

Diversity, equity, and inclusion interventions to support admissions have had little benefit to Black students over past 20 years

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The United States has a history of systemic racism and violence toward minority communities. Unfortunately, the last year has demonstrated that systemic racism, and its consequences, persist. The dental profession has also failed to adequately resolve known issues of racial inequity and systemic racism, with persistent disparities in oral health outcomes for Black Americans compared to all other Americans, underrepresentation of minorities in the profession, and barriers to entry. However, dental education has the opportunity to address these issues. Current accreditation standards do not specifically address racial diversity among the student body, yet it is clear that representation of a population matters and the lack of representation may exacerbate race and racism as public health issues in dentistry.

To explore the issue, we curated American Dental Education Association (ADEA) data on the race of students admitted and enrolled into dental programs across the United States. We used data visualization techniques to present the data and study trends.

While the number of Black and African American (BAA) enrollees in dental schools has increased between 2000 and 2019, this population continues to make up a disproportionately small percentage of all enrollees, relative to the BAA percentage in the U.S. population. Much of the increase in BAA enrollment is attributable to increased places (due to the opening of new schools and increased class size in established schools) and the rate of acceptance of BAA students has had limited improvement.

Very little progress has been accomplished in growing the enrollment of BAA applicants to dental school in 20 years. As a profession, we also fail to grow interest among our graduates in careers that may support historically underrepresented and marginalized racial groups—public health, rural practice, population research, academia, and health policy. This may be a contributing factor to the oral health disparities faced by Black Americans and have implications for dental education.

KEYWORDS

dental education, diversity, racial equity

1 | INTRODUCTION

In 1972, the Xerox company developed PROSPER, one of the first documented diversity training programs.¹ Unfortunately, being an early adopter did not help Xerox, which settled a major legal case where it was alleged the company gave Black salesmen and women poor assignments in low-income neighborhoods.^{2,3}

Much like Xerox, the dental profession has shown that awareness does not necessarily bring resolution in its failure to adequately address known issues of race in various areas within our profession. Racial disparities exist in access to care,⁴ race bias has been shown in clinical decision-making,⁵ and the existence of structural racism in the dental profession has been suggested in recent musings.⁶

In 2010, the Commission on Dental Accreditation (CODA) revised its predoctoral accreditation standards to include diversity.⁷ However, we have no specific policies or guidelines to address racial or ethnic representation, and accreditation standards do not specifically address racial diversity.⁸ The word “race” makes only one appearance in our predoctoral accreditation standards document, and that is in helping to define the term diversity. The term “diversity” is broadly mentioned—Standard 1-4 addresses diversity in our faculty, students, and staff, while Standard 2-17 addresses diversity in our patient pool. Further, Standard 2-26 addresses diversity in patient pools through community rotations, and Standard 4-4 addresses diversity in student recruitment.

Representation matters for the following reasons:

- If prospective students do not see others like them in the profession, they are less likely to pursue it. A study of Black and African American (BAA) dentists showed that one-third of them were the first in their family to graduate from college and the first dentist in their family.⁹
- Representation has a real link to access to care. BAA dentists treat a disproportional share of BAA patients and report that 44.9% of their patient panel is BAA.⁹ Studies in medicine confirm this and show that diversity among medical providers has been shown to enhance social justice because those individuals are more likely to serve in low-income and minority communities.¹⁰
- Black Americans traditionally have lagged behind the average in building generational wealth and accessing the careers that facilitate it. High-income careers like dentistry can have generational impacts on the dentist and their family through wealth and savings. Given the

cost of dental education, a lack of wealth also contributes to a lack of representation.

Race and racism are a public health issue. We already knew this through numerous studies that have found Black Americans have worse outcomes in conditions as broad as diabetes,¹¹ hypertension,¹² pregnancy-related mortality,¹³ injury from legal interventions,¹⁴ and even oral health.⁴ In 2020, the American Medical Association enacted a policy that acknowledges racism is a public health issue.¹⁵ Can representation make a difference to the oral health of Black Americans?

In this vein, this study evaluates American Dental Education Association (ADEA) predoctoral student enrollment data to consider if inroads have been made into the increased recruitment of underrepresented and marginalized students, specifically Black Americans, into the dental profession.

2 | METHODS

On its website, the ADEA makes available data about the race and ethnicity of students admitted and enrolled into dental education programs across the United States.¹⁶ We curated the data and used data visualization techniques to present the data and study trends. According to the University of Michigan human research protection program operating manual part 4.V.A, this study is considered IRB exempt.¹⁷

3 | RESULTS

Table 1 shows the raw number of enrollees, by race, from 2000 to 2019. BAA enrollees increased from 199 in 2000 to 360 in 2019. When we take the average of the first three years of the study (2000–2002) and compare it to the average of the last three years of the study (2017–2019), this represents a 50.8% increase among BAA students between 2000 and 2019. Using the same formula, we found that American Indian/Alaska Native (AIAN) enrollees had reduced by 40%, Asians had increased by 60.8%, Hispanics/Latinos (HL) had increased by 151%, and Whites had increased by 18.5%. Notably, overall dental school enrollment increased from 4234 in 2000 to 6231 in 2019—a 47.2% increase.

Table 2 shows the percentage of applicants successfully enrolled for each racial group among applicants within that same racial group. It is notable that Asians,

TABLE 1 Enrollees by race/ethnicity (raw numbers)

Year	Total	American Indian or Alaska Native	Asian	Black or African American	Hispanic or Latino	Native Hawaiian or other Pacific Islander	White	Two or more races	Do not wish to report or unknown	Non-resident alien
		Enr	Enr	Enr	Enr	Enr	Enr	Enr	Enr	Enr
	Total enrollees									
2000	4234	21	926	199	227	x	2645	x	216	x
2001	4267	19	907	233	254	x	2570	x	284	x
2002	4372	25	870	233	241	x	2582	x	421	x
2003	4528	23	902	263	224	x	2484	x	632	x
2004	4457	24	816	241	253	x	2354	x	769	x
2005	4558	28	910	286	259	x	2768	x	307	x
2006	4618	35	934	282	287	x	2741	x	339	x
2007	4618	27	932	266	308	x	2762	x	323	x
2008	4794	41	1046	266	277	x	2786	x	378	x
2009	4871	24	1106	252	318	x	2746	x	425	x
2010	2676	8	528	142	207	3	1629	55	97	x
2011	5311	17	1176	258	403	3	2930	150	146	228
2012	5483	4	1137	377	377	4	2926	153	183	439
2013	5769	10	1320	268	491	3	3078	178	181	240
2014	5892	16	1376	256	500	3	3166	176	182	217
2015	5943	12	1368	304	542	5	3154	185	148	225
2016	6100	7	1470	308	557	10	3136	199	162	251
2017	6122	20	1484	312	578	5	3083	239	169	232
2018	6163	14	1452	329	617	6	3042	206	303	194
2019	6231	5	1426	360	623	5	3114	229	191	278
2010-2019 Total	55,690	113	12,737	2914	4895	47	29,258	1770	1762	2304

Note: "X" denotes that data were not collected under that category for that year.

Source: American Dental Education Association, Applicants, Enrollees, and Graduates data tables. <https://www.adea.org/data/students/>.

BAA, Whites, two or more races, and nonresident aliens are all experiencing improved rates of enrollment. HL enrollment remains steady, while AIAN, Native Hawaiian/Pacific Islander (NHPI), and those of unknown race or not wishing to report race all are experiencing a steadily worsening enrollment rate.

Table 2 also shows the percentage of each race out of all enrollees from 2000 to 2019. This shows that BAA increased slightly, from 4.70% of enrollees to 5.78% of enrollees. During the period of the study, HL increased from 5.36% of enrollees in 2000 (comparable to BAA) to 10.0% in 2019. AIAN fell from 0.50% of enrollees in 2000 to 0.08% in 2019, and Whites reduced from 62.5% in 2000 to 50.0% in 2019. Asians have remained steady, from 21.87% in 2000 to 22.9% in 2019.

Table 3 compares the percentage of each racial/ethnic group of enrollees to its percentage of the U.S. popu-

lation (note: these data are only available from 2010 to 2019). It was previously described (see Introduction, above) that CODA integrated diversity goals into its predoc-toral accreditation standards in 2010. Unfortunately, BAA enrollees have increased only slightly in this decade, from 5.3% in 2010 to 5.8% in 2019, and AIAN decreased (0.30% in 2010 to 0.08% in 2019). Although HL increased from 7.7% in 2010 to 10.0% in 2019, they remain underrepresented in dental schools in comparison to their percentage of the U.S. population.

From 2011 to 2019, the total number of enrollees increased 17.3%; this can be attributed to the opening of new schools and increased class sizes in existing schools. During this same period, BAA enrollment increased 40.0%. This means that 43.5% of the increase in BAA could be explained by the increasing number of places in dental education—true gains in recruitment and enrollment of

TABLE 2 Enrollees by race/ethnicity (percentages)

Year	TOTAL	American Indian or Alaska Native		Asian		Black or African American		Hispanic or Latino		
	% of applicants enrolled	% of AIAN applicants enrolled	% of AIAN enrollees among all enrollees	% of Asian applicants enrolled	% of Asian enrollees among all enrollees	% of BAA applicants enrolled	% of BAA enrollees among all enrollees	% of HL applicants enrolled	% of HL enrollees among all enrollees	
2000	X	X	0.50	X	21.87	X	4.70	X	5.36	
2001	X	X	0.45	X	21.26	X	5.46	X	5.95	
2002	X	X	0.57	X	19.90	X	5.33	X	5.51	
2003	X	X	0.51	X	19.92	X	5.81	X	4.95	
2004	X	X	0.54	X	18.31	X	5.41	X	5.68	
2005	X	X	0.61	X	19.96	X	6.27	X	5.68	
2006	X	X	0.76	X	20.23	X	6.11	X	6.21	
2007	X	X	0.58	X	20.18	X	5.76	X	6.67	
2008	X	X	0.86	X	21.82	X	5.55	X	5.78	
2009	X	X	0.49	X	22.71	X	5.17	X	6.53	
2010	X	7.21	0.30	2.85	19.73	5.80	5.31	6.28	7.74	
2011	X	6.56	0.32	3.40	22.14	5.76	4.86	5.68	7.59	
2012	4.64	2.44	0.07	3.14	20.74	7.77	6.88	4.87	6.88	
2013	4.82	4.05	0.17	3.66	22.88	6.02	4.65	5.65	8.51	
2014	5.13	6.87	0.27	3.92	23.35	6.27	4.34	6.02	8.49	
2015	5.21	6.94	0.20	3.94	23.02	6.83	5.12	5.85	9.12	
2016	4.99	2.97	0.11	3.92	24.10	5.81	5.05	5.70	9.13	
2017	5.11	6.76	0.33	4.06	24.24	5.90	5.10	5.89	9.44	
2018	5.61	9.72	0.23	4.64	23.56	6.61	5.34	5.90	10.01	
2019	5.92	4.42	0.08	4.84	22.89	7.22	5.78	6.43	10.00	
Year	Native Hawaiian or other Pacific Islander		White		Two or more races		Do not wish to report or unknown		Nonresident alien	
	% of applicants enrolled	% of enrollees among all enrollees	% of applicants enrolled	% of enrollees among all enrollees	% of applicants enrolled	% of enrollees among all enrollees	% of applicants enrolled	% of enrollees among all enrollees	% of applicants enrolled	% of enrollees among all enrollees
2000	X	X	X	62.47	X	X	X	5.10	X	X
2001	X	X	X	60.23	X	X	X	6.66	X	X
2002	X	X	X	59.06	X	X	X	9.63	X	X
2003	X	X	X	54.86	X	X	X	13.96	X	X
2004	X	X	X	52.82	X	X	X	17.25	X	X
2005	X	X	X	60.73	X	X	X	6.74	X	X
2006	X	X	X	59.35	X	X	X	7.34	X	X
2007	X	X	X	59.81	X	X	X	6.99	X	X
2008	X	X	X	58.11	X	X	X	7.88	X	X
2009	X	X	X	56.37	X	X	X	8.73	X	X
2010	6.82	0.11	5.86	60.87	3.21	2.06	7.11	3.62	X	X
2011	2.75	0.06	5.79	55.17	5.09	2.82	4.16	2.75	3.04	4.29
2012	6.15	0.07	5.37	53.36	4.41	2.79	4.73	3.34	5.99	8.01
2013	4.11	0.05	5.60	53.35	4.67	3.09	4.83	3.14	3.15	4.16
2014	1.94	0.05	5.95	53.73	5.63	2.99	4.59	3.09	3.21	3.68
2015	4.00	0.08	6.07	53.07	5.44	3.11	4.42	2.49	3.39	3.79
2016	7.14	0.16	5.84	51.41	4.67	3.26	5.06	2.66	3.09	4.11
2017	5.56	0.08	5.87	50.36	5.15	3.90	4.96	2.76	3.25	3.79
2018	4.55	0.10	6.29	49.36	5.39	3.34	4.80	4.92	4.39	3.15
2019	4.03	0.08	6.53	49.98	6.28	3.68	5.27	3.07	4.67	4.46

Note: "X" denotes that data could not be calculated for that category for that year.

Source: American Dental Education Association, Applicants, Enrollees, and Graduates data tables. <https://www.adea.org/data/students/>.

TABLE 3 Percentage of each minority group within the U.S. population and enrollees to dental school

	Percentage American Indian or Alaska Native in U.S. population	Percentage American Indian or Alaska Native enrollees	Percentage Black or African American in U.S. population	Percentage Black or African American enrollees	Percentage Hispanic or Latino in U.S. population	Percentage Hispanic or Latino enrollees
2010	0.73	0.30	12.3	5.3	16.4	7.7
2011	0.74	0.32	12.4	4.9	16.8	7.6
2012	0.75	0.07	12.5	6.9	17.1	6.9
2013	0.75	0.17	12.7	4.6	17.5	8.5
2014	0.76	0.27	12.8	4.3	17.8	8.5
2015	0.77	0.20	12.9	5.1	18.2	9.1
2016	0.77	0.11	13.0	5.0	18.6	9.1
2017	0.78	0.33	13.1	5.1	18.9	9.4
2018	0.78	0.23	13.2	5.3	19.3	10.0
2019	0.79	0.08	13.3	5.8	19.6	10.0

U.S. population data are taken from US Census Bureau: Data on Sex, Race, and Hispanic Origin. https://www.census.gov/data/tables/time-series/demo/popest/2010s-national-detail.html#par_textimage_1537638156.

The percentage of enrollees by race is from ADEA Data: American Dental Education Association. Applicants and Enrollees data for predoctoral students. <https://www.adea.org/publications-and-data/data-analysis-and-rese-arch/applicants-enrollees-and-graduates.aspx#collapse0>. Accessed October 5, 2020.

BAA are limited. During the same period, HL enrollment increased 54.5% and Whites increased 6.3%.

In 2010, only six of 58 schools (10.3%) had more than 10% of enrollees who were identified as BAA. Those six schools had 11.1%, 11.6%, 14.0%, 14.8%, 67.6%, and 89.8% BAA students, respectively—the last two schools are historically minority-serving institutions. In 2019, nine of 66 schools (13.6%) had more than 10% of enrollees who were identified as BAA. Those nine schools had 10.5%, 10.6%, 12.4%, 12.8%, 13.2%, 14.7%, 17.3%, 55.9%, and 93.5% BAA students, respectively—the last two schools, again, were the same ones traditionally enrolling mostly BAA students in 2010.

For HL students, in 2010, 15 of 58 schools (25.9%) had more than 10% of all enrollees identified as HL. In 2019, 21 of 66 schools (31.8%) had more than 10% of enrollees identified as HL.

While it is critical to consider the data in aggregate, it is also important to highlight results at specific schools. Looking specifically at the two schools that traditionally enroll mostly BAA students, aggregate enrollment in the first year went from 186 in 2010 to 130 in 2019. At the same time, places in international dentist programs expanded. This reduced the intake of first-year dental students and reduced the percentage of the graduating class who are BAA.

In 2010, two schools each had a single successful BAA enrollee, one from 131 BAA applicants and the other from 119 BAA applicants. In 2019, in the same two schools, one had five enrollees from 122 BAA applicants and the other had six from 70 BAA applicants—a limited improvement over a decade. Additionally, in 2010, 13 schools had no BAA

students enrolled after an aggregate of 483 applicants. In 2019, 10 schools had no BAA students after an aggregate of 236 applicants. It is clear there have been no advances in certain schools and backward steps at other schools in terms of enrolling BAA students.

Similarly, in 2010, among three particular schools, one had a successful HL enrollee from 121 applicants, another had two enrollees from 169 applicants, and the third had four enrollees from 248 applicants. In 2019, among those same three schools, respectively, one had 13 HL enrollees from 183 applicants, another 17 from 186, and the third had 26 from 388. Additionally, in 2010, three schools had no HL students enrolled after an aggregate of 155 HL applicants. In 2019, three schools and no HL enrollees after an aggregate of 156 HL applicants—only one of the three schools was the same in both 2010 and 2019.

4 | DISCUSSION

For all the efforts to increase representation of BAA students among dental school enrollees, very little has been accomplished in the 20-year study period. The percentage of enrollees who were BAA was 4.70% in 2000; in 2019, it was 5.78%. The percentage of BAA individuals in the U.S. population is 13.4%,¹⁸ which indicates that this group continues to be underrepresented in dental schools. Since the racial/ethnic distribution of enrollees in dental schools is a leading indicator of the racial/ethnic distribution of our profession, it is an unfortunate predictor of a future dental profession that continues to be underrepresented in BAA.

Previous research has shown that family members and dental school faculty are two of the strongest influencers in choosing a dental career among students successfully matriculating into dental school.¹⁹ However, BAAs are much less likely to have a family member dentist,⁹ and ADEA data presented in 2015 indicate that only 4% of dental school faculty are BAA.²⁰ The latter statistic highlights the lack of BAA role models in dental schools that students might interact with socially, professionally, or when they visit during interviews.

4.1 | Aggregate data from all U.S. dental schools

The number of enrollees into dental school increased from 4234 in 2000 to 6231 in 2019. This is a 47.2% increase and, during the same period, BAA enrollment increased 81.0%. However, 58.4% of that increase can be linked to the increased enrollment opportunities (47.2% more places in dental schools) due to the opening of seven new schools and increased class sizes in existing schools. Actual gains in BAA enrollment are much more limited.

The American Dental Association reports that, among practicing dentists in 2016, 73.6% were White, 5.3% were HL, 4.3% were BAA, and 15.8% were Asian.²¹ We have shown that, in 2016, racial/ethnic distribution of enrollees into the dental school were as follows: 51.4% were White, 9.13% were HL, 5.05% were BAA, and 24.1% were Asian. While there is a slight improvement in BAA enrollments compared with the distribution of BAA dentists in the profession, both these figures are far short of their percentage representations within the U.S. population who identified as BAA in the same year.²¹

Table 3 compares the percentage of each racial/ethnic group among enrollees to their percentage of the U.S. population (note: data were only available from 2010 to 2019). It is previously described (see Introduction, above) that CODA integrated diversity goals into its predoctoral standards in 2010. Unfortunately, BAA enrollees have increased only slightly in this decade, from 5.3% in 2010 to 5.8% in 2019.

Circumstances are no different in dental hygiene, with 4.49% of enrollees in 2016–2017 identifying themselves as BAA.²² Dental technician programs are slightly better, with 8.43% of enrollees identifying themselves as BAA.²³ However, dental assisting programs perform much better, with 14.8% of enrollees in 2016–2017 identifying themselves as BAA.²⁴ Although becoming a dental assistant is not a prerequisite when applying to dental hygiene school, 46% of dental hygiene programs include previous dental office experience in admissions criteria,²⁵ and many successful enrollees become a dental assistant first. Pathway

programs that support dental assistants from underrepresented racial/ethnic groups, and help usher them into the successful application to dental hygiene or dentistry programs, could be highly effective in enhancing BAA enrollments at dental schools.

4.2 | Data from specific dental schools

It is worth considering the data from specific schools in more detail. Our results report that in 2019, 10 schools still had no BAA enrollees, despite 236 applicants. Even if one individual had been accepted, that would be a combined acceptance rate of 0.42% for individuals who are BAAs at those 10 schools. All programs should think deeply about this significant finding:

1. Are BAA applicants to their schools of such low competitiveness that there is a problem with supply? These schools should partner with feeder schools to understand why BAA applicants are so unsuccessful at matriculating into their dental schools. Introducing pathway programs early in the college experience to recruit high-quality BAA students to the dental profession could be valuable.
2. What unconscious biases in their admissions processes need to be resolved?

Since 2011, eight new U.S. dental schools have opened.²⁶ When we consider enrollment in these newer schools in aggregate, the newer schools enrolled 3.10% BAA students, 7.82% HL students, 0% AIAN students, 23.9% Asian students, and 57.7% White students. Unfortunately, these newer schools actually performed worse in the enrollment of BAA and AIAN than all the established schools, and only comparably the same in enrollment of HL and Asian students. Newer schools may represent important opportunities to enhance the nationwide enrollment of BAAs and other underrepresented racial/ethnic groups in general. These schools still have the opportunity to build reputations as inclusive organizations, which may be harder for schools already considered incompatible for BAAs or other racial/ethnic populations.

The six largest U.S. dental schools, in terms of the number of students enrolled in 2019, contributed 18.5% of all newly enrolled dental students. In aggregate, among these larger schools, the percentage of enrollees who were BAA was 3.91%, HL was 9.39%, AIAN was 0.087%, and White was 38.6% (two or more races, those not wishing to report race, and those identified as nonresident aliens comprised 17.5%). Once again, these larger schools performed worse than the remaining schools in terms of enrolling BAA and AIAN students. Programs that facilitate a larger proportion of BAA enrollment at these schools may have a large effect

on nationwide enrollment because of the sheer class sizes at these schools.

4.3 | Opportunities for learning and best practices

Enrollment data from U.S. dental schools show that two schools had an aggregate of two successful BAA enrollees from 250 openings in 2010 (0.8%), which grew to 11 from 192 openings in 2019 (5.71%). Similarly, one school went from zero BAA enrollees in 2010 to 7.6% in 2019. These examples represent major improvements in recruiting BAA individuals; these schools must disseminate their practices to other schools grappling with the same challenges. It may be true that circumstances vary from state to state; however, sharing best practices likely will have a valuable effect on the overall enrollment of dental students from underrepresented racial/ethnic groups.

Currently, U.S. dental schools compete over a small pool of eligible applicants from underrepresented racial/ethnic populations. Although collaboration occurs, the competition for students from these groups may disincentivize schools from true partnership. However, competing over a small pool of eligible applicants is a band-aid solution to a deep-rooted problem. What is truly necessary to impact the recruitment of underrepresented dental students is to grow the pool of eligible applicants through pathway programs in high school, middle school, or even earlier.

5 | CONCLUSION

We have made very little progress in growing the enrollment of BAA applicants to dental school in 20 years. U.S. dental schools compete over a small pool of eligible college graduates from underrepresented racial/ethnic groups instead of collaborating to expand the pool of eligible applicants for dental school. The schools that rarely admitted such students in 2000 remain those that rarely admit them in 2019. The schools that frequently admitted students from underrepresented racial/ethnic groups in 2000 continue to be a primary source of dentists from those groups in 2019.

Black Americans have worse oral health than White Americans and the gap has been persistent. We continue to fail to grow interest among our graduates in careers that support underrepresented populations, such as public health, rural practice, population research, academia, and health policy. Improved representation has the potential to impact recruitment and health, and all programs need to address diversity and end systemic racism among dental schools.

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