



The Evolving Pipeline of Hispanic Dentists in the United States: Practice and Policy Implications



Center for Health Workforce Studies
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PREFACE

The Oral Health Workforce Research Center (OHWRC) at the Center for Health Workforce Studies (CHWS) at the University at Albany's School of Public Health completed a research project to understand trends and challenges in Hispanic/Latino dentists' pathways to practice, examine the changing patterns of care delivery, and identify access and care delivery goals for the Hispanic/Latino population.

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

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

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BACKGROUND

Improving the racial and ethnic diversity of the nation's dentists is critical in efforts to reduce disparities in access to care and health outcomes and to better address the oral health needs of an increasingly diverse US population. The Hispanic/Latino (H/L) dentist workforce, in particular, is disproportionately small compared with the rapidly growing and historically underserved H/L population. Enrollment of H/L students in US dental schools increased from 5.4% in 2000 to 9.1% in 2016¹ but remains far below 17.1%, the proportion of the US population that is H/L.² This suggests that the gap in parity will continue to grow. Half of the H/L dentists in the US are foreign born, and about 1 in 4 were initially trained outside the US, indicating that domestic enrollment numbers may underestimate future supply.³ At the same time, changes to state licensure requirements are altering the historic pathways to practice for foreign-trained providers. Concurrently, international dentist programs (IDPs), also known as advanced standing (AS) programs, have grown significantly. In an IDP/AS program, a foreign-trained dentist repeats the last 2 years of dental school and then becomes a US graduate of that school. Among H/L dentists, the educational debt burden of an IDP/AS foreign graduate can be as much as 10 times greater than that of foreign graduates without an IDP/AS degree, raising questions about both the accessibility of the education and the impact of this debt on practice choices of H/L dentists.³ This study examines the trends in H/L dentists' pathways to practice, analyzes practice patterns of H/L dentists by pathway, and describes the licensure and educational environment for foreign-trained dentists, with a focus on opportunities to enhance workforce diversity and improve access to care for both underserved and H/L populations.

KEY FINDINGS

Hispanic/Latino Dentist Pipeline

- Three-quarters of the H/L dentist workforce are initially US trained, while one-quarter are initially foreign-trained dentists (FTDs). Due to changes in license requirements, younger FTDs complete IDP/AS programs at higher rates than do older graduates, who historically could obtain licensure directly with their foreign credentials.
- Historically, US dental school enrollment numbers may have underestimated the pipeline of H/L dentists coming into practice, as FTDs were not included in those counts. Now that many FTDs complete IDP/AS programs and are thus counted as US graduates, the domestic numbers more accurately reflect the number of new H/L dentists entering the workforce.
- Despite an increase in domestic dental school enrollment among H/L students, a large gap in parity remains between the proportion of the US population that is H/L and the proportion of the US dentist population that is H/L.
- Tracking workforce diversity is largely a retrospective endeavor, with little proactive information on applicants or on the immigrant pipeline from which to project future supply.

Foreign-Trained Hispanic/Latino Dentists

- All FTDs, including H/L FTDs, face increasingly rigid and expensive educational requirements in order to qualify for licensure. There is great variability among states in the educational and licensure pathways available to FTDs, but, as with all dentists, FTDs have greater freedom of movement within the US than in the past once they are licensed.
- Among H/L dentists, being initially foreign trained predicts greater service to H/L patients and to publicly insured patients.
- The cost of the necessary education and testing to obtain a license in the US is increasing for FTDs because of regulatory shifts, but the available data on practice patterns among FTDs do not reflect any impacts of this change on the practice patterns of these dentists.

Service to Underserved Populations Among Hispanic/Latino Dentists

- Among H/L dentists, the most important factor predicting service to publicly insured patients was their primary work setting, with those in nontraditional settings (eg, safety net) providing greater service to this population.
- The biggest predictor of H/L dentists working in nontraditional settings was working in nontraditional settings in their first job.
- The biggest predictor of H/L dentists having had a first job in nontraditional settings was having completed a dental residency and being internally motivated to treat patients in nontraditional and safety net settings.
- Being an FTD or an FTD who completed an IDP/AS program did not predict current or initial work as a dentist in a nontraditional setting.

Technical Report

BACKGROUND

Introduction

Significant portions of the US population have limited access to needed oral care.^{4,5} Chief among these are large shares of racial and ethnic minority groups, who experience disproportionately higher levels of oral health problems as a result.⁶ Hispanic and Latino (H/L) children suffer from the highest rates of tooth decay in the US,⁷ and H/L adults have among the highest rates of untreated tooth decay.⁸ While many factors contribute to these inequalities, improving the diversity of the dentist workforce is considered critical in efforts to reduce disparities in access to care and health outcomes. Data indicate that minority patients are more likely to seek care from providers of their own race or ethnicity.^{9,10} Black/African American, Hispanic/Latino, and American Indian/Alaska Native dentists are considered underrepresented minority (URM) providers. URM dentists serve more patients of their own race or ethnicity than do other providers and serve disproportionately large shares of patients of their own race or ethnicity relative to the communities in which they live.¹¹

The H/L dentist workforce is disproportionately small compared with the rapidly growing and historically underserved H/L population. Enrollment of H/L students in US dental schools increased from 5.4% in 2000 to 9.1% in 2016¹ but remains far below 17.1%, the proportion of the US population that is H/L.² Recent research shows that half of the H/L dentists in the US are foreign born, and about 1 in 4 are initially foreign-trained dentists.³ With few available demographic data on foreign-trained dentists coming to the US annually, assessing the overall trend of H/L dentists over time is difficult.

Further complicating any assessment of the H/L dentist pipeline are changing state licensure laws that have altered the pathways to practice for foreign-trained providers.¹² Historically, states allowed foreign-trained providers to qualify for licensure via testing and evaluation of individual dentists. Information on foreign-trained dentists was distinguishable within license files based on this model.

Currently, states have more uniform licensure requirements, such as regional board exams and education-based qualifying models, allowing them to expand license reciprocity toward an improved capacity for movement of dentists throughout the US. Because these pathways provide a US educational degree, they mask the initial training status of the providers and make them more difficult to distinguish.

The move to greater uniformity in licensure requirements has resulted in significant growth in international dentist programs (IDPs), also known as advanced standing (AS) programs. In the 1970s and 1980s, US dental schools created IDP/AS programs to provide foreign-trained providers with the necessary educational and clinical skills to obtain a license to practice dentistry in the US.¹³ In an IDP/AS

program, a foreign-trained dentist completes the last 2 years of dental school and is conferred with a Doctor of Dental Surgery (DDS) or Doctor of Medicine in Dentistry (DMD) degree as a US graduate of that school. Among H/L dentists, the educational debt burden of an IDP/AS foreign graduate can be as much as 10 times greater than that of foreign graduates without an IDP/AS degree, raising questions about both the accessibility of the education and the impact of this debt on practice choices of H/L dentists.³

Research Aims

This study examines the trends in H/L dentists' pathways to practice, analyzes practice patterns of H/L dentists by pathway, and describes the wider environment within which the workforce is evolving, including licensure and educational options, with a focus on opportunities to enhance workforce diversity and improve access to care for both underserved and H/L populations. The study has 5 interrelated aims:

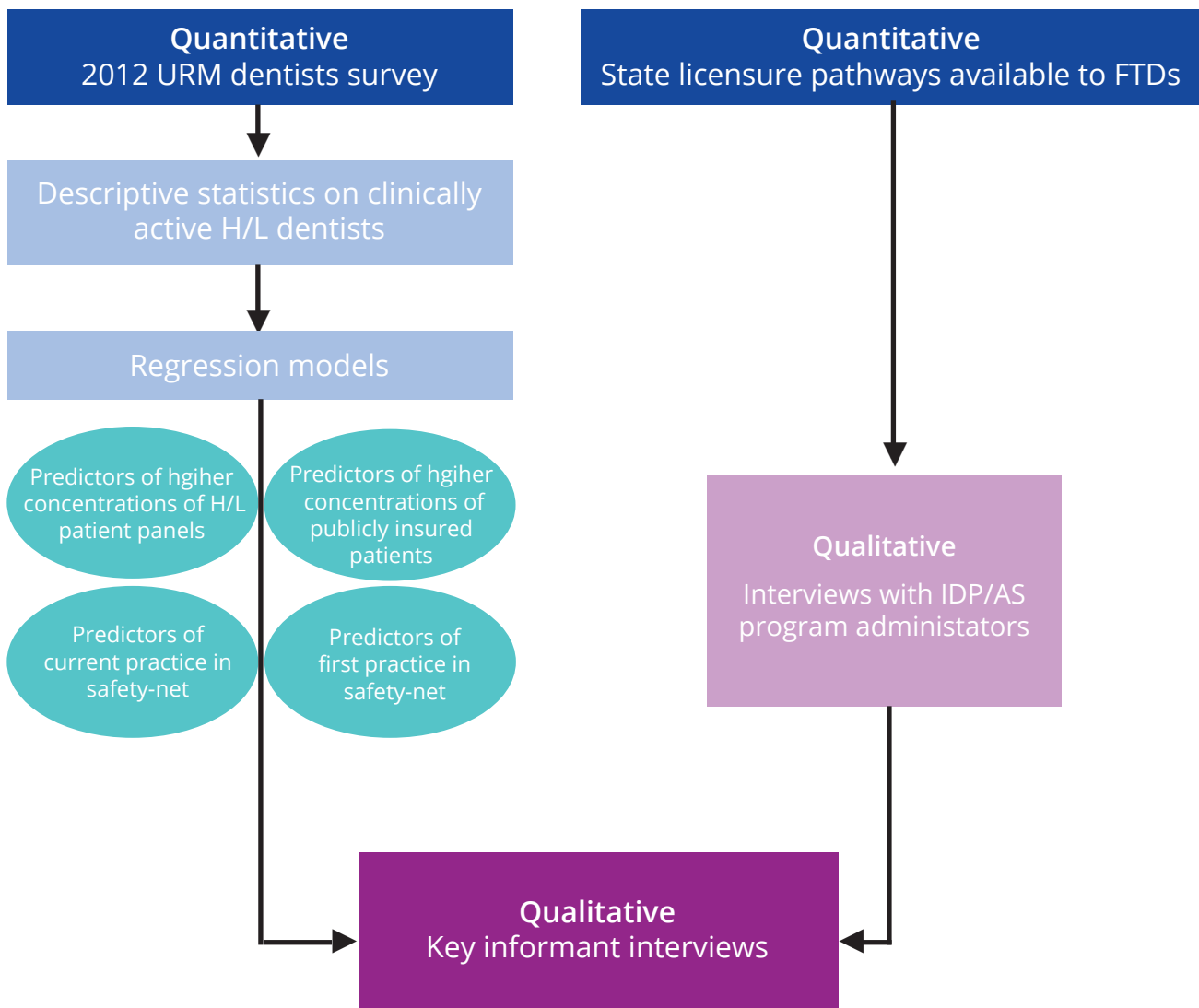
1. To describe changing state licensure laws governing foreign-trained H/L dental graduates' pathways to establish practices in the US
2. To define key indicators of H/L dentists' practice patterns, including geographic location, practice type, specialty, patient population and payer mix, and service to underserved populations
3. To assess variance in practice patterns by 3 pathways to practice: (1) US trained, (2) foreign trained, and (3) foreign trained with IDP completion. The role of residency training in each of the 3 pathways was further examined.
4. To model predictors of service to minority and underserved populations in relation to demographics, training pathway, debt, and other related variables
5. To assess the potential future impact of these changing pathways on H/L provider supply and distribution

The primary hypotheses are that H/L dentists who are trained in a foreign country may be more inclined to treat patients from their own race or ethnicity and publicly insurance patients, and that debt burdens, which vary by pathway, may influence practice choices. A secondary hypothesis is that the increasing shift toward IDP/AS requirements for US licensure is slowing the flow of H/L foreign-trained dentists to the US labor market.

METHODS

Mixed methods were employed for this study, including (1) statistical analysis of 2012 national sample survey data of URM dentists, (2) analysis of state licensure laws, and (3) a qualitative assessment of policymakers' and educators' perspectives on the impact of changing licensure pathways and growth of IDP/AS programs on H/L dentists and their practices (Figure 1). Institutional Review Board (IRB) approval (#16-20509) for this study was obtained through the University of California, San Francisco.

Figure 1. Mixed Methods Study Design^a



^a FTDs, foreign-trained dentists; H/L, Hispanic/Latino; IDP/AS, international dentist program/advanced standing; URM, underrepresented minority.

2012 Survey of Underrepresented Minority Dentists

Data Source

A national sample survey of URM dentists was conducted in 2012, designed to assess these dentists' personal characteristics, practice patterns, educational history, and opinions about key professional issues. The survey had an adjusted response rate of 34% (n=1,489) and was weighted for selection likelihood and nonresponse bias to be nationally representative of the population of URM dentists. The sample was based on the American Dental Association (ADA) Masterfile, which identified a total of 5,926 H/L dentists in the US with active licenses. The response rate for eligible H/L dentists was 35.4%, for an unweighted total of 692. After applying weights for selection likelihood and correctable, measurable response bias (post-stratification weights), the weighted total of H/L respondents was 5,784. The analyses described in this paper are based on the subset of these respondents who reported being active in clinical practice (N=5,342). Comprehensive details on the survey methodology, response rate, and response quality have been reported previously.¹⁴

Statistical Analysis

Descriptive statistics were used to examine H/L practice patterns by age cohort as well as all other relevant variables. To examine clinical practice patterns of H/L dentists, analysis was conducted on the composition of their patient panels in 2 ways. First, predictors of the percentage of patients on their panel who are themselves H/L were identified. Second, predictors of serving publicly insured patients (Medicaid/CHIP, etc) were identified. Because H/L patients are not synonymous with publicly insured patients, these dependent variables were looked at in 2 separate Poisson regressions with some overlapping independent variables. Each dependent variable was coded into an ordinal variable of 10% increments, with 0% of the patient panel as the lowest category and 90%-100% of the patient panel as the highest category.

The overlapping independent variables included the standard control variables of dentist's age (x-level ordinal variable) and sex (1 = female, 0 = male). Two variables were included to examine the role of the dentist's education in both analyses. The first was a binary variable coded 1 if the dentist is an FTD who did not subsequently complete an IDP/AS program at a US dental school and coded 0 otherwise. The second is a binary variable coded 1 if the dentist is an FTD who did subsequently complete an IDP/AS program at a US dental school (labeled "IDP") and coded 0 otherwise. All dentists who are neither an FTD nor an IDP/AS program participant completed dental school at a US dental school for their initial training as a dentist. A binary variable coded 1 if the dentist is a practice owner was included because these individuals have greater leeway in selecting their practice location and patient population, but they also may have financial obligations to the practice that limit their ability to serve either population of interest in the

analysis. Finally, an ordinal variable was created from an external source meant as a proxy for the state policy environment in 2012.¹⁵ The variable was coded 0 if no adult dental Medicaid benefits were available, 1 if adults could access only emergency dental care under Medicaid, and 2 if adult dental Medicaid benefits were more extensive.

Each regression also included independent variables that did not overlap with the variables in the other regression. In the analysis of the percentage of H/L patients served, these other variables included a binary variable coded 1 if the dentist reported speaking Spanish with patients in a clinical setting and a binary variable coded 1 if the dentist reported that his or her primary practice area was general practice. Two variables from the American Community Survey (ACS) 5-year estimates for the period 2008-2012 included a continuous variable of the H/L percentage of the population in the counties where H/L dentists are located and a continuous variable of the percentage of Spanish or Creole speakers in the county who report speaking English very well. These variables gave us a proxy to measure the degree to which the H/L populations in the counties in which the dentists are located are assimilated.

In the analysis of the percentage of publicly insured patients served by H/L dentists, a binary variable coded 1 was included if the dentist reported working in a nontraditional setting (ie, corporate practice, government employment, public health corps, Indian Health Service, civil hire on Indian land, health center, hospital, armed forces, prison, educational institution, or industry). This variable is an important control, as dentists in nontraditional settings often primarily serve publicly insured patients. Finally, 2 additional variables from the ACS 5-year estimates for the period 2008-2012 were included as proxies for the economic composition of the area in which the dentist is located. The first was a continuous variable measuring the percentage of individuals living below the poverty line. The second was the percentage of patients who reported being covered by public insurance in the county.

To link the external data, the mailing address to which the URM survey was sent was used as a proxy for the dentists' practice location. The state-level variable reflecting the availability of Medicaid adult dental benefits was linked using the unique 2-letter state code. The variables from the ACS were linked to the URM survey data at the county level using Federal Information Processing Standards (FIPS) codes, which identify individual counties and county equivalents.

Finally, based on the results of the Poisson regressions, 2 logistic regressions we conducted. These were designed to predict, separately, the likelihood of an H/L dentist practicing in the safety net and the likelihood of having had a first job in a safety net setting among H/L dentists. These regressions included standard control variables, such as age and sex, as well as the variables of interest in studying H/L dentists, such as being an FTD or having completed an IDP/AS program. Also included were factors likely to influence practice choice: educational debt level, having dependent children under 18 years of age,

the state Medicaid context, and responses to survey questions about personal motivations in choosing a practice type. The Medicaid context variable was the same as that used in the previous regressions, and the remaining variables all came from the 2012 Survey of Underrepresented Minority Dentists.

Foreign-Trained Dentist Educational Pathways

To better understand the various educational pathways available to FTDs in the US, interviews were conducted with IDP/AS program directors and administrators. Initial data on the educational pathways available to FTDs were collected from the Commission on Dental Accreditation (CODA), which tracks IDP/AS programs (both accredited and non-accredited). CODA also provides data on the location and admissions criteria for the programs they accredit, which include all US and several Canadian dental schools through an agreement with the Commission on Dental Accreditation of Canada (CDAC).^{16,17}

The initial list of the universities that offer IDP/AS programs was compiled from the ADA's Survey of Dental Education 2015-2016 report and the American Dental Education Association's (ADEA) Centralized Application for Advanced Placement for International Dentists (CAAPID). According to the ADA, there were 39 accredited IDP/AS programs offered in the US in the 2015-2016 school year,¹⁸ while CAAPID allowed centralized application to 28 IDP/AS programs in 2017,¹⁹ including 2 programs that were excluded from the ADA's list. With these 2 lists combined, a total of 41 IDP/AS programs were found available to FTDs in 2016.

The IDP/AS program administrators were identified in 2017 from our compiled list of IDP/AS programs in the US (n=41). An email was sent to program and admissions directors explaining the study and inviting them to participate. Approximately 3 weeks later, a second invitation email was sent to those who did not respond to the initial email. Of the 41 IDP/AS programs contacted, interviews were completed with 8 program directors and/or admissions administrators, with an additional 4 programs responding by email to a set of questions (n=12, 29.3%).

Interviews were conducted using a semi-structured interview guide intended to elicit feedback on historical shifts in education policies for FTDs, with open-ended questions designed to allow participants to describe their unique perspectives. Specifically, IDP/AS program directors and/or administrators were asked to describe the history of their programs for FTDs, including motivations to initiate these programs, any changes in admission criteria over time, and whether any state licensure laws had impacted their programs or enrollment patterns. The interviews were analyzed for common themes and summarized.

Foreign-Trained Dentists' State License Pathways

The data for the licensing pathways for each US state were collected from the ADA, which publishes information on requirements and pathways to licensure for individuals seeking to practice dentistry in the US.^{20,21} The information published by the ADA on each state's requirements, including those of the District of Columbia, Puerto Rico, and the Virgin Islands, were individually verified by contacting their respective licensing boards or dental licensing authorities via phone or email or by collecting data from their official websites.²² The data on different licensure pathways were organized into a database to allow analysis and summary of the pathways through which FTDs can obtain licensure in the US. These include licensure via a completed IDP/AS program in combination with state or national board exams, a portfolio exam, or an Advanced Education in General Dentistry (AEGD) program or General Practice Residency (GPR); postdoctoral residencies in combination with state or national board exams; or more specialized licensure pathways, including limited licensure, teaching licensure, and licensure via endorsement, credential, or reciprocity.

To assess the drivers of changes in licensure pathways, key informant interviews were conducted. Using a convenience sampling method, 3 key informant interviews were conducted using a semi-structured interview format. Qualitative data obtained from these key informant interviews and those conducted with IDP/AS program administrators were used to further our understanding of the impact of changing licensure pathways on FTDs, including H/L dentists.

FINDINGS

Educational Pathways to Practice for Foreign-Trained Dentists

Historical Shift

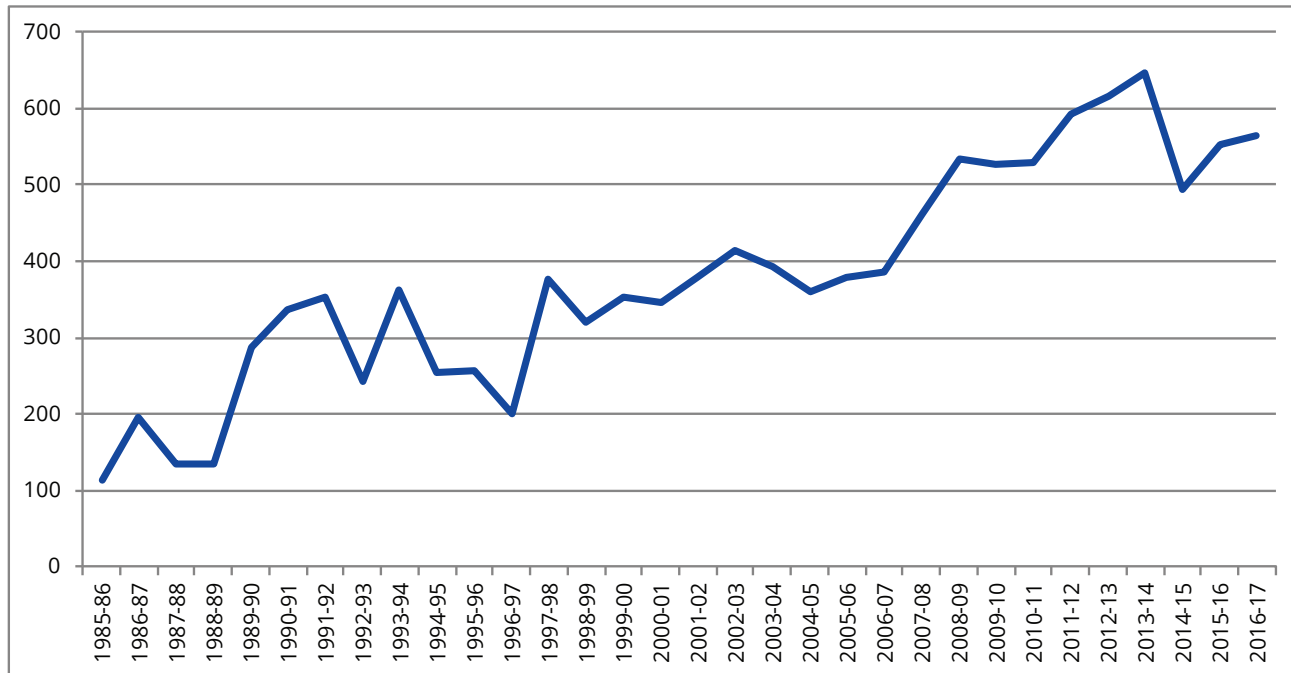
CODA was established in 1975 to ensure that postsecondary dental schools and graduates meet certain quality standards and competencies in the US, yet no such international accreditation body exists to ensure the same standard of educational preparation for FTDs.²³ Prior to the late 1970s, FTDs' qualifications were assessed through a certification examination by individual states. In the late 1970s, states began requiring FTDs to obtain a dental degree from a CODA-accredited dental program, moving the demand by FTDs for educational qualification certification from states' regulatory bodies to the dental education system. Dental schools initially adopted an approach in which they evaluated and placed each FTD into a particular point in the curriculum depending on his or her skills and background. This was a time-consuming and resource-intensive process, and as the demand for licensure of FTDs grew, states and educational programs began to seek a more systematic approach to ensure quality.¹³ Two pathways for gaining educational qualification have emerged: predoctoral IDP/AS programs and postgraduate dental residency training.

The predoctoral programs fall under a range of names, including Internationally Trained Dentist Program (ITDP), International Dental Education Program (IDEP), Program for Advanced Standing Students (PASS), Professional Program for International Dentists (PPID), and International Dental Studies (IDS) program, among others.¹³ These programs, to which are referred to collectively as IDP/AS programs throughout this report, generally share similar admissions criteria, consist of repeating 2 to 3 years of dental school, and result in FTDs gaining a CODA-accredited dental degree. IDP/AS programs have largely replaced the process of individual evaluation by states and/or customized placement of FTDs into dental education.

Immigration laws impact the pipeline of FTDs in relation to qualification for certain programs (eg, postgraduate programs funded through federal Graduate Medical Education [GME] funding can accept only US citizens and permanent residents) and capacity to find employment after attending a US-based educational program. FTDs generally fall into 3 immigration categories: (1) US citizens who trained outside of the US, (2) foreign nationals who have obtained US citizenship or permanent residency, and (3) foreign nationals who are still seeking US citizenship and would train under a temporary visa such as a student visa. Within individual program admission criteria, a clear priority for any particular category of FTD was not found. Those with citizenship or permanent residency will be able to work once licensed, while those without it must be sponsored in their work as part of the pathway to citizenship.

As of 2016, there were 41 dental schools offering IDP/AS programs to FTDs. The ADA's Health Policy Institute's Surveys of Dental Education show a nearly 400% increase in the number of FTDs who were admitted to IDP/AS programs from the mid 1980s to 2015 (Figure 2).²⁴

Figure 2. Number of International Dental School Graduates Admitted With Advanced Standing to US Dental Schools, 1985-2017



Source: American Dental Association, Health Policy Institute, Surveys of Dental Education (various years).

A second pathway for FTDs to gain qualification for US licensure is through postdoctoral education programs. In many states, the completion of a residency program (regardless of initial training) will serve as the educational qualification for licensure. Until recently, this process was somewhat diffuse and depended on a mix of state regulations, graduate program preference, and specialty requirements. As of 2016, there were 2 separate but complementary services that centralized applications for postdoctoral dental programs (ADEA PASS* and Match†) for all dentists (both US- and foreign-trained). Some postdoctoral programs do not participate in either of these application programs and require prospective applicants to contact the program administrators directly.

* ADEA Postdoctoral Application Support Service (ADEA PASS) is a centralized application service for dental graduates to apply to more than 700 participating advanced dental education programs across the US. ADEA PASS standardizes the application process so that a single application will give access to all 700 of the participating programs. Applicants need to search for the programs in which they are interested by program type and/or state. ADEA PASS is open from May through February each year.

† The postdoctoral dental match program (Match) offered by National Matching Services Inc. has been helping dental graduates to obtain positions in postdoctoral education programs of their choice since 1985. Match uses an algorithm to attempt to place an applicant into the program that is most preferred on the applicant's list. With Match, applicants are still required to apply directly to programs in which they are interested. Match provides access to the following types of programs: AEGD, GPR, Canadian General Practice Residency, Oral and Maxillofacial Surgery, Orthodontics, Pediatric Dentistry, Periodontics, Prosthodontics, and Dental Anesthesiology.

In addition to the abovementioned application processes, applicants may be required to take the Advanced Dental Admission Test (ADAT), a standardized test designed to quantitatively assess applicants' critical thinking skills and preparedness for advanced dental education programs. Postdoctoral program directors reported that the move toward requiring the ADAT is in response to many dental schools no longer providing grade point averages and instead reporting grades as pass/fail.²⁵

Dental students in their third or fourth year, dental graduates, and international dentists interested in postdoctoral training or advanced standing in predoctoral programs are eligible for this exam. Despite the centralized application and placement processes, there is no publicly available source of data on the race or ethnicity of applicants or matriculates that is specific to these 2 education qualification pathways. Therefore, the overall trend of the H/L dentist pipeline through these pathways can be observed only retrospectively through cumulative graduation reports from dental education programs or through the ADA Masterfile.

One additional option that has been explored is accreditation of foreign dental schools by US institutions to ensure adequate credentials of FTDs. Universidad De La Salle Bajío's School of Dentistry in León, Guanajuato, Mexico, was first accredited by the Dental Board of California in 2002 and was reaccredited for 7 years in 2012.^{26,27} The school maintains up to 5 spots for a US citizen to be admitted to dental school, as well as an IDP program that was accredited in 2008 and a domestic program for Mexican applicants. This accreditation, which allows graduates license eligibility only in California, is expected to increase the number of H/L and Spanish-speaking dentists available to serve California's large H/L population. From their IDP program alone, they have graduated 183 dentists who have then been licensed in California, 91 (49.7%) of whom were identified as H/L.[‡]

Given the lack of data to quantitatively assess the pipeline, the educational pathways to practice for FTDs were examined through individual discussions with IDP/AS program coordinators about each program's inception and enrollment trends as well as other education and training programs available to FTDs at their universities. A total of 12 IDP/AS program or admissions directors shared information about programs available to FTDs at their universities (Table 1), including additional information on residency pathways. These programs represented 43.6% (241/553) of all FTDs enrolled in US and Canadian dental schools in the 2015-2016 academic year.¹⁸

‡ Personal communication, Lorena Garrido Camposeco, Universidad De La Salle Bajío, August 11, 2017.

Table 1. Select Information About IDP/AS and Residency Programs Available for FTDs^a

School	IDP/AS Program			Residencies for FTDs		
	Inception	Trend in Enrollment	2015-16 Class ^b	AEGD	GPR	Post-Doctoral ^c
Boston University	1970s	Increasing	84	Yes	No	Yes
University of Pennsylvania	1986	Steady	35	No	No	Yes
Rutgers University	2007	Increasing	28	No	Yes	Yes
University of Michigan	2005	Increasing	20	No	No	Yes
Tufts University	1956	Increasing	17	No	No	Yes
New York University	1990s	Decreasing	15	Yes	No	No
University of Minnesota	2007	Increasing	12	No	No	Yes
University of Texas Health Science Center at Houston	1970	Steady	2	No	No	Yes
University of California, San Francisco	2000	Increasing	28	No	No	No
Southern Illinois University Edwardsville	2014	Steady	6	No	No	No
Case Western Reserve University	2000	Decreasing	0	Yes	Yes	Yes
University of Florida	2000s	Steady	2	Yes	No	Yes
^a AEGD, Advanced Education in General Dentistry; FTDs, foreign-trained dentists; GPR, General Practice Residency; IDP/AS, international dentist program/advanced standing. ^b FTDs admitted to 2015-2016 D2 or D3 years, sourced from 2015-2016 Survey of Dental Education, ADA Health Policy Institute. ¹⁸ ^c CODA and non-CODA accredited post-doctoral specialty residency programs.						

The IDP/AS program coordinators universally indicated that their programs were launched in response to changing state licensure laws requiring CODA-accredited dental degrees for FTDs. Over time, there have been periods of expansion of dental school enrollment for these programs as dental school facilities have expanded or been added, which has led to the ability of these school to expand their enrollment of IDP/AS students. In addition to those programs that have preset IDP enrollment targets and capacity, others are more ad hoc, with flexible enrollment of IDP/AS students if domestic students should drop out of the traditional 4-year DDS/DMD program. Total student enrollment is limited by space and/or faculty capacity in preclinical and clinical courses and rotations, and maximum utilization of that capacity is preferred if possible. All but one of the interviewed schools reported that demand for these programs has remained high and even increased over time. The single program that acknowledged cutting the number of training positions available for FTD students noted that this decision was not due to lack of demand from FTDs.

Most programs reported no change in admissions criteria over the years; however, there are some notable differences in these criteria among programs. While most programs require at least the National Dental Board Examination (NDBE) Part I, some programs require Part II as well. Programs administrators also reported a likely movement toward ADAT scores replacing the NDBE, as some view the ADAT (which is scored numerically) as more discerning than the NDBE (which is scored as pass/fail). Proof of a sufficient score on the Test of English as a Foreign Language (TOEFL) is typically required for FTDs from non-English-speaking countries, and some programs require skills tests or exposure to the American dental system in some capacity—for example, shadowing of a dentist or employment as a dental hygienist or dental assistant. About half of the programs whose directors or administrators were interviewed require FTDs to be US citizens or permanent residents due to public funding restrictions.

Despite typically being 2-year programs, tuition for IDP/AS degrees ranges from approximately \$135,000 to \$305,000, which approaches the tuition and fees associated with traditional 4-year dental degrees. However, fewer opportunities for financial aid are available to FTDs.

It is difficult to describe the characteristics of IDP/AS students, as there is no single data source tracking FTDs in IDP/AS programs, although most programs keep detailed information about applicants and graduates of their individual programs. Interviewees reported that most applicants and accepted students are from South Asia, the Middle East, or countries experiencing political unrest. Historically, students from the Caribbean were very common, though demand for IDP/AS programs from this region had decreased. Our interviews found that 2 programs (those of Rutgers University and the University of Florida) reported having larger H/L applicant pools relative to the other programs. The fact that these schools do not engage in more active recruiting of H/L FTD students indicates that student and graduate word of mouth plays a role in school choice. The director of Rutgers University's Internationally Trained DMD Program is herself an H/L dentist whose father participated in an IDP/AS program as an FTD. At the University of Florida, the applicant pool may be reflective of the general population in the state, which includes a high proportion of H/L residents. This school also offers a 2-year AEGD program for students wishing to practice in Florida exclusively, which the director felt may contribute to the higher numbers of H/L students.

In summary, there are increasing formal opportunities for FTDs to obtain educational qualifications in the US with the growth of IDP/AS programs. However, from what could be assessed, no strategies were found for recruitment into these programs specific to foreign-trained H/L dentists which could make an impact on the pipeline.

Dental Licensure Pathways for Foreign-Trained Dentists

Dentist licensure is governed at the state level, and a wide variety of licensure pathways are available to FTDs. Completion of a CODA-accredited dental degree and passage of the NDBE and a state or regional licensing exam are sufficient for a dental license in every US state.²⁸ For FTDs, completion of an IDP/AS program satisfies the dental degree. However, other pathways also are available. For example, some states toggle their policy levers to create limited licenses that allow FTDs to practice but restrict the patients they serve or the settings in which they work. In addition, once licensed in one state, reciprocity may or may not be available depending on the pathway they have chosen. The result is that FTDs face a diverse state policy environment regardless of the educational choices they made to get to the point of licensure. Table 2 details the licensure pathways available to FTDs by state.

Table 2. State-by-State Licensure Pathways for Foreign-Trained Dentists

S/No.	State	Licensing via CODA-Accredited Education (DDS/DMD) International Dentist Program (IDP)				Licensing Without DDS/DMD IDP but With Residency										
		DDS/ DMD IDP and Board Exam	DDS/ DMD IDP and State Board Exam	DDS/ DMD IDP and Portfolio Exam	DDS/ DMD IDP and AEGD/ GPR	Postdoctoral ADA-Recognized Specialty Residency (and Board Exam)										AEGD/ GPR and Board Exam
						Ortho	Pediatric	Prosthodontics	Periodontics	Endodontics	DPH	OMF Pathology	OMF Radio	OMF Surgery		
1	AL	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
2	AK	Y	N	N	Y	N	N	N	N	N	N	N	N	N	N	
3	AZ	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
4	AR	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
5	CA	Y	N	Y	Y	N	N	N	N	N	N	N	N	N	N	
6	CO	Y	N	N	Y	N	N	N	N	N	N	N	N	N	N	
7	CT	Y	N	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	
8	DE	N	Y	N	Y	N	N	N	N	N	N	N	N	N	N	
9	DC	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
10	FL	Y	N	N	N	N	N	N	N	N	N	N	N	N	Y	
11	GA	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
12	HI	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
13	ID	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
14	IL	Y	N	N	N	Y	Y	Y	Y	Y	N	N	N	Y	N	
15	IN	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
16	IA	Y	N	N	N	N	Y	N	N	N	N	N	N	N	Y	
17	KS	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
18	KY	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
19	LA	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	
20	ME	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
21	MD	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
22	MA	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
23	MI	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
24	MN	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
25	MS	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
26	MO	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
27	MT	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
28	NE	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
29	NV	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	
30	NH	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
31	NJ	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
32	NM	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	
33	NY	N	N	N	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	
34	NC	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
35	ND	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
36	OH	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
37	OK	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
38	OR	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	
39	PA	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
40	RI	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
41	SC	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
42	SD	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
43	TN	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	
44	TX	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	
45	UT	Y	N	N	N	N	N	N	N	N	N	N	N	Y	N	
46	VT	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
47	VA	Y	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	
48	WA	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	
49	WV	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
50	WI	Y	N	N	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	
51	WY	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
52	PR	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
53	VI	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	
Total	Yes	51	1	1	9	15	16	15	15	15	11	13	13	16	7	
	No	2	52	52	44	38	37	38	38	38	42	40	40	37	46	
	Total	53	53	53	53	53	53	53	53	53	53	53	53	53	53	
Total without PR and VI	Yes	51	1	1	9	15	16	15	15	15	11	13	13	16	7	
	No	0	50	50	42	36	35	36	36	36	40	38	38	35	44	
	Total	51	51	51	51	51	51	51	51	51	51	51	51	51	51	

Table 2. State-by-State Licensure Pathways for Foreign-Trained Dentists (Cont.)

S/No.	State	Licensing Without DDS/DMD IDP but With Residency						Limited Licensing		Licensing by Clinical Credentials, US (Reciprocity)	Licensing by Clinical Credentials, Foreign (Endorsement)	Licensing by Teaching Credentials, US
		Non-ADA-Recognized Specialty Residency						Dental Intern	Teaching	Case-by-Case Review		
		Oral Med	Implant	Craniofacial Pain and TMJ	Aesthetic Cosmetics	Anesthesiology	Geriatric					
1	AL	N	N	N	N	N	N	Y	Y	Y	N	N
2	AK	N	N	N	N	N	N	N	Y	Y	N	N
3	AZ	N	N	N	N	N	N	N	Y	Y	N	N
4	AR	N	N	N	N	N	N	N	N	Y	N	N
5	CA	N	N	N	N	N	N	N	Y	Y	N	N
6	CO	N	N	N	N	N	N	N	Y	Y	N	Y
7	CT	N	N	N	N	N	N	N	Y	Y	N	N
8	DE	N	N	N	N	N	N	Y	Y	N	N	Y
9	DC	N	N	N	N	N	N	N	N	Y	N	N
10	FL	N	N	N	N	N	N	Y	Y	N	N	N
11	GA	N	N	N	N	N	N	N	N	Y	N	N
12	HI	N	N	N	N	N	N	N	Y	N	N	Y
13	ID	N	N	N	N	N	N	N	N	Y	N	N
14	IL	N	N	N	N	N	N	N	Y	Y	N	N
15	IN	N	N	N	N	N	N	N	Y	Y	Y	N
16	IA	N	N	N	N	N	N	N	Y	Y	N	N
17	KS	N	N	N	N	N	N	N	N	Y	N	N
18	KY	N	N	N	N	N	N	Y	Y	Y	N	N
19	LA	N	N	N	N	N	N	N	Y	Y	N	Y
20	ME	N	N	N	N	N	N	N	N	Y	N	N
21	MD	N	N	N	N	N	N	N	N	Y	N	N
22	MA	N	N	N	N	N	N	Y	Y	Y	N	N
23	MI	N	N	N	N	N	N	N	Y	Y	N	Y
24	MN	N	N	N	N	N	N	N	Y	Y	Y	Y
25	MS	N	N	N	N	N	N	N	Y	Y	N	Y
26	MO	N	N	N	N	N	N	N	N	Y	N	N
27	MT	N	N	N	N	N	N	Y	Y	Y	N	N
28	NE	N	N	N	N	N	N	N	N	Y	N	N
29	NV	N	N	N	N	N	N	N	Y	N	N	Y
30	NH	N	N	N	N	N	N	N	N	Y	N	N
31	NJ	N	N	N	N	N	N	N	Y	Y	Y	N
32	NM	N	N	N	N	N	N	Y	N	Y	N	N
33	NY	N	N	N	N	N	N	Y	Y	Y	N	N
34	NC	N	N	N	N	N	N	N	Y	Y	N	N
35	ND	N	N	N	N	N	N	N	Y	Y	N	Y
36	OH	N	N	N	N	N	N	N	N	Y	N	Y
37	OK	N	N	N	N	N	N	N	Y	Y	N	Y
38	OR	N	N	N	N	N	N	N	N	Y	N	N
39	PA	N	N	N	N	N	N	N	Y	Y	N	N
40	RI	N	N	N	N	N	N	Y	N	Y	N	N
41	SC	N	N	N	N	N	N	N	Y	Y	N	N
42	SD	N	N	N	N	N	N	N	N	Y	N	N
43	TN	N	N	N	N	N	N	Y	Y	Y	N	Y
44	TX	N	N	N	N	N	N	N	N	Y	N	Y
45	UT	N	N	N	N	N	N	N	Y	Y	N	Y
46	VT	N	N	N	N	N	N	N	N	Y	N	Y
47	VA	N	N	N	N	N	N	N	N	Y	N	N
48	WA	N	N	N	N	N	N	N	N	Y	N	N
49	WV	N	N	N	N	N	N	N	Y	Y	N	N
50	WI	N	N	N	N	N	N	N	N	Y	N	N
51	WY	N	N	N	N	N	N	N	Y	Y	N	N
52	PR	N	N	N	N	N	N	N	N	Y	N	N
53	VI	N	N	N	N	N	N	N	Y	N	N	N
Total	Yes	0	0	0	0	0	0	10	32	48	3	15
	No	53	53	53	53	53	53	43	21	5	50	38
	Total	53	53	53	53	53	53	53	53	53	53	53
Total without PR and VI	Yes	0	0	0	0	0	0	10	32	0	3	15
	No	51	51	51	51	51	51	41	19	51	48	36
	Total	51	51	51	51	51	51	51	51	51	51	51

a AEGD, Advanced Education in General Dentistry; CODA, Commission on Dental Accreditation; DDS, Doctor of Dental Surgery; DMD, Doctor of Medicine in Dentistry; DPH, dental public health; endo, endodontics; GPR, General Practice Residency; OMF, oral and maxillofacial; ortho, orthodontics; patho, pathology; perio, periodontics; PR, Puerto Rico; prostho, prosthodontics; radio, radiology, S/No., serial number; TMJ, temporomandibular joints; VI, Virgin Islands.

In every state, FTDs who complete a CODA-approved IDP/AS program leading to a DDS or DMD degree and who pass the Regional Testing Exam (RTE) are eligible for dental licensure.²⁸ New York additionally requires all candidates (FTD and US trained) to complete at least 1 year of a clinical-based postdoctoral general practice residency in a hospital or dental facility.²⁸ Several states have exceptions to the requirement to pass the RTE, though none is less stringent than the RTE. Delaware requires candidates to take their own state's exam in place of the RTE. California offers portfolio examination in lieu of the RTE for all candidates who are educated in a California dental school. Nine states allow license eligibility to FTDs who complete an IDP/AS program and an AEGD program or GPR in place of the RTE.

There are additional pathways to licensure for FTDs in some states for which completion of an IDP/AS program is not required. In 7 states, FTDs may become eligible for licensure after completing an AEGD program or GPR without having also completed an IDP/AS program. These states require a case-by-case review of the licensure application. In addition, about 16 states allow FTDs to complete a postdoctoral program in one of the 9 ADA-recognized specialty areas (dental public health, endodontics, oral and maxillofacial pathology, oral and maxillofacial radiology, oral and maxillofacial surgery, orthodontics and dentofacial orthopedics, pediatric dentistry, periodontics, and prosthodontics) without the completion of an IDP/AS program (the exact number of states allowing each specialty as a pathway varies; see Table 2). The candidates must be able to prove that they have obtained DDS/DMD-equivalent training outside of the US and Canada. They must also present qualifying scores on the NDBE, TOEFL, Graduate Record Examination (GRE) and/or ADAT, and RTE and submit dental school transcripts, Dean's letter, and other recommendations along with a detailed resume. In these states, FTDs are eligible for licensure after completing the residency requirements and receiving board certification in their specialty area. To date, no states allow completion of a non-ADA specialty residency (eg, implants, geriatrics) as evidence of qualification for licensure.

Fifteen states allow FTDs to obtain dental licensure to practice with certain restrictions if they acquire a teaching or faculty position at an ADA-recognized and CODA-approved dental school. There are also limited licenses—for example, Florida has a 2-year certificate for practice in Florida only. After 2 years of AEGD certificate training, the candidate is eligible to obtain dental licensure in Florida.

After FTDs receive initial licensure, they may qualify for licensure in other states after a period of practice without incident. Various terms are used for the process of obtaining licensure in this way, including licensure by credentials, reciprocity, endorsement, or criteria. These are referred to collectively as reciprocity. Reciprocity is available to all licensed dentists in the US whether their initial training was foreign or domestic; however, Delaware, Florida, Hawaii, Nevada, and the Virgin Islands do not participate in license reciprocity. Every other state, the District of Columbia, and Puerto Rico allow dentists licensed in another state to become eligible for licensure in their state after continuous practice for a specified period

(ranging from 2 to 5 years) in another state, without additional didactic and clinical examinations.²¹ For the most part, limited and restricted licenses are eligible for license reciprocity.

While states retain the ability to evaluate and accept the educational credentials of an FTD, as was common into the 1970s, this mechanism (known as endorsement) is currently used in only 3 states.

In summary, the licensing of FTDs has become more standardized in educational and testing requirements while at the same time becoming more flexible in allowing greater workforce movement among states. The measurable impact of these changes on the H/L dentist inflow is unclear given the absence of national tracking data by race or country of origin.

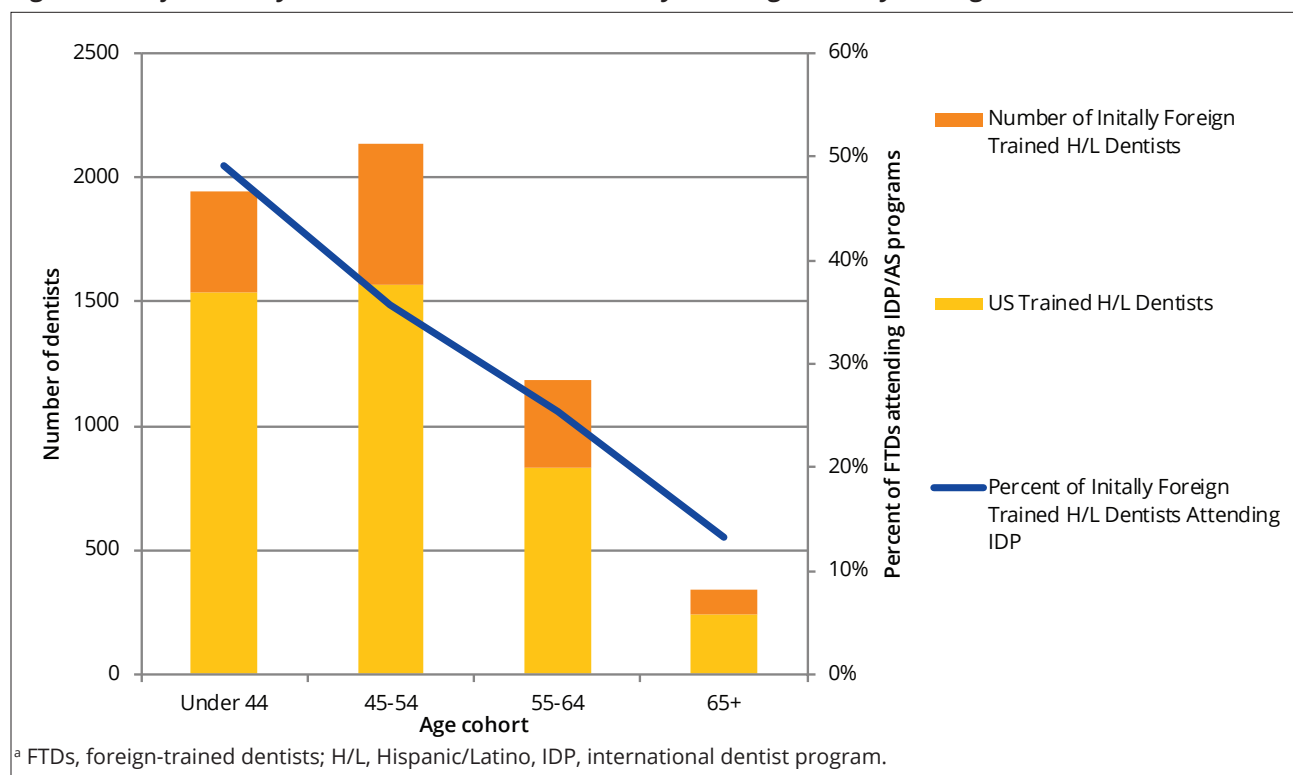
Changing Pipeline and Practice Patterns of Hispanic/Latino Dentists

The distribution within age cohorts of H/L dentists shows that the proportion of H/L dentists who are US trained and those attending IDP/AS programs is greater among younger groups, while those who are gaining direct licensure as FTDs is greater among older groups, as shown in Table 3. Without annual enrollment and licensure numbers of H/L dentists, it cannot be determined definitively if this shift is enhancing or reducing the overall H/L dentist pipeline. However, Figure 3 shows that among younger cohorts of H/L dentists, the percent attending an IDP/AS program has increased dramatically.

Table 3. Professionally Active Hispanic/Latino Dentists in the US by Training Pathway and Age Cohort

Age Cohort	Under 44	45-54	55-64	65+	Total
N (weighted)	1,942	2,132	1,183	341	5,599
Percent US-trained	79	74	70	71	75
Percent foreign-trained	11	17	22	25	16
Percent IDP-trained	10	9	8	4	9
Percent in age cohort	35	38	21	6	100
Percent foreign born	32	43	21	5	100

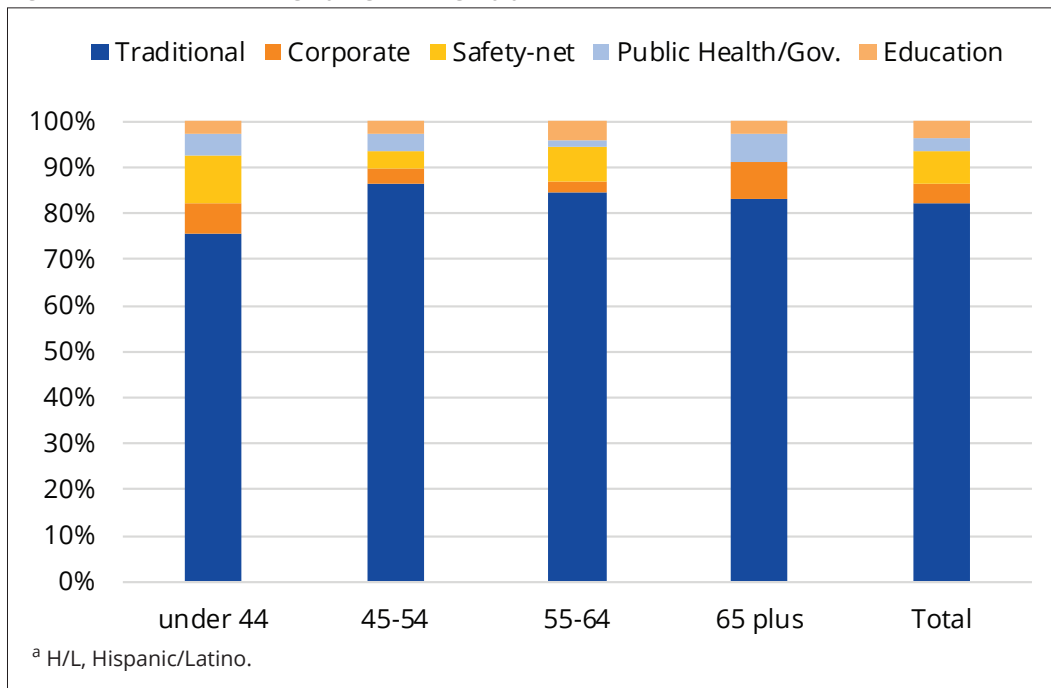
Figure 3. Professionally Active H/L Dentists in the US by Training Pathway and Age Cohort^a



Source: 2012 URM Dentist Survey.

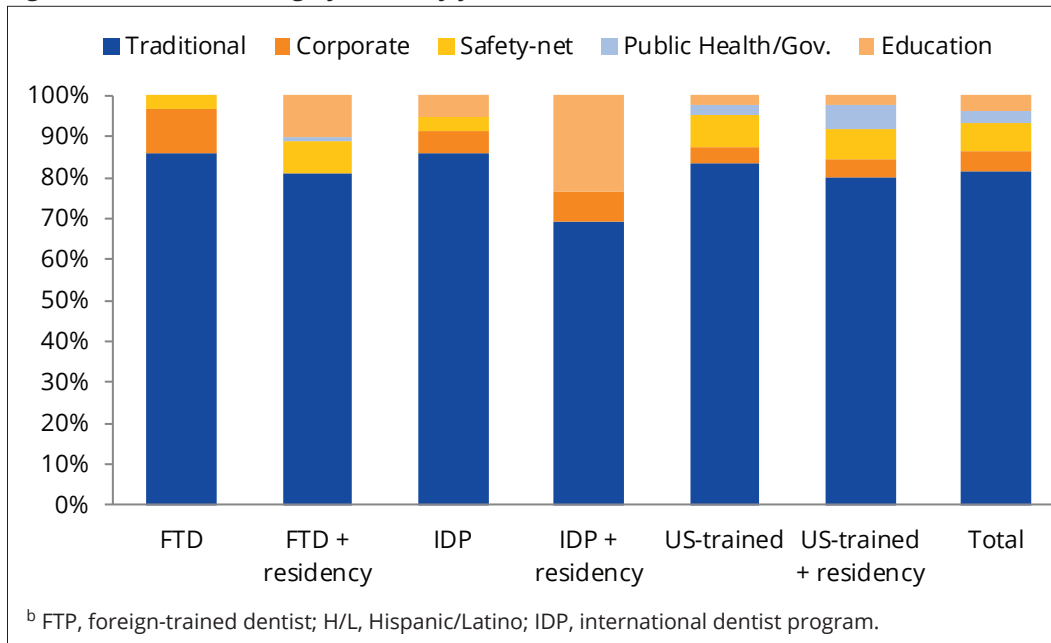
In addition to observing a change in the distribution of FTDs in IDP/AS programs versus exclusively US-trained dentists among the age cohorts, it was also found that the choice of practice type is changing. Younger H/L dentists are more likely to work in nontraditional settings such as safety net, public health, and corporate sectors (Figure 4). Moreover, variability in practice settings by educational pathway (Figure 5) was discovered, as well as an indication of a modifying effect of completing a dental residency (specialty and/or general practice) toward nontraditional practice settings.

Figure 4. Practice Setting by Age Category for H/L Dentists^a



Source: 2012 URM Dentist Survey.

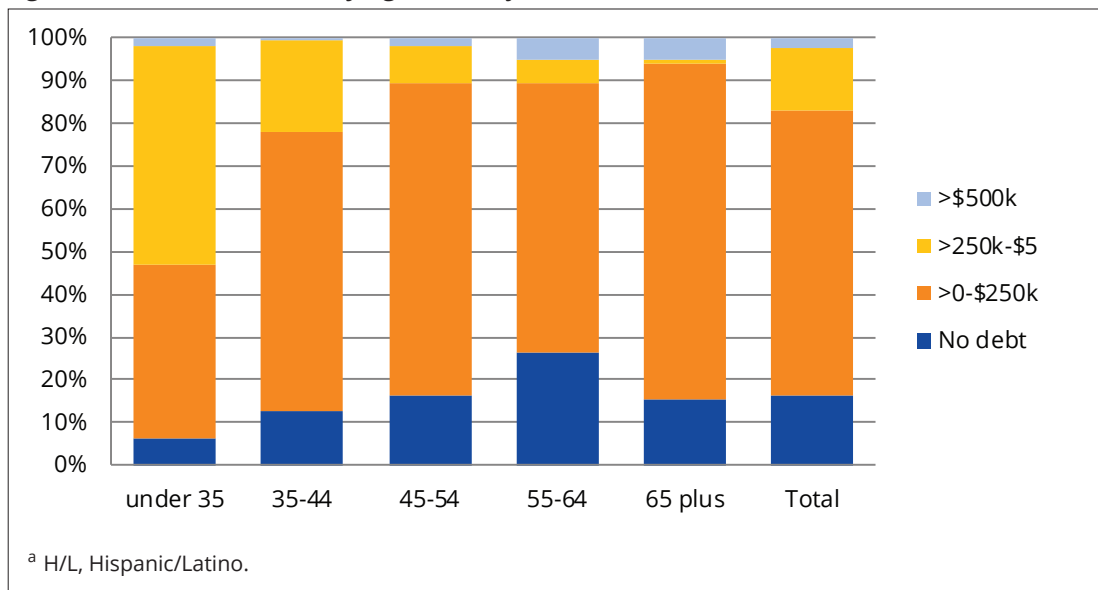
Figure 5. Practice Setting by Pathway for H/L Dentists^b



Source: 2012 URM Dentist Survey.

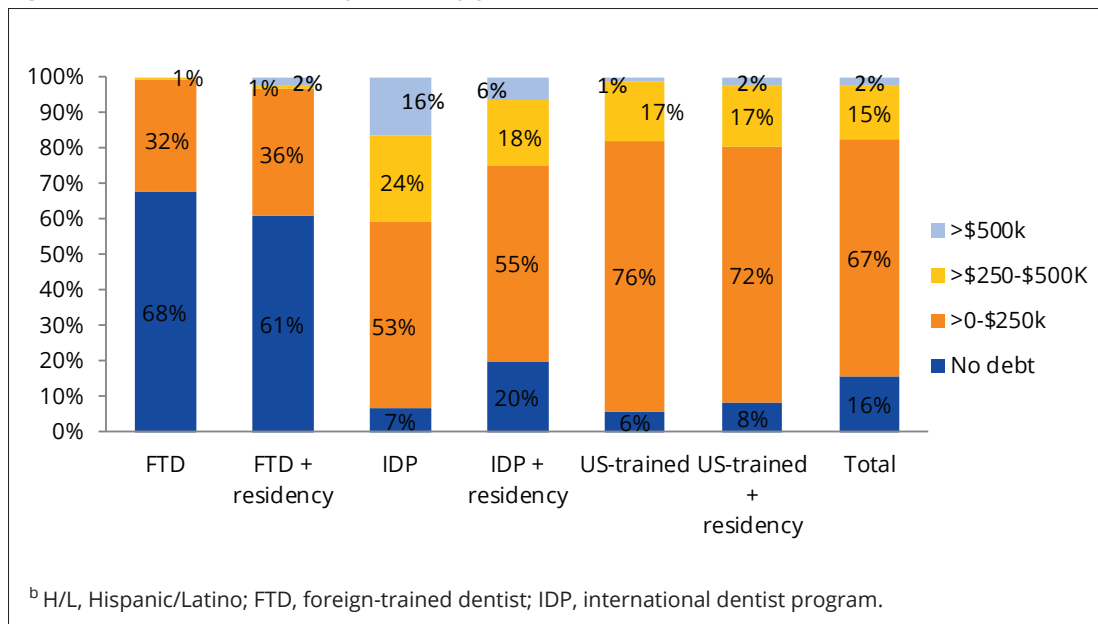
An additional factor of great interest in understanding practice patterns is changing debt levels both over time and between educational pathways. Figure 6 illustrates the massive growth in educational debt (adjusted for 2012 dollars) among younger cohorts of H/L dentists. Figure 7 shows the variability of this debt by educational pathway. Of note is the much greater proportion of IDP graduates with debt greater than \$250k compared with FTDs, who have almost no debt at that level.

Figure 6. Educational Debt by Age Cohort for H/L Dentists^a



Source: 2012 URM Dentist Survey.

Figure 7. Educational Debt by Pathway for H/L Dentists^b



Source: 2012 URM Dentist Survey.

In summary, the pipeline of H/L dentists is changing over time in relation to overall numbers, training pathway, and debt levels, and the practice patterns also vary over time and by pathway.

Treatment of Underserved Populations by Hispanic/Latino Dentists

Among the 190,797 professionally active dentists in the US, there are 5,342 clinical H/L dentists in practice (2.8%).¹¹ Most H/L clinicians are male (62.2%), and just under half (48.9%) were born in the US. Table 4 provides descriptive statistics for the clinical H/L dentist population.

Table 4. Clinical H/L Dentist Population Descriptive Characteristics (N=5,342)^a

Characteristics	N	Percentage of Clinical H/L Dentists in US
Sex		
Female	2,020	37.8%
Country of heritage		
Mexican	1,705	31.9%
Puerto Rican	720	13.5%
Cuban	681	12.8%
Other	2,236	41.9%
Born in US		
Yes	2,612	49.1%
Age category		
Under 35	450	8.6%
35-44	1,361	25.9%
45-54	2,074	39.4%
55-64	1,085	20.6%
65+	290	5.5%
Pathway to US practice		
US-trained	3,896	72.9%
Foreign-trained	861	16.1%
IDP	488	9.1%
Residency		
None	2,790	54.7%
GPR or AEGD	1,328	26.0%
Specialty	863	16.9%
Specialty and GPR and/or AEGD	120	2.0%
Spanish speaking in practice		
Yes	4,048	75.8%
Practice owner		
	3,695	72.7%
Employed in a nontraditional practice		
Yes	577	10.8%
Have a dependent child <18		
	2,722	51.4%
General practice dentist		
Yes	3,939	77.9%
First job in a safety-net setting		
Yes	993	19.5%
Educational debt category		
None	837	16.5%
\$0-\$250,000	3,329	65.5%
>\$250,000-\$500,000	786	15.5%
>\$500,000	128	2.5%
Role of income potential in first job choice (N=4926)		
Very important or important	3,888	78.9%
Moderately important	699	14.2%
Of little important or not important	339	6.9%
Role of opportunity to serve vulnerable pts in first job choice (N=4978)		
Very important or important	1,895	38.1%
Moderately important	1,505	30.2%
Of little important or not important	1,579	31.7%
Role of speaking a language other than English in first job choice (N=5017)		
Very important or important	1,582	31.5%
Moderately important	1,021	20.4%
Of little important or not important	2,413	48.1%

^a AEGD, Advanced Education in General Dentistry; GPR, General Practice Residency; H/L, Hispanic/Latino; IDP, international dentist program.

H/L dentists' treatment of minority and underserved communities was examined in 2 separate regressions (Table 5). First, a Poisson regression was performed with an ordinal dependent variable of the category of percentage of H/L patients on the dentists' patient panels. A higher incidence rate ratio (IRR) indicates a greater relative risk of treating an additional 10% of H/L patients compared with the control, or comparison, group. While the large majority of H/L dentists treat H/L patients (82.7%), the most important predictor of treating a higher percentage of H/L patients was completion of an IDP/AS program (IRR: 1.42; $P<.001$) compared with US-trained dentists (ie, those who attended a CODA school for their initial training). The regression indicates that FTDs (IRR: 1.07; $P=.21$) also treat more H/L patients than US-trained dentists, but this difference was not statistically significant. Other factors contributing to a higher percentage of H/L patients on the panel were living in a state with more coverage of dental care under Medicaid (IRR: 1.16; $P=.01$), being a general practice dentist (IRR: 1.14; $P=.02$), and speaking Spanish in clinical practice (IRR: 1.14; $P=.02$). Practicing in a county with a larger percentage of H/L residents also increased the likelihood of treating more H/L patients (IRR: 1.01; $P<.001$), although practicing in a county in which Spanish- and Creole-speaking patients are very proficient in English (IRR: 0.99; $P=.004$) slightly decreased the likelihood of having more H/L patients on the panel. Educational debt was tested in the model in several forms and found neither to be predictive nor to improve the model in any way; hence, it was omitted.

The second regression was performed with an ordinal dependent variable of the category of percentage of patients covered by public insurance on the dentists' patient panels. A higher IRR indicates a greater relative risk of treating an additional 10% of patients covered by public insurance compared with the control, or comparison, group. The 2 strongest predictors of H/L dentists having a higher percentage of patients covered by public insurance were being employed in a nontraditional practice setting (IRR: 1.60; $P=.002$) and living in a state with more coverage of dental care under Medicaid (IRR: 1.37; $P=.007$). In addition, both completion of an IDP/AS program (IRR: 1.33; $P=.09$) and being an FTD (IRR: 1.28; $P=.053$) were strong predictors of having more patients covered by public insurance, though these differences failed to reach statistical significance. Being in a county with a higher percentage of residents living below the poverty line was significantly associated with having more patients covered by public insurance, but the effect was small (IRR: 1.03; $P=.003$). Finally, being a practice owner was associated with having fewer patients covered by public insurance (IRR: 0.70; $P=.01$). As above, educational debt was tested in the model in several forms and found neither to be predictive nor to improve the model in any way; hence, it was omitted.

Table 5. Predictors of H/L Dentists' Contribution to Treatment of Minority and Underserved Communities^a

Independent Variables	Percent of H/L patients in practice (10% increment)		Percent of public insurance patients in practice (10% increment)	
	IRR	95% CI	IRR	95% CI
Age category (higher = older)	1.03	(0.984-1.069)	0.99	(0.894 - 1.103)
Gender (0 = Male, 1 = Female)	1	(0.912 - 1.090)	1.07	(0.859 - 1.341)
Spanish speaking in practice (1 = yes)	1.14**	(1.027 - 1.273)	-	-
IDP/AS completed (1 = yes)	1.41***	(1.182 - 1.674)	1.33*	(0.955 - 1.849)
Foreign-trained only (1 = yes)	1.07	(0.962 - 1.188)	1.28*	(0.996 - 1.635)
General practice dentist (1 = yes)	1.14**	(1.022 - 1.277)	-	-
Practice owner (1=yes)	1.04	(0.939 - 1.150)	0.70**	(0.528 - 0.921)
Medicaid context (0 = none; 1 = 1-4; 2 = 5+ dental services)	1.16**	(1.034 - 1.304)	1.37***	(1.090 - 1.721)
Employed in non-traditional practice (1=yes)	-	-	1.60***	(1.185 - 2.167)
% Spanish/Creole who are very proficient in English in county	0.99**	(0.987 - 0.998)	-	-
% H/L in county	1.01***	(1.012 - 1.015)	-	-
% in county under poverty line	-	-	1.03***	(1.009 - 1.045)
% in county covered by Medicaid	-	-	1.01	(0.941 - 1.079)
	Un/Weighted Obs= 539/4,416 F (10, 529) = 41.15 Prob > F = 0.0000		Un/Weighted Obs= 432/3,599 F (9, 423) = 10.66 Prob > F = 0.0000	

^a CI, confidence interval; H/L, Hispanic/Latino; IDP/AS, international dentist program/advanced standing; IRR, incidence rate ratio.

Prediction of Employment in a Safety Net Setting

The second Poisson model highlighted the importance of working in nontraditional settings as a predictor of treating underserved patients. Therefore, we sought to further explore the factors associated with an H/L dentist choosing to work in a nontraditional setting. A logistic regression was performed on a binary dependent variable coded 1 for dentists working in a nontraditional setting. The most striking result was the size and significance of having had a first job as a dentist in a nontraditional setting (odds ratio [OR]: 17.18; $P < .001$). Practicing in a state with favorable Medicaid dental policies also was positively (OR: 1.81; $P = .10$) related to practicing in a nontraditional setting; however, all of the other independent variables decreased the odds of working in a nontraditional setting. These included being older (OR: 0.47; $P < .001$), having dependent children under 18 years of age (OR: 0.42; $P = .02$), being a general practice dentist (OR: 0.40; $P = .01$), and having graduated with more educational debt (OR: 0.89; $P = .06$). The independent variables for educational pathway (having completed an IDP/AS program or being an FTD) were tested in the regression but did not perform well and were omitted from the final model.

Given the apparent importance of first working in a nontraditional setting to the retention of dentists in these settings, we set out to identify predictors of an H/L dentist taking his or her first job in a nontraditional setting. A logistic regression was run with a binary dependent variable coded 1 if the dentist reported his or her first job was in a nontraditional setting. This regression included variables not explored in our previous regressions (which were focused on current practice), as these questions assess the influence of push/pull factors on initial practice choice only. These included the dentists' self-reported degree of importance placed on income potential, desire to treat underserved populations, and desire to speak a language other than English in clinical practice when selecting their first job. These questions were asked on a Likert scale ranging from 1 to 5, with 1 being of little or no importance and 5 being important or very important. We were unable to include the Medicaid context variable because we did not know the state in which the dentists' first job was located.

The most important predictor of taking an initial job in a nontraditional setting was having completed a residency (OR: 1.85; $P = .02$). All of the variables measuring the dentists' underlying motivations were significant, with a desire to treat underserved populations as the strongest predictor among the 3 included (OR: 1.63; $P < .001$). Dentists who placed greater importance on income potential (OR: 0.50; $P < .001$) or on speaking a language other than English with their patients (OR: 0.60; $P < .001$) were less likely to have had a first job in a safety net setting.

Table 6. Predictors of H/L Dentists' Current and Initial Work Setting^a

Independent Variables	Current work in non-traditional setting		First job in non-traditional setting	
	OR	95% CI	OR	95% CI
Age category (higher = older)	0.47***	(0.334 -0.670)	0.91	(0.683-1.209)
Gender (0 = male, 1 = female)	1.17	(0.559-2.453)	1.24	(0.739-2.093)
Dependent child <18 (1 = yes)	0.42**	(0.207-0.871)	-	-
Completed a residency (1 = yes)	-	-	1.85**	(1.097-3.125)
IDP/AS completed (1 = yes)	-	-	-	-
Foreign-trained only (1 = yes)	-	-	-	-
General practice dentist (1 = yes)	0.40**	(0.199-0.793)	-	-
First job in non-traditional setting (1 = yes)	17.18***	(8.490-34.763)	-	-
Educational debt (increments of \$50k)	0.89*	(0.795-1.006)	-	-
Medicaid context (0 = none; 2 = 5+ dental services)	1.81*	(0.102-1.960)	-	-
Factors important to first job choice (self-reported; Likert scale 1 = low, 5 = high)				
Income potential	-	-	0.50***	(0.373-0.665)
Desire to treat underserved populations	-	-	1.63***	(1.267-2.105)
Speaking another language in clinical practice	-	-	0.60***	(0.482-0.746)
	Un/Weighted Obs= 564/4,655 F (7, 557) = 12.88 Prob > F = 0.0000		Un/Weighted Obs= 547/4,568 F (6, 541) = 9.93 Prob > F = 0.0000	

^a CI, confidence interval; H/L, Hispanic/Latino; IDP/AS, international dentist program/advanced standing; OR, odds ratio.

In summary, our statistical analysis indicates that among the key factors predicting both H/L dentists' volume of H/L patients and of patients covered by public insurance, being initially foreign trained (both those who complete IDP/AS programs and those who are foreign trained only) is particularly significant, along with being in a state with more dental Medicaid benefits for adults. Working in a nontraditional setting was an important factor in predicting the volume of publicly insured patients. Among H/L dentists, a key predictor of having a nontraditional *current* work setting was having their *initial* practice in a nontraditional setting, and a key predictor of having a nontraditional *initial* work setting was participation in a dental residency program.

STUDY LIMITATIONS

This study has several limitations. The sample size for the key informant policy experts and IDP/AS program administrators was small. As a result, we may be unaware of some IDP/AS programs and some educational and licensing pathways that are targeted more specifically to H/L dentists. In addition, our quantitative statistical analyses were based on the weighted sample of respondents rather than on a census of all H/L providers. The analyses were conducted using some survey responses that depended on providers' recollection of information dating back a number of years in some cases, and therefore may be subject to recall bias. A complete discussion of the survey methodology, response rate, weighting, and adjustment for bias, as well as limitations, has been previously published for our survey of URM dentists.¹⁴

DISCUSSION

Hispanics and Latinos constitute the fastest-growing population in the US, accounting for more than half of the total population growth in America from 2000 to 2010.²⁹ H/L people, while not homogenous in socioeconomic status, currently comprise the largest racial or ethnic minority group in the US, and 60% of this population is part of the millennial generation or younger.³⁰⁻³² Our previous research found that the domestic production of H/L dentists has been unable to keep pace with the H/L population of the US, and that more than one-quarter of all H/L dentists are foreign trained.³ This study further elucidates details on the changing educational and licensure pathways for H/L dentists who are foreign trained and finds that the inflow of H/L dentists is changing in composition between dentists who are foreign trained only and those who complete IDP/AS programs. Unfortunately, much of the data we need to truly assess the size, scope, and origins of the pipeline are not available. ADEA does not distinguish between IDP/AS program and traditional dental school graduates in its data collection, and to our knowledge there is no central tracking of applicants to IDP/AS programs based on race or ethnicity, country of origin, or initial training institution. This leaves us looking to retrospective data in order to make inferences about the future, instead of monitoring the pipeline in real time. Any conclusion about the status of the H/L dentist pipeline must be limited, but the data clearly indicate that consumers lack access to sufficient numbers of H/L and Spanish-speaking dentists in the current health care context.

FTDs have several options available for practice in the US and may choose their country of initial education, their state of initial licensure, and their educational pathway in the US based on their own interests and needs. Completion of an IDP/AS program, completion of a postdoctoral specialty or postgraduate residency, and teaching in a CODA-accredited dental school are all common pathways to dental licensure. Dentists who choose to complete additional education in the US are able to move around the country with their license under state reciprocity agreements. Dentists who prefer to locate in a specific state or area of the country may choose a pathway offering a restricted license. States are continually seeking to balance the needs of dentists for flexible and reasonable licensure requirements against the needs of consumers for access to consistent, high-quality dental care. This study finds progress toward more uniform licensing requirements that ensure equivalent competency of FTDs to US graduates, despite the complexity and variation of requirements across states. This study also finds troubling new barriers for recent FTDs given the high cost of IDP/AS education, which is fast becoming the standard entry pathway. Finally, we found no clear strategy among IDP/AS programs to recruit H/L dentists, and only one program in California that accredits a dental school in Mexico with the explicit strategy of enhancing the H/L dentist workforce for California's population.

The extremely high cost of IDP/AS programs does not seem to have reduced demand for these programs. In fact, the number of slots and enrollment in these programs have grown drastically over the past 40 years. However, the cost may have other implications, including a possible shift in the economic status of the FTD population to only those who can afford an IDP/AS program and a possible shift in FTDs' practice setting choices. Theoretically, the higher cost and debt burden associated with IDP/AS programs could push graduates of these programs to private practice, where income is typically higher than in nontraditional settings. In fact, the regressions we performed indicate that IDP/AS completion is positively associated with treating more H/L patients and more patients covered by public insurance; however, this variable did not perform in the regression predicting work in a nontraditional setting. There, we found that more debt was negatively associated with current work in a nontraditional setting. As we have seen in prior work, there is a strong commitment within the H/L dentist workforce to serve underserved populations, and this study provides further information on variables that impact that overall service commitment.

CONCLUSIONS

This study shows that there is a confluence of policy issues impacting the pipeline of H/L dentists in the US, which may affect future supply and practice patterns. The domestic production of H/L dentists has increased but still lags behind population parity, even with the foreign-trained providers who currently make up 25% of the H/L dentist workforce. FTDs face evolving educational and licensure pathways to practice, along with considerable cost in navigating these pathways. Yet foreign-trained H/L dentists serve higher percentages of H/L and publicly insured patients than do their US-trained counterparts, despite not being more likely to work in nontraditional settings, where residency training and personal motivation seem to have more of an impact across the H/L dentist workforce. With no clear strategy for increasing the H/L dentist pipeline, the current system is likely to continue under producing culturally competent providers needed to serve the significant and growing H/L population in the US.

Policy Implications

The H/L dentist workforce is a critical component of our dental delivery system and is shown to contribute to improved access for H/L populations and underserved populations. Whether foreign or domestic, no clear policies are in place to address the shortage of H/L dentists, nor to monitor the pipeline effectively. Dental education needs to do more to encourage H/L youth to pursue dentistry as part of its evolving focus on workforce diversity.

A strong domestic production should be paramount for US policy, as the US should not rely on other countries to provide well-educated, qualified dentists as a substitute for investing in our own H/L youth. At the same time, foreign-trained H/L dentists clearly contribute both to overall dentist workforce diversity and to improved access for H/L and underserved patients. These immigrants should be able to come to the US and apply their skills and education in their field of training. The educational and regulatory environments in the US have moved toward a system that rigorously ensures standardized qualifications, and the debt burden has not decreased demand for IDP/AS enrollment. However, this essentially creates an import tax on FTDs that has ethical implications, particularly given H/L FTDs' propensity to serve historically underserved populations at even higher rates than their domestic H/L peers.

The current emphasis on workforce diversity in dentistry rests in part on the assumption that minority providers will disproportionately serve underserved communities out of personal motivation, yet the system does not support or reward them for this work except through loan repayment programs. In contrast to medicine, there is no visa mechanism in our immigration policy that allows FTDs employed as dentists in underserved areas to seek citizenship. With more than 4,500 Dental Health Professional

Shortage Areas and a growing pipeline of FTDs, such a mechanism could help direct workforce supply where it is needed most.

A final finding from this work is the importance of residency training in the pipeline for H/L dentists in relation to working in nontraditional settings. Training models in US dental schools that focus on residency training in locations with underserved populations may produce a larger cohort of providers willing to work in these settings in which vulnerable patients are treated. This pathway needs further research to assess which types of residency training programs have the greatest effect and whether this effect extends beyond the H/L dentist experiences described in this study.

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