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Slipping through the Cracks: Just How Underrepresented are Minorities within the Dental Specialties?

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Slipping through the Cracks: Just How Underrepresented are Minorities within the Dental Specialties?

by

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Slipping through the Cracks: Just How Underrepresented are Minorities within the Dental Specialties?

Tera A. Poole

ABSTRACT

INTRODUCTION: Minority populations within the US have been growing more rapidly than in the dentist population leading to the underrepresentation of African American, Hispanic and American Indian/Alaska Native dentists. This lack of diversity in the dental workforce has been linked to disproportionately inadequate delivery of dental care to minority populations in the United States. Furthermore, the current diversity-focused efforts in place primarily focus on understanding and enhancing underrepresented minority (URM) recruitment and retention within dental school. While these programs are critical, little effort has been made to track URM providers through education and practice; leaving a major gap in our knowledge of the extent to which the documented disparities worsen beyond professional school and into residencies and specialization. The purpose of this study is to assess the status of workforce diversity in the dental specialties and to understand the pipeline of URM dental specialists. Understanding the current state and pathways of URM dental specialists will inform pipeline efforts and policies to address access to specialty care.

METHODS: Our study used mixed methods to identify and assess the status of workforce diversity in the dental specialties and to understand the pipeline of URM specialist dentists. The approach includes a literature review, quantitative analysis of practice patterns, and qualitative interviews.

RESULTS: This study elucidates the challenges that URMs face in their pursuit of specialization within the dental profession. The pipeline continues to winnow with fewer URM dentists in specialty practice, indicating a small and leaky pipeline. Further, among all URM

clinical dentists being first in his/her family to obtain a college degree, having a strong desire to work in his/her own cultural community or joining the NHSC due to debt load independently predicted lower odds of specialization. Alternatively, being initially foreign trained as a dentist and valuing professional training were independently predictive of higher odds of specialization. The geographic distribution of specialist dentists by race mirrors trends seen on previously published race/ethnicity dentist population maps, with African American specialist more densely populated in the South Central and Southern Atlantic regions (53.9%) and H/L specialists more populated in the Mountain, Pacific and some of the Southern Atlantic regions (58.9%). Qualitative findings reveal further details about the challenges URM dentists face along the pipeline including personal attributes (i.e first generation and rural upbringing), inadequate institutional resources (i.e. diversity within the institution and debt repayment options for specialists) and lack of access to mentoring and support.

CONCLUSION: The pipeline that prepares students for careers in health professions continues to leak, and despite individual program successes, cumulative impacts are not enough to improve the disparity that exist. This study shows despite efforts aimed to improve the pipeline of URM students into dental school, there is still a significant disparity that exist as URM dentists continue on to specialize. Further, this disparity has not changed much over time and our quantitative results show continued exacerbation of this gap. The lack of diversity within the dental specialties continues to be a critical factor in our educational system and unless, clear actions centered around this topic are initiated improving the pipeline into residency programs for URM students from beginning to end will continue to be unsuccessful.

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INTRODUCTION

Underrepresentation of African Americans (AA), Hispanic/Latinos (H/L), and American Indian/Alaska Natives (AI/AN) in the United States (US) health professions has been a source of concern for decades. As early as 1899, scholars noted the lack of diversity as being problematic. Specifically, W.E.B. DuBois, in his book entitled *The Philadelphia Negro*, was the first-ever to examine the health of the non-white community. Furthermore, The Heckler Report published in 1980s was the first documented comprehensive study of the health status of minorities and became landmark in our understanding of the extent to which racial and ethnic minorities experience significant health disparities.[1] Amongst the various health professions, data from 1990-2000 shows dentistry is an outlier in diversity from other health professions such as nursing, medicine, veterinary, pharmacy and public health. While those profession increased diversity, dentistry decreased in the proportion of underrepresented minority (URM) matriculants over the entire decade.[2]

In 2001, Robert Wood Johnson Foundation (RWJF) Pipeline to Professions program launched a decade long effort to increase the diversity of dental students, with a focus on enhancing matriculation of URMs and building cultural competence for all dental students.[3] A follow up study examining the impact of the Pipeline to Professions program showed that on average, the participating dental schools were successful in meeting program goals with enrollment of URM students increasing 54.4% (excluding three of the schools, given they traditionally have high percentages of URM enrollment) versus 16% in non–dental Pipeline schools.[4] However, because the baseline numbers were so small, the overall impact on URM enrollment nationally was unremarkable. In 2004, even though URMs comprised 32.9% of the U.S. population, the ADEA found URMs still only comprised 12.4% of dental school applicants

and 11.6% of first-year enrollees. Asian/Pacific Islanders and Whites comprised 69.7% of applicants and 71.1% of first-year enrollees.[5]

The representative proportions of these URM groups within the US population has been growing rapidly, creating an extensive gap in parity between URM dentists and their representation of the general US population. In 2003-04, the total African American enrollment at all U.S. dental schools was 5.41%, while 12.8% of the U.S. population was black.[6] Mertz et al., (2016), found that to bring the proportion of underrepresented minority dentists into parity with their proportion of the US population would require an additional 19,714 African American dentists, 31,214 Hispanic/ Latino dentists, 2,825 American Indian/Alaska Native dentists. Mertz et al. noted that to achieve this would entail all dental school graduates being only URM for a decade.[7]

This lack of diversity in the dental workforce has been linked to disproportionately inadequate delivery of dental care to minority populations in the United States. [8] ADEA's long-held position is that without minority practitioners, access to care will be limited or absent in minority communities throughout the nation. In 2006, Sinkford et al. summarized the American Dental Education Association's stance on diversity in dentistry and its specialties. In their article, American Dental Education Association policies included directives for dental education institutions to: 1) support and enhance diversity of both faculty and students or practitioners in dental education, 2) use public needs as the benchmark for determining the types of diversity required in dental education, and 3) continually evaluate both the diversity needs of the public and the ability of dentists to meet those needs. Yet, despite implementing attempts to alleviate the shortages with such as programs as the *Ventures Scholars Program, Summer Medical and*

Dental Education Program (SMDEP), efforts to improve racial/ethnic workforce diversity are falling short, and the gap in parity continues to grow.[9,10]

The diversity-focused efforts in place primarily focus on understanding and enhancing URM recruitment and retention within dental school. While these programs are critical, little effort has been made to track URM providers through education and practice; leaving a major gap in our knowledge of the extent to which the documented disparities worsen beyond professional school and into residencies and specialization. The few studies that exist to track URMs are mainly within the medical field. Studies published in 2004 and 2013, examining medical academia, both stated that URMs report barriers to communication and a lack of role models, in addition to feelings of discrimination, isolation, and racism. These studies concluded that the culmination of URM experiences combined to negatively affect recruitment, retention, and thereby diversity.[11,12] These findings coincide with research from Criddle et al, who evaluated factors affecting African Americans in Oral and Maxillofacial Surgery (OMFS) and found 25% to 46% of participants experienced race-related harassment, and 48% to 55% of participants believed there was a bias against African Americans in OMFS.[13] Based on the ADA 2007-2008 Survey of Advanced Dental Education, the demographics of all the residents enrolled in the 102 Oral and Maxillofacial Surgery residency programs were as follows: whites 701 (70.7%), blacks 43 (4.3%), Hispanics 42 (4.2%), Asians 197 (19.9%), and unknown 8 (0.8%). There are currently no residents of American Indian/ Alaska Native origin.[14] The remaining specialties have yet to be examined, although based on the low enrollment of URM students in the pre-doc programs, the same disparities may exist.

The purpose of this study is to assess the status of workforce diversity in the dental specialties and to understand the pipeline of URM dental specialists. Understanding the current

state and pathways of URM dental specialists will inform pipeline efforts and policies to address access to specialty care.

METHODS

Our study used mixed methods (***Figure 1***) to identify and assess the status of workforce diversity in the dental specialties and to understand the pipeline of underrepresented minority specialist dentists (URMs). The approach includes a literature review, quantitative analysis of practice patterns, and qualitative interviews, each of which is described in **figure 1**. The study was approved by University of California, San Francisco's Institutional Review Board as study #17-22552

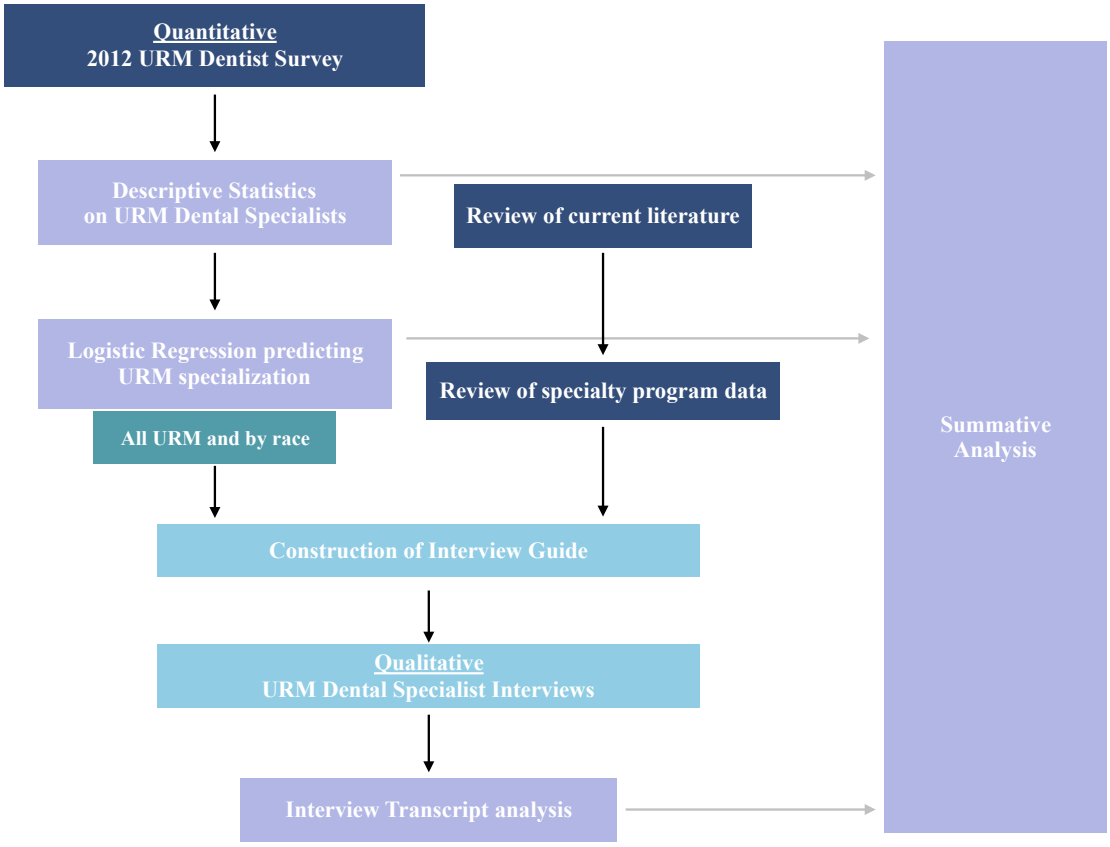

Figure 1. Mixed methods approach

Data Sources

There are several sources of data used in this study. First, we explored if data were collected by the nine dental specialty organizations (e.g. American Association of Orthodontics, American Academy of Pediatric Dentistry) through professional organization websites and via contacting representatives of the professional association. However, either no or minimal data on race or ethnicity are tracked by the specialty professional dental associations about their workforce, and hence unavailable for this study. Second, we downloaded publicly available data from American Dental Association (ADA), Health Policy Institute analysis of the ADA masterfile datasets from 2001 through 2018, which contain the most up-to-date information on dentists in the United States.[15] Finally, we used a 2012 national sample survey of Hispanic/Latino (H/L), Black, or American Indian/Alaska Native (AI/AN) dentists in the US. The sample was selected from the ADA Masterfile (12,983 dentists) based on geographic location of the dentists and identification in the Masterfile as a member of an underrepresented minority group. Removal of ineligible individuals yielded an adjusted universe of 11,382, an adjusted sample of 4,389, and 1,489 unique responses – 289 (19 percent) online and 1,200 (81 percent) hard copy – for a final 34 percent response rate. These responses were weighted to be nationally representative, yielding a population of 12,481 URM dentists. The full survey methodology, including details on the response rate and evaluation of the response quality, has been previously published.[16] This analysis included only URM respondents who were practicing clinical dentistry and for whom we could determine specialty or general practice status (weighted n = 11,137).

Statistical Analysis

The primary outcome variable of generalist versus specialist status was created as dichotomous variable based on two questions 1) whether the dentist completed a dental specialty residency

and 2) current type of practice (including all officially recognized specialties by the ADA). Respondents who did not complete a specialty residency, regardless of indication of main practice type, were coded as general practice. The goal of this study is to examine factors that specifically lead to advanced specialty training, so clear evidence of advanced training was a critical indicator. Individuals who indicated they completed specialty training but did not indicate current practice in a specialty field, were coded a specialists, and included in an "other/unknown" category. Descriptive and multivariate statistical analyses were performed to describe the demographic composition of URM clinical general and specialist dentists and analyze changes in proportions of URMs specializing among age cohorts (proxy for trends over time), differences in specific type of specialization (e.g. pediatrics vs orthodontics), and racial concordance between specialists and their patients.

In order to determine what specific characteristics are predictive of URM specialization we used an iterative process to reach a final set of models; one for all URM clinicians, and then one each for African-American and Hispanic dentists separately. We were unable to independently model factors for AI/AN dentists due to small sample size. The independent variables selected from data in the final models to predict specialization were restricted to factors that could theoretically influence specialization (see **Table 1** for full list). Personal characteristics included whether the dentist was the first in their family to graduate from college, whether they grew up in a rural community, as well as whether the dentist was US-born and/or US-trained (vs. foreign trained for initial dental degree) since there are differences in potential pathways to becoming a dental specialist in these instances. Standard control variables of age and sex were included. Personal values were measured by questions using a 5 item Likert scale that asked about the importance of *professional training and advancement* and *service to own*

cultural community in their choice of initial practice location/type. Dental school factors included whether the dental school attended was a Historically Black College or University (HBCU), as well as a cumulative measure of personal experiences with racial discrimination as a dental student, and if they chose to pursue National Health Service Corps (NHSC) loan repayment due to educational debt. To estimate the strength of these associations with presence or absence of specialization, we estimated ordinary logistic regression models. The regression coefficients were exponentiated to obtain Odds Ratios (OR). Values of OR greater than one indicate higher odds to observe the outcome (being a specialist) when the explanatory variable increases by one unit, when all other variables are held constant. Alternatively, values below one indicate lower odds of association of the explanatory variable with specialization. P- values of 0.05 or lower were deemed as statistically significant. All analyses were weighted to adjust for survey design using a commercially available software package - STATA 14™ with 'svy' extension. The models were tested for goodness of fit using two separate tests[17–19], and in both of them a null hypothesis of fit was retained when $P>0.05$.

Qualitative Data

To further understand the predictive factors identified we conducted qualitative interviews with URM specialists. First, we examined qualitative comments from the 2012 URM survey, including specific comments about clinical practice and overall general comments, to identify any key themes from the original survey. An interview guide was then developed to explore the factors gleaned from the survey analysis. The questionnaire explored potential common tension points, key insights and lingering questions regarding barriers and facilitators to URMs entering dental specialties. Participants from the 2012 URM dental workforce survey who denoted they

would be open to being contacted for follow up projects and current members of specialty dental professional associations were contacted via email for their willingness to be interviewed. Ten one hour long interviews were conducted and transcribed. URM interviewees included 8 females, 2 males, across 5 specialty areas and ranging from current residents to senior practitioners.

Qualitative Analyses

The qualitative data gathered were coded for themes regarding facilitators, barriers and tension points that URM dentists reported in their own journey to becoming a specialist as well as observations about their URM and non-URM peers. Key themes were then compiled and summarized.

RESULTS

Characteristics of the URM dentist workforce

According to ADA data in 2015, among the total dental workforce 9.3% were URM, while among the specialist dental workforce only 8.3% were URM. In 2015, 18.8% of URM dental workforce entered specialty programs in contrast to 21.3% of the total dental workforce. Since URM dentists are already underrepresented in the overall dentist workforce[20] and these data indicate URM dentists are proportionately less likely to specialize, the underrepresentation of URM dentists in specialties is exacerbated.

Descriptive statistics on URM specialist and generalist were generated from the 2012 URM survey (**Table 1**).

Table 1. Characteristics of URM survey respondents by general and specialty status, 2012
Source: Authors analysis of 2012 URM Sample Survey

	URM Practice Type								
	Generalist			Specialist			Overall		
		%	N		%	N		%	N
N=	9095			2042			11137		
Mean Age	49.3			48.8			49.2		
Gender Male		59.8			60.3			59.9	
Female		40.2			39.7			40.1	
#Total wtd. cases			9095			2042			11137
Race/ Ethnicity									
American Indian/Alaskan Native		3.2			2.3			3.1	
African American		51.1			46.4			50.3	
Hispanic/ Latino		45.6			51.3			46.7	
#Total wtd. cases			9095			2042			11137
Community Raised									
Urban		71.5			77.5			72.6	
Rural		28.5			22.5			27.4	
#Total wtd. cases			8968			2020			10988
First person in immediate family to graduate college									
No		60.8			76.1			63.6	
Yes		39.2			23.9			36.4	
#Total wtd. cases			9064			2038			11102
Primary Practice Area									
General Practice		100.0	8734.2					81.7	9095.1
Pediatric dentistry					23.9	488.7		4.4	488.7
Oral and maxillofacial surgery					14.0	286.4		2.6	286.4
Orthodontics and endofacial orthopedics					11.8	240.8		2.2	240.8
Periodontics					11.3	231.3		2.1	231.3
Endodontics					9.3	189.0		1.7	189.0
Prosthodontics					8.1	164.7		1.5	164.7
Oral and maxillofacial pathology					0.6	11.3		0.1	11.3
Public health dentistry					0.5	10.6		0.1	10.6
Oral and maxillofacial radiology					0.1	2.1		0.0	2.1
Not working in specialist area					20.4	417.1		3.7	417.1
#Total wtd. cases			9095			2042			11137
Ever Foreign Trained									
No		89.6			75.8			87.0	
Yes		10.4			24.2			13.0	
#Total wtd. cases			9033			2037			11070
Initial practice considerations									
Income potential		73.6			70.9			73.1	
Family considerations		70.2			74.1			70.9	
Geographic location		70.6			72.6			71.0	
Professional training or advancement in my practice		53.7			62.0			55.2	
Educational debt		57.1			43.6			54.6	
Working with underserved populations		36.8			34.6			36.4	
Desire to work in my own cultural community		38.8			25.7			36.4	
#Total wtd. cases			8746			1932			10678
What impact did debt have on your practice choices?									
Did not impact my practice options		45.8			57.1			47.9	
I could not afford to start my own practice		22.3			19.6			21.8	
I could not afford to purchase a practice		17.1			17.8			17.2	
I joined the Federal Dental Services or Armed		7.5			7.9			7.5	
I could not practice in the location I wanted to		7.3			7.4			7.3	
I joined the National Health Service Corps or Indian Health Service		6.0			0.6			5.0	
Other reasons		5.5			5.3			5.5	
#Total wtd. cases			8964			2032			10997
Dental School Type									
All Public		52.9			48.8			52.2	
All Private (HBCU + Non HBCU)		22.4			18.6			21.8	
HBCU Only		24.7			32.6			26.0	
#Total wtd. cases			8091			1544			9635
Frequency of disctimination (0-4, means)									
In dental school			1.5			1.3			1.4
In dental employment			0.8			0.9			0.8
In the patient-provider relationship			1.7			1.7			1.7
In interactions with medical/dental colleagues			1.2			1.2			1.2

Among URM specialists almost a fourth are pediatric dentists, while public health specialists and prosthodontists represent a tenth of the URM specialists subgroup combined. Among factors reported as important in determining the initial practice plans, family considerations was listed as the top reason, however the biggest difference between generalist and specialists is in the in the professional training and advancement opportunities. Lastly, individuals that were initially foreign trained or attended a private dental school are more represented within the specialty subset.

Specialization over age cohorts

As a proxy for longitudinal trends in specialization, we examined the rate of specialization by age cohort (**Fig. 2**). While the raw number of URM dentists has increased (represented by the lines) both in general and specialist categories, the overall rate of specialization of URMs varies by cohort surveyed, and is proportionately less in the <44 cohorts than in the 65+ cohort.

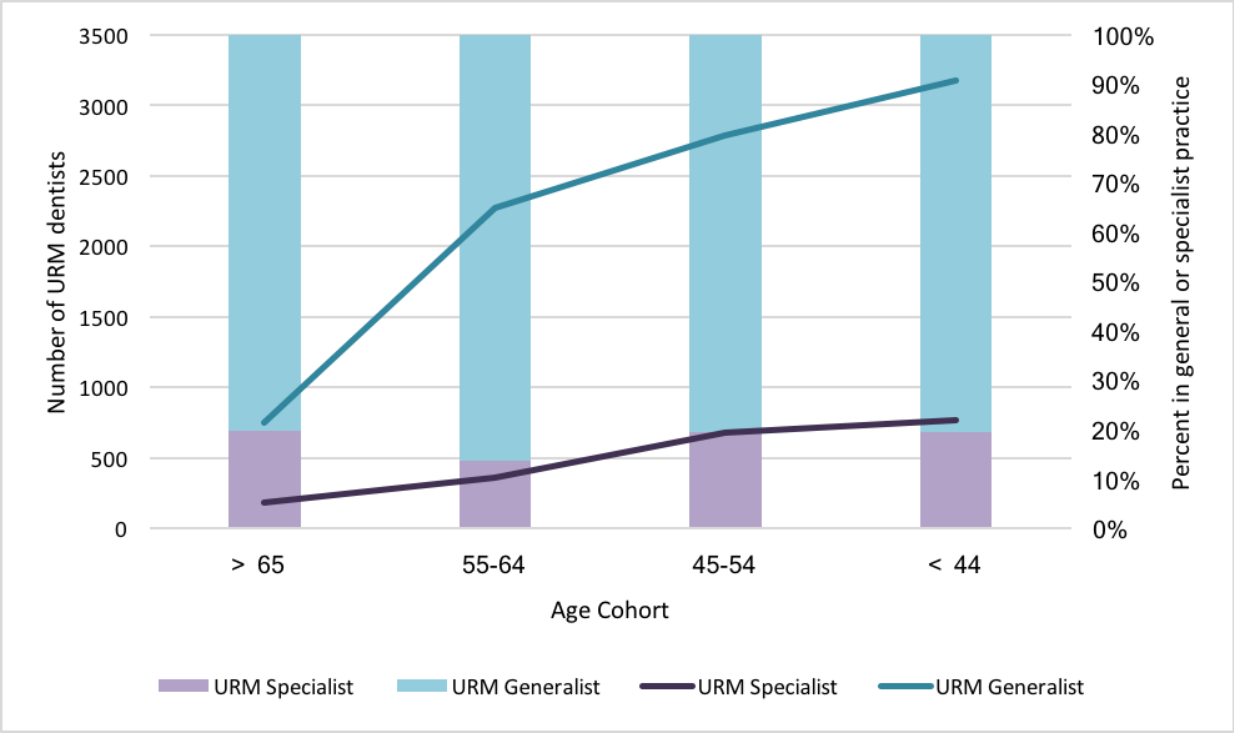

Figure 2: URM Specialization by Age Cohort

Factors associated with URM Dentists' Specialization

Among URM dentists a number of factors were statistically significant in predicting dental specialization when controlling for the other factors in the model (**Table 2**). Among all URM clinical dentists being first in his/her family to obtain a college degree (OR = 0.50), having a strong desire to work in his/her own cultural community (OR= 0.49) or joining the NHSC due to debt load (OR = 0.11) were all significantly associated with lower odds of specialization. Alternatively, being initially foreign trained as a dentist (OR = 3.21) or valuing professional training and advancement (OR = 1.19) were significantly associated with higher odds of specialization, although the latter was not statistically significant at the 5% significance threshold. Other factors that were tested but were not significantly associated with the odds of specialization (**Table 2**) were race, income, level of debt, and interest in self-employment. Being

that URM racial/ethnic subgroups are quite different, we modeled African American and Hispanic/Latino dentists separately. The small sample size did not permit modeling American Indian/Native American dentists separately, although they are included in the all URM model.

Among African American clinical dentists, being female (OR = 0.75), growing up in a rural community (OR = 0.39), being first in his/her family to obtain a college degree (OR = 0.43), having a strong desire to work in his/her own cultural community (OR= 0.49), joining the NHSC due to debt load (OR = 0.11) or having more discriminatory experiences in dental school (OR = 0.80) were associated with lower odds of specialization. Attending an HBCU exerted a positive yet insignificant effect on specialization, but improved model fit (R^2). Among the African American dentists, very few were foreign trained therefore that variable was not included in this model.

Among H/L clinical dentists, approximately 25% are foreign trained for their initial dental degree. This factor is the strongest positive predictor of specialization for this group (OR = 3.64) along with valuing professional advancement and training (OR=1.22) controlling for other factors in the model. In contrast to African American dentists, the number of discriminatory events in dental school is significantly associated with greater odds of specialization within H/L (OR = 1.22). Similar to African-Americans, within in the H/L group, being first in his/her family to obtain a college degree (OR = 0.52) having a strong desire to work in his/her own cultural community (OR= 0.40) or joining the NHSC due to educational debt (OR = 0.11) was significantly associated with lower odds of specialization.

Table 2: Logistic Regressions Predicting Specialization among URM Dentists

	All URM Clinical Dentists			African-American Dentists Only			Hispanic Dentists Only		
	Odds Ratios	*95% CI*	*p*	*Odds Ratios*	*95% CI*	*p*	*Odds Ratios*	*95% CI*	*p*
Intercept	0.31	0.23 – 0.41	**<0.001**	0.74	0.49-1.11	0.142	0.32	0.20-0.5	**<0.001**
Age	1.00	0.99 – 1.00	0.587	1	0.99 – 1.00	0.179	0.99	0.98 – 1.00	0.046
Sex	0.92	0.82 – 1.04	0.171	0.75	0.62-0.90	**0.002**	0.93	0.78-1.09	0.36
Grew up in Rural Community				0.39	0.31-0.49	**<0.001**			
Ever Foreign Trained (1=yes, 0=No)	3.21	2.79 – 3.69	**<0.001**				3.64	3.04-4.43	**<0.001**
Were you the first person in your immediate family to graduate college? (1=yes, 0=no)	0.5	0.45 – 0.57	**<0.001**	0.43	0.35 – 0.53	**<0.001**	0.52	0.44 – 0.62	**<0.001**
Factors Important in Choice of Initial Practice									
Professional training or advancement in my practice (binary, 1 = important or very important)	1.11	0.99-1.24	0.062				1.22	1.04-1.44	0.0017
Desire to work in my own cultural community (binary, 1= important or very important)	0.49	0.43 – 0.55	**<0.001**	0.49	0.41-0.60	**<0.001**	0.4	0.33-0.48	**<0.001**
Effect of educational debt on practice choices									
I joined the National Health Service Corps or Indian Health Service (binary, 1=selected)	0.11	0.05 – 0.19	**<0.001**	0.11	0.04-0.29	**<0.001**	0.11	0.03 – 0.46	**0.002**
Dental School Factors									
Discrimination experiences in dental school (0-4)	0.98	0.95-1.02	0.353	0.8	0.75-0.84	**<0.001**	1.22	1.16 – 1.28	**<0.001**
HBCU (1=attended, 0= did not attend)				1.12	0.91-1.36	0.284			
Observations	1167			556			556		
Cox & Snell's R^2 / Nagelkerke's R^2	0.429 / 0.430			.531/0.531			0.556/0.556		

CI: 95% confidence interval

P: P-value

Practice Characteristics of URM Specialists

Finally, we examined current practice patterns of URM specialists. The geographic distribution of specialist dentists by race mirrors trends seen on previously published race/ethnicity dentist population maps [21–23],with African American specialist more densely populated in the South Central and Southern Atlantic regions (53.9%) and H/L specialists more populated in the Mountain, Pacific and some of the Southern Atlantic regions (58.9%).

Racial concordance between URM providers and URM patients has been previously demonstrated[20] and this concordance pattern is maintained with the specialties. H/L providers have more H/L patients than their URM colleagues and AA have more AA patients than their URM counterparts (**Table 3**).

Table 3: Racial Concordance among URM dental specialists

Patient Demographic	Dental Specialist Demographic %			URM Total (%)
	African-American/ Black	American Indian/ Native American	Hispanic/ Latino	
African-American/Black	44.7	12.6	13.6	29.4
American Indian/Native American	4.2	19.7	3.9	4.7
Hispanic/Latino	20.2	15.0	41.2	30.2
Caucasian/White	30.9	55.3	39.2	35.6
Asian/Pacific Islander	5.8	6.6	6.6	6.2

Behind the numbers

While the data analysis showed clearly the winnowing pipeline of URM dentists going into specialties and some of the factors that may be at work behind these numbers, to further elucidate these trends we solicited personal experiences from URM specialist dentists. Throughout the interviews with minority specialists, a number of common themes arose regarding the pathway for minorities to specialize within the field of dentistry. These included the following:

"Visibility is key to recognizing what the possibilities are"

- Interview Respondent

Not only is early exposure to the profession of dentistry important for initial minority recruitment, but continued exposure and mentorship is crucial to advancement through the dental workforce pipeline to specialist status. While the specialists interviewed followed different paths to higher education, they all shared a common element of having some exposure or experience as the initial spark for choosing dentistry and having a mentor be the main driving factor for their continued perseverance within the field. Respondents felt that pipeline programs served as

important factors for the initial exposure and preparation of URM specialists, while contacts and networking with URMs in their respective dental specialty fields served as the best way to gain mentorship, both of which are critical for moving through specialty training.

Either during dental school or residency, URMs experience was not only difficult but also isolating.

The challenges discussed by interviewees were not necessarily universal graduate school pressures such as a heavy course load but instead were focused around the premise that without a close support group many URMs felt "alone" -- except for those who attended the HBCU institutions. There were mixed responses as to when the isolation occurred- for some it was during dental school; whereas, for others it was during residency. Regardless, the common theme among interviewees was that being the only one or one of very few URMs enrolled during their tenure at their respective programs made the process much more stressful and difficult.

URM dental specialists emphasized they faced additional challenges due to their racial and/or ethnic background which served as intense barriers that almost deterred them.

Some interviewees described blunt racism in regards to derogatory names while others experienced subtle racism in the form of grading, favorites, and micro-aggressions. There was no instance in which a URM specialist with whom we spoke matriculated through the pipeline without directly experiencing any form of racism or discrimination. The feeling was described as "exhausting" and "always needing to be on your toes" because a mistake made by a URM was critiqued in more of a negative manner than their non-URM counterpart for the same type of error.

URM dental specialists were disappointed by the lack of diversity among faculty.

While a high percentage of respondents reported having a URM general practitioner faculty member during dental school, only two interviewees recalled having a minority faculty member during their residency program and/or specialists within their dental school. This lack of representation within the specialty fields further compounds the lack of visibility and mentorship and can impede URMs interest in specialty fields.

URM dental specialists thought the "fix" is having an institutional advocate

Another tension point during the pipeline for specialty program matriculation seemed to be admissions to specialty programs for URMs. Some interviewees felt that there has to be a "gatekeeper" or a person within a leadership position who is willing to continue to advocate for more URM residents. Otherwise, the "group mentality" of recruiting the same type of residents each year will remain in place.

Once in their respective specialty profession, majority feel equal to their non URM counterparts.

All respondents felt after completion of a specialty residency, they experienced fewer instances of racism or discrimination in their respective fields. A sense of "you've made it, so now you're equal" attitude was adopted by their colleagues. Many times this was evident during conferences and/or inter-professional events with colleagues, during which URM specialists felt as though their opinions and work were valued by their colleagues. Furthermore, no URM specialist that we spoke with was able to identify any instance of racism or micro-aggressions post-graduation

from his/her specialty program (which is the complete opposite of URMs reported experience within academia).

URM dental specialists gave negative reviews to the programs and services at their residency programs in regards to continued recruitment and retention of minority residents.

Few interviewees reported being happy with the legacy of their residency programs in regards to continued efforts for recruiting more minorities. Many could count on one hand the number of URM residents to matriculate through the program following their completion and were underwhelmed by the lack of growth of URM representation in the programs.

All expressed concern for the future in regards to not just the profession and patient care but also their own legacy if the disparity does not improve.

Many senior practitioners in private practice stated they are also genuinely concerned about the transition of their own patient bases to a new URM provider if the trend does not show any improvement over the next few years. Further, the demographic of the US population is changing and as the URM population continues to increase, the disparity and access to care will continue to worsen if URM representation does not improve.

DISCUSSION

This study elucidates the challenges that URMs face in their pursuit of specialization within the dental profession. Previous studies have examined these challenges at the stage of initial entry to dental schools, at single institutions, and have evaluated specific pipeline programs. This study extends that work to include the perceived barriers for URM dentists entering specialty

programs, adding to the evidence of a need to enhance strategies to decrease the number of URMs slipping through the cracks in the already small pipeline. In this study, we highlight the challenges along the pipeline including personal attributes (i.e first generation and rural upbringing), inadequate institutional resources (i.e. diversity within the institution and debt repayment options for specialists) and lack of access to mentoring and support.

Personal Level

Among URMs in our quantitative analysis, being first generation was a significant deterrent of specialization. This finding coincides with the qualitative theme of the importance of early exposure to URM specialists, given first generation students may be less likely to have as much exposure to the field. A study done by McCarron in 2012 showed that first generation college students have paths to higher education much different than their non-first generation peers. Through his results, McCarron discovered that high pre-college aspirations and family support are vital in the persistence of educational attainment and prevention of burnout for first generation students. Based on this research, it could be possible that high pre-college aspirations and family support continue to be necessary during the undergraduate years and are key in shaping first generation students' aspirations to pursue advanced degrees[24,25].

Institutional Level

Starting as early as 1972 the Special Health Career Opportunity Grants (SHCOGs) [26] has successfully conducted enrichment and grant programs designed to strengthen the academic pipeline of URMs in health care professions. However, events such as public referenda, judicial decisions, and lawsuits challenging affirmative action policies have forced many higher

education institutions to abandon the use of race and ethnicity as factors in admissions decisions. Specifically, beginning with the case of *Regents of the University of California v. Bakke*, the Supreme Court has served as a battleground for challenging the constitutionality of race-conscious admissions plans in education. Furthermore, although some achievement gaps between white and minority students have narrowed over the past twenty-five years, the persistence of racial disparities greatly hinders many minority students' ability to successfully attain higher education [27].

Professional Associations

URMs value diversity in the profession as an important factor for not just recruitment but also for reducing discrimination and aiding in retention. Yet, the lack of being able to obtain the basic diversity demographic information of specialty subgroups from the respective specialty organizations shows not only how little information is known but also how diversity and inclusion continues to essentially be put on the back burner. Without specialty organizations taking the initiative to track this information, the ability to build strategies for improvement will remain moot point. Therefore, the first step is to bring visibility to the issue by prioritizing data collection and follow up work to enhance diversity.

Policy Level

This analysis showed that URM dentists who chose primary care for loan repayment /debt relief are less likely to specialize. There have been many policy objectives to assist at the dental school level such as NHSC, but in the same instance, being that these programs don't pertain to specialists, these programs are pulling from the already small pool of URMs who could

potentially go on to specialize and stopping them at the general level. To enhance the pipeline end to end, policy objectives such as NHSC for specialists or other loan repayment programs for URMs who go into specialties can not only increase recruitment and retention by lessening the burden of debt but also, assist with public health efforts of increasing URM specialist in underserved areas.

CONCLUSION

The pipeline that prepares students for careers in health professions continues to leak, and despite individual program successes, cumulative impacts are not enough to improve the disparity that exist. This study shows despite efforts aimed to improve the pipeline of URM students into dental school, there is still a significant disparity that exist as URM dentists continue on to specialize. Further, this disparity has not changed much over time and our quantitative results show continued exacerbation of this gap. Further, we were able to uncover that not only do all URM groups face unique challenges that their non-URM counterparts do not, but also that each URM subset is unique. This information coupled with the general lack of information available surrounding this topic shows that the lack of diversity within the dental specialties continues to be a critical factor in our educational system and unless, clear actions centered around this topic are initiated improving the pipeline into residency programs for URM students from beginning to end will continue to be unsuccessful.

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