National Institutes of Health Diversity Supplement Awards by Medical School

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BACKGROUND: Increasing medical school faculty diversity is an urgent priority. National Institutes of Health (NIH) diversity supplements, which provide funding and career development opportunities to individuals underrepresented in research, are an important mechanism to increase faculty diversity.

OBJECTIVE: Analyze diversity supplement utilization by medical schools.

DESIGN: Retrospective cohort study.

PARTICIPANTS: All R01 grant–associated diversity supplements awarded to medical schools from 2005 to 2020. Diversity supplements were identified using the publicly available NIH RePORTER database.

MAIN MEASURES: Main measures were the number of R01-associated diversity supplements awarded to medical schools each year by medical school NIH funding status and the number of R01-associated diversity supplements awarded to individual medical schools in the NIH top 40 by funding status. We also examined the percentage of R01 grants with an associated diversity supplement by NIH funding status and individual medical school in the NIH top 40.

KEY RESULTS: From 2005 to 2020, US medical school faculty received 1389 R01-associated diversity supplements. The number of diversity supplements awarded grew from 2012 to 2020, from ten to 187 for top 40 schools, and from seven to 83 for non-top 40 schools. The annual growth rate for diversity supplement awards at NIH top 40 schools (44.2%) was not significantly different than the annual growth rate among non-top 40 schools (36.2%; $p = 0.68$). From 2005 to 2020, the highest number of diversity supplements that an individual medical school received was 56 and the lowest number was four (mean = 24.6, SD = 11.7). The highest percentage of R01 grants with an associated diversity supplement received by a school was 4.5% and the lowest percentage was 0.79% (mean = 2.3%, SD = 0.98).

CONCLUSION: Medical schools may be missing an opportunity to address the continuing shortage of individuals historically underrepresented in biomedical science and should consider additional mechanisms to enhance diversity supplement utilization.

KEY WORDS: NIH diversity supplements; NIH funding; research funding; faculty diversity; biomedical workforce diversity.

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INTRODUCTION

Despite modest gains in medical student racial/ethnic diversity over the last decade,[1] racial and ethnic diversity among medical school faculty remains limited. Black, Hispanic/Latino, and American Indian or Alaska Native (AIAN) people respectively represent 13.6%, 18.9%, and 1.3% of the United States (US) population.[2] However, they represented only 3.6%, 5.5%, and 0.2% of full-time US medical school faculty.[3] In addition to these disparities in representation, racial/ethnic inequities in faculty promotion,[4] salary,[5] and NIH funding[6] have been well-documented.

National Institutes of Health (NIH) diversity supplements, introduced in 1989,[7] award additional funding to an existing grant so that the principal investigator can mentor an individual at any career stage who is historically underrepresented in biomedical science.[8,9] These supplements provide direct support to the awardees to cover a portion of their salary and provide protected time to engage in research and career development opportunities.[8] Although diversity supplements are awarded competitively, the rate of success for fundings diversity supplement applications has been reported to be high.[10–12] Diversity supplements may therefore represent a potentially powerful tool to address disparities in faculty representation, promotion, and NIH funding.[7,8] Yet, little is known about how US medical schools have utilized NIH diversity supplements over time and whether utilization varies across medical schools.

The purpose of this study was to analyze diversity supplement utilization by US medical schools. Our objective was to determine whether diversity supplement utilization has varied over time, by NIH funding status, and by individual medical school.

METHODS

Ethics Approval

This study was deemed exempt by the Yale Institutional Review Board.

Data Collection

All data analyzed during the current study are available in the NIH's public RePORTER database, https://reporter.nih.gov/.[13] Data collection was performed using the Advanced Projects Search function. The search query for diversity supplements included R01 grants awarded from 2005 to 2020 and associated with one of the 10 diversity supplement Funding Opportunity Announcements that were used from 2005 to 2020 (PA-21-071, PA-20-222, PA-20-166, PA-18-906, PA-18-586, PA-16-288, PA-15-322, PA-12-149, PA-08-190, PA-05-015). The search query for all R01 grants included R01 grants awarded from 2005 to 2020. Subprojects were excluded from both search queries.

Defining Medical Schools

Medical schools were defined using the Blue Ridge Institute for Medical Research's 2020 medical school designations.[14] Blue Ridge's designations primarily follow the designations used by NIH RePORTER, with several exceptions. For example, Blue Ridge classifies Mayo Clinic as a medical school (rather than as a domestic non-profit) and combines data from Case Western Reserve University and Cleveland Clinic Lerner College of Medicine because they share facilities and a single dean.

Except for grants awarded to Mayo Clinic, we excluded from our analysis all grants that were awarded to organization types other than "schools of medicine", "school of medicine & dentistry", "overall medical", "independent hospitals", and "hospitals". For our analysis, grants awarded to independent hospitals and hospitals were assigned to their affiliated medical school. For example, grants awarded to Massachusetts General Hospital were assigned to Harvard Medical School. Medical school affiliations were determined using internet search and/or by directly contacting the hospital or medical school. Grants awarded to hospitals that were not affiliated with a medical school were excluded from our analysis.

Defining NIH Funding Status

NIH funding status was defined using the Blue Ridge Institute for Medical Research's 2020 rankings for NIH funding by medical school. We defined the NIH top 40 as the 40 medical schools that were awarded the most funding by NIH in 2020 according to Blue Ridge.

Eliminating Duplicates

To avoid counting the same grant multiple times, all R01 grants that had duplicate institute codes and serial numbers were eliminated from our sample. Because multiple diversity supplements can be awarded to the same R01 grant, diversity supplements with duplicate institute codes and serial numbers were included in all analyses by number of diversity supplements. However, diversity supplements with duplicate institute codes and serial numbers were eliminated when determining the percentage of R01 grants with at least one associated diversity supplement.

Analyses

Analyses were performed using R version 4.1.1 and RStudio. We determined the number of supplements awarded by NIH fiscal year, NIH top 40 status, and individual medical school in the NIH top 40. We calculated the compound annual growth rate of the number of supplements awarded by NIH top 40 status and descriptive statistics for number of supplements by medical school in the NIH top 40. We performed Poisson regression to determine the impact of fiscal year, NIH top 40 status, and their interaction on the number of supplements awarded (α = .05). Finally, we calculated the percentage of R01 grants awarded to each medical school in the NIH top 40 that had at least one associated diversity supplement. Code is available upon request.

RESULTS

From 2005 to 2020, US medical school faculty received 1389 R01-associated diversity supplements. Before 2012, few supplements were awarded at any institution (Fig. 1a). From 2012 to 2020, the number of R01-associated supplements awarded per year increased from 17 to 270, for an annual growth rate of 41.3% ($p < .001$).

The number of diversity supplements awarded at both top 40 and non-top 40 (by NIH funding) medical schools increased from 2012 to 2020, from ten to 187 for top 40 schools and from seven to 83 for non-top 40 schools. Poisson regression demonstrated that the annual growth rate for diversity supplement awards at NIH top 40 schools (44.2%) was not significantly different than the annual growth rate among non-top 40 schools (36.2%; $p = 0.68$; Fig. 1b). From 2005 to 2020, medical schools in the NIH top 40 by funding status received 70.8% (n = 983) of all R01-associated diversity supplements (Fig. 1a).

In the same period, NIH top 40 institutions had 43,380 active R01 grants, 919 (2.12%) of which had at least one associated diversity supplement, and non-top 40 institutions

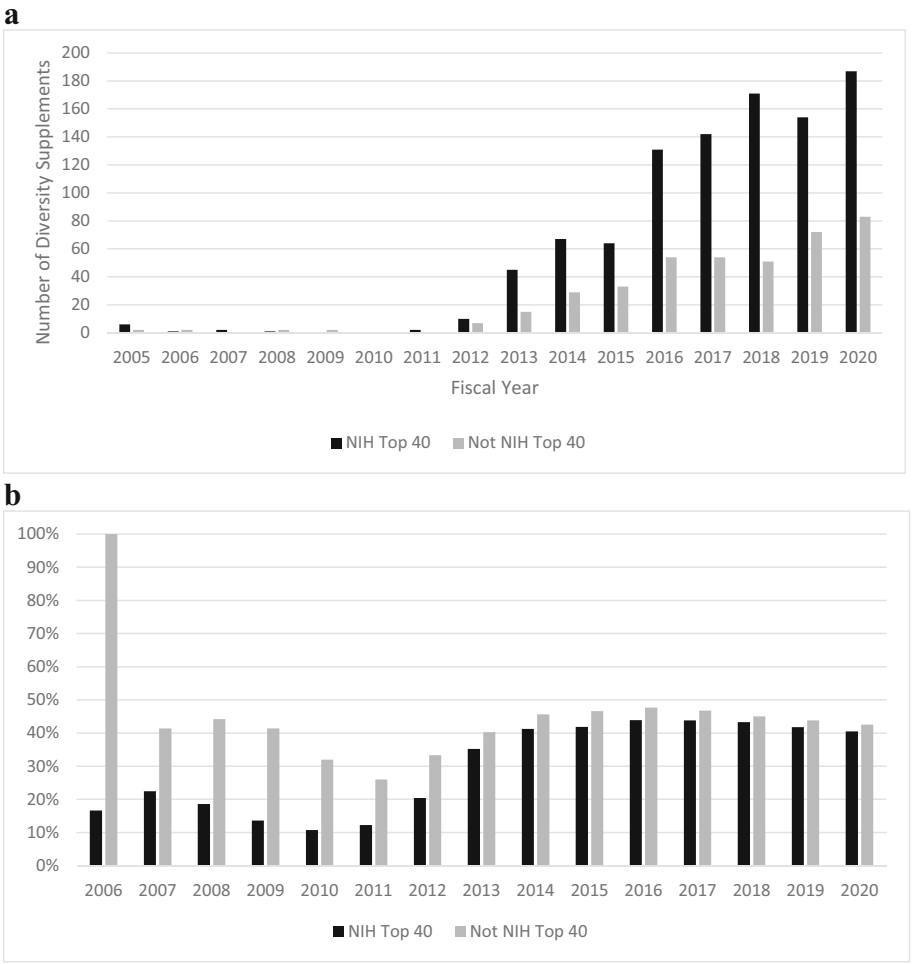

Fig. 1 Diversity supplements by NIH fiscal year and NIH top 40 funding status from 2005 to 2020. a Number of diversity supplements (*y*-axis) by fiscal year (*x*-axis). b Compound annual growth rate of diversity supplements (*y*-axis) by fiscal year (*x*-axis)

had 18,134 active R01 grants, of which 384 (2.12%) had at least one associated diversity supplement.

From 2005 to 2020, the highest number of diversity supplements that a school received was 56 and the lowest number was four (mean = 24.6, SD = 11.7; Fig. 2a). The highest percentage of R01 grants with an associated diversity supplement received by a school was 4.5% and the lowest percentage was 0.79% (mean = 2.3%, SD = 0.98; Fig. 2b). The highest number of R01-associated diversity supplements awarded to a school in a single year[15] occurred in 2020. That same year, three NIH top 40 medical schools received no R01-associated diversity supplements.

DISCUSSION

Despite rapid growth in the number of diversity supplements awarded over the last 15 years, only a small percentage of R01 grants awarded to medical schools have an associated diversity supplement. Since 2005, there has been significant variation in the utilization of diversity supplements among medical schools, even within the NIH top 40. Interestingly, NIH top 40 medical schools were no more likely than non-top 40 schools to have diversity supplement funding.

This study was limited by the unavailability of information on the number and success rate of diversity supplement applications by medical school. Although diversity supplements appear to have a high success rate, the budget reserved for diversity supplements is not publicized and may vary by institute.[10–12] Some supplements may have been awarded to affiliated hospitals that were not accounted for by this study. Some medical schools may have received diversity supplements for organization or grant types not accounted for in this study or some diversity supplements may have been misclassified as other award types in NIH RePORTER. However, our sample included 75.5% of all diversity supplements awarded to medical schools from 2005 to 2020 as reported by NIH RePORTER. Additionally, NIH RePORTER is meticulously maintained and reported errors are corrected by data stewards.[15]

The results of this study suggest that many medical schools may be missing important opportunities to mentor, retain, and develop faculty of color by not pursuing diversity supplements more aggressively. Research has shown that federally funded

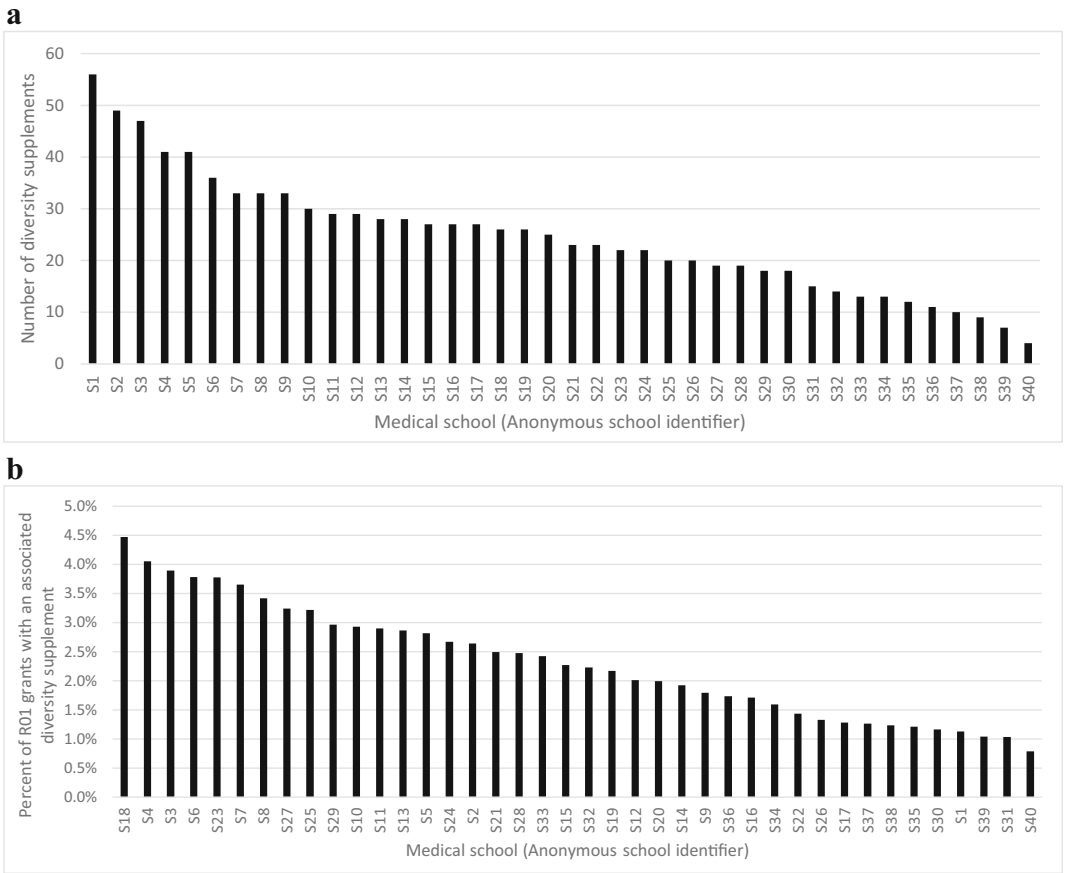

Fig. 2 Diversity supplements by medical school in the NIH top 40 from 2005 to 2020. a Number of diversity supplements (*y*-axis) by medical school (anonymous school identifier on *x*-axis). b Percent of R01 grants with an associated diversity supplement (*y*-axis) by medical school (anonymous school identifier on *x*-axis)

faculty development programs for diversity are associated with increased faculty diversity over time,[16] providing an evidence-based case for the use of interventions like NIH diversity supplements to address disparities of representation in the biomedical research workforce.

While many medical schools have verbally advocated for the need to increase faculty diversity, a school's use of diversity supplements may represent an explicit measure of an institution's commitment to promoting diversity, equity, and inclusion. Diversity supplements also allow institutions to increase their direct and indirect research funding and enhance research output.[8] Rather than rely on the efforts of individual faculty members to procure diversity supplements, medical school leadership could develop institutional infrastructure to streamline the process for diversity supplement submission.

Potential interventions include increasing faculty awareness of the diversity supplement program[17] and/or instituting procedures to match faculty interested in pursuing diversity supplements with eligible candidates. In addition to tracking and publicly reporting total NIH funding, individual medical schools could also track and report diversity supplement applications and awards. The NIH should also consider increasing the funding reserved for diversity supplements to make them more widely available.

Diversity supplements represent a tremendous opportunity to increase faculty diversity and medical schools should consider additional mechanisms to enhance diversity supplement utilization.

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