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Assessing the Characteristics of New York State Dentists Serving Medicaid Beneficiaries



School of Public Health University at Albany, State University of New York

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PREFACE

New York State (NYS) offers extensive dental benefits to both its Medicaid base population and its Medicaid expansion population. Despite extensive dental benefits, there are many barriers to accessing dental care for Medicaid patients in NYS. This study explores the demographic, educational, and practice characteristics of actively practicing dentists in NYS to better understand which factors are associated with dentists' participation and their level of participation in the Medicaid program.

This report was prepared by the Center for Health Workforce Studies (CHWS) staff, Shen Wang, Robert Martiniano, and Kristen Stiegler, with layout design by Leanne Keough. Funding for this report was provided by the NYS Department of Health.

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EXECUTIVE SUMMARY

INTRODUCTION

New York State is 1 of 14 states that offers extensive dental benefits to both its Medicaid base population and its Medicaid expansion population.¹⁻² Oral health services supported through Medicaid include preventive, restorative, periodontal, dentures, and oral surgery services.³ Despite the extensive dental benefits for Medicaid beneficiaries in New York State, there are many barriers to accessing dental care. This study explores the demographic, educational, and practice characteristics of actively practicing dentists in New York State to better understand which factors are associated with dentists' participation and their level of participation in New York State's Medicaid program.

BACKGROUND

Despite the available Medicaid and Children's Health Insurance Plan (CHIP) resources for oral health care in New York State, researchers have identified several barriers that exist for Medicaid beneficiaries attempting to access oral health services. Nationally, 1 major barrier cited to accessing oral health care was low dentist participation in Medicaid.^{2, 4-6} Enrollment in Medicaid, however, did not ensure that dentists actually treated Medicaid beneficiaries, with many dentists enrolled in Medicaid but providing a minimum amount or no services to Medicaid beneficiaries.^{5,7} Dentists' negative attitudes to both Medicaid in general and Medicaid beneficiaries also has led to reluctance in providing care to Medicaid beneficiaries, including restricting the number of patients in their practices.^{5,8}

Previous research has found that certain dentist characteristics such as age, gender, and race and participation in post dental school residencies influenced the likelihood of a dentist serving Medicaid beneficiaries. Studies also found that dentists who are female or who are ethnic or racial minorities were more likely to both serve Medicaid beneficiaries and to accept Medicaid beneficiaries as new patients.^{5,9} Practice characteristics also influenced the likelihood of a dentist serving Medicaid beneficiaries, with dentists practicing in dental service organizations (DSOs) or federally qualified health centers (FQHCs) more likely to treat Medicaid beneficiaries than dentists at hospitals or at private practices.^{10,11} Finally, research has found that pediatric dentists have a higher Medicaid participation rate than general dentists and other dental specialists.^{5,7,10,12}

METHODS

Research Questions

To better understand and assess the factors affecting dentist participation and level of participation in New York State's Medicaid program, this study explored the demographic, educational, and practice characteristics of dentists who were active in New York State. The study seeks to answer the following:

- 1. What proportion of all New York State dentists who were enrolled in Medicaid actively participate in the program?
- 2. What is the relationship between dentist demographic, educational, geographic, and practice characteristics and Medicaid participation?
- 3. What is the relationship between the volume of services and the above-mentioned characteristics?

Data

Two data sources, American Dental Association (ADA) Dentist Masterfile and New York State Medicaid claims data, were used in this study. The ADA Masterfile includes 14,629 dentists who were reported actively practicing in New York State as of December 31, 2018. New York State Medicaid claims data for 2018 was accessed using the Salient Data Management System. Data accessed included information on the dentists (National Provider Identifier (NPI), profession code, and service location), services provided (diagnosis and procedure), and the patient (patient identifier and the date of service). Using the NPI, 12,837 (88%) dentists in the ADA Masterfile were linked to the Medicaid dental claims data, accounting for over 6.6 million claims records. Using the claims data, the number of visits per unique NPI were determined. In prior research, annual visits, unique patients, or billing amounts have been used to identify active Medicaid dental participation.^{12,13} This study's research used visits to identify Medicaid active status, and the analysis determined that 10 or more annual visits meant a dentist was Medicaid active. Over 4,200 dentists met the 10 or more visits definition to be considered active in Medicaid. Dentists active in Medicaid made up slightly less than one-third of all active dentists in New York State.

Analytic Approach

Two analytic techniques were employed to address our research questions. First, descriptive analyses were conducted on the 2 outcome variables – Medicaid active status and level of Medicaid visits. Second, to determine the associations between each dentist demographic, education, and practice characteristic and the outcome variables, while controlling for the effects of the other variables, regression analyses were conducted. All analyses were conducted using IBM SPSS Statistics v24. A binary logistic regression was conducted using all 12,837 active dentists to identify which characteristics were associated with Medicaid participation. A Poisson regression was conducted to identify how dentist characteristics were associated with volume of Medicaid services.

KEY FINDINGS

The results of the binary logistic regression analyses suggested that several dentist characteristics were associated with participating in Medicaid. Controlling for the effects of the other variables in the analysis, race/ethnicity, dental school, practice setting, specialty, region, rural/urban status, and years of experience were associated with actively participating in Medicaid, while gender and completion of a dental residency were not. Dentists who identified as Black, non-Hispanic (hereafter referred to as Black) were 2.6 times more likely to participate in Medicaid than dentists who identified as White, non-Hispanic (hereafter referred to as White). Additionally, dentists who identified as Hispanic/ Latinx (hereafter referred to as Hispanic) (2.1 times) or who identified as Asian, non-Hispanic (hereafter referred to as Asian) (1.6 times) were more likely to be participate in Medicaid than dentists who identified as White.

Compared to dentists who worked full time in private practice, dentists who worked in FQHCs were nearly 6 times more likely to participate in Medicaid, and dentists who worked part time in private practice were 15% less likely to participate in Medicaid. Pediatric dentists and oral and maxillofacial surgeons were more likely to participate in Medicaid than general dentists, 2.4 times and 2.1 times, respectively. Finally, for each additional year of practice experience, a dentist was 2% less likely to participate in Medicaid. Dentists who graduated from foreign dental schools were 2.5 times more likely to participate in Medicaid than dentists who graduated from dental schools in other states. Dentists who graduated from New York University (1.8 times) and from SUNY Stony Brook University (1.4 times) were more likely to participate in Medicaid than dentists who graduated from dental schools in other states. Finally, dentists practicing in Western New York were nearly 22% more likely to participate in Medicaid than dentists in New York City.

The results of the Poisson regression analyses suggested that several dentist characteristics were associated with Medicaid visit volume. Controlling for the effects of the other variables in the analysis, gender, race/ethnicity, dental school attended, completion of a dental residency, practice setting, specialty, region, and years of experience were associated with actively participating in Medicaid, while a rural/urban practice location was not. Dentists who were male had 15% more Medicaid visits than dentists who were female. Dentists who identified as Hispanic had 17% more and those who identified as Asian had 13% more Medicaid visits than dentists who identified as White. Dentists who graduated from New York University had about 9% more Medicaid visits than dentists who graduated from dental schools in other states. Dentists who worked as dental school faculty had 59% more Medicaid visits, and dentists who worked at FQHCs had 30% more Medicaid visits than dentists who worked full time in private practices. Pediatric dentists had 2.4 times more Medicaid visits than general dentists. For each additional year of experience, a dentist would have 0.8% fewer Medicaid visits. A dentist with 10 years of experience would have 8% fewer Medicaid visits than a dentist with no experience. Finally, dentists who worked in the Western New York region had 14% more Medicaid visits than dentists who worked in the New York City region.

DISCUSSION

This research indicated that one-third of dentists in New York State actively served Medicaid beneficiaries in 2018, which is slighter higher than the ADA estimate of about 26%.¹⁰ As shown in the analyses, key variables, such as race, age/experience, dental school, residency, practice setting, specialty, and working in rural areas, played an important role in the likelihood that a dentist participated in Medicaid and the volume of visits by Medicaid beneficiaries.

First, while fewer than one-third of dentists in this study were female, they were more apt to treat Medicaid beneficiaries, though at a slightly lower volume than male dentists. Additionally, race and ethnicity also played an important role in treating Medicaid beneficiaries. Dentists in this study who were racial or ethnic minorities were more likely to see patients who were also members of racial and ethnic minority groups than dentists who were White. Dental schools also played a role in promoting service to vulnerable populations. Educating students about health disparities and inequity has been shown to increase altruistic attitudes. Understanding the importance of treating all patients in underserved communities or who have specials needs was found to be positively correlated with increased altruistic attitudes.^{8,14} Finally, adult Medicaid beneficiaries were most likely to continue to struggle with accessing oral health care due to low Medicaid participation rates and low volume of services by general dentists. While some research has indicated that Medicaid coverage leads to increased oral health services utilization,¹⁵ the ongoing challenge, ultimately, is encouraging more general dentists to actively participate in the program.

CONCLUSIONS

While certain characteristics of dentists are linked to their participation in the Medicaid program, New York State dentists, especially general dentists, lag behind their counterparts in many other states. A more diverse dental workforce as well as redoubling efforts in dental schools to emphasize treating diverse and vulnerable populations could help reduce the gap. Additionally, the impact on increased Medicaid reimbursement should be more fully researched to understand its influence on access to care. Finally, as more and better data become available about dentists practicing in New York State, continued research on factors driving participation in the Medicaid program could guide policy makers on future adjustments to the program.

LIMITATIONS

About 12% of dentists from the ADA Masterfile lacked NPI information and were excluded from the analysis. Additionally, about one-half of the dental services supported by Medicaid was not linked to dentists. This research also used visits and not patients for the analysis. Potentially, a low number of visits could come from 1 family or from 1 person who was new to Medicaid due to employment or other financial changes. Consequently, the definition of a dentist participating in Medicaid used in this study excluded 555 dentists who had 1-9 visits in 2018 and therefore may require sensitivity analyses to re-examine regression outcomes by changing the Medicaid participation active threshold or by using patients instead of visits.



TECHNICAL REPORT

INTRODUCTION

New York State is 1 of 14 states that offers extensive dental benefits to both its Medicaid base population and its Medicaid expansion population.¹⁻² Oral health services supported through Medicaid include preventive, restorative, periodontal, dentures, and oral surgery services³ and is the leading source of support of oral health care for low-income children and adolescents.¹⁶ Children and adolescents are covered for oral health services up to age 21, but there are no mandatory coverage requirements for adults, ultimately leaving coverage up to the individual states.^{3,6} As of December 2021, slightly more than 7.3 million New Yorkers were enrolled in Medicaid, Child Health Plus (CHIP), or in Child/Teen Health Program (C/THP).¹⁷

BACKGROUND

Despite the extensive dental benefits for Medicaid beneficiaries in New York State, there are many barriers to accessing dental care; chief among them is the limited availability of dentists treating Medicaid beneficiaries.^{6,18-19} This study explores the demographic, educational, and practice characteristics of actively practicing dentists in New York State to better understand which factors are associated with dentists' participation and their level of participation in New York State's Medicaid program.

Despite the available Medicaid and CHIP resources for oral health care in New York State, researchers have identified several barriers that exist for Medicaid beneficiaries attempting to access oral health services. Nationally, 1 major barrier cited to accessing oral health care was low dentist participation in Medicaid.^{1,4-6} The Health Policy Institute (HPI) at the American Dental Association (ADA) estimated that in 2017, 40% of dentists in New York State were enrolled in Medicaid.¹⁰ Enrollment in Medicaid, however, did not ensure that dentists actually treated Medicaid beneficiaries, with many dentists enrolled in Medicaid but providing a minimum amount or no services to Medicaid beneficiaries.^{5,7} One-fourth of New York State dentists enrolled in Medicaid did not provide services to Medicaid patients during that year and another 5% of those enrolled treated fewer than 10 patients.¹⁰

Dentists' negative attitudes to both Medicaid in general and Medicaid beneficiaries also led to reluctance in providing

care to Medicaid beneficiaries, including restricting the number of patients in their practices.^{5,8} Dentists reported that patient behavior and knowledge, such as skipped appointments, low adherence to treatment, and low oral health literacy all contributed to low dentist participation in Medicaid.^{5,8,9,20} Additionally, dentists indicated that low reimbursement rates and the administrative burden of billing for Medicaid contributed to a reluctance to treat Medicaid beneficiaries.^{5, 8, 19, 20} Finally, increased Medicaid reimbursement rates did not necessarily mean an increase in treating Medicaid beneficiaries.^{8,21-23} Other factors such as patient behavior, including not missing appointments, and claims processing improvements may be as important in changing the willingness to treat Medicaid patients as increased reimbursement rates.²¹ Ultimately, the shortage of dentists providing services to Medicaid beneficiaries causes the increase in emergency department visits for nontraumatic dental conditions (NTDCs).6

Demographic and Education Characteristics

Previous research has found that certain dentist characteristics such as age, gender, race, and participation in post dental school residencies influenced the likelihood of a dentist serving Medicaid beneficiaries. Studies found that dentists who were female or who were ethnic or racial minorities were more likely to both serve Medicaid beneficiaries and to accept Medicaid beneficiaries as new patients.^{5,9} Additionally, older dentists were found to accept Medicaid more frequently.^{7,24} Finally, completion of a residency program, including those residencies funded through the Health Resources and Services Administration (HRSA), was shown to increase the likelihood of a dentist serving pediatric beneficiaries enrolled in Medicaid.²⁴

Practice Characteristics

Practice characteristics also influenced the likelihood of a dentist serving Medicaid beneficiaries, with dentists practicing in dental service organizations (DSOs) or federally qualified health centers (FQHCs) more likely to treat Medicaid beneficiaries than dentists at hospitals or at private practices.^{10,24} Additionally, research has found that pediatric dentists have a higher Medicaid participation rate than general dentists and other dental specialists.^{5,7,10,12} Finally, studies found Medicaid participation to be higher among dentists in rural areas.^{1,8,24}

METHODS

Research Questions

To better understand and assess the factors affecting dentist participation and level of participation in New York State's Medicaid program, this study explored the demographic, educational, and practice characteristics of dentists who were active in New York State. This study sought to answer the following:

- 1. What proportion of all New York State dentists who were enrolled in Medicaid actively participate in the program?
- 2. What is the relationship between dentist demographic, educational, geographic, and practice characteristics and Medicaid participation?
- 3. What is the relationship between the volume of services and the above-mentioned characteristics?

Data

Two data sources, ADA Dentist Masterfile and New York State Medicaid claims data, were used in this study. The ADA Masterfile includes 14,629 dentists who reported actively practicing in New York as of December 31, 2018. Variables included the National Provider Identifier (NPI), gender, age, and race/ethnicity; dental school attended, graduation year, and whether a residency program was completed; office address; and practice information, including specialty, setting, DSO/FQHC affiliation, and Medicaid participation status in 2017.

New York State Medicaid claims data from January 1-December 31, 2018 were accessed using the Salient Data Management System. Data accessed included information on the dentists (NPI, profession code, and service location), services provided (diagnosis and procedure), and the patient (patient identifier and the date of service). The Medicaid data included 12.4 million dental Medicaid claims submitted by any dentist.

Variables Created

Several variables were created to facilitate the analysis. The ADA Masterfile variable entitled "occupation description" was combined with two other variables that identified whether the dentist worked at a DSO or an FQHC to create a new setting variable used for the analysis. The new variable included as categories FQHCs, DSOs, interns/residents, hospital staff, government employees, school faculty, dentists in practice full time, and dentists in private practice part time. Using geocoded addresses, the New York State Department of Labor region was assigned for each office address. Finally, office address zip codes were classified into rural and urban using Rural-Urban Commuting Area (RUCA) codes.* RUCA codes 1-6 (metropolitan and micropolitan areas) were classified as urban areas and RUCA codes 7-10 (small towns and rural areas) were classified as rural areas.

Linking ADA Masterfile to Medicaid Claims

Using the NPI, 12,837 (88%) dentists in the ADA Masterfile were linked to the Medicaid dental claims data, accounting for over 6.6 million claims records. Dentists without NPIs were excluded from the analyses.

Defining Patient Visits for Oral Health Care

The linked Medicaid claims data were arranged and filtered by individual dentists using their NPIs. Each dentist was associated with a list of all Medicaid claims by Medicaid beneficiary, and a dentist could have several claims billed for different services in the same day for the same Medicaid beneficiary. A dental visit was defined as the aggregation of dental claims that occurred on the same day for a unique enrollee regardless of the number of claims. For example, a dentist who billed 5 claims on January 1, 2018, for patient B would have 1 visit assigned to patient B.

Defining Dentists Actively Participating in Medicaid

After the aggregation of claims into visits for oral health care, the number of visits per individual NPI were determined. On average, there were 798 Medicaid visits to each dentist serving Medicaid beneficiaries in 2018. In prior research, annual visits, unique patients, or billing amounts had been used to identify active Medicaid dental participation.^{12,13} This research used visits to identify Medicaid active status, and the analysis conducted as part of this research determined that 10 or more annual visits meant a dentist was Medicaid active.

* https://www.ers.usda.gov/data-products/rural-urban-commut ing-area-codes/documentation/

Based on the frequency distribution of visits in 2018, 10 visits were at the 12th percentile among all dentists with at least 1 Medicaid visit (Table 1). Sensitivity analyses were conducted with lower (10th percentile or 8 visits) and higher (15th percentile or 19 visits) cutoff points to determine how different cutoff points affected the stability of the analyses. Both sensitivity analysis outcomes were consistent with outcomes using 10 visits at the 12th percentile on dentists' Medicaid participation. Dentists active in Medicaid in the study were, thus, defined as a dentist who billed at least 10 Medicaid visits in a year.

TABLE 1. Frequency Distribution of Visits for All New York State Dentists With Medicaid Visits

Mean		798.05
	5	3.00
Percentiles		
	12	10.00
	20	35.00

More than 4.200 dentists met the 10 or more visits definition to be considered active in Medicaid. Dentists active in Medicaid made up slightly less than one-third of all active dentists in New York State. Four outliers were identified as having more than 25,000 visits per year (or about 70 visits per day), whereas all other dentists had fewer than 15,000 visits per year. These dentists were chief faculty (COO, Dean, Director) from 3 major New York State dental schools. It is likely their institutions used the NPIs of these dentists for Medicaid billing purposes for services provided by dental school students who did not have NPIs to satisfy Medicaid billing requirements. In this case, billing services provided by multiple providers would not only skew the data but also decrease statistical power to study the entire Medicaid dentist population. Hence, these 4 dentists were excluded from the analysis, leaving 4,262 Medicaid-active dentists for the analysis.

Analytic Approach

Two analytic techniques were employed to address our research questions. First, descriptive analyses were conducted for each of the outcome variables. Second, to determine the associations between each dentist demographic, education, and practice characteristic and the outcome variables while controlling for the effects of the other variables, regression analyses were conducted. All analyses were conducted using IBM SPSS Statistics v24.

Regression Analysis Assessing Characteristics Associated With Dentist Participation in Medicaid

A binary logistic regression was conducted using all 12,837 active dentists to identify which characteristics were associated with Medicaid participation. Explanatory variables in the model included practice setting, gender, race/ethnicity, dental specialty, dental school from which the dentist graduated, whether the dentist completed a dental residency, practice location, years of experience since graduating from dental school, and rural/urban practice status. Age was highly correlated with years of experience and was excluded from this analysis.

Regression Analysis Assessing Characteristics Associated With Medicaid Visit Volume

A Poisson regression was conducted to identify how dentist characteristics were associated with volume of Medicaid services. Poisson regression was selected because the dependent variable, visit count, was not normally distributed. Independent variables included practice setting, gender, race/ethnicity, dental specialty, dental school from which the dentist graduated, years since dental school graduation, whether the dentist completed a dental residency, practice location, and rural/urban practice status.

In total, 4,262 dentists were defined as active in Medicaid for the Poisson regression. Of those dentists who participated in Medicaid and had 10 or more visits in 2018, the mean number of visits was 878 and the median number of visits was 475 (Table 2).

TABLE 2. Frequency Distribution of Visits for New YorkState Dentists Participating in Medicaid

		Number of Visits
Mean		878.41
Median		475.00
	25	142.00
Percentiles	50	475.00
	75	1,146.00

Characteristics of New York State Dentists

More than two-thirds (69%) of active dentists in New York State were male (Table 3). The majority of active dentists were between ages 45-64. Slightly over one-fifth of active dentists were age 65 or older. Fifty-seven percent of active dentists identified themselves as White, non-Hispanic (hereafter referred to as White), with another 10% of dentists identifying themselves as Asian, non-Hispanic (hereafter referred to as Asian). Slightly more than 3% of active dentists identified themselves as African American/Black, non-Hispanic (hereafter referred to as Black), and nearly 3% of active dentists identified themselves as Hispanic/Latinx (hereafter referred to as Hispanic). Additionally, about 25% of dentists did not report race and ethnicity.

More than half of active dentists graduated from dental school since 1990 (55%). Nearly 60% of active dentists graduated from New York State dental schools, and another one-third graduated from dental schools in other states. Over half (56%) of active dentists completed a residency training program. Slightly more than 80% of active dentists worked at private dental practices, including those working full and part time. Six percent of active dentists worked at FQHCs, and another 4% worked at DSOs. In terms of specialty, slightly over three-fourths of active dentists worked as general dentists (76%), followed by orthodontists (slight-ly more than 4%) and pediatric dentists (slightly less than 4%).



TABLE 3. Demographic, Education, and Practice Characteristics of Actively Practicing Dentists in New York State, 2018

Variable	Value	Number	Percent
	Female	3,950	30.8%
Gender	Male	8.756	68.3%
	Missing	131	1.0%
	Younger than 35	1,040	8.1%
	35 - 44	2,515	19.6%
Age Group	45 - 54	2,862	22.3%
	55 - 64	3,710	28.9%
	65 and older	2,710	21.1%
	African American/Black, non-Hispanic	412	3.2%
	Asian, non-Hispanic	1,330	10.4%
Daca (Ethnicity	Hispanic/Latinx	369	2.9%
Race/Ethnicity	White, non-Hispanic	7,319	57.0%
	Other, non-Hispanic	131	1.0%
	Missing	3,276	25.5%
	Columbia University	932	7.3%
	New York University	4,241	33.0%
Dentel Colorel Legetien	Stony Brook University	685	5.3%
Dental School Location	University at Buffalo	1,812	14.1%
	Other US location	4,336	33.8%
	Out of US	831	6.5%
	Before 1980	2,461	19.2%
	1980 - 1989	3,292	25.6%
Dental School Graduation Year	1990 - 1999	2,842	22.1%
	2000 - 2009	2,799	21.8%
	2010 and later	1,443	11.2%
Completed Residency	No	5,603	43.6%
	Yes	7,234	56.4%
	DSO	571	4.4%
	FQHC	805	6,3%
Practice Setting	Private Practice, Full time	9,177	71.5%
	Private Practice, Part time	1,253	9.8%
	School Faculty	707	5.5%
	Other	324	2.5%
	Endodontics	377	2.9%
	General Dentistry	9,710	75.6%
	Oral and Maxillofacial Surgery	592	4.6%
Practice Specialty	Orthodontics	666	5.2%
Fractice specialty	Pediatrics	545	4.2%
	Periodontics	507	3.9%
	Prosthodontics	388	3.0%
	Multi-specialties/Other	52	0.4%
Pural/Urban	Rural (RUCA codes 7-10)	263	2.0%
	Urban (RUCA Codes 1-6)	12,574	98.0%

While two-thirds of active dentists were male, a higher percentage of dentists who were female served Medicaid beneficiaries compared to dentists who were male (39% and 31%, respectively) (Table 4). Additionally, a higher percentage of dentists between the ages of 35 and 44 participated in Medicaid compared to dentists in other age groups. Dentists age 65 years and older had the lowest percentage of Medicaid participation at 27%. A higher percentage of dentists who indicated they were racial or ethnic minorities participated in Medicaid compared to dentists who identified themselves as White, including dentists who identified themselves as Black (54%), who identified themselves as Hispanic (52%), and who identified themselves as Asian (44%).

A higher percentage of dentists who trained at foreign dental schools (46%) participated in Medicaid compared those who trained at New York State (35%) dental schools or who had trained at dental schools in other US states (28%). Additionally, a higher percentage of dentists who completed residency trainings (35%) participated in Medicaid compared to dentists who did not complete residency training (31%).

Almost three-quarters (73%) of dentists who worked at FQHCs participated in Medicaid. In contrast, dentists who worked in private practices were among the lowest in Medicaid participation. Fifty-five percent of pediatric dentists and 48% of oral and maxillofacial surgeons participated in Medicaid. Only one-third of general dentists participated in Medicaid.

For a complete table of active Medicaid dentists versus non-Medicaid active dentists, see Appendix A.

Association of Dentists' Characteristics to Participation in Medicaid

The results of the binary logistic regression analyses suggested that several dentist characteristics were associated with participating in Medicaid. Controlling for the effects of the other variables in the analysis, race/ethnicity, dental school, practice setting, specialty, region, rural/urban status, and years of experience were associated with actively participating in Medicaid, while gender and completion of a dental residency were not. Dentists who identified as Black were 2.6 times more likely to participate in Medicaid than dentists who identified as White (Table 5). Additionally, dentists who identified as Hispanic (2.1 times) or who identified as Asian (1.6 times) were more likely to be participate in Medicaid than dentists who identified as White.

Compared to dentists who worked full time in private practice, dentists who worked in FQHCs were nearly 6 times more likely to participate in Medicaid, and dentists who worked part time in private practice were 15% less likely to participate in Medicaid. Pediatric dentists and oral and maxillofacial surgeons were more likely to participate in Medicaid than general dentists, 2.4 times and 2.1 times, respectively. In contrast prosthodontists, periodontists, and endodontists were less likely to participate in Medicaid than general dentists. Finally, for each additional year of practice experience, a dentist was 2% less likely to participate in Medicaid. A dentist with 10 years of experience was 20% less likely to participate in Medicaid than a dentist with 1 year of experience.

Dentists who graduated from foreign dental schools were 2.5 times more likely to participate in Medicaid than dentists who graduated from dental schools in other states. Dentists who graduated from New York University (1.8 times) and from SUNY Stony Brook University (1.4 times) were more likely to participate in Medicaid than dentists who graduated from dental schools in other states.

Finally, dentists practicing in the Capital, Finger Lakes, Long Island, and Hudson Valley regions were less likely to participate in Medicaid than dentists in New York City area. In contrast, dentists practicing in Western New York were nearly 22% more likely to participate in Medicaid than dentists in New York City. Dentists practicing in rural areas of New York State were 1.6 times more likely to participate in Medicaid than dentists in urban areas. TABLE 4. Medicaid Participation by Demographic, Education, and Practice Characteristics of Actively Practicing Dentists in New York State, 2018

Variable	Value	% Actively Participated
	Female	38.5%
Gender	Male	30.8%
	Missing	36.6%
	Younger than 35	37.3%
	35 - 44	40.2%
Age Group	45 - 54	37.6%
	55 - 64	28.9%
	65 and older	26.5%
	African American/Black, non-Hispanic	53.6%
	Asian, non-Hispanic	43.8%
Daca/Ethnicity	Hispanic/Latinx	51.5%
Race/Ethnicity	White, non-Hispanic	26.3%
	Other, non-Hispanic	49.6%
	Missing	39.2%
	Columbia University	30.6%
	New York University	38.3%
Dental Cabaal Location	Stony Brook University	32.4%
Dental School Location	University at Buffalo	28.6%
	Other US location	28.4%
	Out of US	46.3%
	Before 1980	25.2%
	1980 - 1989	24.3%
Dental School Graduation Year	1990 - 1999	37.5%
	2000 - 2009	43.1%
	2010 and later	39.6%
Completed Desidency	No	30.7%
Completed Residency	Yes	35.2%
	DSO	34.7%
	FQHC	72.7%
Practice Cotting	Private Practice, Full time	30.3%
	Private Practice, Part time	23.3%
	School Faculty	39.5%
	Other	41.4%
	Endodontics	16.7%
	General Dentistry	33.4%
	Oral and Maxillofacial Surgery	48.1%
Practice Specialty	Orthodontics	34.4%
Practice specialty	Pediatrics	55.4%
	Periodontics	16.2%
	Prosthodontics	10.1%
	Multi-specialties/Other	36.5%
Dural/Urban	Rural (RUCA codes 7-10)	39.5%
Kurai/Urban	Urban (RUCA Codes 1-6)	33.1%

TABLE 5. Odds Ratios Measuring the Impacts of Dentists' Characteristics on Participation in Medicaid for Statistically Significant Variables

Variable	Value	Odds Ratio
	White, non-Hispanic	Reference Group
	African American/Black, non-Hispanic	2.609
Deco/Ethnicity	Asian, non-Hispanic	1.640
Race/ Ethnicity	Hispanic/Latinx	2.135
	Other, non-Hispanic	2.065
	Missing	1.275
	Other US location	Reference Group
	New York University	1.791
Dental School Location	Stony Brook University	1.445
	Foreign Dental School	2.505
	Private Practice, Full time	Reference Group
	FQHC	5.750
Practice Setting	Hospital Staff	3.426
	Private Practice, Part time	0.848
	School Faculty	1.781
	General Practice	Reference Group
	Endodontics	0.420
	Oral and Maxillofacial Surgery	2.067
Practice Specialty	Orthodontics	1.298
	Pediatrics	2.360
	Periodontics	0.418
	Prosthodontics	0.208
Dural (Linhan	Urban (RUCA Codes 1-6)	Reference Group
Rurai/Orban	Rural (RUCA codes 7-10)	1.599
	New York City	Reference Group
	Capital Region	0.784
	Finger Lakes	0.754
PHIP Region	Long Island	0.679
	Mid-Hudson	0.617
	Western New York	1.218
Experience	Years of Experience Since Dental School	0.980

For a complete table on the parameter estimates on Medicaid-active status, see Appendix B.

Association of Dentists' Characteristics to Volume of Visits

The results of the Poisson regression analyses suggested that several dentist characteristics were associated with Medicaid visit volume. Controlling for the effects of the other variables in the analysis, gender, race/ethnicity, dental school attended, completion of a dental residency, practice setting, specialty, region, and years of experience were associated with the volume of Medicaid visits, while rural/urban practice location was not. Dentists who were male had 15% more Medicaid visits than dentists who were female (Table 6). Dentists who identified as Hispanic had 17% more and those who identified as Asian had 13% more Medicaid visits than dentists who identified as White. Dentists who graduated from New York University had about 9% more Medicaid visits than dentists who graduated from dental schools in other US states. Dentists who worked as dental school faculty had 59% more Medicaid visits and dentists who worked at FQHCs had 30% more Medicaid visits than dentists who worked full time in private practices. Dentists who worked part time in private practices had nearly 18% fewer visits than dentists. For each additional year of experience, a dentist would have 0.8% fewer Medicaid visits. A dentist with 10 years of experience would have 8% fewer Medicaid visits than a dentist who worked in the New York City region, while dentists who worked in Finger Lakes or in the Long Island regions had 20% and 18% fewer visits, respectively, than dentists who worked in the New York City region.

Category	Value	Odds Ratio
Candar	Female	Reference Group
Gender	Male	1.149
	White, non-Hispanic	Reference Group
Race/ Ethnicity	Asian, non-Hispanic	1.168
	Hispanic/Latinx	1.133
Dental School Location	Other U.S.	Reference Group
Dental School Location	New York University	1.088
	Private Practice, Full time	Reference Group
Due sties Catting	FQHC	1.295
Practice Setting	Private Practice, Part time	0.825
	School Faculty	1.590
	General Practice	Reference Group
	Endodontics	0.621
Practice Specialty	Pediatrics	2.406
	Periodontics	0.433
	Prosthodontics	0.473
Desiderer	No	Reference Group
Residency	Yes	1.108
	New York City	Reference Group
	Finger Lakes	0.799
PHIP Region	Long Island	0.828
	Western New York	1.142
Experience	Years of Experience Since Dental School	0.992

TABLE 6. Odds Ratios Measuring the Impacts of Dentists'	Characteristics on	Medicaid V	/isit Volume for	Statistically
Significant Variables				

For a complete table on the parameter estimates on Medicaid visits, see Appendix C.

DISCUSSION

This research indicated that one-third of dentists in New York State actively served Medicaid beneficiaries in 2018, which is slightly higher than the ADA estimate of about 26%.¹⁰ Consequently, it is important to understand the factors associated with dentists serving Medicaid beneficiaries. As shown in the analyses, key variables such as race, age/experience, dental school, residency, practice setting, specialty, and working in rural areas, played an important role in the likelihood that a dentist participated in Medicaid and the volume of visits by Medicaid beneficiaries.

First, while less than one-third of dentists in this research were female, they were more apt to treat Medicaid beneficiaries, though at a slightly lower volume than male dentists. Additionally, race and ethnicity also played an important role in treating Medicaid beneficiaries. Dentists who identified as racial or ethnic minorities were more likely to see patients who were also members of racial and ethnic minority groups than dentists who were White. At the same time, Black and Hispanic dentists were woefully underrepresented compared to the general population.²⁵ Efforts to address the lack of diversity among dentists include pipeline programs to encourage training a more diverse workforce by ensuring that students from diverse backgrounds graduate high school, attend appropriate undergraduate programs, and continue on to dental schools. In the shorter term, service-obligated programs can help encourage dentists to practice in designated shortage areas. These efforts can help address racial and ethnic disparities and promote culturally competent care in dentistry in New York state.

In addition, dental schools can also play a role in promoting service to vulnerable populations. Educating students about health disparities and inequity has been shown to increase altruistic attitudes. Understanding the importance of treating patients in underserved communities or patients with specials needs was found to be positively correlated with increased altruistic attitudes.^{8,14} Likewise, dental students who have a history of volunteerism prior to dental school have been found to score higher on a survey regarding dentist responsibilities toward vulnerable communities, low-income patients, and underserved populations.²⁶

Service learning and community-based education have also resulted in positive outcomes in adjusting perceptions of dental providers.^{27,28} Programs such as the Pipeline, Profes-

sion and Practice: Community Based Dental Education program and the Summer Medical and Dental Education Program (SMDEP), both created by The Robert Wood Johnson Foundation in conjunction with The California Endowment, the W.K. Kellogg Foundation, as well as the Baylor College of Dentistry's Bridge to Dentistry program, were designed to attract racial and ethnicity minority students to dental schools and support their education to ultimately improve dental care and access to dental care in underserved communities.²⁹ Also, serving in the National Health Service Corps (NHSC) can reduce bias and encourage dentists who have fulfilled their service obligation to continue working in an underserved community.³⁰

Lastly, FQHCs are major safety net providers in New York State, providing oral health services to Medicaid beneficiaries. Our study found that more than 70% of dentists working at FQHCs provided services to Medicaid beneficiaries. In many communities, FHQCs are the only source of care, especially of oral health care, for the Medicaid population. However, FQHCs continue to report difficulties recruiting and retaining dentists.³¹ Service-obligated programs such as NHSC provide some avenue for recruitment, but that and other service-obligated programs fall short of meeting all of the oral health staffing needs of FQHCs. Funding for service-obligated programs that target services to the Medicaid population is needed to ensure increased access to care for this vulnerable population.

A higher percentage of pediatric dentists accept Medicaid and serve a higher volume of Medicaid patients than general dentists, mostly likely due to the CHIP program, which helps ensure continued access to oral health services to children. Adult Medicaid beneficiaries, however, most likely continue to struggle with accessing oral health care due to low Medicaid participation rates and low volume of services by general dentists. While some research has indicated that Medicaid coverage leads to increased oral health services utilization,³² the ongoing challenge is encouraging more general dentists to actively participate in the program.

LIMITATIONS

CONCLUSIONS

About 12% of dentists from the ADA Masterfile lacked NPI information and were excluded from the analysis. Additionally, about half of the dental services supported by Medicaid were not linked to dentists. These dentists and these services could be billed under an organizational NPI instead of their individual NPI, potentially changing our results. Further research should investigate this data shortcoming to develop a more complete understanding of dentist participation in Medicaid. This research also used visits and not patients for the analysis. Potentially, a low number of visits could come from 1 family or from 1 person who is new to Medicaid due to employment or other financial changes. Consequently, the definition of a dentist participating in Medicaid used in this study excluded 555 dentists who had 1-9 visits in 2018 and therefore may require sensitivity analyses to re-examine regression outcomes by changing the Medicaid participation active threshold or by using patients instead of visits.

While certain characteristics of dentists are linked to their participation in the Medicaid program, New York State dentists, especially general dentists, lag behind their counterparts in many other states. A more diverse dental workforce as well as redoubling efforts in dental schools to emphasize treating diverse and vulnerable populations could help reduce the gap. Additionally, the impact on increased Medicaid reimbursement should be more fully researched to understand its influence on access to care. Finally, as more and better data become available about dentists practicing in New York State, continued research on factors driving participation in the Medicaid program could guide policy makers on future adjustments to the program.





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APPENDICES

APPENDIX A

		Not Active	Row %	Medicaid Active	Row %	Total	Column %
	Private Practice FT	6,399	69.7%	2,778	30.3%	9,177	71.5%
	Private Practice PT	961	76.7%	292	23.3%	1,253	9.8%
	School Faculty	428	60.5%	279	39.5%	707	5.5%
e	Government	94	75.2%	31	24.8%	125	1.0%
Setting	Hospital Staff	34	40.5%	50	59.5%	84	0.7%
	Intern/Resident	62	53.9%	53	46.1%	115	0.9%
	DSO	373	65.3%	198	34.7%	571	4.4%
	FQHC	220	27.3%	585	72.7%	805	6.3%
	Female	2,431	61.5%	1,519	38.5%	3,950	30.8%
Male	Male	6,057	69.2%	2,699	30.8%	8,756	68.2%
	Missing	83	63.4%	48	36.6%	131	1.0%
	White Non-Hispanic (NH)	5,394	73.7%	1,925	26.3%	7,319	57.0%
	Not Reported	1,993	60.8%	1,283	39.2%	3,276	25.5%
Daca Ethnicity	Asian NH	748	56.2%	582	43.8%	1,330	10.4%
Race Ethnicity	Black NH	191	46.4%	221	53.6%	412	3.2%
	Hispanic/Latinx	179	48.5%	190	51.5%	369	2.9%s
	Other NH	66	50.4%	65	49.6%	131	1.0%
	Younger than 35	652	62.7%	388	37.3%	1,040	8.1%
	35-44	1,504	59.8%	1,011	40.2%	2,515	19.6%
Age Group	45-54	1,787	62.4%	1,075	37.6%	2,862	22.3%
	55-64	2,636	71.1%	1,074	28.9%	3,710	28.9%
	65 and older	1,992	73.5%	718	26.5%	2,710	21.1%
	Other US location	3,106	71.6%	1,230	28.4%	4,336	33.8%
	Columbia University	647	69.4%	285	30.6%	932	7.3%
Dental School	New York University	2,616	61.7%	1,625	38.3%	4,241	33.0%
Dental School	Stony Brook, SUNY	463	67.6%	222	32.4%	685	5.3%
	Buffalo, SUNY	1,293	71.4%	519	28.6%	1,812	14.1%
	Foreign School (1st)	446	53.7%	385	46.3%	831	6.5%
	Before 1980	1,840	74.8%	621	25.2%	2,461	19.2%
Destal Calcul	1980-1989	2,491	75.7%	801	24.3%	3,292	25.6%
Graduation	1990-1999	1,776	62.5%	1,066	37.5%	2,842	22.1%
Graduation	2000-2009	1,592	56.9%	1,207	43.1%	2,799	21.8%
	2010 and later	872	60.4%	571	39.6%	1,443	11,2%

TABLE A-1. All New York State Dentists With NP	Pl by Medicaid-Active Status (N=12,837) (cont.)
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		Not Active	Row %	Medicaid Active	Row %	Total	Column %
Specialty	General Practice	6,463	66.6%	3,247	33.4%	9,710	75.6%
	Oral & Maxillofacial Surgery	307	51.9%	285	48.1%	592	4.6%
	Endodontics	314	83.3%	63	16.7%	377	2.9%
	Orthodontics	437	65.6%	229	34.4%	666	5.2%
	Pediatrics	243	44.6%	302	55.4%	545	4.2%
	Periodontics	425	83.8%	82	16.2%	507	3.9%
	Prosthodontics	349	89.9%	39	10.1%	388	3.0%
	Multi-Spec/DPH/Other	33	63.5%	19	36.5%	52	0.4%
Residency	No	3,884	69.3%	1,719	30.7%	5,603	43.6%
	Yes	4,687	64.8%	2,547	35.2%	7,234	56.4%
Rural/	Urban (RUCA=1-6)	8,412	66.9%	4,162	33.1%	12,574	98.0%
Urban	Rural (RUCA=7-10)	159	60.5%	104	39.5%	263	2.0%

APPENDIX B

TABLE B-1. Parameter Estimates of Impacts on Medicaid-Active Status (N=12,837)

		В	Standard Error	Sig.	Exp(B)
Setting	Private Practice FT (ref)				
	Private Practice PT	-0.165	0.075	0.029	0.848
	School Faculty	0.577	0.090	0.000	1.781
	Government	-0.201	0.219	0.360	0.818
	Hospital Staff	1.231	0.235	0.000	3.426
	Intern/Resident	0.274	0.202	0.176	1.315
	DSO	0.124	0.097	0.203	1.132
	FQHC	1.749	0.089	0.000	5.750
Gender	Male (Yes)	0.088	0.047	0.060	1.092
	White Non-Hispanic (NH) (ref)				
	Missing	0.243	0.053	0.000	1.275
Dese	Asian NH	0.495	0.069	0.000	1.640
касе	Black NH	0.959	0.113	0.000	2.609
	Hispanic	0.759	0.117	0.000	2.135
	Other NH	0.725	0.191	0.000	2.065
	Other US DS (ref)				
	Columbia University	0.118	0.087	0.177	1.125
Dontal School	New York University	0.583	0.053	0.000	1.791
Dental School	Stony Brook, SUNY	0.368	0.097	0.000	1.445
	Buffalo, SUNY	0.034	0.077	0.660	1.034
	Foreign Dental School	0.918	0.089	0.000	2.505
	General Practice (ref)				
	Oral & Maxillofacial Surgery	0.726	0.094	0.000	2.067
	Endodontics	-0.868	0.149	0.000	0.420
Specialty	Orthodontics	0.261	0.092	0.005	1.298
(DS+Res)	Pediatric	0.859	0.098	0.000	2.360
	Periodontics	-0.873	0.131	0.000	0.418
	Prosthodontics	-1.568	0.179	0.000	0.208
	Multi-/DPH/Other	-0.034	0.323	0.915	0.966
Residency	Residency (yes)	-0.096	0.052	0.069	0.909

		В	Standard Error	Sig.	Exp(B)
	New York City (ref)			Ŭ	
PHIP Region	Capital Region	-0.243	0.107	0.023	0.784
	Central New York	-0.221	0.123	0.071	0.802
	Finger Lakes	-0.282	0.106	0.008	0.754
	Long Island	-0.386	0.059	0.000	0.679
	Mid-Hudson	-0.482	0.068	0.000	0.617
	Mohawk Valley	0.095	0.253	0.706	1.100
	North Country	0.207	0.211	0.327	1.230
	Southern Tier	0.294	0.157	0.061	1.341
	Tug Hill Seaway	0.078	0.223	0.726	1.082
	Western New York	0.197	0.097	0.043	1.218
Rural	Rural RUCA (Yes)	0.469	0.145	0.001	1.599
Experience	Years of experience since dental school	-0.021	0.002	0.000	0.980
	Constant	-0 700	0.092	0 0 0 0	0 497

TABLE B-1. Parameter Estimates of Impacts on Medicaid-Active Status (N=12,837) (cont.)

APPENDIX C

TABLE C-1. Parameter Estimates of Impacts on Medicaid Visits (N=4,262)

	R	Standard Error	ςίσ	Evn(B)	% Change
(Intercept)	6.673	0.0928	0.000	791.101	// change
FOHC	0.258	0.0551	0.000	1.295	29.5%
DSO	0.117	0.0916	0.202	1.124	
Intern/Resident	-0.001	0.1528	0.994	0.999	
Hospital Staff	0.239	0.1704	0.160	1.270	
Government	-0.269	0.2826	0.342	0.764	
School Faculty	0.528	0.1111	0.000	1.590	59.0%
Private Practice PT	-0.192	0.0948	0.042	0.825	-17.5%
Private Practice FT (ref)					
Male	0.139	0.0442	0.002	1.149	14.9%
Female (ref)					
Other NH	0.181	0.1589	0.256	1.198	
Hispanic	0.155	0.0969	0.049	1.168	16.8%
Black NH	0.002	0.0974	0.983	1.002	
Asian NH	0.125	0.0630	0.047	1.133	13.3%
Not Reported	0.059	0.0518	0.256	1.061	
White NH (ref)					
1st Foreign	0.004	0.0897	0.963	1.004	
Buffalo, SUNY	-0.098	0.0799	0.222	0.907	
Stony Brook, SUNY	0.041	0.0970	0.672	1.042	
New York University	0.084	0.0526	0.039	1.088	8.8%
Columbia University	-0.015	0.0851	0.862	0.985	
Other US (ref)					
Multi-Specs/DPH/Other	0.438	0.2472	0.076	1.550	
Prosthodontics	-0.748	0.3459	0.031	0.473	-52.7%
Periodontics	-0.836	0.2401	0.000	0.433	-56.7%
Pediatrics	0.878	0.0595	0.000	2.406	140.6%
Orthodontics	-0.025	0.0976	0.801	0.976	
Endodontics	-0.476	0.2294	0.038	0.621	-37.9%
Oral & Maxillofacial Surgery	0.082	0.0855	0.336	1.086	
General Practice (ref)					
Residency Yes	0.103	0.0536	0.025	1.108	10.8%
No (ref)					

TABLE C-1. Parameter Estimates of Impacts on Medicaid Visits (N=4,262) (cont.)

	В	Standard Error	Sig.	Exp(B)	% Change
Western New York	0.132	0.0937	0.038	1.141	14.1%
Tug Hill Seaway	-0.201	0.2186	0.358	0.818	
Southern Tier	-0.172	0.1682	0.307	0.842	
North Country	0.218	0.1860	0.240	1.244	
Mohawk Valley	0.253	0.2311	0.275	1.287	
Mid Hudson	-0.085	0.0689	0.218	0.919	
Long Island	-0.200	0.0654	0.002	0.818	-18.2%
Finger Lakes	-0.225	0.1116	0.044	0.799	-20.1%
Central New York	0.132	0.1165	0.258		
Capital Region	-0.133	0.1128	0.238	0.875	
New York City (ref)					
Rural (RUCA=7~10)	0.006	0.1464	0.965	1.006	0.6%
Urban (RUCA=1~6) (ref)					
Experience since dental school	-0.008	2.2019E-03	0.000	0.992	-0.8%
(Scale)	1451.216				

About the Authors



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Shen Wang performs survey analysis and database management on several New York State projects, including Delivery System Reform Incentive Payment (DSRIP) initiatives and the New York State health workforce registration surveys. Mr. Wang specializes in data and model analysis, database management, and GIS, network, and system dynamic analysis. He holds an MPA with a concentration in Policy Analysis from the Rockefeller College at the University at Albany, SUNY, and a Master's of Public Health in Health Policy and Management from the School of Public Health at the University at Albany, SUNY.

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Dr. Martiniano is the lead on a number of CHWS projects dealing with federal shortage designations and the healthcare workforce, including the Center's Health Careers website, the annual report on New York's healthcare workforce, the New York State Health Workforce Planning Data Guide, the development of profession-specific surveys, and data analysis on various healthcare professions, including understanding Medicaid access and utilization. He also is the lead evaluator on many Center projects, using quantitative, qualitative, and mixed research design methods.



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Kristen Stiegler coordinates the DSRIP Survey process, coordinates and compiles the tracking report, and oversees the New York work and reports. She specializes in project management, program coordinaton, and stake holder management. Ms. Stiegler has a Bachelor of Science in Enironmental Studies from the University of Oregon and a Master of Public Administration, with a focus on project management and natural resource administration from Portland State University (Oregon).



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