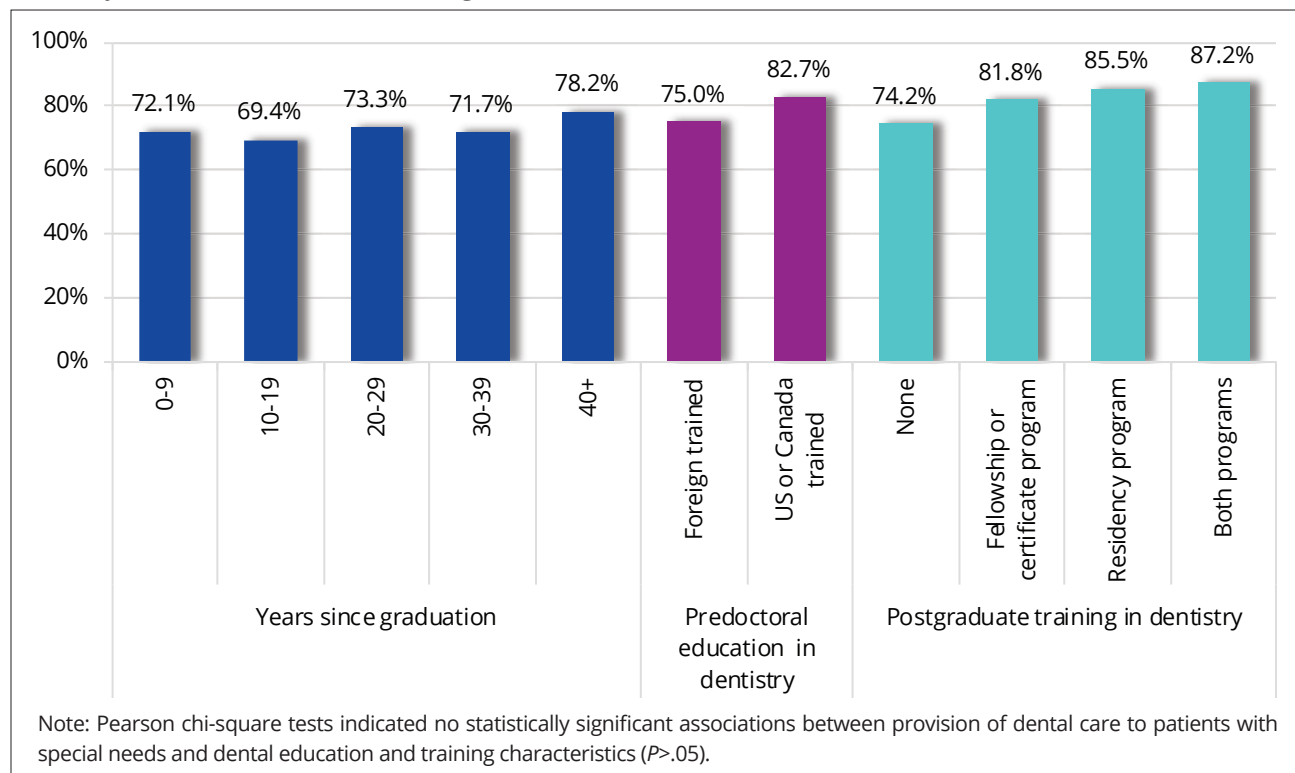
There were no statistically significant differences in provision of dental care to patients with special needs by gender or age group of survey respondents. Significantly higher proportions of white (77.9%) and underrepresented minority (67.1%) dentists indicated that they treated “many” people with special needs in a typical month during 2018 compared with respondents who were Asian (48.1%; $P < .0001$) (Figure 4). These results should be interpreted with caution because of missing demographic information for more than 15% of survey respondents (20.0% for gender, 17.7% for age, and 29.8% for race/ethnicity).

FIGURE 4. Percentage of Dentists Indicating That They Provided Dental Services for “Many” Patients With Special Needs by Demographic Characteristics of Dentists



Although there was an overall increase in the proportion of survey respondents treating “many” people with special needs commensurate with professional experience, location of dental school education, and levels of postdoctoral training in dentistry, these differences were not statistically significant (Figure 5). As previously mentioned, the results should be interpreted with caution due to missing information for more than half of survey respondents with regard to location of predoctoral education (64.3%) and completion of postgraduate training (60.8%) in dentistry.

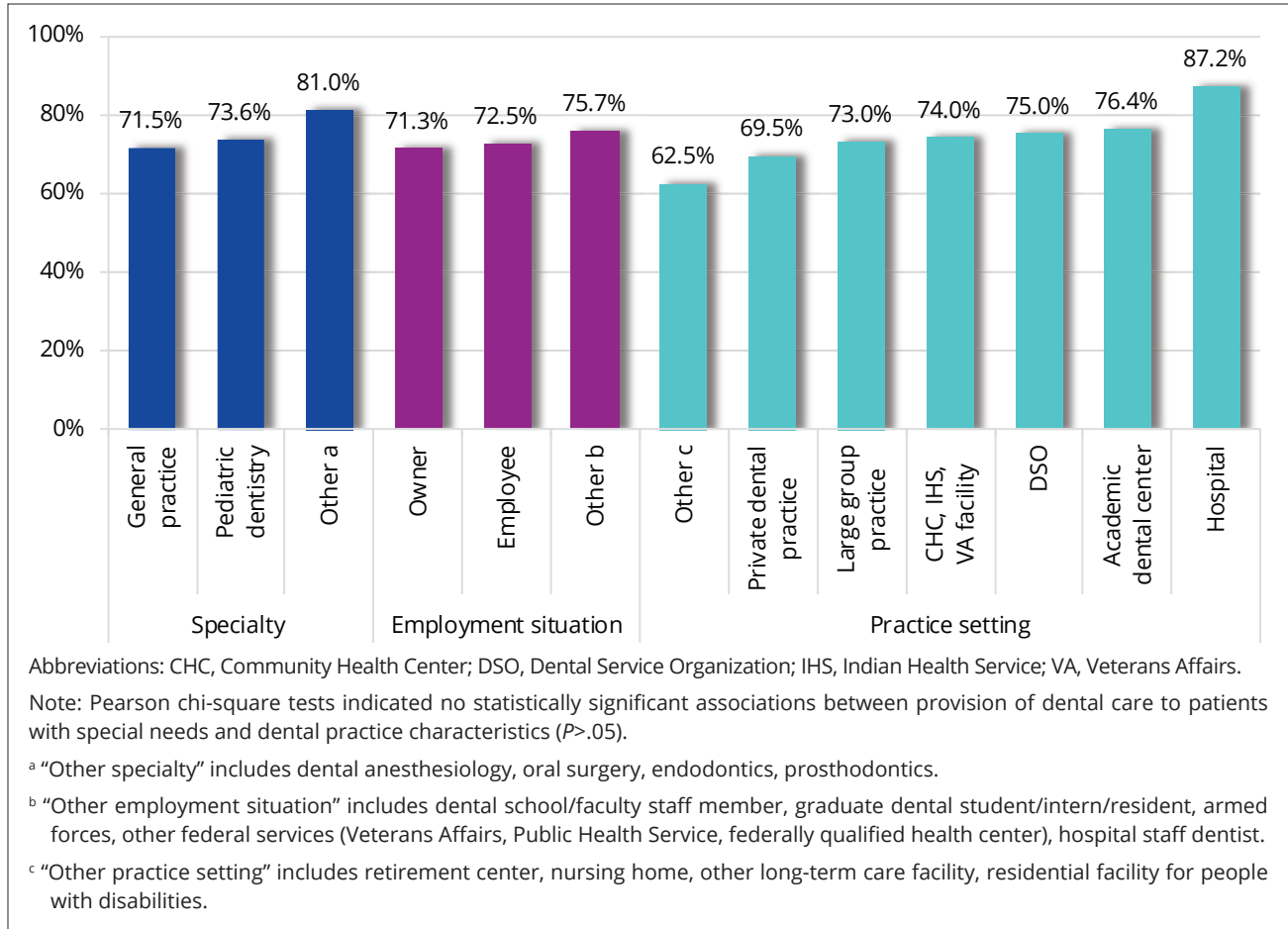
FIGURE 5. Percentage of Dentists Indicating That They Provided Dental Services for “Many” Patients With Special Needs by Dental Education and Training Characteristics of Dentists



The study found variations in the proportion of dentists treating “many” people with special needs by dental specialty, practice ownership, and setting. Among survey respondents, 71.5% of general practice dentists, 73.6% of pediatric dentists, and 81.0% of dentists working in other specialties (mainly oral surgery and dental anesthesiology) treated “many” people with special needs; however, these differences were not statistically significant (Figure 6). The proportions of dentists treating “many” people with special needs were 71.3% for those who owned a dental practice, 72.5% for employed dentists, and 75.7% for dentists in “other” employment situations (eg, dental school faculty, graduate dental students/residents, federal services employees, and hospital staff dentists); these differences also were not statistically significant. Similarly, provision of dental services for “many” people with special needs varied by practice setting, from 62.5% of dentists in “other” settings (eg, retirement centers and nursing homes) to 87.2% in hospitals; however, some of the grouped settings contained too few respondents to permit identification of potential associations.

Although there was an overall increase in the proportion of survey respondents treating “many” people with special needs commensurate with professional experience, location of dental school education, and levels of postdoctoral training in dentistry, these differences were not statistically significant.

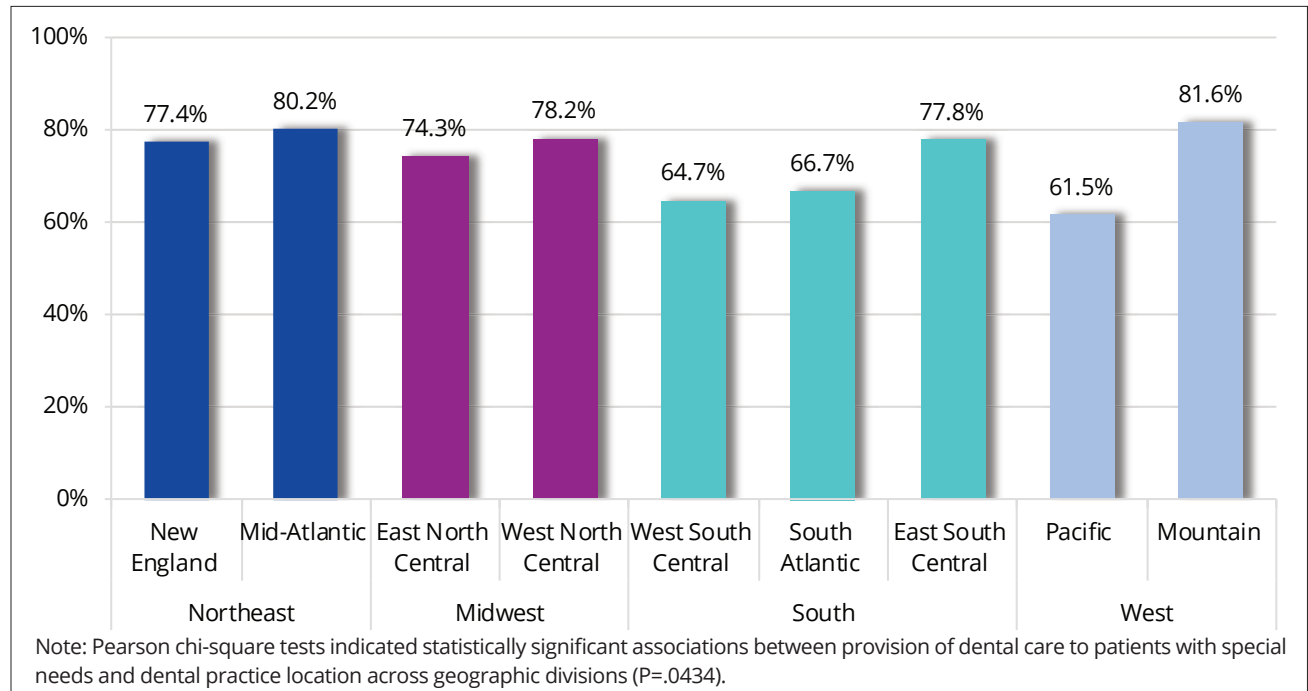
FIGURE 6. Percentage of Dentists Indicating That They Provided Dental Services for “Many” Patients With Special Needs by Practice Characteristics of Dentists



There was a statistically significant difference among respondents who indicated that they treated “many” people with special needs by location of their primary practice ($P = .0434$) (Figure 7). Survey dentists located in the Mountain Division of the West Region (81.6%) and the Mid-Atlantic Division of the Northeast Region (80.2%) were proportionally more likely to report serving “many” people with special needs than those located in other geographic areas. The lowest proportions of respondents serving “many” people with special needs were dentists located in the Pacific Division (61.5%) of the West Region and those in the West South Central (64.7%) and South Atlantic (66.7%) Divisions of the South Region.

Among survey respondents, 71.5% of general practice dentists, 73.6% of pediatric dentists, and 81.0% of dentists working in other specialties (mainly oral surgery and dental anesthesiology) treated “many” people with special needs.

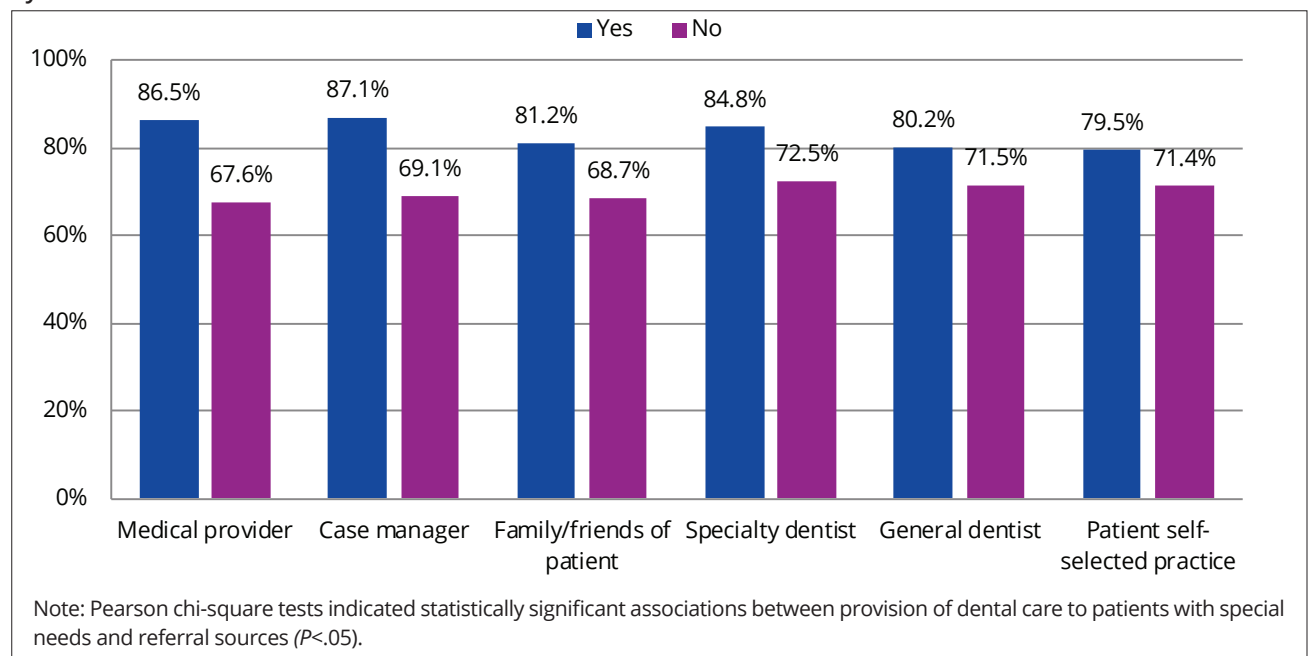
FIGURE 7. Percentage of Dentists Indicating That They Provided Dental Services for “Many” Patients With Special Needs by Practice Location (Region and Division) of Dentists



Associations With Facilitators of Dental Care Provision to Patients With Special Needs

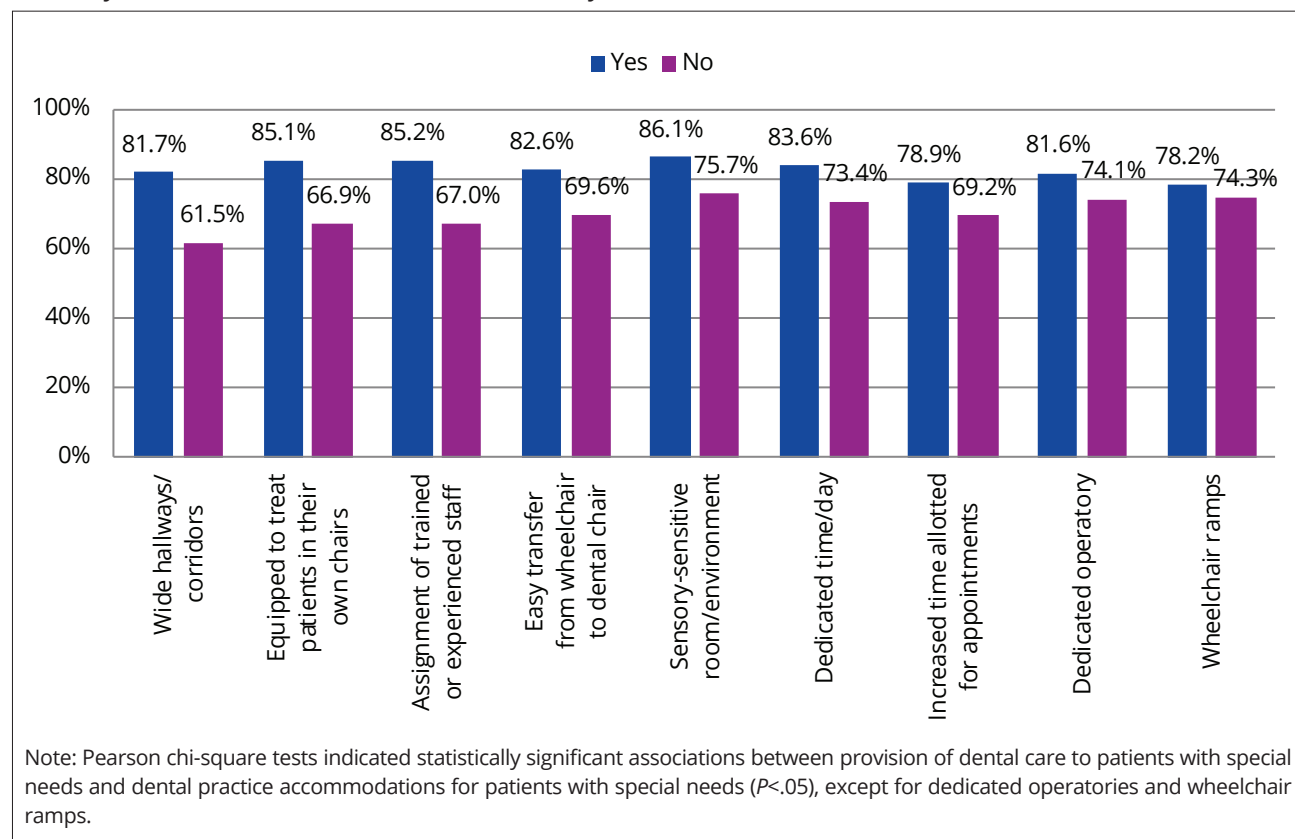
Proportionally more survey respondents who indicated that some of their people with special needs were referred by a medical provider (85.5% vs 67.6%; $P<.0001$) or a case manager (87.1% vs 69.1%; $P<.0001$) provided dental care to “many” people with special needs compared with dentists who did not report these patient referral sources (Figure 8). Other referral sources—such as family or friends of patients ($P=.0006$), specialty dentists ($P=.0017$), general dentists ($P=.0157$), and self-referrals ($P=.0260$)—were also positively and significantly associated with the provision of dental services to “many” people with special needs, but the differences were smaller in magnitude.

FIGURE 8. Percentage of Dentists Indicating That They Provided Dental Services for “Many” Patients With Special Needs by Referral Sources of These Patients



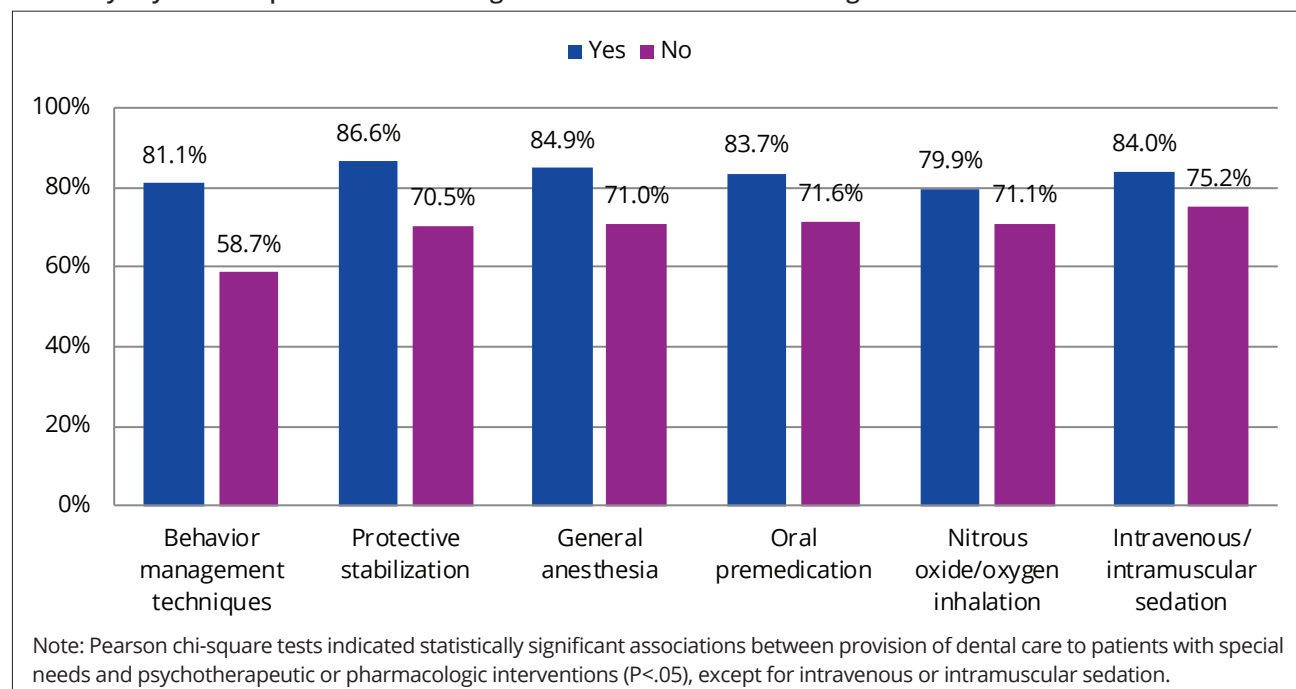
Accommodations in the primary practice for people with special needs such as wide hallways or corridors (81.7% vs 61.5%; $P<.0001$), being equipped to treat patients in their own chairs (85.1% vs 66.9%; $P<.0001$), and assignment of trained or experienced staff (85.2% vs 67.0%; $P<.0001$) had the highest impact on dentists' decisions to treat "many" people with special needs (Figure 9). Other primary practice accommodations or features offered for people with special needs also were associated with the provision of dental services to "many" people with special needs, but the associations were smaller in magnitude. Other significant accommodations included easy-transfer dental chairs ($P=.0003$), sensory-sensitive environments ($P=.0008$), dedicated time or day for appointments ($P=.0094$), and increased time for appointments ($P=.0191$). There were no significant differences associated with having dedicated operatories ($P=.0524$) or wheelchair ramps ($P=.2826$). Survey respondents who reported having at least one of these accommodations were 2 times more likely to serve "many" people with special needs than those who had none (76.9% vs 40.0%; $P=.0002$) (data not shown).

FIGURE 9. Percentage of Dentists Indicating That They Provided Dental Services for "Many" Patients With Special Needs by Accommodations/Features in the Primary Practice Offered to These Patients



The use of behavior management techniques (81.1% vs 58.7%; $P<.0001$) and protective stabilization (86.6% vs 70.5%; $P<.0001$) when treating people with special needs were the factors with the highest influence on the provision of dental care for "many" people with special needs among survey respondents (Figure 10). The use of general anesthesia ($P=.0001$), oral premedication ($P=.0008$), and nitrous oxide/oxygen inhalation ($P=.0189$) also were associated with the provision of dental care for "many" people with special needs, but these associations were smaller in magnitude. Intravenous/intramuscular sedation ($P=.0580$) was not significantly associated with the provision of dental services for "many" people with special needs. Survey respondents who reported using at least one of these psychotherapeutic or pharmacologic interventions were 1.5 times more likely to serve "many" people with special needs than those who used none of them (78.8% vs 52.3%; $P<.0001$) (data not shown).

FIGURE 10. Percentage of Dentists Indicating That They Provided Dental Services for “Many” Patients With Special Needs by Psychotherapeutic/Pharmacologic Interventions When Treating These Patients

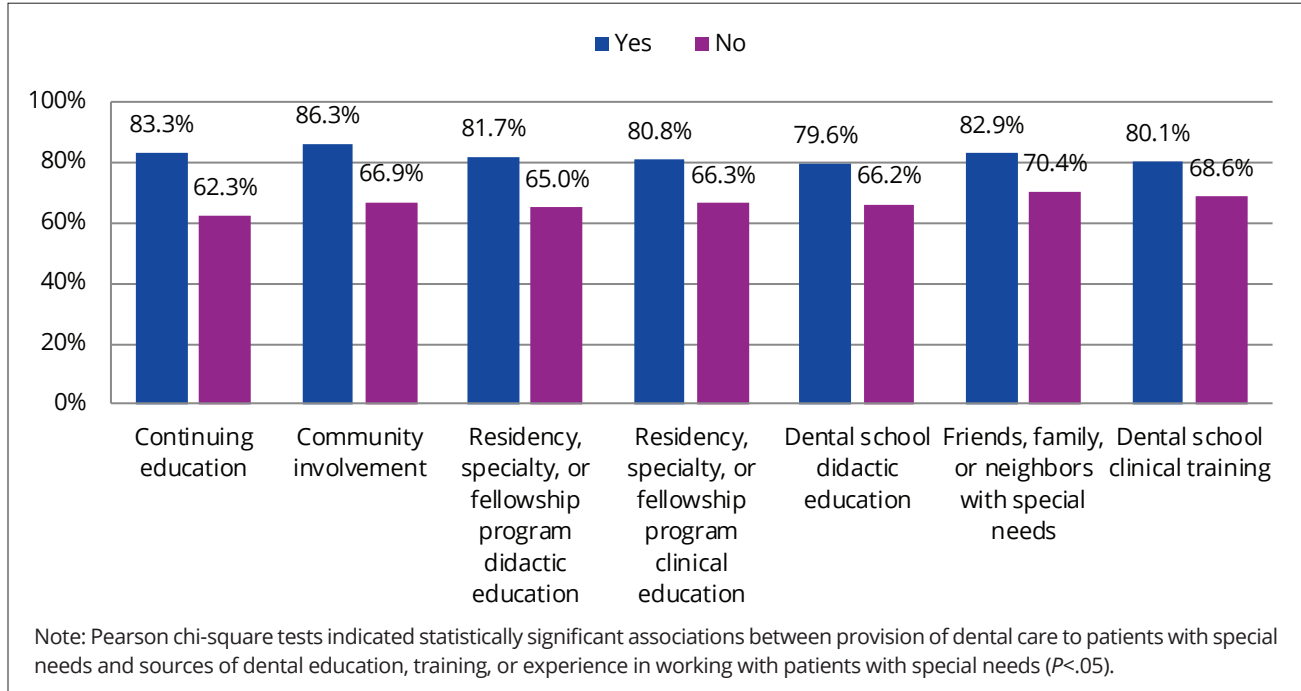


Associations With Dentists’ Education and Training in Providing Dental Treatment to People With Special Needs

Training or experience working with people with special needs through continuing education (83.3% vs 62.3%; $P < .0001$), community involvement (86.3% vs 66.9%; $P < .0001$), and didactic education (81.7% vs 65.0%; $P < .0001$) and clinical training (80.8% vs 66.3%; $P < .0001$) in residency programs had the highest impact on the provision of dental care for “many” people with special needs (Figure 11). Didactic ($P = .0003$) and clinical ($P = .0016$) education in dental schools and experience with family or friends with special needs ($P = .0017$) also were significantly associated with the provision of dental care for “many” people with special needs, but these associations were smaller in magnitude. Survey respondents who reported having at least one of these sources of education, training, or experience in working with people with special needs were 1.7 times more likely to serve “many” people with special needs than those who had none (75.8% vs 45.5%; $P = .0001$) (data not shown).

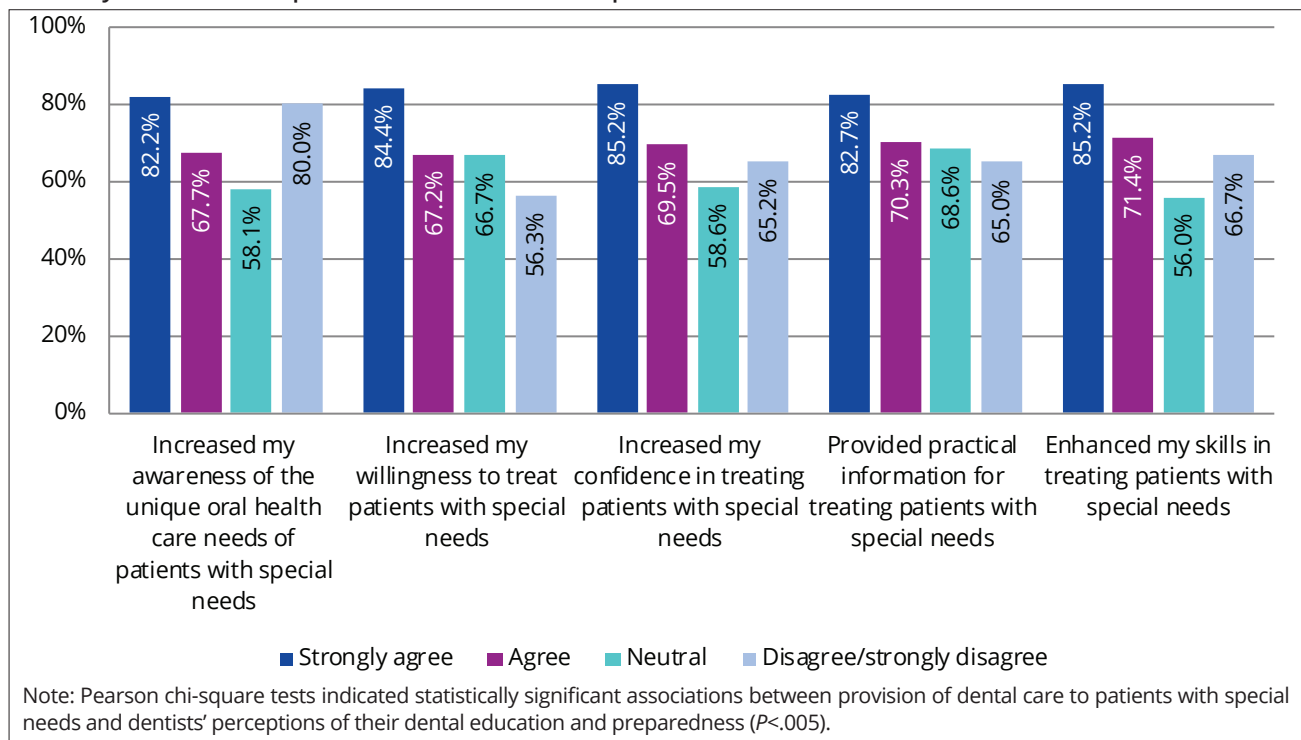
The use of behavior management techniques and protective stabilization when treating people with special needs were the factors with the highest influence on the provision of dental care for “many” people with special needs.

FIGURE 11. Percentage of Dentists Indicating That They Provided Dental Services for “Many” Patients With Special Needs by Dentists’ Education and Training in Working With These Patients



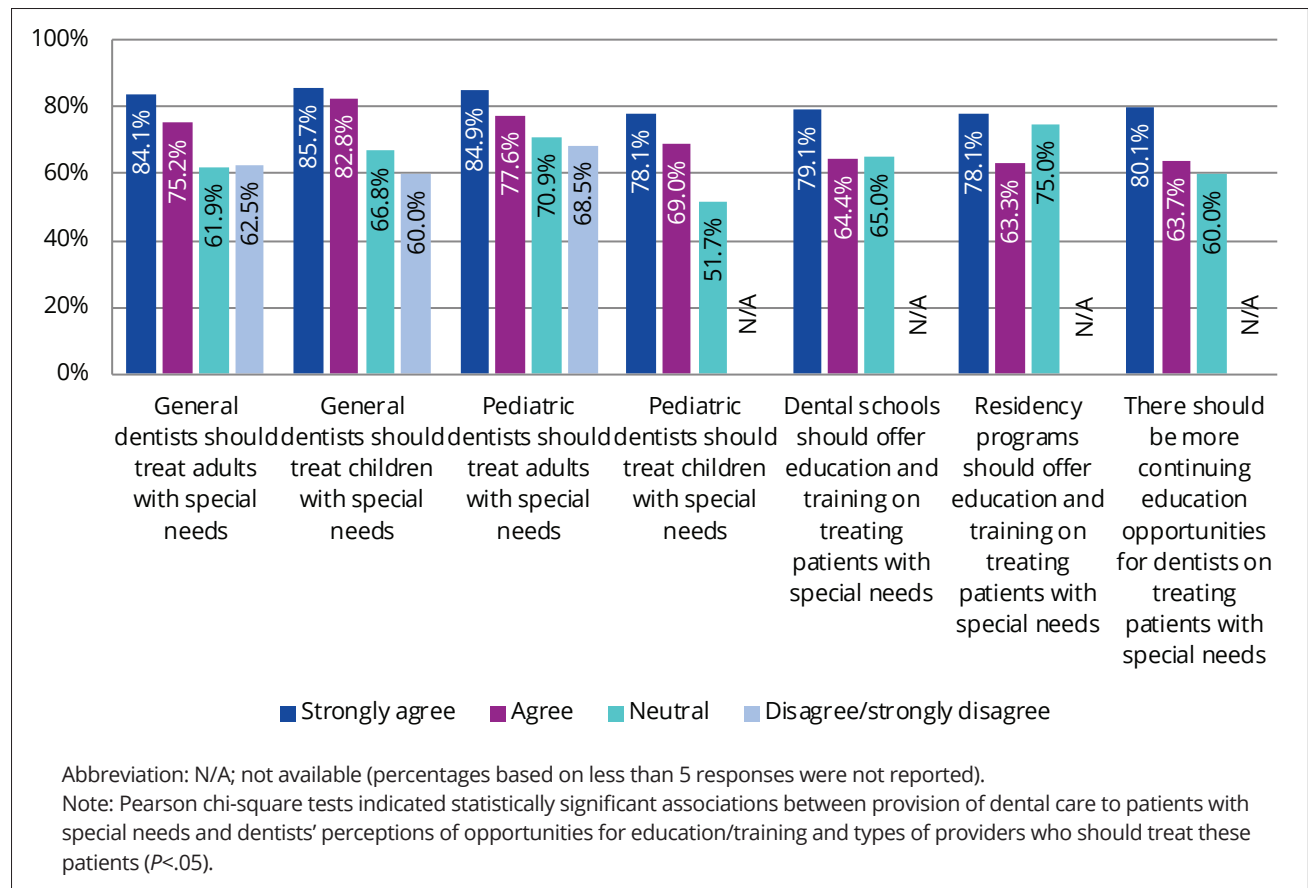
There was a statistically significant difference among respondents who indicated that they treated “many” people with special needs by their perceptions of the impact of their education on preparedness to treat these patients. More dentists who strongly agreed (82.2% to 85.2%) or agreed (67.2% to 71.4%) that education and training increased their awareness ($P = .0003$), willingness ($P < .0001$), or confidence ($P < .0001$) and/or provided practical information ($P = .0023$) and enhanced their skills ($P < .0001$) to treat people with special needs treated “many” patients than did those who were neutral (56.0% to 68.6%) or disagreed or strongly disagreed (56.3% to 80.0%) with these statements (Figure 12).

FIGURE 12. Percentage of Dentists Indicating That They Provided Dental Services for “Many” Patients With Special Needs by Dentists’ Perceptions of Education and Preparedness to Treat These Patients



There was a statistically significant difference among respondents who indicated that they treated “many” people with special needs by their perceptions of the importance of education and the types of providers who should treat these patients. More dentists who strongly agreed (78.1% to 85.7%) or agreed (63.3% to 82.8%) that general dentists should treat adults with special needs ($P=.0003$); that general dentists should treat children with special needs ($P<.0001$); that pediatric dentists should treat adults with special needs ($P=.0232$); that pediatric dentists should treat children with special needs ($P=.0039$); and that dental schools ($P=.0070$), residency programs ($P=.0034$), and continuing education programs ($P=.0002$) should offer more opportunities for education and training on treating people with special needs treated “many” people with special needs than those who were neutral (51.7% to 75.0%) or disagreed or strongly disagreed (60.0% to 68.5%) with these statements (Figure 13).

FIGURE 13. Percentage of Dentists Indicating That They Provided Dental Services for “Many” Patients With Special Needs by Dentists’ Perceptions of Opportunities for Education and Training and Types of Providers Who Should Treat These Patients



DISCUSSION & CONCLUSIONS

The number of children in the US with disabilities has increased over recent years²⁹ as the count of older adults with chronic and disabling health conditions continues to grow.² According to previous research, 1 in 4 noninstitutionalized adults reported a disability in 2016.² In addition, people living in poverty and rural areas have a higher prevalence of disability, suggesting that geography and socioeconomic conditions may further compromise access to oral health services for patients with disabling conditions.^{30,31}

Individuals with special needs may have complicated medical diagnoses that impair their ability to maintain good oral health. For example, people with intellectual and/or developmental disabilities are more likely to have poor oral hygiene, periodontal disease, and untreated dental caries than members of the general population.^{9,32} Reasons may include side effects of medications such as reduced salivary function, oral aversions, selective diets high in carbohydrates, and dependence on caregivers for regular oral hygiene.⁹

Consequently, the need for health and oral health services specifically tailored to those with special needs is also increasing. Access to oral health services for people with disabilities is confounded by a scarcity of dentists and dental hygienists with the necessary skills to serve people with special health care needs.³² Training a sufficiently sized and adequately prepared dental workforce to manage the care of exceptional populations is imperative for these patients to attain and maintain optimal oral health and their ability to eat, speak, and smile.

Characteristics of Dentists Serving People With Special Needs

The data from our survey support the hypothesis that many dentists are treating at least a small number of patients with special needs who differ from the usual patient population. A survey of a random sample of 500 general practice dentists in Michigan found that most responding dentists treated some individuals with developmental disabilities; 77.3% treated some adults and 48.4% treated some children with special needs.¹⁷ Our survey found that 89.9% of respondents

treated some patients with intellectual and/or developmental disabilities and 90.9% treated some patients with physical disabilities. Moreover, three-quarters of dentists (75.7%) treated some patients with other acquired disabilities, such as dementia, traumatic brain injury, or another type of injury or condition.

The majority of responding dentists were in private dental practices (61.2%). Proportionally more dentists who worked in hospitals, academic dental centers, and dental safety net organizations served “many” people with special health care needs than did dentists in private practice, as did proportionally more dentists who worked in large group specialty practices or in dental service organizations. However, the differences across practice settings were not statistically significant, possibly due to the small number of respondents working in certain setting types. Subar and colleagues collected survey data and found that dentists who were not in private practice treated significantly more patients with developmental disabilities and medically compromised patients under age 65.¹¹ Yet these researchers also reported that dentists in private practice were treating significantly more medically compromised patients over age 65 than were dentists in other settings.

Only a few dentists indicated not treating one or another cohort of children, working-age adults, or elders with special needs. The majority (63.3%) of dentists treated between 1 and 10 working-age adults with special needs in a typical month, 49.1% treated between 1 and 10 children with special needs, and 46.5% of respondents provided dental care to between 1 and 10 adults 65 years of age and older with special needs.

Dentists were asked about referral sources for people with special needs. One interesting finding was that dentists who treated “many” people with special needs noted their primary sources of referral as medical providers and case managers, followed by family or friends of patients and self-referrals.

Availability of Accommodations for People With Special Needs

The accommodations needed for patients with exceptional needs vary substantially depending on the type and nature of a disability or condition. Patients with limited mobility may need only accommodations for

physical access, while those with behavioral disorders or intellectual and/or developmental disabilities may benefit from the use of behavioral modification techniques or even pharmaceutical interventions. The type and extent of modifications required to effect quality treatment are individually determined, making it especially difficult to understand the extent to which dental practices are equipped to meet a broad spectrum of special needs among patients. A patient caseload might be limited because of the physical characteristics of the office or the operatory or by the abilities of the workforce to appropriately provide other therapeutic modifications. One study in Michigan found that concerns about behavior management (67.9%), inadequate training and experience (52.4%), and severity of a patient's condition (41.7%) were among the most common reasons for not treating patients with behavior management problems.¹⁸ Although the number of dentists in our survey who did not treat people with special needs was small, they identified the main barriers to including special populations in their practices as not being Medicaid providers, not having appointment requests from such patients, and not having a dental office properly equipped to accommodate special needs. These respondents also expressed concerns about not feeling properly trained to treat people with psychotherapeutic and pharmacologic needs.

The most common accommodations provided for people with special needs were allowing increased time to complete the patient appointment for a scheduled patient with special needs (77.2%) and structural features including wide hallways and corridors (76.3%), wheelchair ramps (56.3%), easy transfer to dental chairs (54.7%), and an office properly equipped to treat patients in their own chairs (54.1%). This was not an unexpected finding in that the Americans With Disabilities Act (ADA) requires certain structural features at initial construction of a building or upon renovation. Thus, accessible entries and hallways are rapidly becoming standard features of both medical and dental practices. A study conducted by Freeman and colleagues in 1997 found that 56% of dental practices had steps or stairs at the entrance, while only 9% of dentists had a ramp or lift for patients at the entrance to their practice.¹⁷ Our findings suggest structural changes enabling better access to dental practices for those with special needs subsequent to the ADA. The next most common accommodation indicated by respondents to our sur-

vey was the assignment of appropriately trained staff to provide services (53.4%).

Dentists who served “many” people with special needs in a typical month were proportionally and significantly more likely than dentists who treated “none or few” to indicate that their practices were designed with the necessary accommodations to provide treatment, including wide hallways/ corridors, the ability to treat patients in their own wheelchairs, and the assignment of appropriately trained or experienced staff. Other practice accommodations with significant impacts on the likelihood of treating people with special needs included easy-transfer dental chairs, sensory-sensitive environments, a dedicated time or day for appointments, and increased time for treatments.

The most common psychotherapeutic or pharmacologic interventions used by survey respondents when treating people with special needs were behavior management techniques (80.4%) and nitrous oxide/oxygen inhalation (63.9%). In a study of pediatric dentists' interventions for children with any intellectual and/or developmental disability, researchers found that nitrous oxide was the most commonly used anxiolytic or sedation technique.⁹ Survey respondents who provided dental services to “many” people with special needs were proportionally and significantly more likely than dentists who treated “none or few” to indicate that they used behavior management techniques and/or protective stabilization when treating these patients. Dentists' ability to use other interventions such as general anesthesia, oral premedication, and nitrous oxide or oxygen inhalation also had a positive impact on the provision of dental care to people with special needs.

Attitudes of Dentists About Treating People With Special Needs

Our study found high levels of agreement with the statement that general dentists should treat adults with special needs (75.1%). An additional 20.5% of respondents expressed neutrality in reaction to this statement. While the majority of respondents expressed overall agreement that general dentists should also treat children with special needs, levels of agreement were lower (52.4%), and one-third of dentists were neutral (33.2%). These attitudes were supported by the finding that nearly all respondents

(94.4%) agreed with and a small percentage (5.3%) were neutral to the statement that pediatric dentists should treat children with special needs. Dentists were more ambivalent about pediatric dentists treating adults with special needs, with just 45.0% of respondents agreeing that pediatric dentists should be treating adults. An additional 28.6% were neutral. There was a statistically significant association between level of agreement with these statements and the provision of dental care to people with special needs.

Education and Training to Prepare Dentists to Treat People With Special Needs

In 2004, the Commission on Dental Accreditation (CODA) added Standard 2-25 charging dental education programs with integrating a new competency into predoctoral curricula.²⁵ That standard was “graduates must be competent in assessing the treatment needs of patients with special needs.” Stakeholders commented that the directive was not as specific as needed, as it did not require competency in treating these patients. In 2019, CODA standards were again modified to include a directive that dental students must be prepared to assess and manage the treatment of people with special needs.

Research published in 2012, using survey data accrued in 2008 from dental school deans and chairs, found that at that time, 59% of responding schools were in full compliance and 16% were in partial compliance with the 2004 CODA mandate.³³ At that time, 29% of dental schools in the survey had a dedicated clinic to treat people with special needs. Eighty percent of schools responded either “definitely yes” or “probably yes” when asked if more time should be spent teaching students about the treatment of people with special needs. Researchers for this study also found that the dental student clinics staffed by pediatric and general practice residents, not dental students, had the highest likelihood of routinely treating people with special needs, suggesting that exposure to people with special needs is more common in postdoctoral education than in predoctoral programs.³³

In our survey, 59.5% of responding dentists who provided information about their education and training in special needs indicated that they received the relevant training in working with people with special needs during a dental residency, specialty training, or fellow-

ship program. Approximately 81% of dentists who completed a postdoctoral residency, specialty training, or fellowship (such as a general practice residency, advanced education in general dentistry, pediatric dentistry residency, or another dental specialty) treated “many” people with special needs compared with about 66% of those who did not indicate a residency program as a source of their personal education in special needs. Dentists who provided dental care to “many” people with special needs were also more likely than dentists who treated “none or few” to indicate continuing education and community involvement with people with special needs or advocacy organizations—followed by dental schools or family or friends with special needs—as sources of education, training, and experience in working with these patients.

Dentists were asked to provide their level of agreement with specific statements about the impact of their education and training and other experiences on their awareness of unique oral health needs among people with special needs, their willingness to treat these patients, and their confidence in doing so. A significantly higher proportion of dentists who strongly agreed that their education provided them with increased awareness of special needs (82.2%) provided services to “many” people with special needs compared with those who agreed with (67.7%) or were neutral to (58.1%) the statement. Moreover, a significantly higher proportion of dentists who strongly agreed that their education and training increased their willingness to serve people with special needs, that it increased their confidence to treat, that it provided practical information about treating such patients, and that it enhanced their skills to treat these patients were also dentists who provided services to “many” people with special needs compared with other dentists.

A recent study suggested that inequalities in didactic training and clinical experience during the pediatric dental residency affect pediatric dentists’ ability or willingness to treat some people with special needs.⁹ Some dentists may still need to refer certain patients to other settings to accomplish treatment. The authors suggested that the reasons may be complex and may range from the adequacy of the facility to accommodate the special need to financial reimbursement issues to uncooperative patient behavior making it difficult to complete treatment.

Another study surveyed pediatric dentistry residency students on the adequacy of their predoctoral training to care for children with special health care needs.¹⁴ Only 25% felt that their predoctoral program provided adequate preparation to treat patients with cerebral palsy, 28% to treat children with mental retardation, and 33% to treat medically compromised children. Researchers also asked residency program directors to rate the predoctoral preparation of these students relative to their ability to treat a variety of special needs. The responses of program directors differed markedly from those of their students. Only 9% of program directors indicated that first-year residents were adequately prepared to treat children with cerebral palsy, 11% to treat patients with mental retardation, and 11% to treat medically compromised patients. Conversely, 59% of program directors indicated that first-year residents were inadequately prepared to treat children with cerebral palsy, 63% to treat patients with mental retardation, and 64% to treat medically compromised patients.¹⁴

Exposure to the complexities of treatment of special-needs populations appears to be critical at all levels of dental education. Subar and colleagues surveyed alumni dentists and found that dentists who completed any postdoctoral residency (which was in and of itself predictive of providing services to people with special needs) were also more likely to report predoctoral training and experience in treating patients with developmental disabilities.¹¹

Limitations of the Survey Data and Analytic Methods

The results of this survey were encouraging in that many responding dentists were treating at least some patients who required treatment modifications. However, the low overall response rate among those in the random sample and the use of convenience sampling to reach dentists known to treat people with special needs make it difficult to generalize results to the larger population of dentists. Nonetheless, the findings are of interest as they contribute to the literature describing the contributions of dentists to services for special populations.

The high rate of response among dentists providing services to people with special needs suggests the pos-

sibility of response/selection bias among survey participants. While the generic survey solicitation letter requested that all dentists in the sample complete the survey, the authors surmise that the topic may have been a deterrent to those who do not treat people with special needs. Recent literature discussing survey response rates suggests that the relevance of a topic to the potential respondent is a predictor of survey completion, which may or may not result in nonresponse bias.^{34,35}



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APPENDIX

APPENDIX: SURVEY INSTRUMENT

Dentists' Experiences Serving Patients With Special Needs

1. Please describe the primary setting in which you practiced in 2018. (Please select only one.)
 - a. Private dental practice (full- or part-time)
 - b. Large group multispecialty practice
 - c. Large group specialty practice
 - d. Hospital
 - e. Academic dental center
 - f. Dental management/support organization
 - g. Veterans Administration facility
 - h. Indian Health Service
 - i. Community health center/safety net clinic
 - j. Other, please specify

2. What was your primary practice's zip code in 2018?
 - a. Please enter the 5-digit zip code

3. What was your employment situation in your primary practice in 2018?
 - a. Sole proprietor (ie, the only owner)
 - b. Partner (ie, one of two or more owners)
 - c. Employee (on a salary, commission, percentage, or associate basis)
 - d. Independent contractor
 - e. Other, please specify

4. What was the total number of weeks that YOU worked in your primary practice in 2018 (excluding vacation)?
 - a. Number of weeks worked

5. Approximately how many TOTAL patients did YOU treat in your primary practice in 2018?
 - a. Number of patients treated

6. Approximately what percentage of the patients that YOU treated in your primary practice in 2018 are in the following age categories?
Percentage of patients by age group (the total should equal 100%):
 - a. Birth to 17 years of age
 - b. 18 to 64 years of age
 - c. 65 years of age or older

7. Approximately what percentage of the patients that YOU treated in your primary practice in 2018 are in the following insurance or payment categories?
Percentage of patients by type of insurance (the total should equal 100%):
 - a. Covered by a private insurance program that pays or partially pays for their dental care
 - b. Covered by a public assistance program that pays or partially pays for their dental care
 - c. Not covered by an insurance program

8. Did YOU provide care to any patients with special needs in your primary practice in 2018? (Select all that apply.)
 - a. Patients with intellectual and/or developmental disabilities (IDD) (eg, those with autism spectrum disorder, seizure disorders, genetic conditions like Down syndrome, cerebral palsy, etc.)
 - b. Patients with physical disabilities (eg, mobility or movement disorders; such as those who require the use of a wheelchair or those who have involuntary or uncontrollable movements)
 - c. Patients with other acquired disabilities (eg, those with dementia, traumatic brain injury, or other type of injury or condition)
 - d. I did not provide care to any patients with special needs

9. Approximately how many patients with special needs did YOU treat in the primary practice in the typical MONTH during 2018? (None, 1 to 10, 11 to 50, 51 to 100, or 101 or more.)
 - a. Birth to 17 years of age
 - b. 18 to 64 years of age
 - c. 65 years of age or older

10. Please select the top three statements that best describes why YOU did not provide care to patients with special needs, where 1 is the most important, 2 is the second most important, and 3 is the third most important:
 - a. I had no appointment requests from patients with special needs or from their families or caregivers
 - b. Our office refers patients with special needs directly to another provider upon an inquiry for a visit
 - c. I am not a Medicaid provider, and I have found that most of the patients with special needs in my state are covered by Medicaid
 - d. My office is not properly equipped to accommodate patients with special needs
 - e. I am concerned about the behavior management required when working with patients with special needs
 - f. I am concerned about the medical and pharmacologic considerations when working with patients with special needs
 - g. I do not feel properly trained to treat patients with special needs
 - h. My staff is not properly trained to treat patients with special needs
 - i. Other, please explain

11. Please indicate the referral sources for YOUR patients with special needs. (Select all that apply.)
 - a. General dentist
 - b. Specialty dentist
 - c. Medical provider
 - d. Family/friends of patient
 - e. Case Manager (eg, from a community based organization, state agency, or group home)
 - f. Patient/family/caregiver self-selected my practice
 - g. Other, please specify

12. Which of the following accommodations or features does your primary practice offer for patients with special needs? (Select all that apply.)
- a. Dedicated time/day
 - b. Dedicated operatory
 - c. Assignment of appropriately trained or experienced staff
 - d. Increased time allotted for appointments
 - e. Easy transfer (eg, from wheelchair) to dental chair
 - f. Equipped to treat patients in their chair (eg, long tubing and other fixtures that move to chair)
 - g. Wide hallways/corridors
 - h. Wheelchair ramps
 - i. Sensory-sensitive room/environment
 - j. Other, please specify
 - k. None of the above
13. Do you use any of the following psychotherapeutic and/or pharmacological interventions when treating patients with special needs? (Select all that apply.)
- a. Behavior management techniques (ie, tell-show-do, voice control/modulation, desensitization, modeling, cognitive strategies)
 - b. Protective stabilization
 - c. Oral premedication
 - d. Nitrous oxide/oxygen inhalation
 - e. Intravenous/intramuscular sedation
 - f. General anesthesia
 - g. Other, please specify
 - h. None of the above
14. In your primary practice in 2018, how often did YOU encounter a patient with special needs who did not cooperate for treatment in your primary practice?
- a. Often (daily to weekly)
 - b. Sometimes (monthly)
 - c. Rarely (a few times throughout the year)
 - d. Never
15. When YOU encounter a patient with special needs who is not able to cooperate for treatment, what do you do? (Select all that apply.)
- a. Our team does our best to treat the patient in the chair/clinic setting
 - b. Our team reschedules the appointment to try again at another time
 - c. Our team reschedules the patient for care under sedation or general anesthesia
 - d. I refer the patient to another provider (general dentist)
 - e. I refer the patient to a specialty provider (pediatric or other)
 - f. I refer the patient for treatment under general anesthesia
 - g. Other, please specify

16. Have YOU had any education, training, or other experience working with people with special needs? (Select all that apply.)
- a. Dental school didactic education
 - b. Dental school clinical training
 - c. Residency, specialty, or fellowship program didactic education
 - d. Residency, specialty, or fellowship program clinical training
 - e. Continuing education
 - f. Community involvement (eg, Special Olympics, Dental Lifeline, Mission of Mercy)
 - g. Friends, family, or neighbors with special needs
 - h. Other, please specify
 - i. No, none
17. Please rate YOUR level of agreement with the following statements about your education, training, or other experiences working with people with special needs. (Strongly agree, agree, neutral, disagree, or strongly disagree.)
- a. Increased my awareness of the unique oral health needs of people with special needs
 - b. Increased my willingness to treat people with special needs
 - c. Increased my confidence in treating people with special needs
 - d. Provided practical information for treating people with special needs
 - e. Enhanced my skills in treating people with special needs
18. Please rate your level of agreement with the following statements. (Strongly agree, agree, neutral, disagree, or strongly disagree.)
- a. General dentists should treat children with special needs
 - b. General dentists should treat adults with special needs
 - c. Pediatric dentists should treat children with special needs
 - d. Pediatric dentists should treat adults with special needs
 - e. Dental schools should offer education and training on treating people with special needs
 - f. Residency programs should offer education and training on treating people with special needs
 - g. There should be more continuing education opportunities for dentists on treating people with special needs
19. Please provide any additional comments on the subject of treating people with special needs in the space below.



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With a background as a medical doctor and 15 years of experience in health sciences, Dr. Surdu has contributed to the development and implementation of epidemiologic studies supported by the US National Institute of Health (NIH), the European Union (EU), the World Health Organization (WHO), among others. Dr. Surdu has worked for the Center for Health Workforce Studies (CHWS) for the past 5 years and her current research involves comprehensive studies of oral health in various states, including the evaluation of oral health needs, delivery of oral health services, and access and utilization of oral health services, particularly for underserved populations.



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