The Medical Foundation
Health Resources in Action

POLICY AND PRACTICE REPORT

Developing a Racially Diverse Biomedical Research Workforce

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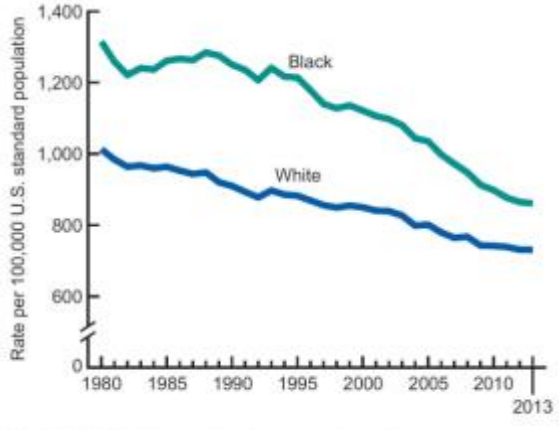
OVERVIEW

The achievement of health equity is a priority of Health Resources in Action (HRiA). While there has been enormous improvement in health in recent decades, stark gaps remain in life expectancy, disease incidence, and health status among the diverse populations in the United States. The National Center for Health Statistics estimates that blacks born in in the United States in 2013 (the latest year for which data is available) can expect to live 3.6 years less than whites. Differences in health status are well documented across racial groups, and for a variety of diseases. For example, the racial gap in cancer mortality has remained relatively constant over the past 20 years.[1] In 2013, Black Americans continued to experience higher age-adjusted death rates than whites (see Figure 1), and had double the rates of death due to common preventable conditions such as hypertension, suicide, pneumonia, and influenza.[2]

Some of the difference may be due to a general trend in the U.S., where higher income is linked with increased life expectancy.[3] The social determinants of health – including economic stability, neighborhood and built environment, social and community context, and education. – undeniably play a large role in both race and class discrepancies.

FIGURE 1
Continued Racial Disparities in Death Rates



SOURCE: CDC/NCHS, National Vital Statistics System, Mortality.

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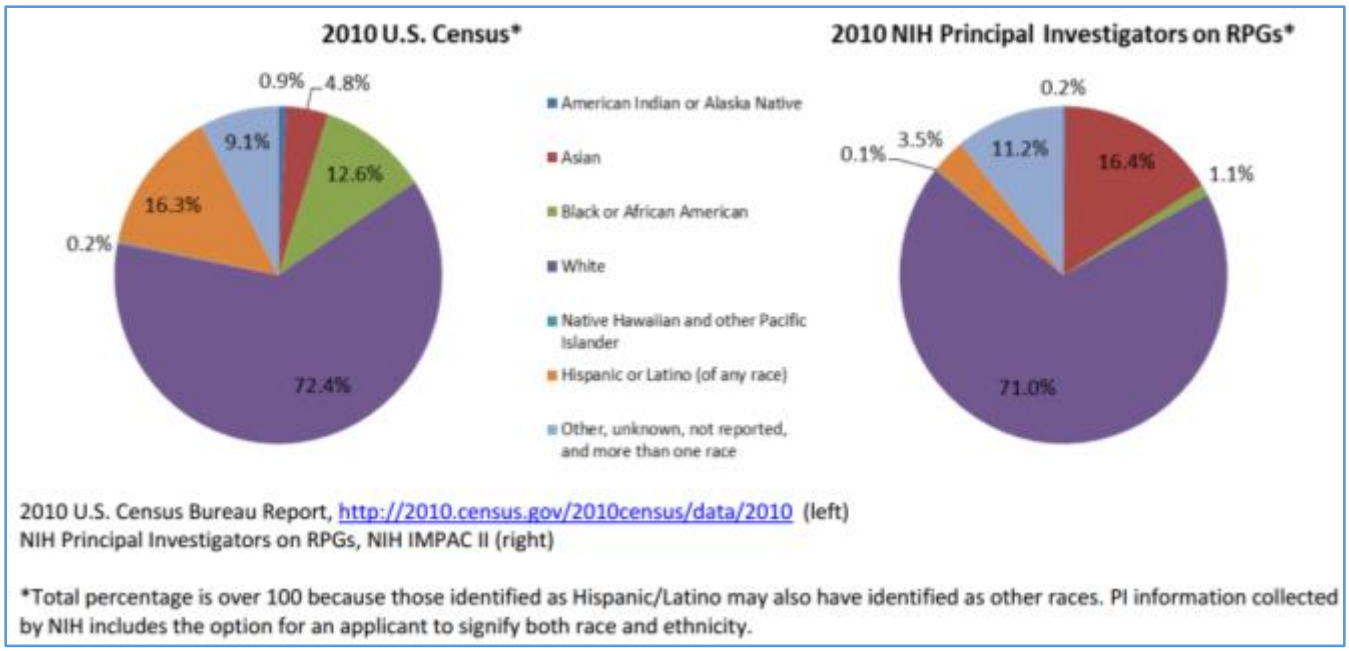
However, there may be another contributing factor. It seems likely that the ability of our research enterprise to improve our health remains substantially compromised by the relative racial and ethnic homogeneity of our current research workforce. While 12.6% of Americans are Black and 16.3% are Hispanic or Latino, only 1.1% of National Institutes of Health (NIH) Principal Investigators are Black and just 3.5% are Hispanic or Latino (see Figure 2).[4]

A HOMOGENEOUS FIELD IN A DIVERSE SOCIETY

Diversity in scientific research benefits the workforce and society at large. Innovation in biomedical sciences relies on a vast range of observational, analytical, and computational skills; the knowledge and talents of investigators with multiple perspectives can best meet the varied health needs of our changing society.[6, 7, 8, 9] Diverse teams bring a variety of backgrounds, experiences and perspectives; they generally outperform homogenous teams, particularly those attempting

FIGURE 2

Race and ethnicity of the 2010 U.S. Population and the 2010 NIH Principal Investigators



Reproduced from NIH: http://acd.od.nih.gov/diversity%20in%20the%20biomedical%20research%20workforce%20report.pdf

As an organization that serves 13 philanthropic foundations in making grants in biomedical research, The Medical Foundation at Health Resources in Action (HRiA) has a long-standing and deep interest in and knowledge about scientific research and the research workforce. For example, HRiA recently described the challenges facing young women scientists as they begin their careers.[5] This report presents the status of racial and ethnic diversity in biomedical research, efforts underway to create a more inclusive scientific workforce that reflects the U.S. population, and a proposed approach that leverages the extraordinary scientific resources in our country, and especially in Boston, with the potential to spur discovery and improve the health of the entire nation.

to solve complex problems.[8, 10] Researchers from diverse backgrounds are also more likely to explore topics that are overlooked, thereby broadening the scope of biomedical research[11] and thus our understanding of the impact of disease on all populations. Citing these and similar factors, the National Institutes of Health has sought to increase the diversity of its independent investigators.[12]

We are, however, far from achieving meaningful diversity among independent investigators. The underrepresentation of Blacks in biomedical research has been widely documented. In 2010, Blacks comprised 12.6% of the U.S. population but accounted for just 1.1% of NIH principal investigators.[4] In 2011, Black researchers were

significantly less likely to receive funding from the NIH than their White counterparts; this difference remained after controlling for factors such as education, country of origin, training experience, previous research awards, number of publications, and institutional research base.[13] The NIH reports that in 2015, only 13 of its 835 (1.6%) Senior Investigator (tenured) workforce was Black, Non-Hispanic, and 3.2% were Hispanic.[14]

Tabak and Collins[15] assert that White applicants for NIH funding are more likely to benefit from the cumulative benefits of a quality education starting in elementary school, mentoring opportunities, and access to resources that propel their career. Implicit bias may play a role in lower funding rates for Black scientists. In 2012, the NIH Working Group on Diversity in the Biomedical Research workforce reported a significantly worse *overall impact score*—used by the NIH to rank applications and make funding decisions—for Black applicants.[4] These racial differences in the critical overall impact scores persisted even after correcting for differences in the more narrowly defined categorical subscores (criterion scores) reported by the very same reviewers.

The lack of diversity among senior scientists has far-reaching consequences. A relatively homogenous scientific workforce may tend to employ similar approaches to complex problems, inhibiting progress in the field.[4, 5] Other issues also affect research progress. The intensely personal nature of biomedical research influences research priorities. Researchers, grant reviewers, philanthropists, scientists and funders reported that they choose research priorities based on their own health histories, or those of their friends and families. A homogeneous workforce is less likely to undertake the study of diseases that disproportionately affect minority populations. The primarily White research profession affects the alignment of research priorities to disease burden. For example, funding for research about sickle cell anemia, the most common single-gene genetic disorder in the United States, and one that is relatively common among U.S. Blacks, lags far behind funding for less prevalent genetic diseases, including cystic fibrosis, that affect a largely White population.[16]

Lack of diversity among investigators may contribute to the challenges in recruiting patients to participate in clinical trials. Members of minority groups together constitute more than 30% of the U.S. population, however they represent less than 18% of clinical trial participants. Research progress critically depends on the willingness of patients and members of the public to enroll in clinical trials. Potential cures for persistent diseases and health challenges, particularly those with disproportionate incidence among low income and/or multicultural populations, rely on participation by all groups in scientific research. Individuals from diverse backgrounds are more likely to participate in research studies exploring topics specific to their communities.[19, 20, 21]

All-white investigator teams may contribute to causing discomfort and reluctance among non-white individuals to participate in research studies. Limited understanding by investigators of cultural differences can contribute to ineffective or even inappropriate communication strategies about research at all stages, including recruitment, enrollment, and retention. Mistrust was a widely reported barrier across four racial and ethnic groups in a recent literature review, (77.3% of all articles reviewed), and was associated among Blacks with the perception that research benefits Whites or the research institution, and not people of color or their communities. Mistrust was also linked to dark historical experiences of minorities in research studies, and to a fear of purposeful mistreatment and experimentation, characterized as being treated like a "lab rat" or "guinea pig".[22] Multiple other barriers to participation in research studies have been reported including competing demands of multiple jobs, experiences of differential treatment in the health care system, the absence of bilingual research staff and information materials, and legal status. A variety of strategies have been tried to increase minority participation, including matching participant and investigator demographics.[23, 24]

THE MAKING OF A SCIENTIST

Independent biomedical researchers have completed an exceptionally long education and

training path, which starts in high school and continues to the median age of the mid 40s for the first NIH independent research award. Biomedical scientists typically develop their career interests in high school, choose science courses in the first year in college, major in science in college, and then attend graduate school for five or more years to earn their PhD degree. Young scientists then train as postdoctoral fellows for another two to five years before undertaking a long series of increasingly independent research experiences, eventually establishing their own research careers.

Viewed through this perspective, it becomes apparent that high school, when students are first exposed to the physical and life sciences, is a critical period for developing researchers.[25] Successful students solidify their interest in science in high school and enter college qualified for enrollment in the required introductory science courses. However, most minority students don't even enter this long pipeline of education and training. Many high school students, particularly in low-income communities, do not have adequate access to the rigorous academic preparation required for entry into the field. Without advanced science education, many students lose interest and may even begin to underachieve. For those who remain interested in biomedical science, many are discouraged from taking competitive high school math and science courses and do not receive proper advising about the college admission process.[26] These students enter college at a disadvantage and find it challenging, if not impossible, to keep up.

In one study, researchers followed 33 diverse high school students interested in careers in science, technology, engineering, or math (STEM) over a three-year period.[27] Forty-five percent of the students who expressed interest in a STEM career in the tenth grade were no longer interested in the field by their senior year. During twelfth grade interviews, most explained that they had little to no science-related extracurricular opportunities and no contact with professionals in the field.

The problem persists throughout the educational process. Significantly fewer Black students who enter college intending to major in biological sciences become graduate students in the field compared white students*. Some of this attrition may be linked to poor preparation in high school. The lack of quality science programs in high school is generally augmented by little if any exposure to diverse research professionals. It is quite unlikely that interested students will find a Black mentor during their education and training. There were over two thousand times as many Black college freshmen interested in biological sciences as there were Blacks with independent NIH research funding, as shown in Figure 3, which draws on data from both the National Academy of Sciences and the National Institutes of Health.

Many young students lack access to workplace-based experiences that strengthen their competitiveness for college. Most programs aiming to increase science workforce diversity target high-achieving college graduates, not elementary, middle, and high school students. The Academic Competitiveness Council published a report in 2007 that examined programs committed to improving America's competitiveness in STEM. Only 19 of the 107 federally sponsored STEM programs in 2006 targeted students in the kindergarten through twelfth grades.[28]

Not surprisingly, fewer and fewer potential scientists advance through the subsequent steps to career readiness. In 2015, investigators reported that white freshmen students intended to major in biological and agricultural sciences at roughly twice the rate of Black students (698,869 White students v. 117,119 Black students). By way of comparison, the U.S. Department of Education reports that 14.7% of undergraduate students are black, while 58.3% are White. By graduate school, the number of White students in the biological sciences was 38,878 compared to 3,677 Black graduate students. Later in their careers, an estimated 3,500 White researchers were awarded independent investigator-initiated (R01) grants compared to only 55 Black researchers. (See Figure 2)
This trajectory can be reversed. One program involving Black high school students who participated in a summer science camp doubled the proportion who expressed interest in taking additional science courses and the number of students who planned to major in science in college.[29]

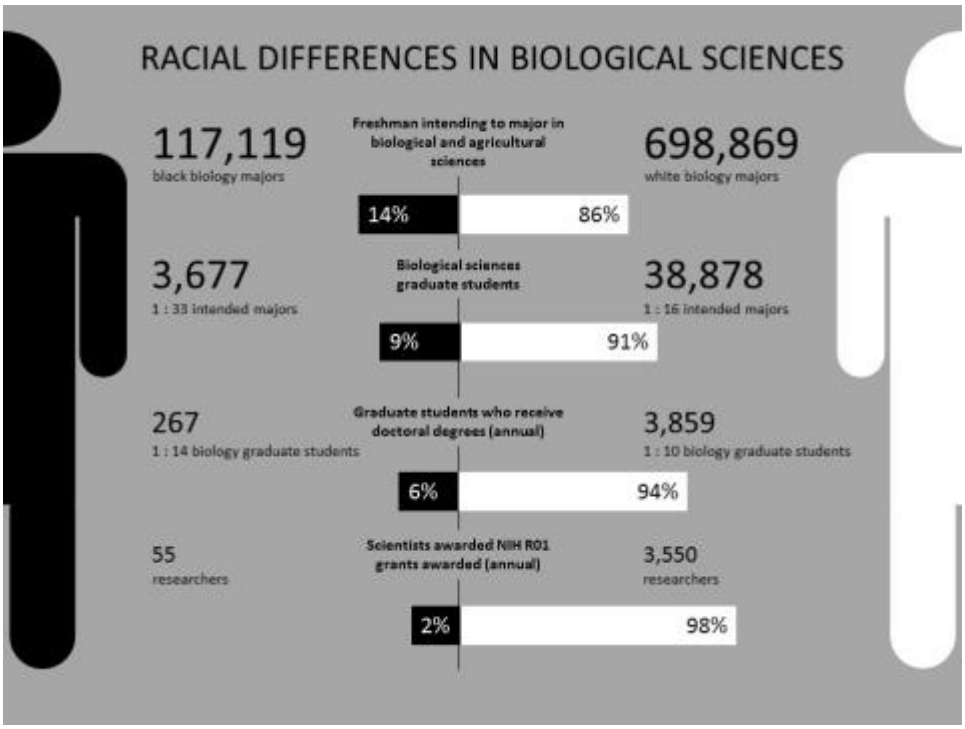
*1 in 33 Blacks compared to 1 in 18 Whites, Odds Ratio 0.55 (0.53-0.57)

CURRENT PROGRAMMING: LESSONS LEARNED AND MILES TO GO

Boston is one of the most renowned research centers in the world. The top academic and health care organizations prepare the next generation of leading scientists and apply constantly evolving knowledge to caring for patients with some of the most complex and damaging diseases of our time. These institutions increasingly recognize the need to diversify their workforces, yet with few exceptions, most are not making a thoughtful and strategic commitment to sustainable change.

FIGURE 3

Racial disparities in the biological science workforce by career stage



National Science Foundation, National Center for Science and Engineering Statistics. 2015. Women, Minorities, and Persons with Disabilities in Science and Engineering: 2015. Special Report NSF 15-311. Arlington, VA. Available at www.nsf.gov/statistics/wmpd/

National Institutes of Health. Draft Report of the Advisory Committee to the Director Working Group on Diversity in the Biomedical Research Workforce. Published June 13, 2012. Available at http://acd.od.nih.gov/dbr.htm

In Boston, as in many cities, resource-deprived neighborhoods adjoin large academic health care centers. Many students of the Boston Public Schools are challenged by deeply entrenched problems that threaten their ability to succeed. These include poverty, unstable housing, violence, and substance use. Many students attend schools with inadequate educational programs that don't expose them to the region's scientific enterprises, inspire their talents, or help them plan a course for success.

Furthermore, due to the small number of minority scientists, young people of color have little or no personal exposure to researchers and role models they can identify with and who might spark their interest in research careers, encourage their enrollment in science courses, and facilitate their access to enrichment programs. Without personal encouragement, young people may feel shy or awkward about participating in programs in which they can interact with professionals they perceive to be vastly more educated. Or, they may simply not know where to start.

Developing solutions that will make our next generation of scientists more diverse will require long-term investments that begin in secondary school and apply the growing knowledge of what it takes to help young people from under-resourced communities succeed. This investment will result in improvements in knowledge and health. Increasingly diverse research teams will focus their investigations on diseases that disproportionately affect non-white populations, thereby addressing health disparities through improved understanding of the underlying causes and cures of disease for all Americans. As young people of color become more engaged, a broader constituency from all communities may choose to become participants in scientific research, and enjoy the associated benefits of advanced medical care while contributing to our future health care knowledge.

Building the Next Generation of Top Scientists

National initiatives

Several colleges and universities sponsor efforts to support minority students interested in biomedical sciences. We found 13 programs [Table] that provide high school students with summer research opportunities, most of which are funded by the NIH. The remaining programs receive funding through collaborative initiatives between donors, laboratories, and educational institutions.

These programs admit the highest achieving high school and/or college students for periods ranging from three weeks to entire summer or year-long experiences. Some programs prefer students with prior lab experience or advanced work courses. All include compensation in the form of stipends, hourly pay, or scholarships, and the majority integrate mentorship components.

A new NIH program, Research Supplements to Promote Diversity in Health-Related Research for High School Students, awards $1,000 supplemental funding to Principal Investigators who include high school students in their projects. Priority is given to PI's who include underrepresented racial and ethnic students, individuals with disabilities, and those from disadvantaged backgrounds.

Initiatives in the Greater Boston Area

Closer to our Boston home, there are limited efforts underway to engage underrepresented minority students in the sciences. A recent review by HRiA of 20 such programs [Table] shows current outreach efforts of Boston -area research institutions universities and research organizations. The programs are varied: some admit the highest achieving high school and/or college students from urban or suburban settings for periods ranging from six weeks to whole summer or year-long experiences. Students may be paid, receive stipends, or participate as volunteers. They may work in meaningful roles in established research labs or carry out lower level tasks that prepare them for technical research jobs that provide a living wage but don't offer the kinds of opportunities that support their development as independent scientists.

Other noteworthy initiatives merit review. The Massachusetts Life Sciences Center has invested more than $12 million in bringing modern lab equipment to high schools, middle schools, and organizations in Massachusetts. This opportunity has the potential to vastly improve students' access to technology that will help boost their learning and improve their competitiveness for college and eventual employment in the life sciences. Schools that meet the criteria for application(?)are public schools in which at least 30% of students qualify for free or reduced price lunch. These schools may apply for up to $100,000 in funding to purchase lab equipment. (Applicants seeking between $100,000-$250,000 must secure matching funds for the amount over $100,000 from an industry partner.)

HRiA's Leaders in Education, Action and Hope (LEAH) project trains low-income high school students in the Boston Public Schools (BPS) as mentors to facilitate hands-on science lessons and provide homework help to BPS elementary school students. The project offers valuable work experience, increases interest in the sciences, and offers job readiness skills to high school mentors while inspiring low-income elementary students to succeed academically and develop their interests in science.

Conclusion

We have an enormous opportunity to build on what works while supporting promising efforts to prepare young and diverse students for careers in science. Programming that engages aspiring students who have the will and potential for success requires sustained commitment by all of our public schools, hospitals, higher-educational institutions, and research institutes. Their investments will yield greater talent by increasing diversity in the scientific workforce. As a city with one of the most advanced research enterprises in the world that is home to 17 Nobel laureates, Boston can serve as a model of the impact of accessible biomedical science education on diversity in scientific research and on our ability to improve health locally and globally.

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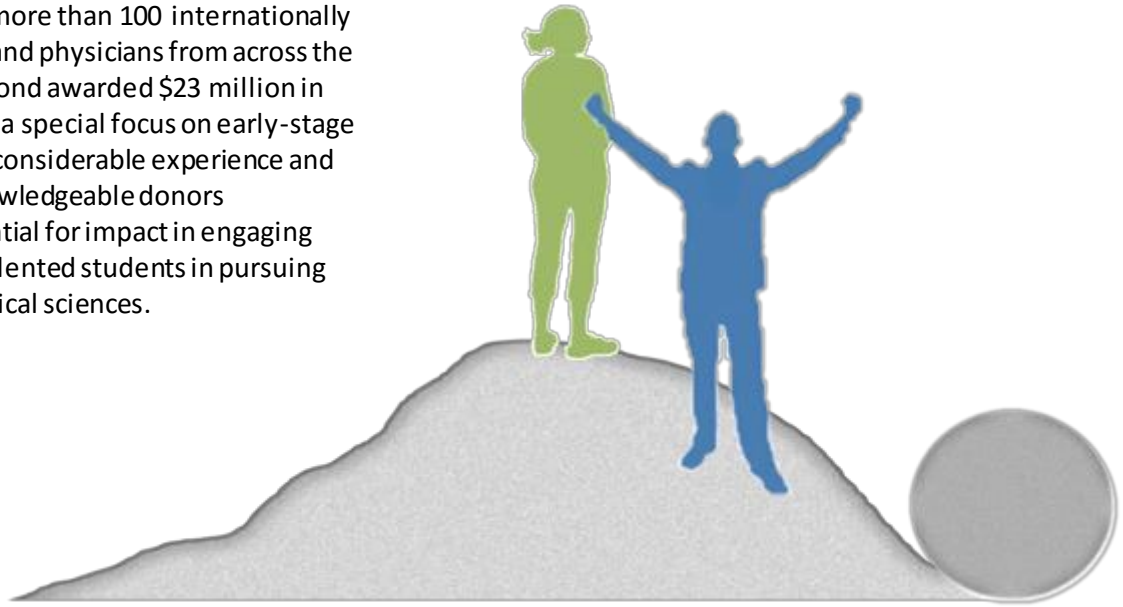
About Health Resources in Action

For over fifty years, HRiA has been a leader in developing programs that advance public health and medical research. HRiA works with governments, communities, scientists, legislators, and nonprofit organizations that share an imperative for resolving today's most critical public health issues through policy, research, prevention, and health promotion.

The Medical Foundation at HRiA advises individual, family, and corporate philanthropists on the latest breakthroughs in life sciences research. We provide expertise in clinical, translational, and basic science research as a recognized leader in designing customized grant programs that accelerate medical discoveries. In 2015, more than 100 internationally recognized scientists and physicians from across the United States and beyond awarded $23 million in research awards, with a special focus on early-stage investigators. HRiA's considerable experience and partnerships with knowledgeable donors strengthens the potential for impact in engaging young, diverse, and talented students in pursuing careers in the biomedical sciences.



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Health Resources in Action (HRiA) is a nonprofit public health organization dedicated to promoting individual and community health through prevention, health promotion, policy, and support of medical research. HRiA is the parent organization of the Medical Foundation which provides medical research grants programs and philanthropic advisory services.

Our Vision:
A world where social conditions and equitable resources foster healthy people in healthy communities.

Our Mission:
To help people live healthier lives and create healthy communities through prevention, health promotion, policy, and research.

Our Values:

- Commitment to social justice in our work
- Excellence and innovation in our approach
- Leadership where there is need
- Collaboration where there are opportunities
- Passion and thoughtfulness in our endeavors
- Diversity in our organizational practices

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Table 1: Sample Massachusetts Programs/Initiatives to Engage High School Students of Color in the Sciences			
Program Description	**Summary**	**Contact**	**Charge/ Compensation**
Continuing Umbrella of Research Experiences (CURE)	Low income, under-represented high school and college students are placed at local cancer research institutions.	Dana-Farber/Harvard Cancer Center iecd@partners.org	Stipend
Forsyth Educational Outreach Program	Low income, underrepresented high school students work in the laboratory with world-renowned scientists engaged in cutting edge research.	The Forsyth Institute 245 First Street Cambridge, MA 02142 617-262-5200	Paid Internship
Minority Introduction to Engineering and Science (MITES)	Six-week summer advanced academic enrichment program for promising high school juniors interested in STEM. Participants develop relationships with individuals from diverse racial, ethnic, cultural, and socioeconomic backgrounds.	Executive Director: Shawna L. Young 77 Massachusetts Avenue, E38-104 Cambridge, MA 02139 617-253-8052	Free
Upward Bound Math Science	Upward Bound Math Science is a part of the federally funded TRIO programs, whose purpose is to prepare low-income and first-generation college bound students for success in higher education.	Boston University School of Education Upward Bound Math Science 2 Silber Way Boston, MA 02215 617-353-3551	Free
Summer Science and Engineering Program (Smith College)	Four-week summer residential program in which young women with strong interests in science, engineering, and medicine conduct hands-on research with Smith scientists and engineers.	Director of Summer Programs & Conference Services 30 Belmont Avenue Smith College Northampton, MA 01063 413-585-2165	
Summer Pathways in Science and Engineering (exclusive to young women)	Summer Pathways is an opportunity for young women to explore science and engineering fields.	Cynthia Brossman Boston University, LERNet 590 Commonwealth Ave Boston, MA 02215 617-353-7021 cab@bu.edu	$675

Boston Leadership Institute	Three-week summer research program taught by leading scientist in biomedical sciences, chemistry, psychology, physics, engineering, marine biology, neuroscience, and STEM entrepreneurship.	info@bostonleadershipinstitute.com 781-431-2514 http://bostonleadershipinstitute.com/research-programs.html	
Bioinformatics Inquiry through Sequencing (Tufts University)	Six-week summer research experiences in bioinformatics, including molecular biology and genetics lab techniques. Students learn to collect and make sense of data by working with a next- generation DNA sequencer.	Tufts Summer Study 419 Boston Avenue Medford, MA 02155 617-627-2000	$2,725
MGH Youth Scholars Program	Massachusetts General Hospital's Center for Community Health Improvement (CCHI) offers a variety of programs to help high school students get the resources they need to pursue careers in health care.	617-724-3210	
Student Success Jobs Program	Brigham and Women's Hospital offers a year-round internship program that introduces 80 students to medical, health and science professions. Limited to partnering high schools. Linked to summer internship program	Daina Estime, SSJP Student Coordinator. (617) 264-8743 (destime@partners.org)	
Boston University Research in Science and Engineering (RISE) program	Student entering their senior year of high school who are interested in the sciences contribute to research projects in science and engineering.	rise@bu.edu	$6,700
Broad Summer Scholars Program (Note: of 13 students in 2015, only 1 was African American/Black)	Six-week summer research program for exceptional and mature students with a keen interest in science.	Rachel Gesserman Broad Institute of MIT and Harvard 415 Main Street (formerly 7 Cambridge Center) Cambridge, MA 02142 rgesser@broadinstitute.org	
The Jackson Laboratory Summer Student Program	Introduction to research science. The emphasis is on methods of discovery and communication of new knowledge, not the mastery of established facts.	Students from CT, NH, and MA	Stipend

The Young Scholars Program, Northeastern University Colleges of Arts and Sciences and Engineering	The Young Scholars Program offers Boston-area high school students who have completed their sophomore or junior year of high school to have hands-on experiences in science and engineering research laboratories.	Center for STEM Education Attn: Young Scholars Program 153 Snell Engineering Northeastern University 360 Huntington Ave. Boston, MA 02115	
Genetics Internship at Partners HealthCare Personalized Medicine	Six-week summer research opportunity with hands-on experiences in cutting-edge research and clinical testing facilities for rising high school seniors.	Amy McGlinn at amcglinn@partners.org via fax (617-525-4488) or mail (77 Avenue Louis Pasteur, Suite 250 Boston, MA 02115).	
Woods Hole Science Aquarium (WHSA) High School Summer Intern Program	High school students learn about marine animals and environments, aquarium operations, and careers in marine science and related fields.	George.Liles@noaa.gov	

Table 2: Sample National Programs/Initiatives to Engage High School Students Interested in the Sciences

Minority Specific Programs	Summary	Contact	Charge/ Compensation
Short-Term Research Experience for Underrepresented Persons (STEP-UP) NIH & NIDDK	Summer research experiences for high school and undergraduate students. Goal is to build a research workforce pipeline focused on the National Institute of Diabetes and Digestive and Kidney Diseases' (NIDDK) core mission areas.	Rob Rivers, Ph.D. niddkestepup@mail.nih.gov	Research Stipend
Summer Internship Program in Biomedical Research (SIP)	Developmental training experience across NIH departments for promising high school interested biomedical sciences.	Debra Anderson debra.anderson@nih.gov	Research Stipend
High School Scientific Training and Enrichment Program (HISTEP)	HISTEP expands the pipeline of high school sophomores and juniors interested in STEM and biomedical and healthcare careers by providing opportunities for students from schools with a large population of financially-disadvantaged students.	HiStep@od.nih.gov	$1,740/mo + travel stipend
High School Scientific Training and Enrichment Program 2.0 (HISTEP 2.0)	Summer research program for high school seniors with little or no research experience on the NIH Main Campus in Bethesda, MD.	HiStep@od.nih.gov	$1,740/mo + travel stipend

	Students receive benefits to cover the cost of public transportation and a stipend determined by their grade level completed prior to starting at the NIH.		
Mathematics & Science for Minority Students (Phillips Academy)	Residential summer program founded in 1977 to cultivate the mathematical and scientific abilities of economically disadvantaged African American, Latino, and Native American high school students from targeted cities and communities across the United States.	ms2@andover.edu 978-749-4402	Free
Neurological Surgery Summer Student Program (NIH & Univ. of Washington)	Provides "bench to bedside" exposure to the field of neurosciences.	Christina Buckman, Program Coordinator cbuckman@neurosurgery.washington.edu 206-897-5732	$2,667
Summer Internship Program in Biomedical, Behavioral, or Statistical research, specifically Vision Research and Ophthalmology	NEI seeks to increase the number of underrepresented minorities in vision research by promoting career development opportunities for science students interested in pursuing a career in research or medicine.	Cesar Perez-Gonzalez Program Coordinator 301-451-6763 cesarp@nei.nih.gov	$2,667
Summer Research Apprentice Program (SRAP) in math, engineering, statistics, and the sciences	High school student summer STEM program at University of Wyoming.	Lisa Abeyta SRAP Project Coordinator labeyta1@uwyo.edu	Paid. SRAP is funded by Wyoming NSF EPSCoR through the National Science Foundation grant (EPS-0447681).

Jefferson Lab High School Summer Honors Program	Increasing the number of teachers with a substantial background in math and science, strengthen the motivation and preparation of all students, especially minorities and females, and address the serious underrepresentation of minorities and females in science, math, engineering and technology careers.	Jefferson Lab High School Summer Honors Program Office of Science Education, MS 28E Thomas Jefferson National Accelerator Facility 628 Hofstadter Road, Suite 6 Newport News, VA 23606 757-269-7633	Paid
PI's to Include High School Students	**Summary**	**Contact**	**Charge/ Compensation**
Research Supplements to Promote Diversity in Health-Related Research for High School Students	This supplement enables Principal Investigators with eligible NHLBI research grants to include high school students in their projects. Priority is given to applications requesting support for	Nara Gavini, Ph.D. Center for Translation Research and Implementation Science (CTRIS) National Heart, Lung, and Blood Institute	Salary for a high school student, consistent with the institutional salary
	individuals from underrepresented racial and ethnic groups, including African Americans, Hispanic Americans, American Indians/Alaska Natives, Native Hawaiians and Pacific Islanders.	NIH 6701 Rockledge Drive Room 9184, MSC 7913 Bethseda, MD 20892-7913 301-451-5081 gavininn@nhlbi.nih.gov	policies. An additional $1,000 per year may be requested for supplies and travel to scientific meetings, home, school, and/or research site.

Non-Minority Specific	Summary	Contact	Charge/ Compensation
Summer Internship Program (SIP) in Biomedical Research	Summer programs at the National Institutes of Health (NIH) provide opportunities for high school, college and graduate students starting at age 16 and older to spend a summer in biomedical laboratories at the NIH working side-by-side with leading scientists.	National Institutes of Health Framingham, MA Summer_Postbac_Questions@mail.nih.gov www.training.nih.gov/programs/sip	Stipend
Research Science Institute	Summer program for 80 of the world's most accomplished high school students. Combines on-campus course work in scientific theory with off-campus work in science and technology research	Center for Excellence in Education (CEE) Maureen Palmer (Program Manager) mpalmer@cee.org	
The Davidson Institute Fellows Scholarship	Makes awards to extraordinary young people, 18 and under for STEM, literature, music, philospophy, and Creative projects.	DavidsonFellows@DavidsonGifted.org	Scholarship
The Institute on Neuroscience (ION/Teach)	Summer research program Student and teacher scholars conduct mentored laboratory research projects. Sponsored by the National Institute of Mental Health (NIMH) and hosted by Georgia State University, Emory University, and the Yerkes National Primate Research Center.	Reagan Horack Koski rkoski1@gsu.edu	Paid Hourly
The Jackson Laboratory Summer Research Program	The Summer Student Program is designed to help students understand the nature of research science. The emphasis of this program is on. methods of discovery and communication of knowledge, not the mastery of established facts	Bar Harbor, ME	$4,750 + roundtrip travel to lab
Arthritis Foundation Summer Science Internship Program	Outstanding high school students work in leading research and clinical laboratories at Stanford University and the University of California, San Francisco (UCSF), in either basic laboratory (bench) research or clinical translational/epidemiological (patient outcomes oriented) research.	Cecilia Haywood chaywood@arthritis.org 415-356-1230	$1,500