UCSF UC San Francisco Previously Published Works

Title

The American Indian and Alaska Native dentist workforce in the United States

Permalink https://escholarship.org/uc/item/13d4s97r

Journal Journal of Public Health Dentistry, 77(2)

ISSN 0022-4006

Authors

Mertz, Elizabeth Wides, Cynthia Gates, Paul

Publication Date

2017-03-01

DOI

10.1111/jphd.12186

Peer reviewed



HHS Public Access

Author manuscript *J Public Health Dent*. Author manuscript; available in PMC 2017 June 19.

Published in final edited form as:

J Public Health Dent. 2017 March ; 77(2): 125–135. doi:10.1111/jphd.12186.

The American Indian and Alaska Native Dentist Workforce in the United States

Elizabeth Mertz, PhD, MA [Associate Professor], UCSF School of Dentistry

Cynthia Wides, MA [Research Analyst], and UCSF School of Dentistry

Paul Gates, DDS, MBA [Chairman] Bronx-Lebanon Hospital Center Dental Department

Abstract

Objectives—The purpose of this paper is to describe the American Indian/Alaska Native (AI/AN) dentist workforce, the general practice patterns of these providers, and their contributions to oral health care for AI/AN and underserved patients.

Methods—A national sample survey of underrepresented minority dentists was conducted in 2012 and received a 34.0% response rate for self-reported AI/AN dentists. Data were weighted for selection and response bias to be nationally representative. Descriptive and multivariable statistics were computed to provide a workforce profile. Comparisons to Census data and published information on dental students and dentists were used to examine practice patterns.

Results—The AI/AN dentist workforce (weighted n=442) is very diverse with 55 reported individual tribal affiliations. Tribal heritage was provided by 96.4% of AI/AN dentists (n=426), and of these, 93.9% (n=400) reported an affiliation with only one tribe. The largest share of AI/AN dentists were born in the U.S. (98.2%, n=434), married (75.6%, n=333), and had dependent children under age 18 (52.0%, n=222). Only 0.9% (n=4) of AI/AN dentists spoke a traditional AI/AN language in patient care, while 10.6% (n=46) were raised on tribal land or reservation. Initial practice in the Indian Health Service was reported by 15.8% of AI/AN dentists while 16.2% report currently practicing in a safety-net setting, and 42.0% report working in a practice that primarily serves underserved patients.

Conclusions—AI/AN dentists provide a disproportionate share of care for AI/AN populations, yet the number of AI/AN dentists would need to increase 7.4 fold in order to meet population parity.

Keywords

Dentist's Practice Patterns; Indians; North American; Survey Research; Health Workforce

INTRODUCTION

In the field of dentistry, American Indian/Alaska Natives (AI/AN) are considered underrepresented minorities (URM) in the workforce (1). The lack of workforce diversity in

dentistry has been cited by the Surgeon General and the Institute of Medicine as a pressing problem, remediation of which is considered critical in the efforts to improve the cultural competence of the workforce, reduce disparities in access to care and health outcomes, and better serve minority populations' oral health needs (2–5). Research that builds from the theory of racial concordance, which posits that minority patients may be more likely to seek care from a provider with a race or ethnicity similar to their own, points to increasing the number of minority providers as an important strategy in reducing health disparities (6, 7). In 27 different studies on patient-practitioner racial concordance, approximately 70% resulted in positive outcomes for all or some of the patient groups across various health care fields (8).

AI/AN populations have been shown to have high rates of dental disease and many barriers to accessing oral health care (9). In 2012, the American Dental Association (ADA) masterfile identified only 471 dentists in the United States (U.S.) as being AI/AN, while the Society of American Indian Dentists has identified just over 250 dentists who are AI/AN (10). Increasing the number of AI/AN dentists will not solve the access problem since many factors impact oral health, but it would be one measurable step toward reducing the vast disparities found in the AI/AN population (11). Despite a number of initiatives over the last decade aimed at diversifying the profession, data on the outcomes of these efforts remains scarce, and the number of minority providers remains significantly below parity. Perhaps the least understood minority workforce is that of AI/AN providers. The aims of this paper are to describe the AI/AN dentist workforce and the practice patterns of AI/AN providers and to provide a preliminary examination of their contributions to oral health care for AI/AN and other underserved patients.

METHODS

The data for this study were collected through a national sample survey of URM dentists conducted in 2012–2013 under IRB-approved study number 11-07905 at the University of California, San Francisco (12). A census of AI/AN providers was derived from ADA's masterfile which identified a total of 12,983 URM dentists, 471 of which were identified by the ADA as AI/AN. Of these, 95 were removed as ineligible during the survey process, leaving a universe of 376 AI/AN dentists. A total of 128 of the 376 providers originally identified as AI/AN responded for a final response rate of 34.0% (Table 1). The available study resources did not allow for inclusion of non-URM dentists in the survey.

Survey respondents were able to identify as multiple racial/ethnic categories; however, for analytic purposes a primary race was assigned to each respondent. Supplementary Table 1b online details the racial/ethnic composition of AI/AN dentists. To determine primary race, we conducted a detailed examination of individuals who identified as more than one of the sampling categories of AI/AN, African American (AA) and Hispanic/Latino (H/L) through a matrix of variables including self-identified race/ethnicity, location where they grew up, organized dentistry affiliations, languages spoken, any tribal affiliations or blood quantum data, and work history. This process resulted in 13 individuals being moved from their original sampling frame (AA or H/L) to a primary classification as AI/AN, and 9 respondents sampled as AI/AN being moved to a primary classification as AA or H/L.

Selection likelihood and correctible, measureable response bias were adjusted for using base and post-stratification weights applied from the original sampling frames, producing a data set that is reasonably representative of the URM dentist population (12). This resulted in a weighted sample of 442 AI/AN dentists, 29 fewer than were identified in the original ADA masterfile. U.S. Census population data was linked to the survey data through the provider's mailing address to allow for analysis of provider and population distribution (13, 14). Descriptive and multivariable statistics were computed on the weighted AI/AN survey responses. Comprehensive details on the survey methodology, response rate, and response quality have been previously reported (12).

RESULTS

American Indian/Alaska Native Dentists' Demographic Characteristics

The largest share of AI/AN dentists were born in the U.S. (98.2%, n=434), are married or in a civil union or domestic partnership (76.8%, n=338), and have children under age 18 (52.0%, n=222). A small number (1.6%, n=7) identified as gay, and none identified as lesbian or bisexual. One quarter (n=109) of the AI/AN dentists reported speaking a language other than English, but only 15.1% (n=67) reported speaking this language in patient care. Among the languages used in patient care, 6.0% reported speaking Navajo, while 81.6% reported speaking Spanish. *Detailed demographic characteristics of all URM dentists are provided in* Supplementary Table 2 online.

Tribal affiliation was provided by 95.7% of AI/AN dentists (n=423), and, of these, 90.5% (n=400) reported an affiliation with only one tribe (Table 2). Twenty percent (n=90) of AI/AN dentists reported a blood quantum, with a mean of 0.21 and a range of 0.008 to 1.0. Blood quantum is a measure of "the degree of American Indian or Alaska Native blood from a federally recognized tribe or village that a person possesses" which, among other things, may determine rights and eligibility for a number of Federal and state programs (15, 16). Our data is based on self-reported AI/AN identity and does not indicate the degree to which respondents are connected to their respective tribes.

The socio-demographic characteristics of AI/AN dentists have changed over time. Nearly equal proportions of AI/AN dentists report being raised in a large or medium city (34.8%), small city (34.5%) and on rural or tribal lands (30.2%). Yet, a ten times as many of those age 49 or older (21.4%, n=42) were raised on tribal land or a reservation compared to those under age 49 (1.7%, n=4). The inverse is true for large and medium cities, where 42.7% of those under age 49 were raised compared to 25.5% of those age 49 and older. Therefore, younger AI/AN dentists are much less likely to have been raised on tribal land than were their elder counterparts and more likely to come from urban centers.

Looking at parental educational achievement, fathers of AI/AN dentists under age 49 are more than twice as likely to have attended or completed graduate school (41.7% vs. 17.9%) and are half as likely to have terminated their education at a high school diploma or less (26.5% vs. 51.3%) as those of dentists age 49 or older. This pattern is magnified for mothers' highest education, where dentists under age 49 are more than three times as likely to have mothers who attended or completed graduate school (26.6% vs. 7.9%) and are

almost half as likely to have a mother who completed high school or less (30.6% vs. 54.8%) compared to dentists age 49 or older. Likewise, only 22.0% (n=53) of those under age 49 were the first in the family to graduate from college compared to 50.4% (n=99) of those age 49 and older. This pattern indicates that AI/AN dentists increasingly hail from more highly educated families. *Detailed parental education tables for all URM dentists are provided in* Supplementary Tables 3 and 4 online.

American Indian/Alaska Native Dentists' Education, Licensure and Professional Membership

All AI/AN dentists attended a Commission on Dental Accreditation (CODA)-accredited dental school for their initial dental degree. The majority (73.8%, n=326) attended a public university, with no difference by dentist age in the attendance distribution between public and private dental schools over time. Twenty-six percent of AI/AN dentists reported completing advanced training, including specialty residencies (9.1%), an Advanced Education in General Dentistry or General Practice Residency (AEGD/GPR) (14.5%), or both (2.2%). Among AI/AN dentists, 77.1% are licensed in only one state, 70.4% are ADA members, and 13.8% are members of the Society of American Indian Dentists (SAID). Nineteen percent of AI/AN dentists reported no membership in any professional association. No differences were observed in membership patterns by age.

The average debt of AI/AN dentists upon graduation in 2012 dollars was \$155,691, while 10.7% of AI/AN dentists completed dental schooling with no educational debt. Compared to debt figures reported by the American Dental Education Association (ADEA) for all dentists, AI/AN dentists reported consistently higher average levels of educational debt (17). Over the 15 year period from 1996 to 2010, the average of annual average debt reported in 2012 dollars by ADEA across all schools was \$147,871, but AI/AN dentists graduating in those same years reported an average debt of \$174,852 in our survey – a difference of almost \$27,000. Looking at ADEA-reported debt for public schools, this differential dropped \$20,233, but was over \$100,000 for students who attended private schools where the ADEA reported average was \$183,578 compared to \$284,275 for AI/AN dentists. The factors underlying higher debt for AI/AN dentists compared to other dentists despite a preponderance of them attending public schools which are traditionally less expensive, are unclear from our data.

Regardless of the cause of higher educational debt, the most common impacts of debt reported by AI/AN dentists were the decision to join the National Health Service Corps or Indian Health Service (IHS) (18.9%, n=83), accepting a position as an associate (16.8%) or an employee (11.6%), and being unable to afford starting their own practice (15.3%, n=68) or to afford purchasing their own practice (13.4%). One quarter of AI/AN dentists (n=107) reported more than one impact (among 11 choices) of debt on their practice choices, and 38.7% (n=171) of AI/AN dentists report "no impact" of their educational debt on immediate practice choice.

American Indian/Alaska Native Dentists' Career Trajectory

Among all AI/AN dentists, 99% (n=438) reported being professionally active and of these, 97% (n=425) are clinically active. Just 1% (n=4) reported not working in the dental field. Two of these are caring for children and expect to return to practice; two reported a disability and did not expect to return to practice. All AI/AN dentists were asked to provide their initial practice setting, and professionally active dentists were asked to report their current primary and secondary practices. (Table 3). Male AI/AN dentists are more likely to report a traditional current practice (82.7% vs. 66.2%), while female AI/AN dentists are twice as likely to report a current practice in the safety-net (25.8% vs. 13.2%). Table 3 classifies specific practice types and provides a breakdown of initial and current practice settings.

We examined career trajectories of professionally active AI/AN dentists by mapping the combinations between first and current practice types. Those in industry were omitted due to small numbers (Table 4). A preference is shown for traditional practice settings, with 60.2% (n=233) of AI/AN dentists who start in a traditional setting remaining there, and an additional 41.5% (n=59) of AI/AN dentists starting in other sectors moving to a traditional practice. Retention in education is high, although the total numbers are small. Retention in the safety-net is 52.0%, with 39.8% of those who leave moving to traditional practice. Among AI/AN dentists who remain in the safety-net, a greater proportion completed preceptorships, clinical rotations, externships, or electives working with dentally underserved populations (92.2%) while in dental school than did those in the population that moved to traditional practice (79.6%), which may indicate some efficacy in these educational opportunities improving recruitment and retention in safety-net settings. The corporate and public sector patterns are identical and show retention of only 37.5% of AI/AN dentists who begin in these settings, regardless of the high rate of preceptorship experiences. Finally, among clinically active AI/AN dentists who reported the IHS or civil hire on Indian land as their initial practice location (n=83), more than half (53%, n=44) remain in these settings, with 36% (n=16) practicing with IHS or as a civil hire on Indian land for longer than five years.

Eighty-five percent (n=367) of AI/AN dentists report that they are general practitioners, and 31.9% (n=138) indicated that they are board certified in their area of practice. Additional areas of clinical focus were reported by 253 (57.7%) providers and include: implantology (47.1%), cosmetic dentistry (47.3%), orthodontics (27.4%), geriatrics (26.3%), anesthesia (14.7%), special care (11.1%), and hospital dentistry (10.3%). AI/AN dentists reported an average work week of 41 hours, 32 of which were in direct clinical care. The majority (80.2%, n=345) of AI/AN dentists intend to practice for an additional 10 years or longer.

American Indian/Alaska Native Dentists in Clinical Practice

Among clinically active AI/AN dentists 73.2% (n=305) own their own practice. Among owner dentists, fifty-four percent (n=162) built their own practice, and 45.6% (n=136) purchased an existing practice. The average AI/AN dentist's clinical setting has 3 dentists, 2 registered dental hygienists, and 5 operatories.

AI/AN dentists treat an average of 69 scheduled patients per week and an average of 9 unscheduled walk-in or emergency patients per week. Those in safety-net settings treat an average of 50 scheduled patients and 13 walk-in patients each week, and those in traditional settings report treating an average of 73 scheduled patients and 9 walk-in patients each week.

AI/AN dentists in clinical practice vary in reported levels of busy-ness: 37.9% (n=153) indicated being "not busy enough;" 40.6% (n=164) indicated that they "provide care to all who request appointments, but are not overworked;" 1.3% (n=54) reported that they "provide care to all who request appointments, and are overworked;" and 8.3% (n=33) reported being "too busy to treat all who request appointments." Dentists in safety-net settings reported higher rates of being "overworked" (26.8%) and "too busy" (25.7%).

Among clinical AI/AN dentists who reported (n=329) whether they work with expanded function dental assistants, hygienists, or therapists, 70.0% (n=230) indicated that the state in which they practice allows employment of expanded function dental assistants, hygienists, or therapists. More than half, 59% (n=120), work at a practice that employs expanded function staff. Expanded function dental assistants were employed more frequently (n=111) than were expanded function dental hygienists (n=33) by those practices. Only 2% (n=4) of AI/AN dentists reported working at a practice that employs a dental therapist. Dentists in safety-net settings were much more likely to employ expanded function staff (67.8%) than dentists in traditional settings (45.8%).

The average annual income in 2011 (n=356) of all AI/AN dentists was reported to be \$175,997; those working in safety-net practices (\$123,907) and education (\$164,271) reported lower than average income while those in traditional practices (\$185,536) reported higher than average incomes. Female AI/AN dentists reported an average income of \$159,019 compared to male AI/AN dentists at \$183,469 and this gender gap was found across all age categories, with the largest gap (\$68,460) in the 45–54 age cohort. The ADA reports that in 2014 the net income of dentists in private practice was \$180,000 for owners, and \$140,000 for employed dentists.(18)

American Indian/Alaska Native Dentists' Patient Characteristics

Forty-five percent (n=180) of AI/AN dentists in clinical practice primarily treat underserved patients in their primary practice. Additionally, 6.2% (n=25) reported that they do not work in a primary practice that focuses on underserved patients, but they do work in a secondary practice that primarily treats underserved patients. Dentists over the age of 49 (52.8%, n=94) were slightly more likely to primarily treat underserved patients compared to their younger colleagues (49.7% n=111). Tables 5 & 6 describe the patient population of AI/AN clinical dentists as reported by providers.

Clinical AI/AN dentists report on average that 20.4% of their patients are AI/AN, compared to only 1.7% of the U.S. population, a key indicator of the importance of the AI/AN workforce in providing access to care for AI/AN populations (13). Among AI/AN dentists who reported both being affiliated with a federally recognized tribe and their blood quantum, the mean percent of AI/AN patients was 30.2% compared to 19.6% for AI/AN dentists who

did not report a quantum. Among AI/AN clinical providers, 38.7% (n=143) reported treating children under the age of 1, 81.5% (n=301) treated children under the age of 5, and 67.2% (n=248) reporting treating patients over 85.

As well, 55.7% of AI/AN dentists accept public insurance and on average 23.3% of AI/AN dentists' patients are covered by public insurance, with an additional 26.6% uninsured. Comparatively, in 2012 among all private practice dentists only 6.1% of their patients are reported to be publicly insured.(19) Eighteen and a half percent (n=50) of AI/AN dentists reported public insurance programs covered a majority of their patients for all or part of dental services provided. A majority of AI/AN dentists (59.1%; n=222) reported discounting or waiving fees for patients who are either uninsured or unable to pay for an average self-reported value of \$58,450 worth of free or discounted dental services.

Professional Collaboration, Technology Use & Volunteerism

Dental care providers currently practice in a fast changing, increasingly interconnected environment with new technology and interprofessional roles. Clinically active AI/AN dentists report a high rate of collaboration (defined as "often" or "sometimes") with other dentists: 64.1% (n=259) with general practice dentists and 91.3% (n=369) with specialist dentists. Collaboration with other health care workers was more varied: highest with pharmacists (72.5%) and lowest with mental health workers (17.8%). AI/AN dentists in safety-net settings report collaborating more frequently and with more types of non-dental health care providers than do dentists in traditional practice settings.

AI/AN dentists were asked to report their current use or intention to use 15 different information technology tools in their dental practice. Technologies specific to enabling the treatment of vulnerable populations included teledentistry tools, phone language translation services, and mobile dental equipment. Use of any of these three enabling technologies was more prevalent by dentists in safety-net practices (72.8%) than in traditional practices (40.4%). Online Supplementary Tables 5 and 6 provide details on URM dentists' clinical collaboration and technology.

Dentists often volunteer their clinical services, and among all AI/AN dentists currently working in the dental field (including those working in non-clinical settings), 51.0% (n=218) reported volunteering any time <u>as a dentist</u> outside of their own practice. Of dentists who volunteer, 31.2% do so less than 3 days a year, 14.1% reported volunteering between 3–11 days per year, and 4.6% report volunteering 1 day per month or more in an average year. The most frequent volunteer location was at organized community events (65.3%, n=128), such as health fairs or Remote Area Medical (RAM)-type events. This is followed by volunteering at a local community or tribal clinic (27.5%, n=54), schools (26.0%, n=51), locations outside of the U.S. (13.4%, n=26), and hospitals (9.0%, n=18). Among the reasons given for providing volunteer dental services, "desire to give back" was the most common, selected by 81.2% (n=158) of dentists who responded to the question. AI/AN dentists in safety-net settings reported volunteering less (39.0%) than those in traditional settings (53.1%). Comparative data on technology use, collaboration and volunteerism are not nationally available for all dentists.

Geographic Distribution American Indian/Alaska Native Dentists

Compared to all dentists, AI/AN dentists were 1.5 times more likely to locate their practices in the Mountain Division and 2.9 times more likely to locate in the West South Central Division (20) (Figure 1). Supplementary Table 7 *provides the distribution of all URM dentists by Census Division.* The AI/AN dentist to AI/AN population ratio within Census Divisions varied widely from 1:5,801 to 1:66,590 (13, 14) (Figure 2). This demonstrates not only the uneven distribution of AI/AN dentists, but the huge disparities between the population and workforce numbers. Even the South Atlantic Division, which has the most favorable AI/AN dentist to AI/AN population ratio, still exceeds 1:5,000, the level at which the Health Resources and Services Administration (HRSA) can consider an area to qualify as a Dental Health Professional Shortage Area (21).

Study Limitations

Data presented are based on the weighted sample of respondents from a 34% response rate, not an actual census of all AI/AN providers. Survey responses depend on provider memory across a variety of years, and therefore may be subject to recall bias. Item non-response varies, but is generally minimal. Comparisons can be made to national data sources, but we do not have non-URM comparison groups in our dataset, therefore we cannot conduct statistical tests with non-URM groups. We did not cross reference self-identified AI/AN status with official tribal registration, and therefore can only present self-identified AI/AN status. A full discussion of the survey methodology, response rate, weighting and adjustment for bias as well as limitations has been previously published (12).

DISCUSSION

This study is the first ever detailed profile of the AI/AN dentist workforce in the U.S. Published reports to date do not provide adequate overall numbers for AI/AN dentists much less data on gender, multiple racial/ethnic identifications, tribal affiliations, or regional distribution (1). AI/AN people are incredibly diverse and this is reflected in the tribal diversity found within the AI/AN dentist population. Yet few AI/AN dentists report speaking a native language in practice, and those who report being raised on tribal land or reservation is decreasing over time. The educational level of AI/AN dentists' parents is increasing but when compared to all dentists, even the younger AI/AN dentists are more likely to have parents whose highest educational achievement was a high school diploma or less, and they are less likely to have parents who have completed any education beyond high school (17).

In practice, AI/AN dentists are slightly more likely than all dentists to be in general practice, and they much less likely to complete a residency, only 26% of AI/AN dentists vs. 67% of estimated graduates from the 2011 class (22). As well, the AI/AN dentist population is not distributed evenly in relation to the AI/AN population, nor in relation to the dentist population. A large percent of AI/AN dentists work in the IHS specifically and safety-net sector more broadly, and safety-net providers are twice as likely to be women as men. Some of this practice choice may be explained by hiring preferences in the IHS (23), or preferences for minority applicants to scholarships or loan repayments awards by federal or private programs. Yet, in AI/AN dentists' practice trajectory, we see a movement toward

One of the most informative findings in this paper is the high needs and diversity of the patient pool of AI/AN providers. The average percent of AI/AN patients in their practices that is 12.6 times greater than the percent of the AI/AN population in the U.S. Previous research has identified racial concordance patterns among dentists, but the limited information on AI/AN dentists' patterns are more than 20 years old (1, 24). Among AI/AN dentists, 98.3% reported treating patients with diabetes, and, among those, the average percent of patients with diabetes (20.5%) is more than double the U.S. population average (9.1%) (25), as is the average percent of patients with developmental disabilities, reported as 4.3% vs. 2.5% of the U.S. population (26). The percent of patients with hypertension (27.1%) is close to being on par with percent in the general U.S. population (32.5%) (27). The average debt load is greater for AI/AN dentists compared to all dentists, and women AI/AN dentists earn far less on average than do male AI/AN dentists, raising important questions about equity and the sustainability of the pipeline to practice in the safety-net and for underserved patients.

Even identifying AI/AN dentists is a challenge. ADEA tracks AI/AN enrollment in dental school and graduations by race but only as self-reported by students (17), and the ADA masterfile misidentified many AI/AN providers (12). The dentists who self-identify as AI/AN are already a very small group, but this becomes even smaller when considering AI/AN dentists who are federally registered with a tribe. With more than 40% of the AI/AN dentist workforce self-identifying as multi-ethnic or multi-racial, formal tribal affiliation is a factor that is important to the AI/AN community that would be valuable in workforce diversity tracking, and as indicated in our data, it may be a better indicator of future community service patterns.

The AI/AN population makes up 1.7% of the U.S. population; however, only 0.2% of the 190,800 active dentists in the U.S. in 2012 were AI/AN (13, 20). The number of AI/AN dentists would have to increase seven fold in order to meet population parity, a raw increase of 2,825 dentists. Based on dental school enrollment data (28), as many as 221 AI/AN dental students will graduate between 2012 and 2017, and our study indicates that 32 AI/AN practicing dentists intend to retire in the same time frame. Thirty-one of these are clinical dentists. The net result would be an average of 32 AI/AN dentists being added to the provided pool for each of the next six years; however, this would ultimately have little impact on the 2,825 new AI/AN dentists needed in the U.S. to reach population parity. This study indicates that AI/AN dentists are a vital component of the workforce required to address the oral health needs of AI/AN individuals. However, these data also caution against broad generalizations, and further investigation of the *diversity within* this population may tell us as much or more about this provider population than do comparisons of AI/AN providers to the wider dentist workforce.

CONCLUSION

Among the number of strategies that policymakers, educators, health professions, advocates and the public are discussing as solutions to addressing the unacceptably high burden of dental disease in the AI/AN populations, improving the workforce diversity of dental providers is critical. The data presented in this paper expand our capacity to examine the pipeline of providers and to understand the current practice patterns, particularly in relationship to care provision for AI/AN populations. Further investigation is needed to understand sustainable strategies to expand the pipeline of AI/AN dentists and to understand the impact of debt, workforce policy and other programs on AI/AN dentists' practice patterns over time.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

References

- Brown LJ, Wagner KS, Johns B. Racial/ethnic variations of practicing dentists. J Am Dent Assoc. 2000; 131(12):1750–4. [PubMed: 11143740]
- 2. Institute of Medicine. Improving Access to Oral Health Care for Vulnerable and Underserved Populations. Washington, DC: National Academies Press; 2011 May.
- 3. Institute of Medicine. Advancing Oral Health In America. Washington, DC: National Academies Press; 2011 Apr.
- 4. U.S. Department of Health and Human Services. Oral Health in America: A Report of the Surgeon General. Rockville, MD: U.S. Department of Health and Human Services; 2000.
- 5. U.S. Department of Health and Human Services. National Call to Action to Promote Oral Health. Rockville, MD: U.S. Department of Health and Human Services, National Institute of Dental and Craniofacial Research, National Institutes of Health; 2003.
- Bender DJ. Patient preference for a racially or gender-concordant student dentist. J Dent Educ. 2007; 71(6):726–45. [PubMed: 17554091]
- 7. Health Resources and Services Administration. The Rationale for Diversity in the Health Professions: A Review of the Evidence. U.S. Department of Health and Human Services; 2006 Oct.
- 8. Meghani SH, Brooks JM, Gipson-Jones T, Waite R, Whitfield-Harris L, Deatrick JA. Patientprovider race-concordance: does it matter in improving minority patients' health outcomes? Ethnic Health. 2009; 14(1):107–30.
- Tiwari T, Quissell DO, Henderson WG, Thomas JF, Bryant LL, Braun PA, et al. Factors associated with oral health status in American Indian children. J Racial Ethn Health Disparities. 2014; 1(3): 148–56. [PubMed: 25232515]
- 10. Spruce, George Blue. Personal Communication. 2015.
- Mejia GC, Parker EJ, Jamieson LM. An introduction to oral health inequalities among Indigenous and non-Indigenous populations. Int Dent J. 2010; 60(3 Suppl 2):212–5. [PubMed: 20718305]
- Mertz E, Wides C, Cooke A, Gates P. Tracking workforce diversity in dentistry: importance, methods and challenges. J Public Health Dent. 2016; 76(1):38–46. [PubMed: 26183241]
- Norris, T., Vines, P., Hoeffel, E. The American Indian and Alaska Native Population: 2010. U.S. Census Bureau; 2012 Jan. C2010BR-10
- 14. U.S. Census Bureau. 2010 Census Summary File 1, Tables QT-P3 and P6. In: generated by C. Wides using American FactFinder, editor. 2015.
- 15. Association of American Indian Affairs. Frequently Asked Questions. 2016. [Available from: http://www.indian-affairs.org/general-faq.html

- U.S. Department of the Interior. Indian Affairs: Frequently Asked Questions. 2015. [Available from: http://www.bia.gov/FAQs/
- 17. American Dental Education Association. ADEA Survey of Dental School Seniors, 2012 Graduating Class Tables Report. Washington, D.C: Mar. 2014
- 18. American Dental Association. Income, Gross Billings, and Expenses: Selected 2014 Results from the Survey of Dental Practice (Tables in Excel). Chicago, IL: Health Policy Institute; 2015 Dec.
- American Dental Association. Characteristics of Private Dental Practices: Selected 2014 Results from the Survey of Dental Practice (Tables in Excel). Chicago, IL: Health Policy Institute; 2015 Dec.
- U.S. Department of Health and Human Services, Health Resources and Services Administration, National Center for Health Workforce Analysis. National and State-Level Projections of Dentists and Dental Hygienists in the US, 2012–2025. Rockville, MD: 2015.
- U.S. Department of Health and Human Services, Health Resources and Services Administration, National Health Service Corps. Health Professional Shortage Area (HPSAs) Definition. Rockville, Maryland: 2015. [Available from: http://nhsc.hrsa.gov/ambassadors/hpsadefinition.html
- 22. American Dental Education Association. Comparison of Predoctoral Dental School Graduates With First-Year Enrollment in Advanced Dental Education Programs, 2000–2011. Washington, D.C: 2015. Available from: http://www.adea.org/uploadedFiles/ADEA/Content_Conversion/ publications/TrendsinDentalEducation2009/TDEStudents/Documents/ Graduates_Postdoctoral_files/ComparisonofPredoctoralGraduates.pdf
- U.S. Department of Health and Human Services. Indian Health Service: Indian Preference. Rockville, MD: Indian Health Service; 2015. Available from: http://www.ihs.gov/careeropps/ indianpreference/
- 24. Mertz EA, Grumbach K. Identifying communities with low dentist supply in California. J Public Health Dent. 2001; 61(3):172–7. [PubMed: 11603321]
- 25. American Diabetes Association. Statistics About Diabetes. 2014. [Available from: http://www.diabetes.org/diabetes-basics/statistics/
- 26. Morstad, D. How Prevalent Are Intellectual and Developmental Disabilities in the United States?. Watertown, WI: Bethesda Institute; 2012.
- 27. Centers for Disease Control and Prevention. Hypertension. Washington, D.C: 2014. Available from: http://www.cdc.gov/nchs/fastats/hypertension.htm
- 28. American Dental Association Health Policy Institute. Report 1: Academic Programs, Enrollment and Graduates. Chicago, IL: 2015.

England 0.2

52

Middle

N/A

South Atlantic

1.1



Figure 1. Ratio of Percent of American Indian/Alaska Native Dentists to Percent of All Dentists in the U.S. by Census Division

*Pacific division includes Hawaii and Alaska.

>1.25



Figure 2.

Ratio of American Indian/Alaska Native Dentists per American Indian/Alaska Native Population by U.S. Census Division

Survey and Response of the American Indian/Alaska Native Dentist Workforce in the U.S.

	N*
Base Census from ADA Masterfile	471
Deceased/Retired/Unlicensed	-2
Undeliverable/Could Not Locate	-22
Identified as Non-URM	-71
Adjusted Census Surveyed	376
Total AI/AN Respondents (Unweighted)	128
Survey Response Rate = Total Respondents/Adjusted Census	34.0%

* Unweighted sample and respondents

Tribal Affiliations Reported by Respondents (Weighted)

Tribal Affiliation (n=423)	Percent Reporting Each Tribal Affiliation $^{*, \dagger}$		
Cherokee	26.0%		
Choctaw	10.6%		
Navajo	6.4%		
Lumbee	5.4%		
Apache	5.2%		
Shinnecock	5.0%		
Chickasaw	3.8%		
Eastern Band Cherokee	3.5%		
Creek	3.1%		
Auga Caliente band of Cahuilla Indians	2.8%		
Haida	2.4%		
<u>All Tribal Affiliations Reporting <2.0%</u>	<2.0%		
Chictor, Comanche, Lakota Sioux, Tesuque			
All Tribal Affiliations Reporting <1.0%	<1.0%		
Chactaw, Cheroenhaka Nottowa, Cheyene River Sioux, Chickahominy Virginia, Chipewyan-Ojibwa, Chippewa, Chugach Ajokan Native,			

Chactaw, Cheroenhaka Nottowa, Cheyene River Sioux, Chickahominy Virginia, Chipewyan-Ojibwa, Chippewa, Chugach Ajokan Native, Citizen Potawatomi Nation, Cup'ig Eskimo, Crow, Delaware, Echota Cherokee, Erie, Hualapai, Kiowatribe of Oklahoma, Laguna Pueblo, Maidu, Menominee, Micmak, Miwok, Northern Cheyenne, Oglala Sioux, Oneida, Osage, Ottawa, Paiute, Penobscot, Plains, Pomo, Potawatomi, Seminole, Seneca, Shoshoni, Sioux, Tlingit, United Houma Nation, Wampanoag, Wyandohe, Yakama Nation, Zuni

Percents will not add to 100% because some individuals provided multiple tribal affiliations.

[†]Numbers are weighted from survey respondents, and therefore will not necessarily reflect every tribe that every AI/AN dentist is affiliated with.

Author Manuscript

Author Manuscript

Author Manuscript

ŝ
e
q
Та

Initial and Current Practice Settings of American Indian/Alaska Native Dentists

Practice Setting	Practice Type	Initial Primary Practice Setting $\stackrel{\circ}{n}_{(n=430)}$	Current Primary Practice Setting [‡] (n=433)	Average Year of Joining Current Primary Practice¶ (n=414)	Current Secondary Practice Setting [‡] (n=105)
Solo Practice	Traditional	35.8% (n= 154)	63.4% (n= 275)	1997	2.7% (n=4)
Associate	Traditional	17.0% (n=73)	5.3% (n= 23)	2007	3.1 (n= 5)
Contractor	Traditional	5.4% (n= 23)	1.7% $(n=7)$	2010	11.3% (n=12)
Group Practice	Traditional	5.5% (n= 24)	6.6% (n= 29)	2004	1.2% (n=2)
Corporate	Corporate	1.8% (n=8)	1.0% $(n=5)$	2008	2.7% (n=4)
Local or Federal Government	Public	1.6% (n=7)	1.3% (n=6)	2010	0.0% (n=0)
Public Health Corps	Public	0.7% (n=3)	0.0% (n=0)	*	4.7% (n=7)
SHI	Safety-net	15.8% (n= 68)	4.0% (n=18)	2003	12.2% (n=18)
Civil Hire on Indian Land	Safety-net	5.5% (n= 24)	6.3% (n= 28)	2011	0.0% (n= 0)
Health Center	Safety-net	4.2% (n=18)	4.3% (n= 19)	2007	1.3% (n=2)
Hospital	Safety-net	0.0% (n=0)	0.0% (n=0)	*	5.1% (n= 8)
Armed Forces	Safety-net	4.8% (n=21)	1.6% $(n=7)$	2002	3.4% (n= 5)
Prison	Safety-net	1.2% (n= 5)	0.0% (n= 0)	*	23.2% (n= 24)
Educational Institution	Education	0.6% (n= 3)	2.9% (n=13)	1997	9.1 (n= 14)
Industry	Industry	0.0% (n= 0)	0.9% (n=4)	1959	0.0 (n= 0)
*					

Missing data

J Public Health Dent. Author manuscript; available in PMC 2017 June 19.

 † Asked of all respondents (n=442)

 ‡ Asked of all professionally active respondents (n=438)

 π Asked of clinically active dentists (n=425)

Author Manuscript

4	
ð	
ă	
a'	
-	

Dentists
Native
/Alaska
Indian
Americar
Active A
ofessionally
or Pro
Trajectories f
Career

Initial to Current Primary Practice Type	Count	Percent of Total	Percent of Sub- Total	Community-Based Experience (CBE)	Percent CBE by Progression Type
Traditional to Traditional	238	60.7%	95.2%	199	83.6%
Traditional to Safety-net	8	2.0%	3.2%	8	100.0%
Traditional to Education	4	1.1%	1.6%	*	*
Traditional Sub-Total	250	63.9%	100%	207	82.8%
Corporate to Corporate	3	1.3%	37.5%	3	100.0%
Corporate to Traditional	5	0.7%	62.5%	5	100.0%
Corporate Sub-Total	8	1.9%	100%	8	100%
Safety-net to Safety-net	64	16.3%	52.0%	59	92.2%
Safety-net to Traditional	49	12.5%	39.8%	39	79.6%
Safety-net to Corporate	2	0.5%	1.6%	2	100.0%
Safety-net to Public Sector	5	1.3%	4.1%	5	100.0%
Safety-net to Education	3	0.8%	2.4%	*	*
Safety-net Sub-Total	123	31.5%	100%	105	85.4%
Public Sector to Public Sector	3	0.8%	37.5%	3	100.0%
Public Sector to Traditional	S	1.3%	62.5%	5	100.0%
Public Sector Sub-Total	8	2.1%	100%	8	100.0%
Education to Education	3	0.7%	100.0%	3	100.0%
Education Sub-Total	С	0.7%	100%	c	100.0%
Totals	392	100%		331	84.4%
* Missing					

J Public Health Dent. Author manuscript; available in PMC 2017 June 19.

٦

Medical Conditions of American Indian/Alaska Native Dentists' Patient Population

	Percent of AI/AN clinical dentists who treat any patients with the characteristics shown (n=356)	Average percent of patient population for AI/AN dentists who treat any patients with the characteristics shown
Medically compromised	98.3%	15.6%
Diabetes	98.3%	20.5%
Physical disability	93.0%	6.9%
Hypertension	94.7%	27.1%
Developmental disability	94.4%	4.3%
Pregnant	91.9%	4.9%
Mental illness	78.9%	6.1%
Low oral health literacy	77.5%	24.6%
A severe behavior management problem	76.1%	5.3%
Long term care resident or homebound	70.5%	3.5%
HIV positive	60.1%	1.6%
Prefer health information in a language other than English	54.2%	8.3%

Demographics of American Indian/Alaska Native Dentists' Patient Population

Patient Age (years) (n= 369)	Averag	e Estimated Percent of Patient I	Pool*
0 to 1		2.2%	
2 to 5		8.3%	
6 to 17	20.2%		
19 to 64	53.6%		
65 to 85	15.9%		
85+	3.7%		
Gender and Sexual Orientation (n=356)	Percent of AI/AN clinical dentists treat any patients with the characteristic Average percent patient who population among all AI/AN dentists		population among all AI/AN ists
Female	99.4%	54.3%	
Lesbian, Gay, Bisexual, or Transgender	62.9%	4.1%	
Race (n=370)	Average Estimated % of Patient Pool [*]	Range (percent)	Percent of U.S. population $^{\uparrow, \ddagger}$
African American/Black	12.8%	0–85% 13.2%	
American Indian/Alaska Native	20.4%	0–100% 1.7% ¶	
Hispanic/Latino	13.7%	0–50% 16.2%	
Caucasian/White	54.6%	0-100%	74.1%
Asian/Pacific Islander	8.2%	0–58%	5.5%
Insurance Status (n=359)	Percent of respondents who treat any of the patient population	Average percent of patient population *	Range of patient population reported (percent)
Private insurance	96.9%	54.4%	0–99
Public insurance	55.7%	23.3%	0-100
Uninsured/Out-of-pocket	96.7%	26.6%	0–90
Other	15.3%	16.1% 0–100	

*Will not add to 100% because averages are based category, not on the patient population as a whole.

[†]Will not add to 100% because data does not include all Census designations and collapses race and ethnicity; respondents identifying as Hispanic/ Latino may be included in any racial category.

[‡]U.S. Census Bureau. American Community Survey, 2012 American Community Survey 3-Year Estimates, Tables S0201 and B03002. In: Race alone or in combination and Hispanic population by Census Division generated by C. Wides using American FactFinder, editor. 2015.

[#]Norris T, Vines P, Hoeffel E. The American Indian and Alaska Native Population: 2010. U.S. Census Bureau, 2012 January. Report No.: C2010BR-10.