

Reducing Educational Debt Among Underrepresented Physicians and Dentists

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Executive Summary

The rising cost of higher education raises concerns about equitable access to professional education for underrepresented minorities (URMs). This is problematic since URMs play critical roles in the health care field. They often speak patients' languages and/or relate to them on both cultural and socio-economic levels, which strengthens the patient-physician relationship through higher levels of trust and satisfaction with care. Many URM students come from families of modest incomes and are often deterred from applying to health professional schools because of their costs. URMs who do attend medical or dental school, must often take on substantial educational debt to afford the escalating tuition and fees. Interest rates for student loans are higher than for most other common forms of debt such as auto, mortgage, and small business, which makes them even more difficult to repay.

This issue brief presents data on educational debt among medical and dental students, summarizes the literature on the relationship between educational debt and career choices, describes policy options for reducing educational debt, and makes recommendations for reducing debt among URM health professionals.

Data on educational debt among medical school graduates indicate that American Indian, Blacks, and Latino graduates are more likely to have educational debt than White graduates and more likely to have debt of \$100,000 or more. Black and Latino dental school graduates are also more likely to have educational debt than White graduates. Deciding to take on this debt could encourage URM students to choose educational programs and careers that enable them to pay off debt more easily instead of ones in which they are most passionate or for which they are best suited.

Review of the literature suggests that the association between educational debt and specialty choice is mixed among physicians. However, among dentists, higher levels of educational debt is associated with lower likelihood of specialization. Students with high levels of debt are more likely to enter private practice. The association between educational debt and practice location is limited and inconclusive. The rising level of educational debt disproportionately affects URM students and limits their representation in health professions, and the ability of underrepresented communities to obtain concordant, timely, and affordable care. These challenges can be overcome with focused efforts to reduce or eliminate the cost of education for URM students.

There are two policy strategies for reducing the educational debt burden for URM students. The first strategy is to reduce or eliminate the level of accrued educational debt through scholarships, loan repayments and income-sharing agreements. The second strategy is to decrease educational costs by shortening the duration of education or reducing tuition. The most direct method for reducing or eliminating educational debt is to ensure low or no cost education for URM students. One way this can be accomplished is through tuition reduction or elimination programs supported by private philanthropic endeavors. Other options include targeting reductions in the cost of education for students of certain racial/ethnic backgrounds who commit to practice in certain areas (e.g., health professions shortage areas) to increase concordance (racial/ethnic, cultural and linguistic) of health professionals for these communities.

The feasibility, success, and traction of these strategies is difficult to assess. Some initiatives aimed at reducing medical or dental student debt are broad and do not specifically target URM students. Some programs only offer URMs small amounts of money which does not substantially reduce their educational debt. In addition, few initiatives targeted at reducing debt among URMs have been evaluated. Further study is needed to determine which strategies are most effective.

Introduction

The rising cost of higher education raises concerns about equitable access to professional education for underrepresented minorities (URMs). URMs play critical roles in the health care field because they may often speak patients' languages and/or relate to them on both cultural and socio-economic levels. Prior research has shown that patient-physician concordance of race, language, and social characteristics strengthen the patient-physician relationship through higher levels of trust and satisfaction with care.¹⁻³ However, many of these students come from families with modest incomes. The median net worth of Black and Latino families is substantially lower than White families, which limits parents' ability help their children pay for higher education.⁴ Many take on substantial debt to afford escalating tuition and fees, and these debts can be so large that they partially explain the racial wealth gap in the United States.⁵

The resulting high levels of educational debt may lead URM health professionals to choose practice settings where they are less likely to provide care to low income or uninsured patients. High educational debt may also dissuade some URM health professionals from practicing in the specialty for which they have the greatest passion. Some URMs with high educational debt who would prefer to become specialists may choose to pursue generalist career paths because the shorter length of training allows them to enter practice sooner and begin to repay educational loans. Other URMs who may prefer to become generalists may choose to become specialists in order to earn a higher income. Some URMs may not apply to medical or dental school since "the prospect of piling up debt deters students of modest means from even considering medical school".⁶ A survey of more than 1,500 U.S. resident physicians showed that paying off medical school debt was their top personal financial concern, leaving 62 percent of them behind financially for retirement.⁷ These factors are barriers to increasing the diversity of health professionals and may exacerbate the difficulties that low income Americans, particularly underrepresented racial and ethnic groups, face in obtaining concordant, timely, and affordable care.

This issue brief presents data on educational debt among medical and dental students, summarizes the literature on the relationship between educational debt and choice of specialty, practice type, and practice location, and describes policy options for reducing educational debt. The literature review was performed using PubMed and Google Scholar and was complemented by searching websites of organizations that we believed would contain pertinent data and information.

Background

Educational debt for medical and dental students has increased dramatically over the past few decades. Figures 1 and 2 show the increase in average debt of graduating medical and dental students over time; debt for medical students has increased 172 percent while that for dental students has increased 117 percent during a similar timeframe. The increases in debt reflect rising tuition and growing reliance on loans to pay for professional education.

Figure 1. Average Medical Education Debt Among Students with Debt in 2017 Dollars^{8, 9}

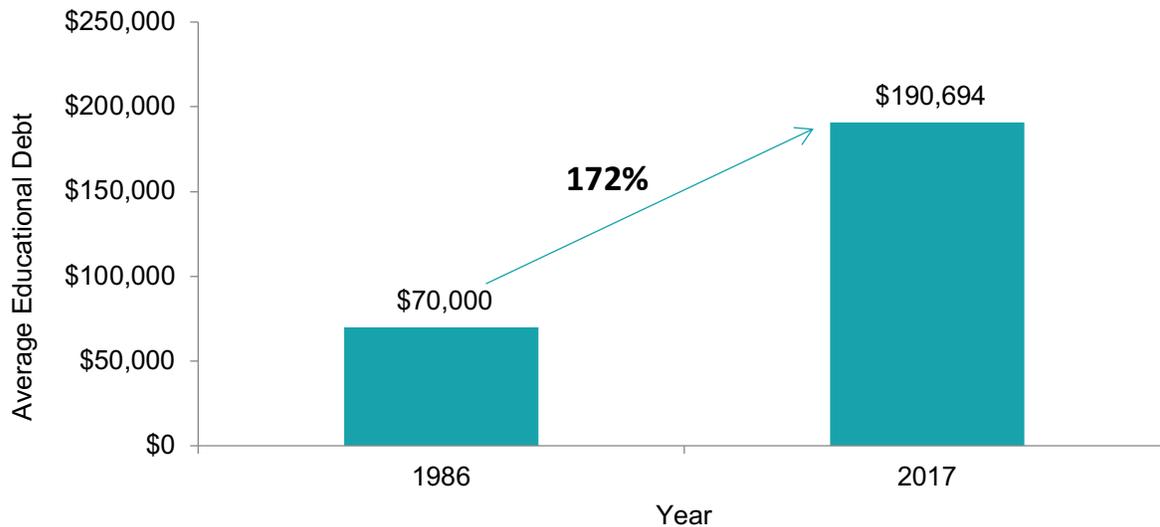
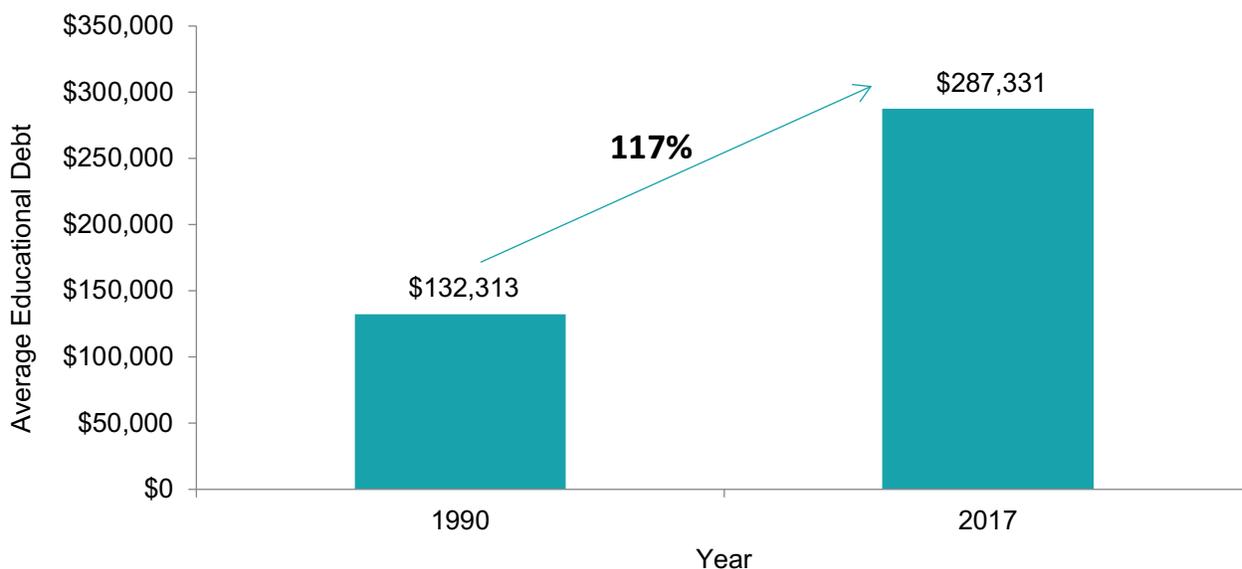


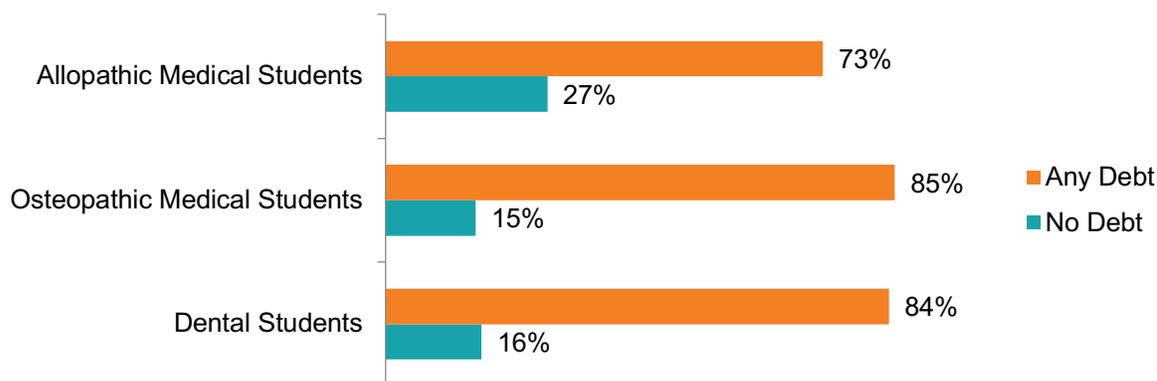
Figure 2. Average Dental Education Debt Among Students with Debt in 2017 Dollars¹⁰



Despite the large increases in the average amount of educational debt among students with debt, a large percentage of both medical and dental graduates reported having “no debt” in 2016 (see Figure 3). One study concluded that the increase in proportion of medical students graduating with no debt is due to an increase in students from wealthy backgrounds.⁸ Another analysis concluded that the increase in wealthy students does not explain this trend definitively. Although the percentage of graduates from families with parental income of at least \$200,000 has increased since 2010, the percentage of graduates reporting no medical school debt and parental income of at least \$200,000 decreased in two recent years (2015 and 2016). The authors suggest that two additional factors are contributing to this trend. First, discontinuation of federally subsidized loans at the beginning of the 2012-2013 academic year results in phasing out of graduates using only these

loans from the debt data. Second, the amount of scholarship dollars awarded and frequency of awards increased in recent years.¹¹

Figure 3. Percentage of Students with No Educational Debt versus Any Educational Debt in 2016^{8, 10, 12}



In addition to debt incurred during medical or dental school, many students enter medical and dental school with educational debt accrued during their pre-professional education. Recent data show that 83 percent of allopathic medical students had a combined debt (pre-medical school and medical school) of \$100,000 or more and 14 percent of students had a debt of \$300,000 or more.⁹ Among dental students, 76 percent had a combined debt of \$100,000 or more and 39 percent had a debt of \$300,000 or more.¹⁰

Despite the rising debt burden for students, Congress passed the Bankruptcy Abuse Prevention and Consumer Protection Act of 2005, which exempted private student loans from discharge in bankruptcy.¹³ The only exception to this rule is if a student files an “adversary proceeding” and the court finds that loan repayment would cause “undue hardship.” Though no single test is used to determine such hardship, the student must prove that she or he: 1) Cannot maintain a minimal standard of living; 2) will face continued hardship for a significant portion of the loan repayment period; and 3) has made a good faith effort to repay the loan.¹⁴

Educational Debt by Race and Ethnicity

Among medical students, educational debt disproportionately affects URM groups.ⁱ The Association of American Medical Colleges (AAMC) estimates that 74.3 percent of Asian students have some debt as do 81.5 percent of White students. In comparison, the percentage of URM students with educational debt is higher; 84.8 percent of American Indians, 87.2 percent of Latinos, and 93.4 percent of Black medical students have some debt.¹⁵ Table 1 summarizes the level of educational debt by race/ethnicity among allopathic medical students and shows that Black students, more than any other group, had educational debt of \$300,000 or more.

ⁱ URM groups are commonly listed as Black or African American, Hispanic or Latino, and American Indian or Alaska Native. For simplicity, these groups are referred to as Black, Latino, and American Indian, respectively, throughout this policy brief.

Table 1. Level of Educational Debt of Allopathic Medical School Graduates by Race and Ethnicity¹⁵

Race/Ethnicity	No Debt	Any Debt	\$100,000 or More	\$300,000 or More
American Indian	15.2%	84.8%	67.3%	14.1%
Asian	25.7%	74.3%	52.7%	8.2%
Black	6.6%	93.4%	79.4%	17.1%
Latino	12.8%	87.2%	70.0%	10.8%
White	18.5%	81.5%	65.7%	10.3%

Osteopathic medical students from underrepresented backgrounds also have higher levels of educational debt. In the 2016-2017 academic year, the average debt was highest for Black students (\$286,540), followed in descending order by Latino students (\$265,413), White students (\$240,903), and Asian students (\$216,194).¹²

Table 2 summarizes the findings from the American Dental Education Association’s (ADEA’s) survey of the 2017 graduating class for total educational debt (undergraduate debt and dental school debt) by students’ race/ethnicity.

Table 2. Level of Educational Debt of Dental School Graduates by Race and Ethnicity¹⁶

Race/Ethnicity	No Debt	Any Debt	\$100,000 or More	\$300,000 or More
American Indian	22.2%	77.8%	77.8%	33.3%
Asian	18.0%	82.0%	74.3%	40.5%
Black	2.4%	97.6%	88.9%	49.1%
Latino	10.1%	89.9%	76.3%	38.7%
White	14.4%	85.6%	78.1%	40.5%

Similar to medical students, Black dental students have the highest rates of educational debt (97.6 percent), followed by Latino students (89.9 percent), White students (85.6 percent), Asian students (82.0 percent) and lastly, American Indian students (77.8 percent). Nearly half of all Black students had \$300,000 or more in educational debt, which is much higher than all other racial/ethnic groups. A national sample survey of underrepresented minority dentists similarly found that Black dentists reported higher average educational debt than all other dental students.¹⁷

Family income levels contribute to the higher levels of educational debt among URM students in allopathic medical schools (see Table 3). Nearly one-third (31.1 percent) of Black students reported their parents’ combined gross income was less than \$50,000 compared with 28.5 percent of Latino students, 16.2 percent of Asian students, and 8.8 percent of White students. In contrast, 38.3 percent of White students reported their parents’ combined gross income was \$200,000 or greater, compared with 32.3 percent of Asian students, 19.8 percent of Latino students, and 14.9 percent of Black students.

Table 3. Parents' Combined Gross Income by Race and Ethnicity among Medical Students, 2015¹⁸

Race/Ethnicity	Less than \$50,000	\$200,000 or More
American Indian	14.8%	23.1%
Asian	16.2%	32.3%
Black	31.3%	14.9%
Latino	28.5%	19.8%
White	8.8%	38.3%

Note: Students' reports of parents' combined gross income in the previous year.

Data from osteopathic school graduates also show a negative correlation between average educational debt and family income; students from families with lower incomes have the highest levels of educational debt.¹² The contribution of family income levels to educational debt for dental students is unknown due to the lack of data.

Additional Considerations for Students in California

Educational debt is largely determined by two factors: tuition and fees, and cost of living. In California, the average first year costs for tuition and fees of allopathic and osteopathic medical schools is only slightly higher than it is in other states (see Table 4). For dental schools, the average first year costs for tuition and fees is substantially higher in California.

Table 4. Average First Year Costs for Tuition and Fees¹⁹⁻²¹

Location	Allopathic School	Osteopathic School	Dental School
California Schools	\$52,188	\$55,083	\$89,040
Non-California Schools	\$52,049	\$49,577	\$68,400

Notes:

1. Schools in Puerto Rico were excluded from the analysis.
2. A possible explanation for only a slight difference in the average cost of allopathic education between California and non-California schools, but a major difference in the average cost of dental schools, is the type of ownership. Most medical schools in California are public (i.e., University of California), while most of the state's dental schools are private.

In addition to tuition and fees, student debt is also affected by the cost of living in the communities in which the schools are located. Although the cost of living includes expenses such as food and transportation, housing is the primary factor affecting the total cost of living. Table 5 illustrates that median rents in California are 71.0 percent and 75.4 percent higher than other states for one- and two-bedroom apartments, respectively. Some California cities where medical and dental schools are located, such as San Francisco, have median rents that are considerably higher.

Table 5. Monthly Rents for Housing within and outside California²²

Location	Median One-Bedroom Apartment	Median Two-Bedroom Apartment
California	\$1,443	\$1,840
Other States*	\$844	\$1,049

*Includes all 50 states plus the District of Columbia. Puerto Rico was excluded from the analysis.

When the cost of living is added to the cost of tuition, it is apparent that medical and dental students in California experience a much greater total educational cost than students in other states and therefore may take on greater educational debt.

Debt and Career Decisions

We reviewed literature regarding associations between educational debt and choice of specialty, practice type, and practice location for both medical and dental students and summarize key findings below.

Association Between Educational Debt and Specialty

Studies of the influence of medical education debt on specialty choice show mixed results. Many studies conclude that higher levels of educational debt deter students from choosing careers in primary care fields,²³⁻²⁹ however other studies do not confirm a similar association.³⁰⁻³³ One study found high educational debt among graduates of public medical schools dissuaded students from choosing primary care careers, but the same was not true for graduates of private medical schools.³⁴

Summary of Key Findings

- Among physicians, the association between educational debt and specialty choice is mixed, but among dentists higher levels of dental education debt are associated with a lower likelihood of specialization.
- Students with higher levels of debt are more likely to enter private practice.
- Literature assessing the association between educational debt and practice location is limited and inconclusive.

A study by Youngclaus et al. modeled the impact of educational debt on choice of a career in primary care. The study compared the impact of various amounts of debt, repayment plans, and living expenses across three specialties to assess whether a physician earning a typical primary care salary can repay a median level of educational debt (\$160,000) and meet standard household expenses without incurring additional debt. The modeling indicated that a primary care career choice is feasible under these conditions. However, students with higher levels of educational debt must factor trade-offs and compromises such as extended repayment plans that reduce monthly payments but increase the total amount of interest paid, and the use of federal loan forgiveness or repayment programs that require service obligation such as working at a nonprofit or practicing in a medically underserved area.³⁵

Although the overall decrease in the percentage of medical students with debt between 2010 and 2016 was described earlier in this brief, it is worth noting that the decrease was smaller among students selecting careers in primary care fields than among those selecting careers in other specialties.⁸

For dentistry, although there are fewer studies looking at the association of educational debt on career choice, the results are clearer. A national survey found that dental students with higher levels of debt are less likely to

specialize, because it extends time in training and delays entry into practice.³⁶ Two studies, both conducted at single dental schools, surveyed fourth-year students about educational debt and career plans. One study found that students with the greatest amount of accrued debt planned to pursue private practice in general dentistry and not specialize.³⁷ The second study found that anticipated debt of at least \$100,000 was associated with plans to enter private practice (and therefore general practice) after graduation rather than continued training and specialization.³⁸

Association Between Educational Debt and Practice Type

Medical education debt is associated with choice of practice type, but the relationship varies among physicians with different demographic characteristics and specialties. A survey of medical students and residents from six Texas institutions found that the amount of debt influenced decisions about practice type. For example, women were more likely to consider working in an underserved area to reduce educational debt. Black and Latino students who anticipated higher levels of debt were more likely to indicate a willingness to practice in a medically underserved area as part of a loan repayment program.³⁹ A survey of oncology fellows found that those with higher levels of debt were more likely to pursue private practice and less likely to plan an academic career.⁴⁰ A national survey of plastic surgery residents found that those with higher levels of debt (greater than \$250,000 versus less than \$100,000) were significantly less interested in additional training and were more likely to pursue working in private practices.⁴¹

Although the magnitude of effect sizes varies, educational debt is associated with dental students' choice of practice type. Students graduating with a higher debt burden are more likely to enter private practice than those with less debt,^{36-38, 42, 43} to accept higher paying jobs at graduation, and work longer hours.³⁶ One study found that educational debt of at least \$100,000 was the strongest predictor of plans to enter private practice.³⁸ Educational debt also influenced choice of employment settings, practice ownership, and whether or not to provide care to patients who are uninsured or insured through Medicaid.³⁶ Several studies found that although educational debt was statistically significant in predicting practice type after graduation, the magnitude of effect of other variables such as sex and race was at least as large.^{36, 42, 44}

Association between Educational Debt and Practice Location

The literature on the association between medical school debt and practice location is inconclusive. A national study of osteopathic students found that those with the most debt were more likely to report an intention to practice in underserved areas than those with the least amount of debt.⁴⁵ In contrast, an earlier study examining the factors that affect the practice location choice of new graduates in New York found that shortage area designations attract primary care physicians without educational debt, but deter those with debt.⁴⁶

There is a scant literature examining the association between educational debt and practice location for dental students. One study of Latino dentists found that higher educational debt was associated with decreased odds of working in a “non-traditional” setting (i.e., a setting primarily serving publicly insured patients), but the association was not significant.⁴⁷ This survey also showed that 17.2 percent of Black dentists practice in inner cities, compared to 7.9 percent of Latino dentists, and 7.5 percent of White dentists,⁴⁸ despite Black dentists having higher levels of educational debt (see Table 2 above). Similarly, a study of Black dentists and another of Latino dentists found that each group reported higher average educational debt and provide a disproportionate share of dental care for minority and underserved communities.^{17, 49}

Policy Options

Findings from the literature review suggest that the level of educational debt carried by medical and dental students in the U.S. has significantly increased in the last few decades. The rising level of debt raises concern about the underrepresentation of Black, Latinos, and American Indians among medical and dental students because underrepresented students are more likely to have large amounts of educational debt than other students. In addition, some studies have found that higher levels of educational debt influence students' decisions about whether or not to pursue specialty training and work in practices that provide care to medically underserved and/or low income populations. Given that URM professionals are more likely to provide care for underrepresented racial and ethnic communities,⁵⁰⁻⁵² greater levels of educational debt may make it more difficult for underrepresented communities to obtain concordant, timely, and affordable care.

Policy options that decrease the educational debt burden for URM students are vital for ensuring diversity among physicians and dentists. The options can be grouped into two categories: 1) those that reduce or eliminate the level of educational debt and 2) those that decrease the cost students pay for education.

Reducing or Eliminating Educational Debt

The level of medical and dental school debt accrued by students can be reduced using one of three strategies: 1) scholarships or loan repayments that are contingent on providing service in an underserved area for a specified period of time; 2) scholarships and loan repayments that are non-contingent on service; and 3) income-share agreements.ⁱⁱ

Service-Contingent Scholarships and Loan Repayment Programs

Service-contingent scholarships and loan repayment programs require students to fulfill one or more requirements to receive the scholarship or loan. These contingencies are often based on physicians or dentists caring for underserved populations or working in underserved areas for a specified period of time. Thus, they create incentives for physicians and dentists who have educational debt to practice in settings that have the greatest need for additional physicians and dentists. Four types of service-contingent scholarships and loan repayment programs are described below.

National Health Service Corps (NHSC)

The NHSC awards scholarships and loan repayment in exchange for a minimum of two years (for scholarships) to three years (for loan repayment) at an approved site, located in a Health Professional Shortage Area (HPSA).⁵⁶ Scholarships are awarded while students are in medical or dental school whereas loan repayments are awarded after they complete their education. Eligible disciplines for the scholarship

ⁱⁱ Organizations who offer contingent and non-contingent scholarships and grants should be cognizant of how tax policy affects the value of these scholarships and grants. For example, the Tax Cuts and Jobs Act of 2017 resulted in the unintended consequence for taxation of non-tuition scholarships and grants (e.g., money given for room and board). Prior to the enactment of this legislation, non-tuition scholarships and grants awarded to persons under age 24 were taxed at their parents' marginal tax rates. They are now taxed at the same rate as trusts and estates (37 percent), which is much higher than the marginal tax rates paid by low-income families. This increase in the tax rate for non-tuition scholarships and grants substantially erodes their monetary value to students who rely on them to cover their living expenses. Two bills, H.R. 1994, the *Setting Every Community Up for Retirement Enhancement Act of 2019* (SECURE Act)⁵³ and S. 1667, the *Tax Relief for Student Success Act*⁵⁴ are meant to correct this mistake and are currently pending in the Senate. The American Council on Education (ACE), along with other signatories including AAMC, wrote a letter to Senate leadership on June 21, 2019, requesting that Congress act expeditiously to correct this error.⁵⁵

program include primary care physicians and dentists;⁵⁷ eligible disciplines for the loan repayment programs include physicians practicing in family medicine, obstetrics/gynecology, internal medicine, geriatrics, pediatrics, or general psychiatry, and dentists.^{58, 59} The NHSC currently has 10,000 members and more than 5,000 NHSC-approved healthcare sites in urban, rural, and tribal areas. The NHSC program has been positively associated with caring for underserved, rural, and low-income patients.⁶⁰⁻⁶³ Additional studies conclude that the NHSC physicians who remain in rural settings make up a considerable proportion of all rural practitioners.^{64, 65}

Indian Health Service (IHS)

IHS will repay up to \$40,000 of educational loans for health professionals, including physicians and dentists, who commit at least two years of practice in facilities serving American Indian and Alaska Native communities.⁶⁶ Annual contract extensions are granted until the qualified student loans are paid. Qualified loans include federal, state, and local loans from the government as well as commercial loans used to pay for a health profession education. The eligible facilities are assigned a site score based on their needs for specific health profession disciplines. Loan repayment awards are given to clinicians working at facilities with a score of 70 or higher (see IHS website for detail).⁶⁷ IHS also offers a Supplemental Loan Repayment Program (SLRP) for federal sites “to attract health professionals to facilities that otherwise wouldn’t be able to offer loan repayment as an incentive.”⁶⁸

State Scholarship and Loan Repayment Programs

Many states have scholarship and loan repayment programs designed to encourage physicians, dentists, and other health professionals to practice in underserved areas. These programs vary in their eligibility criteria, populations served, contingency requirements, type of award (i.e., loan, scholarship, repayment, forgiveness), and award amount. A comprehensive database for the medical programs can be found through the AAMC⁶⁹ and state-specific details for dental programs are compiled by American Dental Education Association.⁷⁰

State scholarship and loan repayment programs in California are designed to increase the number of health professionals practicing in HPSAs. The medical specialties eligible for these programs include family medicine, general internal medicine, general pediatrics, gerontology, general psychiatry, and obstetrics/gynecology. The California State Loan Repayment Program, which is funded by the NHSC, awards \$50,000 in exchange for a two-year full-time service obligation or a four-year half-time service obligation. Annual extensions are available for up to four years, with varying dollar amounts for each extension.⁷¹

California also has the County Medical Services Program Loan Repayment Program. Qualifying primary care physicians and dentists are required to serve in one of the 35 participating counties for two years. Those who commit to full-time service receive a \$50,000 award and those who commit part-time receive \$25,000.⁷² Additional loan repayment programs⁷³ and scholarship programs⁷⁴ are also available through the Health Professions Education Foundation. For example, the Steven M. Thompson Physician Corps Loan Repayment Program provides awards of up to \$105,000 to physicians who agree to practice for three years in an underserved area of California.

CalHealthCares is a loan repayment program administered by Physicians for a Healthy California and is made available to both eligible physicians and dentists.⁷⁵ Both physicians and dentists are required to have a patient caseload of at least 30 percent Medi-Cal beneficiaries for five years. In exchange, they may apply for a loan repayment of up to \$300,000. Dentists also have the option to apply for a practice support grant of up to \$300,000 in exchange for a ten-year service obligation.

Research demonstrates that physicians serving obligations to state programs practice in needier areas and care for more patients insured under Medicaid and those who are uninsured. These physicians also remain in their practices longer than non-obligated physicians.⁷⁶ For dental professionals, access to a state- or federally-sponsored loan repayment program is the most significant predictor of plans to enter public service, while the most significant barriers is increasing amounts of educational debt.⁷⁷

Public Service Loan Forgiveness (PSLF) Program

The PSLF Program forgives the remainder of a student's Direct Loans after he/she has "made 120 qualifying monthly payments under a qualifying repayment plan while working full-time for a qualifying employer."⁷⁸ While general guidance is provided to borrowers on what criteria must be met to qualify for the loan forgiveness program,⁷⁸ many borrowers remain confused by the program requirements, as described in a report by the U.S. Government Accountability Office (GAO).⁷⁹ The report states that the customer service staff "frequently" receives calls from borrowers who are confused about PSLF program requirements related to "qualifying loans, employment, repayment plans, and payments." The GAO study found that as of April 2018, out of the 1,173,420 borrowers who requested to certify that their employment and loans were eligible for PSLF, only 890,516 had their employment and loans certified as eligible. Moreover, out of the 19,321 borrowers who submitted a loan forgiveness application, only 55 were actually granted loan forgiveness.

Non-Service Contingent Scholarship and Loan Repayment Programs

Non-service contingent scholarships and loan repayment programs are available to students without any location-specific, time-specific, or service stipulations. A list of non-service contingent scholarship and loan repayment programs appears below. The amounts awarded by these programs are small relative to the average cost of medical school tuition and fees. So, while these programs can help reduce educational debt, these are not large enough to obviate the need for underrepresented students from low- and middle-income families to obtain student loans.

National Medical Fellowships

Designed for students who seek to work in underrepresented communities, the National Medical Fellowships (NMF) programs match students with mentors in areas of clinical and/or public health need.⁸⁰ NMF offers 22 general scholarships, six service-learning programs, and an emergency scholarship fund. The scholarships and other awards are awarded primarily to first and second year medical students and are based on financial need. Scholarships range from \$2,000 to \$7,500. General eligibility requirements include:

- Proof of U.S. citizenship or Deferred Action for Childhood Arrivals (DACA) approval letter
- Current enrollment in an accredited U.S. medical school
- Underrepresented minority student
- Demonstrated leadership ability
- Commitment to serving medically underserved communities

Awards may be subject to additional eligibility requirements and details can be found on the NMF website.⁸⁰

American Medical Association's (AMA) Physicians of Tomorrow Awards

These scholarships are for students approaching their final year of medical school. The ten categories of available awards have different eligibility requirements, and most are in the amount of \$10,000. Students must be nominated by the dean or dean's designate. Each medical school is allowed two nominations per category and each student can only be nominated for one category. Overviews of the ten awards are presented in Appendix A and additional details are available on the AMA's website.⁸¹

Two scholarships are specifically intended for URM students: the Underrepresented in Medicine scholarship and the Dr. Richard Allen Williams & Genita Evangelista Johnson/Association of Black Cardiologists Scholarship. While the former is intended for all URM students (Black, Latino, and American Indian students) who demonstrate a dedication to serving vulnerable or underserved populations, the latter is a \$5,000 scholarship for Black students with an interest in cardiology.⁸²

Association of American Medical College's Herbert W. Nickens Medical Student Scholarships

A medical school may nominate one student per year for this \$5,000 scholarship. Candidates must be entering their third year of study in an accredited U.S. medical school and have shown leadership in efforts to eliminate inequities in medical education and health care and in addressing educational, societal, and health care needs of racial and ethnic minorities in the United States. Five scholarships are given each year. Details on the nomination process can be accessed through AAMC's website.⁸³

Hispanic Dental Association Foundation Scholarships

Scholarships are available to members of the Hispanic Dental Association (HDA) and the Hispanic Student Dental Association in amounts that vary based on a student's year in school and the funder. While no set number of scholarships are awarded each year, over \$37,000 was given in 2012 and more than \$100,000 was awarded over the last four years. Funding information, in addition to the scholarships' eligibility criteria and application, is available on HDA's website.⁸⁴

Income-Share Agreements

An income-share agreement, or ISA, is a contract between the student and university under which the student agrees to pay the university a fixed percentage of his/her income for a defined period of time after graduation in exchange for funding his/her education. Although the concept is not new, the use of ISAs to help fund education made a recent resurgence when Purdue University created its Back a Boiler – ISA Fund in 2016.⁸⁵ The program is currently available to sophomores, juniors and seniors with a declared major. When compared to traditional loans, Purdue lists the ISA benefit as having a “minimum income threshold and a maximum payment cap, so students who use the program will not pay if they do not meet a minimum income level, while those who earn a substantial amount of income will not pay above a certain maximum amount.”⁸⁶ The first cohort of participants graduated in 2017 and used ISAs to cover fees of \$12,000 on average.⁸⁷

Other colleges and universities have recently announced offering ISAs to students,⁸⁸⁻⁹⁰ but no medical or dental schools are currently offering this arrangement. ISAs could serve as a more equitable education financing strategy than fixed-fee loans. For example, primary care physicians would pay less than orthopedic surgeons because their average incomes are significantly lower. The lower monthly payments might persuade individuals to choose a career in primary care over a specialty field. However, there remain questions as to the appropriate terms of ISA contracts and whether or not these terms could lead to predatory or discriminatory behavior⁹¹ similar to Sallie Mae's subprime lending behavior around private loans.⁹²

Limitations of Strategies for Reducing or Eliminating Educational Debt

Existing scholarship and loan repayment programs have several important limitations. Many disjointed funders are responsible for dispensing financial aid to students pursuing health professional degrees. Moreover, the borrowing terms and conditions of these loans are sometimes opaque and confusing. This makes it difficult for students to navigate their options and choose the loan(s) most appropriate for them. Second, federal loans disbursed between July 1, 2018 and July 1, 2019 for undergraduate education have a fixed interest rate of 5.05 percent; for graduate or professional education the rates are 6.6 percent or 7.6 percent depending on the type of loan.⁹³ These rates exceed the average interest rates for other loans such as auto (three percent to five percent), mortgage (four percent), and small business (three percent to 5.5 percent).⁹⁴ High interest rates add to the difficulty that health professionals face in repaying their loans in a timely manner. The impact of ISAs on reducing educational debt for physicians and dentists is unknown since no medical or dental schools are offering this arrangement.

Decreasing the Cost of Education

There are two main approaches to reducing the cost of education experienced by medical and dental students: shorten the duration of the educational pathway and reduce tuition for professional education.

Shortening the Duration of the Educational Pathway

Examples of shorter educational training paths include joint degree programs that combine undergraduate and professional education and accelerated programs that shorten the number of years of medical or dental school. In 2015, eight medical schools formed the Consortium of Accelerated Medical Pathway Programs (CAMPP)⁹⁵ with funding by the Josiah Macy Jr. Foundation. Although these schools have varying goals and curriculums, the consortium was developed to “focus on reducing the nationwide physician shortage and alleviating student debt.”⁹⁵

Some accelerated/joint degree programs specifically target URM students. One example is the Sophie Davis Biomedical Education Program at the City University of New York (CUNY), which focuses on educating youth from disadvantaged backgrounds, many of whom are the first in their families to go to college. The curriculum is designed to enable students to complete requirements for a bachelor’s of science degree in three years and then complete four years of medical school. The University of California, Davis’ Accelerated Competency-based Education in Primary Care program is another example. Students in this program complete medical school in three years followed by a three year residency in general internal medicine or family medicine at one of four affiliated residency programs. The program gives preference for admission to students meeting the following criteria: fluency in a language other than English, first in their family to complete college, completed high school in a Northern California county served by Kaiser Permanente, or have experience in primary care or community health.⁹⁶

Accelerated/joint degree programs typically help mitigate students’ educational debt. However, this is not always the case. For example, the University of the Pacific Arthur A. Dugoni (University of the Pacific) School of Dentistry is the only dental school in the country where students can complete their dental education in three years instead of four. For the 2018-2019 academic year, first year students will pay \$111,925 for tuition and a total of \$135,286 once fees are added.⁹⁷ In comparison, students at the University of California, San Francisco (UCSF) School of Dentistry pay \$11,442 for tuition and \$49,071 in total with fees if they are California residents; non-residents pay a total of \$61,316 for tuition and fees at UCSF.⁹⁸ As a result, students attending University of the Pacific for three years would pay more for their education than students attending UCSF for four years. Although there are many drivers for this cost differential (e.g., University of the Pacific is

a private institution while UCSF is a public one), this example illustrates that shortening the duration of educational time does not guarantee lower educational costs for students.

Some have suggested that medical training can be shortened by 30 percent (equal to one year of education) without compromising physician competence or quality of care.⁹⁹ Advocates of joint/accelerated programs believe that shortened educational training could enable students to enter practice sooner, increase their years in practice, and thus help address the shortage of physicians.¹⁰⁰ Many three-year M.D. programs place their graduates into residency programs at their own institution, which may offer the advantage of streamlining the training process and reducing the adverse effects of debt burden on the economic and racial/ethnic diversity of the student population.¹⁰⁰

Critics of joint/accelerated programs cite failed attempts decades ago, when these programs first emerged, as evidence that they are not beneficial. In prior efforts, faculty and students felt pressured by the compressed curriculum and as many as 25 percent of students voluntarily extended their education by one to two years.¹⁰¹ Other concerns arise from the belief that the fourth year of education can be a valuable maturation period and provide important research and/or clinical opportunities.¹⁰⁰ Residency program directors shared that the fourth year of medical school is a critical time to address common struggles such as lack of self-reflection and improvement, poor organizational skills, underdeveloped professionalism, and weak medical knowledge.¹⁰² Students have disparate opinions about the value of the fourth year of medical school.^{103, 104}

Appendix B (see Tables B.1 and B.2) lists the schools that offer accelerated/joint degree programs for medical and dental students, respectively. The tables provide an overview of the programs; detailed descriptions of each program can be found on the school’s website, the link of which can be found in the References section of this policy brief.

Institutional Efforts to Reduce Tuition

Reducing tuition is the most direct method for making education more affordable. Medical schools have experimented with various strategies ranging from untargeted approaches like free education for everyone with no stipulations to targeted strategies such as providing scholarships to students who wish to become primary care physicians practicing in underserved areas. Table 6 highlights the methods that medical schools are currently using to decrease or eliminate tuition. Although only one program is mentioned for each tuition reduction method, multiple schools may have similar programs.

Table 6. Medical School Strategies to Reduce Tuition

School	Overview	Eligibility and Contingencies
Columbia University Vagelos College of Physicians and Surgeons	Replaces student loans with scholarships, including full-tuition scholarships.	All students who qualify for financial aid. Students with the greatest financial need (about 20 percent of students) receive full-tuition scholarships. ¹⁰⁵
Charles R. Drew University of Medicine and Science	Four students are selected for L.A. Care’s Elevating the Safety Net Scholarship Program and receive up to \$350,000 in full scholarships. ¹⁰⁶	Students are chosen based both on financial need and the student’s desire to work in underserved and vulnerable communities.

New York University School of Medicine	Free tuition for all current and future medical students. ¹⁰⁷	All students without restrictions.
University of Kentucky College of Medicine	Tuition-guarantee program that ensures that students in each entering class will pay a constant amount for all four years. ¹⁰⁸	All incoming students without contingencies.
University of California, Los Angeles David Geffen School of Medicine	Awards a merit-based scholarship to up to 20 percent of entering students. The scholarship pays for the cost of four years of medical school, including tuition, fees, books, and living expenses. ¹⁰⁷ Additionally, four students are selected for L.A. Care's Elevating the Safety Net Scholarship Program and receive up to \$350,000 in full medical school scholarships. ¹⁰⁶	All applicants without contingencies. ¹⁰⁹ Students are chosen based both on financial need and the student's desire to work in underserved and vulnerable communities.
University of California, Riverside School of Medicine	Waives all tuition and fees for two years.	Students who agree to work for 30 months in general internal medicine, obstetrics and gynecology, pediatrics, family medicine, general surgery, or psychiatry within the Inland Empire. ¹¹⁰

Some of the strategies illustrated in Table 6 are funded by philanthropy. For example, New York University (NYU) School of Medicine's tuition-free initiative is estimated to cost ~\$600 million to fund indefinitely, \$450 million of which has already been raised. Kenneth Langone, chair of the board of trustees, and his wife, Elaine, for whom the medical school is named, have contributed \$100 million of this amount.¹⁰⁷ While critics have voiced concerns about sustainability of this approach,¹¹¹ private philanthropy allows investments to be targeted as they best see fit. Specifically, philanthropies can stipulate that preferences will be given to students from particular racial/ethnic groups or low-income families. NYU's funding arrangement does not make these requirements, although NYU believes their strategy "addresses both physician shortages and diversity."¹¹²

The provision of scholarships by philanthropic foundations and other private entities is an especially important strategy for reducing the debt of URM students who attend public medical schools in California. Proposition 209 bars the University of California from awarding scholarships to students on the basis of race or gender, but does not place the same restrictions on private organizations. The University of California can provide logistical support and access to campuses to private organizations that sponsor scholarships for students of a specific gender or race/ethnicity, provided University personnel do not participate in the selection of recipients. L.A. Care's Elevating the Safety Net Scholarship Program for students at the University of California, Los Angeles' medical school is an example of a private scholarship program for UC medical students.¹¹³

Limitations of Strategies for Decreasing the Cost of Education

Accelerated pathways can reduce the length and cost of education for students who are well-prepared for medical or dental school. However, some students may need four full years of undergraduate education and four full years of medical school particularly if they attended K-12 schools that did not provide them with a strong foundation in science and mathematics. In addition, accelerated pathway programs vary in the extent to which they prioritize admission of students who are URMs and/or from disadvantaged backgrounds. Accelerated programs that do not prioritize admission of these students may not be very effective at increasing racial/ethnic diversity among physicians and dentists.

Some programs that reduce or eliminate tuition, such as the NYU School of Medicine's tuition-free initiative, are also available to all students and do not target resources toward students with the greatest financial need or to URM students. Lowering or eliminating tuition for all students requires more resources than targeting reductions toward financially needy students and/or URM students and does not target resources to advance the goals of increasing the socio-economic and racial/ethnic diversity of physicians and dentists.

Conclusion and Recommendations

Over the past few decades, levels of medical and dental educational debt have more than doubled due to the rising cost of education. Underrepresented minority students are particularly affected as they are both more likely to have educational debt and to have higher levels of debt. This differential level of debt for URM students raises concerns about equitable access to professional education. For medical students, the association between educational debt and specialty choice is mixed while dental graduates with higher levels of educational debt are less likely to specialize. Both medical and dental students with higher levels of debt are more likely to enter private practice. The data on the relationship between educational debt and practice location are inconclusive for physicians and limited for dentists.

Policy options that decrease the educational debt burden for URM students are vital for ensuring diversity among physicians and dentists and for ensuring access to concordant, timely and affordable care for racial and ethnic communities. The existing policy options we describe use one of two approaches: reduce or eliminate the level of educational debt or decrease the cost of professional education. A few options specifically focus on URM students while others focus on graduates who are willing to commit to caring for underserved populations or working in underserved areas. One option identified in our review, income-share agreements, has been implemented by universities but not medical or dental schools.

There is no silver bullet policy approach for reducing or eliminating the educational debt burden for physicians and dentists. Rather, a multi-faceted approach is needed. Below we present recommendations for policy makers to consider to reduce educational debt among URM physicians and dentists.

Recommendations

Several examples of programs and strategies used to address the reduction and elimination of debt for physicians and dentists are found in the "Policy Options" section of this brief. With few exceptions, the feasibility, success, and traction of these programs is difficult to assess. For example, many of the programs and policies currently being used have not been evaluated to measure their success at increasing the number of URM health professionals. In addition, some of these programs do not focus specifically on medical or dental students from underrepresented backgrounds. Policy makers who wish to address the growing educational debt for physicians and dentists should aim to balance the least restrictive requirements for

students to obtain debt relief with specific eligibility criteria to maximize their ability to increase the diversity of physicians and dentists in the workforce, and improve access to care for the underserved. The following recommendations are grouped based on the major categories found in the main text of the brief, namely, reducing or eliminating the level of educational debt and decreasing the cost of education.

Reducing or Eliminating Educational Debt

Educational debt can be reduced or eliminated through the use of service-contingent and non-service contingent scholarship and loan repayment programs. In addition to implementing best practices for these programs,¹¹⁴ we recommend the following approaches to increase the representation of students from URM backgrounds:

- Design state programs to meet gaps not addressed by other local and federal scholarship or loan repayment programs and that meet a state's unique needs for care for underserved populations, geographic regions, and communities.
- Ensure that funding for repayment and scholarship programs are responsive to rising levels of educational debt through broadened and/or renewable funding sources.
- Ensure adequate funding over time through public-private partnerships such as combining public funds (e.g., taxes) with philanthropic funding.

Whether or not these scholarship and loan repayment programs choose to attach contingency requirements to receive the awards should be based on the goals of the programs. If the goal is simply to reduce educational debt, contingency requirements are not necessary. However, if programs also seek to improve access to care for underserved populations, contingency requirements can be used to help fill in gaps of health care delivery by providing incentives for URMs to care for these populations. Regardless of whether or not contingency requirements are used, federal programs that do not take into account the input and recommendations of states, appears to reduce the likelihood that funds will be optimally allocated to address the health needs of local communities. A symbiotic relationship between federal and state programs, where both entities are in a continuous dialogue with one another, may increase the likelihood that these needs are met.

Strategies for reducing or eliminating educational debt need to be coordinated in order to help facilitate structural changes to financing the needs of URM health professionals. In addition to the recommendations above, we also recommend the following structural changes to improve borrowing practices for URM students:

- Collapse the myriad funding channels of scholarships and loan repayments into fewer funds directed towards URM students. This will ensure less confusion among students which should increase their ability to select the best funding option available.
- Make the borrowing terms of all student loans more transparent and easy to compare. First-generation students, who are predominantly URMs, are less likely to have complete knowledge about available loans and, as a consequence, may not consider a loan at all.¹¹⁵

Decreasing the Cost of Education

Existing approaches to decrease the cost of education include shortening the duration of education and reducing tuition through accelerated or joint degree programs. In addition to implementing best practices for these programs,¹¹⁶ we recommend the following approaches to increase the representation of students from URM backgrounds in medicine and dentistry:

- Add eligibility criteria to reflect an intention to prioritize admission of URM students.
- Allow students flexibility to opt-in to joint degree programs after a year of conventional undergraduate pathway.
- Conversely, allow students the opportunity to opt-out of an accelerated or joint degree program and transition to a conventional undergraduate or medical or dental school pathway.

Flexibility in transitioning into and out of accelerated/joint degree programs offer opportunities to tailor the educational experience to meet the needs of students who may benefit from more opportunity to refine career choices and obtain academic support as they commit to a career in medicine or dentistry.

The most direct method for reducing or eliminating educational debt is to ensure low or no cost education. There are an increasing number of examples of tuition being markedly reduced or eliminated through support from philanthropy. However, some programs that reduce or eliminate tuition, such as the NYU School of Medicine's tuition-free initiative, are available to all students and do not target resources toward students with the greatest financial need. Programs that focus on low-income students are more helpful, but often the majority of beneficiaries are not URM students because most low-income students are White. Concerted efforts should be made to target the needs of URM students. We recommend the following modifications to increase the representation of students from URM backgrounds:

- Eliminate the cost of education entirely for URM students and those from disadvantaged backgrounds.
- Target students of certain racial/ethnic backgrounds who commit to practice in certain areas (e.g., health professions shortage areas) to address the biggest gaps in unmet health care needs in communities. This approach can also increase concordance (racial/ethnic, cultural and linguistic) of health professionals for these communities.
- Fund and administer tuition reduction or elimination programs through private philanthropic endeavors. This approach will enable the program to earmark money to be given to URM students without infringing on or violating affirmative action laws.

References

1. Street, R.L., Jr., et al., *Understanding concordance in patient-physician relationships: personal and ethnic dimensions of shared identity*. *Ann Fam Med*, 2008. **6**(3): p. 198-205.
2. Cooper, L.A., et al., *Patient-centered communication, ratings of care, and concordance of patient and physician race*. *Ann Intern Med*, 2003. **139**(11): p. 907-15.
3. Thornton, R.L., et al., *Patient-physician social concordance, medical visit communication and patients' perceptions of health care quality*. *Patient Educ Couns*, 2011. **85**(3): p. e201-8.
4. Emmons, W.R. and B.J. Noeth, *Why Didn't Higher Education Protect Hispanic and Black Wealth?* Federal Reserve Bank of St. Louis, August 2015, No. 12. See www.stlouisfed.org/publications/in-the-balance/2015/why-didnt-higher-education-protect-hispanic-and-black-wealth.
5. Houle, J.N. and F.R. Addo, *Racial Disparities in Student Debt and the Reproduction of the Fragile Black Middle Class*. *Sociology of Race and Ethnicity*: p. 1-16.
6. Kellermann, A. and A. Saguil, *The Case For Debt-Free Medical Degrees*. Health Affairs Blog, January 19, 2018.
7. AMA Insurance, *2017 Report on U.S. Physicians' Financial Preparedness*. 2017.
8. Grischkan, J., et al., *Distribution of Medical Education Debt by Specialty, 2010-2016*. *JAMA Intern Med*, 2017. **177**(10): p. 1532-1535.
9. Association of American Medical Colleges, *Medical Student Education: Debt, Costs, and Loan Repayment Fact Card*. 2017.
10. American Dental Education Association, *ADEA Survey of Dental School Seniors, 2017 Graduating Class Tables Report*. April 2018: Washington, D.C.
11. Youngclaus, J., *An Exploration of the Recent Decline in the Percentage of U.S. Medical School Graduates with Education Debt*. AAMC Analysis in Brief, September 2018. **18**(4).
12. American Association of Colleges of Osteopathic Medicine, *2016-17 Academic Year Survey of Graduating Seniors Summary*. 2017.
13. Bankruptcy Abuse Prevention and Consumer Protection Act of 2005, *Pub. L. No. 109-8, 119 Stat. 23 (2005)*.
14. U.S. Department of Education. *Federal Student Aid. Discharge in Bankruptcy*. Available from: <https://studentaid.ed.gov/sa/repay-loans/forgiveness-cancellation/bankruptcy#how-determine-hardship>.
15. Association of American Medical Colleges. *AAMC Facts & Figures 2016, Table 36*. 2016; Available from: <http://aamcdiversityfactsandfigures2016.org/>.
16. American Dental Education Association, *ADEA Survey of Dental School Seniors, 2017 Graduating Class Tables Report, Table 19*. April 2018: Washington, D.C.
17. Mertz, E., et al., *The Black dentist workforce in the United States*. *J Public Health Dent*, 2017. **77**(2): p. 136-147.
18. Association for American Medical Colleges, *Diversity in Medical Education: Facts & Figures 2016, Figure 30*. 2016.
19. Association of American Medical Colleges, *Tuition and Student Fees for First-Year Students: U.S. Medical Schools in Academic Year 2017-2018*. October 2017.
20. American Association of Colleges of Osteopathic Medicine, *Osteopathic College Tuition and Fees (1st Year): 2017-2018 and Historical*. 2018.
21. American Dental Association, Health Policy Institute, *2016-17 Survey of Dental Education (United States Group II, Question 27; Canada Group II, Question 17)*. 2017.
22. Apartment List. 2018, June 1; Available from: <https://www.apartmentlist.com/rentonomics/rental-data/>.

23. Bale, A.G., et al., *Increasing educational indebtedness influences medical students to pursue specialization: a military recruitment potential?* *Mil Med*, 2013. **178**(2): p. 202-6.
24. Rosenthal, M.P., et al., *Influence of income, hours worked, and loan repayment on medical students' decision to pursue a primary care career.* *JAMA*, 1994. **271**(12): p. 914-7.
25. Rohlfing, J., et al., *Medical student debt and major life choices other than specialty.* *Med Educ Online*, 2014. **19**: p. 25603.
26. Rosenblatt, R.A. and C.H. Andrilla, *The impact of U.S. medical students' debt on their choice of primary care careers: an analysis of data from the 2002 medical school graduation questionnaire.* *Acad Med*, 2005. **80**(9): p. 815-9.
27. Phillips, J.P., et al., *Medical student debt and primary care specialty intentions.* *Fam Med*, 2010. **42**(9): p. 616-22.
28. Hauer, K.E., et al., *Factors associated with medical students' career choices regarding internal medicine.* *JAMA*, 2008. **300**(10): p. 1154-64.
29. Grayson, M.S., D.A. Newton, and L.F. Thompson, *Payback time: the associations of debt and income with medical student career choice.* *Med Educ*, 2012. **46**(10): p. 983-91.
30. Diehl, A.K., et al., *Predictors of final specialty choice by internal medicine residents.* *J Gen Intern Med*, 2006. **21**(10): p. 1045-9.
31. Kahn, M.J., et al., *Is medical student choice of a primary care residency influenced by debt?* *MedGenMed*, 2006. **8**(4): p. 18.
32. Gil, J.A., et al., *Influence of Medical Student Debt on the Decision to Pursue Careers in Primary Care.* *R I Med J* (2013), 2016. **99**(7): p. 19-21.
33. Spar, I.L., K.C. Pryor, and W. Simon, *Effect of debt level on the residency preferences of graduating medical students.* *Acad Med*, 1993. **68**(7): p. 570-2.
34. Phillips, J.P., et al., *A retrospective analysis of the relationship between medical student debt and primary care practice in the United States.* *Ann Fam Med*, 2014. **12**(6): p. 542-9.
35. Youngclaus, J.A., et al., *Can medical students afford to choose primary care? An economic analysis of physician education debt repayment.* *Acad Med*, 2013. **88**(1): p. 16-25.
36. Nicholson, S., et al., *The effect of education debt on dentists' career decisions.* *J Am Dent Assoc*, 2015. **146**(11): p. 800-7.
37. Dhima, M., et al., *Dental students' perceptions of dental specialties and factors influencing specialty and career choices.* *J Dent Educ*, 2012. **76**(5): p. 562-73.
38. Nashleanas, B.M., et al., *Career influences among final year dental students who plan to enter private practice.* *BMC Oral Health*, 2014. **14**: p. 18.
39. Price, M.A., et al., *Educational debt of physicians-in-training: determining the level of interest in a loan repayment program for service in a medically underserved area.* *J Surg Educ*, 2009. **66**(1): p. 8-13.
40. Shanafelt, T.D., et al., *Oncology fellows' career plans, expectations, and well-being: do fellows know what they are getting into?* *J Clin Oncol*, 2014. **32**(27): p. 2991-7.
41. Hashmi, A., et al., *A survey of current state of training of plastic surgery residents.* *BMC Res Notes*, 2017. **10**(1): p. 234.
42. Wanchek, T., et al., *Educational debt and intended employment choice among dental school seniors.* *J Am Dent Assoc*, 2014. **145**(5): p. 428-34.
43. Badger, G.R., et al., *Helping Dental Students Make Informed Decisions About Private Practice Employment Options in a Changing Landscape.* *J Dent Educ*, 2015. **79**(12): p. 1396-401.

44. Nasseh, K. and M. Vujicic, *The relationship between education debt and career choices in professional programs: The case of dentistry*. J Am Dent Assoc, 2017. **148**(11): p. 825-833.
45. Richards, J.R., et al., *Practice Area Intentions of Graduates of Colleges of Osteopathic Medicine: What Role Does Debt Play?* J Am Osteopath Assoc, 2018. **118**(6): p. 384-388.
46. Chou, C.F. and A.T. Lo Sasso, *Practice location choice by new physicians: the importance of malpractice premiums, damage caps, and health professional shortage area designation*. Health Serv Res, 2009. **44**(4): p. 1271-89.
47. Raja, Z., et al., *The Evolving Pipeline of Hispanic Dentists in the United States: Practice and Policy Implications*. Oral Health Workforce Research Center, Center for Health Workforce Studies, School of Public Health, SUNY Albany, 2017.
48. Wanchek, T., B.J. Cook, and R.W. Valachovic, *Annual ADEA Survey of Dental School Seniors: 2017 Graduating Class*. Journal of Dental Education, 2018. **82**(5): p. 524-539.
49. Mertz, E., et al., *The Hispanic and Latino dentist workforce in the United States*. J Public Health Dent, 2017. **77**(2): p. 163-173.
50. Metz, A.M., *Medical School Outcomes, Primary Care Specialty Choice, and Practice in Medically Underserved Areas by Physician Alumni of MEDPREP, a Postbaccalaureate Premedical Program for Underrepresented and Disadvantaged Students*. Teach Learn Med, 2017. **29**(3): p. 351-359.
51. Mertz, E.A., et al., *Underrepresented Minority Dentists: Quantifying Their Numbers And Characterizing The Communities They Serve*. Health Aff (Millwood), 2016. **35**(12): p. 2190-2199.
52. Walker, K.O., G. Moreno, and K. Grumbach, *The association among specialty, race, ethnicity, and practice location among California physicians in diverse specialties*. J Natl Med Assoc, 2012. **104**(1-2): p. 46-52.
53. *Setting Every Community Up for Retirement Enhancement Act of 2019, H.R. 1994, 116th Cong. (2019-2020)*.
54. *Tax Relief for Student Success Act, S. 1667, 116th Cong. (2019-2020)*.
55. American Council on Education. *Letter to Senate Leaders Urging Swift Passage of the Kiddie Tax Scholarship Fix*. June 21, 2019; Available from: <https://www.acenet.edu/news-room/Pages/Letter-Senate-leaders-kiddie-tax-fix.aspx>.
56. HRSA National Health Service Corps. July 2018; Available from: <https://bhw.hrsa.gov/loansscholarships/nhsc>.
57. HRSA National Health Service Corps, *National Health Service Corps Scholarship Program*. June 2018.
58. HRSA National Health Service Corps, *National Health Service Corps Loan Repayment Program*. June 2018.
59. HRSA National Health Service Corps, *National Health Service Corps Students to Service (S2S) Loan Repayment Program*. June 2018.
60. Xu, G., et al., *The relationship between the race/ethnicity of generalist physicians and their care for underserved populations*. Am J Public Health, 1997. **87**(5): p. 817-22.
61. Rabinowitz, H.K., et al., *The impact of multiple predictors on generalist physicians' care of underserved populations*. Am J Public Health, 2000. **90**(8): p. 1225-8.
62. Pathman, D.E., T.R. Konrad, and T.C. Ricketts, 3rd, *The National Health Service Corps experience for rural physicians in the late 1980s*. JAMA, 1994. **272**(17): p. 1341-8.
63. Probst, J.C., et al., *The National Health Service Corps and Medicaid inpatient care: experience in a southern state*. South Med J, 2003. **96**(8): p. 775-83.
64. Cullen, T.J., et al., *The National Health Service Corps: rural physician service and retention*. J Am Board Fam Pract, 1997. **10**(4): p. 272-9.
65. Brooks, R.G., R. Mardon, and A. Clawson, *The rural physician workforce in Florida: a survey of US- and foreign-born primary care physicians*. J Rural Health, 2003. **19**(4): p. 484-91.

66. U.S. Department of Health and Human Services Indian Health Service. *Loan Repayment Program*. Available from: <https://www.ihs.gov/loanrepayment/>.
67. Indian Health Service. *Site Scores*. Available from: <https://www.ihs.gov/loanrepayment/sitescores/>.
68. Indian Health Service. *Loan Repayment*. Available from: <https://www.ihs.gov/careerops/loanrepayment/>.
69. AAMC Loan Repayment/Forgiveness/Scholarship and Other Programs. 1995-2018; Available from: https://services.aamc.org/fed_loan_pub/index.cfm?fuseaction=public.welcome.
70. American Dental Education Association, *State and Federal Loan Forgiveness Programs*. November 2016.
71. OSHPD. *California State Loan Repayment Program (SLRP)*. 2018; Available from: <https://oshpd.ca.gov/loans-scholarships-grants/loan-repayment/slrp/>.
72. OSHPD. *County Medical Services Program Loan Repayment Program (CMSP LRP)*. 2018; Available from: <https://oshpd.ca.gov/loans-scholarships-grants/loan-repayment/cmsplr/>.
73. OSHPD. *Open HPEF Loan Repayment Programs*. 2018, August 1; Available from: <https://oshpd.ca.gov/open-hpef-loan-repayments/>.
74. OSHPD. *Upcoming HPEF Scholarship Programs*. 2018, July 30; Available from: <https://oshpd.ca.gov/scholarship-def-opens-july-1/>.
75. Physicians for a Healthy California. *CalHealthCares*. 2019; Available from: <https://www.phcdocs.org/Programs/CalHealthCares>.
76. Pathman, D.E., et al., *Outcomes of states' scholarship, loan repayment, and related programs for physicians*. *Med Care*, 2004. **42**(6): p. 560-8.
77. Davidson, P.L., et al., *Reforming dental workforce education and practice in the USA*. *Eur J Dent Educ*, 2011. **15**(2): p. 73-9.
78. U.S. Department of Education. *Federal Student Aid. Public Service Loan Forgiveness*. Available from: <https://studentaid.ed.gov/sa/repay-loans/forgiveness-cancellation/public-service>.
79. United States Government Accountability Office, *Public Service Loan Forgiveness: Education Needs to Provide Better Information for the Loan Servicer and Borrowers*. September 2018.
80. National Medical Fellowships. *About Our Scholarships & Awards: Service-Learning Programs*. Available from: <https://nmfonline.org/about-our-scholarships-and-awards/programs/>.
81. American Medical Association. *Physicians of Tomorrow Awards*. 1995-2018; Available from: <https://www.ama-assn.org/physicians-tomorrow-awards>.
82. American Medical Association Foundation. *Physicians of Tomorrow: AMAF Physicians of Tomorrow Scholarship Program*. Available from: https://amaf.smapply.io/prog/physicians_of_tomorrow/.
83. Association of American Medical Colleges. *Herbert W. Nickens Medical Student Scholarships*. 2018; Available from: <https://www.aamc.org/initiatives/awards/nickens-student/>.
84. Hispanic Dental Association. Available from: <https://hdassoc.org/hda-foundation/scholarship-program/>.
85. Purdue University Division of Financial Aid. *Income Share Agreements*. 2015; Available from: <https://www.purdue.edu/dfa/types-of-aid/income-share-agreement/index.html>.
86. Purdue Research Foundation. *FAQ About Back a Boiler - ISA Fund*. 2016; Available from: <https://www.purdue.edu/backaboiler/FAQ/index.html>.
87. *Income-share agreements are a novel way to pay tuition fees*, in *The Economist*. 2018.
88. Clarkson University. *Lewis Income Share Agreement Program*. 2018; Available from: <https://www.clarkson.edu/isa>.

89. Messiah College, *Messiah College announces new financing model to align cost of education with student outcomes*. 2018, May 1.
90. Lackawanna College, *Lackawanna College Launches Innovative Student Financing Solution*. 2017, November 30.
91. Gellman, L., *Code Now. Pay Tuition Later.*, in *The Atlantic*. 2018.
92. Cowley, S. and J. Silver-Greenberg, *Loans 'Designed to Fail': States Say Navient Preyed on Students*, in *The New York Times*. 2017, April 9.
93. U.S. Department of Education. *Federal Student Aid. Interest Rates and Fees*. Available from: <https://studentaid.ed.gov/sa/types/loans/interest-rates#rates>.
94. ValuePenguin. *Average Loan Interest Rates: Car, Home, Student, Small Business, and Personal Loans*. 2019; Available from: <https://www.valuepenguin.com/loans/average-loan-interest-rates>.
95. NYU Langone Health. *Consortium of Accelerated Medical Pathway Programs*. 2018; Available from: <https://med.nyu.edu/education/md-degree/accelerated-three-year-md/consortium-accelerated-medical-pathway-programs>.
96. UC Davis School of Medicine M.D. Program. *About ACE-PC*. 2018; Available from: <https://www.ucdmc.ucdavis.edu/mdprogram/ACE-PC/about.html>.
97. University of the Pacific Arthur A. Dugoni School of Dentistry. *Estimating Your Attendance Costs*. 2018; Available from: <http://www.dental.pacific.edu/academic-programs/doctor-of-dental-surgery/tuition-and-fees/estimating-your-attendance-costs>.
98. University of California, S.F. *School of Dentistry: 2018-2019 Student Fees*. 2018, August 9; Available from: <https://registrar.ucsf.edu/registration/fees/dentistry>.
99. Emanuel, E.J. and V.R. Fuchs, *Shortening medical training by 30%*. *JAMA*, 2012. **307**(11): p. 1143-4.
100. Abramson, S.B., et al., *A 3-year M.D.--accelerating careers, diminishing debt*. *N Engl J Med*, 2013. **369**(12): p. 1085-7.
101. Goldfarb, S. and G. Morrison, *The 3-year medical school--change or shortchange?* *N Engl J Med*, 2013. **369**(12): p. 1087-9.
102. Lyss-Lerman, P., et al., *What training is needed in the fourth year of medical school? Views of residency program directors*. *Acad Med*, 2009. **84**(7): p. 823-9.
103. Wolf, S.J., et al., *Students' perspectives on the fourth year of medical school: a mixed-methods analysis*. *Acad Med*, 2014. **89**(4): p. 602-7.
104. Chen, P.W., *Should Medical School Last Just 3 Years?*, in *The New York Times*. 2013, October 24.
105. Columbia University Irving Medical Center, *Columbia Launches Scholarship Program to Eliminate Medical School Loans for Students with Financial Need*. 2018.
106. L.A. Care Health Plan. *Elevating the Safety Net - Frequently Asked Questions*. 2018; Available from: <http://www.lacare.org/providers/provider-central/provider-initiatives/elevating-safety-net/faqs>.
107. Chen, D.W., *Surprise Gift: Free Tuition for All N.Y.U. Medical Students*, in *The New York Times*. 2018.
108. University of Kentucky College of Medicine. *Cost of Attendance*. 2018; Available from: <https://meded.med.uky.edu/cost-attendance>.
109. UCLA David Geffen School of Medicine. *Eligibility*. Available from: <http://medschool.ucla.edu/geffen-scholarships-eligibility>.
110. Odriozola, A., *UC Riverside School of Medicine helps students pay for schooling by serving the Inland Empire*, in *University of California, Riverside*. 2018: The Highlander.

111. Supiano, B., *5 Key Questions About NYU's Tuition-Free Policy for Medical School*, in *The Chronicle of Higher Education*. 2018.
112. Harris, A., *NYU's Free Medical-School Tuition Could Funnel More Doctors to Primary Care*, in *The Atlantic*. 2018.
113. University of California Office of General Counsel. *Guidelines For Addressing Race and Gender Equity in Academic Programs in Compliance with Proposition 209*. July 2015; Available from: <https://www.ucop.edu/general-counsel/guidance/enhancing-diversity-at-uc.html>.
114. Pathman, D.E., et al., *States' experiences with loan repayment programs for health care professionals in a time of state budget cuts and NHSC expansion*. *J Rural Health*, 2012. **28**(4): p. 408-15.
115. Burdman, P., *The Student Debt Dilemma: Debt Aversion as a Barrier to College Access*. October 2005.
116. Cangiarella, J., et al., *Three-Year MD Programs: Perspectives From the Consortium of Accelerated Medical Pathway Programs (CAMPP)*. *Acad Med*, 2017. **92**(4): p. 483-490.
117. Clemson University. *Accelerated Pathways to MUSC Professional Health Degrees*. 2018; Available from: <https://www.clemson.edu/academics/programs/musc/>.
118. Cooper Medical School of Rowan University. *PC3*. 2018; Available from: <http://cmsru.rowan.edu/education/meded/PC3.php>.
119. McMaster University. *MD Program: About Us*. 2015; Available from: <https://mdprogram.mcmaster.ca/mcmaster-md-program/about-us>.
120. Mercer University. *School of Medicine: Accelerated Track*. 2018; Available from: <https://medicine.mercer.edu/family-savannah/accelerated-track/>.
121. NYU Langone Health. *Accelerated Three-Year MD at NYU School of Medicine*. 2018; Available from: <https://med.nyu.edu/education/md-degree/accelerated-three-year-md>.
122. The Ohio State University College of Medicine. *Admissions for 3-Year Primary Care Track*. Available from: <https://medicine.osu.edu/admissions/md/3-year-track/pages/index.aspx>.
123. Penn State College of Medicine. *Accelerated MD Pathways*. 2018; Available from: <https://med.psu.edu/md/accelerated>.
124. Hackensack Meridian School of Medicine at Seton Hall University. *Unique Curriculum*. Available from: <https://www.shu.edu/medicine/unique-curriculum.cfm>.
125. The City College of New York. *BS/MD Degree Program*. Available from: <https://www.ccny.cuny.edu/csom/bsmd-degree-program>.
126. Stony Brook School of Medicine. *3YMD@SBSOM*. 2016; Available from: <https://medicine.stonybrookmedicine.edu/3YMD>.
127. Temple University College of Science and Technology. *3+4 Accelerated BA+MD*. 2018; Available from: <https://cst.temple.edu/academics/accelerated-programs/34-accelerated-ba-cst-md-tu-school-medicine>.
128. Texas Tech University Health Sciences Center School of Medicine. *Family Medicine Accelerated Track*. 2018; Available from: <https://www.ttuhscc.edu/medicine/admissions/fmat.aspx>.
129. Medical College of Wisconsin. *MCW Medical School*. 2017, August 11; Available from: <http://www.mcw.edu/Medical-School-Bulletin/Curriculum-Grad-Requirements/MD-Program-3-year.htm>.
130. Baptist Health Madisonville. *Rural Medicine Accelerated Track*. 2017; Available from: <https://www.baptisthealth.com/madisonville/Pages/about-baptist-health/education/university-of-louisville-school-of-medicine-trover-campus/rural-medicine-accelerated-track.aspx>.
131. Boston University. *Baccalaureate/DMD (Seven-Year Program)*. Available from: <http://www.bu.edu/academics/sdm/programs/seven-year-program/>.

132. Case Western Reserve University. *Programs Toward Graduate or Professional Degrees*. 2018-19; Available from: <http://bulletin.case.edu/undergraduatestudies/gradprofessional/#preprofessionalscholarsprogramstext>.
133. Marquette University. *Pre-Dental Scholars Program*. 2018; Available from: <http://www.marquette.edu/explore/scholarships-pre-dental.php>.
134. NYU Dentistry. *DDS Program*. Available from: <https://dental.nyu.edu/academicprograms/dds-program.html>.
135. Nova Southeastern University. *Dual Admission - Dental Medicine*. 2018; Available from: <http://www.nova.edu/undergraduate/academics/dual-admission/dental-medicine.html>.
136. Rutgers School of Dental Medicine. *BS/DMD Programs*. 2015; Available from: <http://sdm.rutgers.edu/admissions/bs-dmd.htm>.
137. Temple University College of Science and Technology. *3+4 Accelerated BA+DMD*. 2018; Available from: <https://cst.temple.edu/node/105>.
138. University at Buffalo School of Dental Medicine. *Combined Degree Program (BS/DDS)*. 2018; Available from: <https://dental.buffalo.edu/education/dds-program/dds-program/combined-degree-program--bs---dds---.html>.
139. University of Connecticut. *Special Program in Dental Medicine*. Available from: <https://admissions.uconn.edu/apply/freshman/special-programs/dental#>.
140. University of Detroit Mercy. *7 Year Dental Program*. Available from: <http://eng-sci.udmercy.edu/academics/science/pre-med/seven-year-dental.php>.
141. UF Office of Admissions College of Dentistry. *B.S.-D.M.D.* 2018, August 23; Available from: <https://admissions.dental.ufl.edu/d-m-d/combined-programs/b-s-d-m-d/>.
142. University of Maryland. *3 Year Arts/Dentistry Program*. Available from: <https://www.prehealth.umd.edu/3-year-artsdentistry-program/>.
143. University of Pennsylvania School of Arts and Sciences Department of Biology. *Accelerated Dental Program*. 2018; Available from: <https://www.bio.upenn.edu/https%3A/%252Fwww.bio.upenn.edu/accelerated-dental-program>.
144. University of Southern California. *DH/DDS Pathway*. Available from: <https://dentistry.usc.edu/programs/dental-hygiene/dh-dds/>.
145. UT Health San Antonio School of Dentistry. *Dental Early Acceptance (3+4) Program*. Available from: <https://www.uthscsa.edu/academics/dental/programs/deap-program>.
146. University of the Pacific Arthur A. Dugoni School of Dentistry. *Doctor of Dental Surgery*. 2018; Available from: <http://www.dental.pacific.edu/academic-programs/doctor-of-dental-surgery>.

Appendix A: American Medical Association’s Physicians of Tomorrow Scholarships

Scholarship Name	Scholarship Requirement(s)
AMA Alliance Grassroots Physicians of Tomorrow Scholarship	Students must have an interest in women’s and/or children’s health issues.
AMA Foundation Chicago-area Physicians of Tomorrow Scholarship	Students must attend one of the Chicago-area medical schools: Chicago Medical School at Rosalind Franklin University, Loyola University Chicago Stritch School of Medicine, Northwestern University Feinberg School of Medicine, Rush Medical College, University of Chicago Pritzker School of Medicine, or University of Illinois College of Medicine.
AMA Foundation Physicians of Tomorrow Scholarship	A general nomination form must be submitted by a medical school dean or designate.
Dr. Lin and Minta Hill Alexander Physicians of Tomorrow Scholarship	Students must currently attend medical school in the state of Oklahoma.
Dr. Richard Allen Williams and Genita Evangelista Johnson/Association of Black Cardiologists Scholarship	Students must be African-American with an interest in cardiology.
Medical Society of the State of New York/Dr. Duane and Joyce Cady Physicians of Tomorrow Scholarship	Students must attend a medical school in the state of New York, be actively involved in organized medicine and have expressed plans to practice in the state of New York.
Ohio Physicians of Tomorrow	Students must attend medical school in the state of Ohio and be actively involved in, or willing to become involved in, organized medicine.
The David Jones Peck, MD, Health Equity Scholarship Fund	Students must demonstrate an interest toward health disparities and the desire to promote health equity in diverse, economically disadvantaged urban environments.
The Herman E. Diskin, MD Memorial Physicians of Tomorrow Scholarship	Students must demonstrate a strong commitment to humanitarian public service and compassionate patient care. There are no restrictions on populations served, field of medical specialization or geographical area.
Underrepresented in Medicine (formerly the Minority Scholars Award)	For African American, Latino/Hispanic, or Native Americans/Native Hawaiians/Alaska Natives scholars who demonstrate a dedication to serving vulnerable or underserved populations.

Appendix B: Accelerated/Joint Degree Medical and Dental Programs

Table B.1. Accelerated/Joint Degree Medical Programs

School / Program	Overview
Clemson University / Medical University of South Carolina College of Medicine	Students will begin the accelerated pathway program by taking their undergraduate classes at Clemson University for three years. Subsequently, students will attend Medical University of South Carolina for four years, eventually obtaining their baccalaureate degree and MD in seven years. ¹¹⁷
Cooper Medical School of Rowan University	Three-year primary care track for students planning a career in Primary Care Internal Medicine or Pediatrics. ¹¹⁸
McMaster University Michael G. DeGroote School of Medicine	A Canadian-based CAMPP partner whose three-year medical program has students working directly with patients within the first month. ¹¹⁹
Mercer University School of Medicine	The three-year medical school program is intended to increase the number of primary care practitioners in rural and underserved communities in Georgia. ¹²⁰
New York University School of Medicine	The three-year MD program offers early, conditional residency acceptance into one of 20 residency programs after the student's third year of training. Students must meet academic and professional standards and participate in the National Resident Matching Program to finalize residency placement. ¹²¹
Ohio State University College of Medicine	Three-year primary care track with guaranteed acceptance into the Ohio State University Family Medicine Residency Program. ¹²²
Penn State College of Medicine	Offering multiple "3+" pathway models for which students can choose, students will ultimately complete their medical degree in three years plus their residency training at Penn State; the length of residency depends on the student's choice of specialty and ranges from three to seven years. ¹²³
Seton Hall Hackensack Meridian School of Medicine	First class began in July 2018. Offers a "3+1" curriculum where students participate in a three-year core curriculum followed by a customized fourth year. One customized option is for a dual degree while another is for early entry into residency. ¹²⁴
Sophie Davis Biomedical Education Program / The City University of New York School of Medicine	Students of the program fulfill all requirements of their B.S. degree in three years and their MD degree in four years. Both degrees are conferred by The City College of New York. The program aims to increase the number of URM primary care physicians. ¹²⁵
Stony Brook University School of Medicine	Began accepting applications in late January 2019 for their inaugural three-year MD program. ¹²⁶

Temple University School of Medicine	Students of the Health Scholars program receive their B.A. at Temple University’s College of Science and Technology and MD at Temple University’s School of Medicine in seven years. ¹²⁷
Texas Tech University Health Sciences Center School of Medicine	The purpose of this three-year program is to increase the number of physicians who want to practice family medicine, especially in underserved areas. ¹²⁸
The Medical College of Wisconsin’s Discovery Curriculum	Offered at both their Green Bay and Central Wisconsin campuses, the Discovery Curriculum is designed for students to earn their MD in three years. ¹²⁹
University of California, Davis School of Medicine	In partnership with Kaiser Permanente Northern California, this three-year program is designed for students who are committed to primary care careers. ⁹⁶
University of Louisville School of Medicine	The Rural Medicine Accelerated Track program is through Baptist Health Madisonville in Madisonville, Kentucky. Students begin the program by completing a four-week summer preceptorship and then subsequently can complete medical school in three years. This program is only available to students who want to practice primary care in a small rural town. ¹³⁰

Table B.2. Accelerated/Joint Degree Dental Programs

School	Overview
Boston University Henry M. Goldman School of Dental Medicine	Designed for students to earn both their baccalaureate degree and DMD in seven years. The first three years and one summer are spent in the College of Arts & Sciences and the final four years are spent at Henry M. Goldman School of Dental Medicine. ¹³¹
Case Western Reserve University School of Dental Medicine	The Pre-Professional Scholars Program in Dentistry is a combined undergraduate and dental school program to be completed in seven years. If students enroll in the program, they can either elect to earn a bachelor’s degree in any subject or enroll in the Senior Year in Professional Studies program, which allows them to substitute the work of the first year in dental school for that required during the last year as an undergraduate. ¹³²
Clemson University / Medical University of South Carolina College of Medicine	Students will begin the accelerated pathway program by taking their undergraduate classes at Clemson University for three years. Subsequently, students will attend Medical University of South Carolina for four years, eventually obtaining their baccalaureate degree and DMD in seven years. ¹¹⁷

Marquette University School of Dentistry	The Pre-dental Scholars Program allows students to obtain both a baccalaureate degree and DMD in seven years. To be eligible for the program, students must enroll as a biological sciences, biomedical sciences, or physiological sciences major. ¹³³
New York University College of Dentistry	The B.A. and DDS joint degree program is designed for students to finish in seven years. Although the last four years must be completed at New York University's College of Dentistry, the first three years can be taken at one of two undergraduate institutions: New York University College of Arts and Science or Adelphi University. ¹³⁴
Nova Southeastern University	The dual Bachelor's Degree and Doctor of Dental Medicine Degree program can be completed in either seven or eight years. ¹³⁵
Rutgers School of Dental Medicine	A seven year program where students spend their first three years at one of 11 participating undergraduate schools followed by four years at the Rutgers School of Dental Medicine. ¹³⁶
Temple University Kornberg School of Dentistry	Students receive their B.A. at Temple University's College of Science and Technology and DMD at Temple University's Kornberg School of Dentistry in seven years. ¹³⁷
University at Buffalo School of Dental Medicine	This combined undergraduate and dental school program is designed to be completed in seven years. Students can opt to complete their undergraduate degree at University of Buffalo or The State University of New York (SUNY) Geneseo in the first three years. However, students must major in either chemistry or biology at either school. ¹³⁸
University of Connecticut School of Dental Medicine	The dual B.A./B.S. and DMD degree program is designed as an eight-year curriculum but flexible enough for students who want to accelerate their undergraduate degree. ¹³⁹
University of Detroit Mercy School of Dentistry	Students in this seven-year program spend their first three years at the McNichols Campus doing pre-dental work in the College of Engineering & Science. The last four years are in the School of Dentistry. Students can choose their undergraduate degree from either a B.S. in Biology or B.A. in Chemistry. ¹⁴⁰
University of Florida College of Dentistry	This program is designed for students to complete in seven years. The student will receive a B.S. in either Microbiology or Nutrition at the University of Florida and a DMD through the College of Dentistry. ¹⁴¹
University of Maryland School of Dentistry	Students in the three-year arts-dentistry program receive their B.S. degree in Arts-Dentistry through the University of Maryland, College Park and are allowed to apply to the University of Maryland School of Dentistry one year early. ¹⁴²

University of Pennsylvania School of Dental Medicine	Through the University’s Department of Biology and School of Dental Medicine, the accelerated dental program is a seven-year program. ¹⁴³
University of Southern California Herman Ostrow School of Dentistry	This program allows students to earn a bachelor’s degree in Dental Hygiene and a DDS in six years. ¹⁴⁴
University of Texas Health San Antonio School of Dentistry	In this seven year program, students spend their first three years at one of 18 participating undergraduate schools and their remaining four years at University of Texas Health San Antonio School of Dentistry. ¹⁴⁵
University of the Pacific Arthur A. Dugoni School of Dentistry	The only dental school in the United States where students can complete their dental schooling in three years instead of four. ¹⁴⁶