



EDITORIAL

Racial Inequalities in Health and Research

By SPENCER SHORKEY

MILLERS FALLS – The 1776 Declaration of Independence of what would become the United States of America included the phrase “all men are created equal” – however, the white male that wrote it owned hundreds of enslaved Black people. The US Constitution, ratified in 1788, codified the young slave-nation’s racism by stating that enslaved people were “counted as three-fifths of a free individual.” And in the USA’s early days, only land-owning white males could vote. It wasn’t until the 15th and 19th Amendments in 1870 and 1919 that voting rights were protected for all races and women respectively. Even with this constitutional protection, voter suppression tactics continue to this day.

That the American ideal of the equality of all people has yet to be realized is evidenced by our economic and political systems, which have continuously been dominated by wealthy capitalists; their exploitation of the working class has yielded a country where the top tenth of households own 70% of all wealth while the bottom half own 2%. Four million enslaved people were emancipated into this system by 1865, a system which unsurprisingly perpetuates oppression and inequality over a century later. Those with money get richer, while those without get stepped on.

One aspect of the inequality and racism that persist to this day is disparity related to public health. The significant disparities Black and Indigenous Americans face compared to White Americans and Asian Americans include higher rates of hypertension, diabetes, obesity, HIV/AIDS, and coronavirus.

For example, a study of COVID-19 deaths in the USA in the *Journal of the American Medi-*

cal Association found that in 2020, pre-vaccine, Black Americans had a twofold higher mortality rate than White Americans. Scientific studies aimed at fixing these and many more health disparities are funded through the National Institute on Minority Health and Health Disparities (NIMHD).

The NIMHD is one of 27 research institutes and centers funded by the National Institutes of Health (NIH). It funds studies such as how pharmaceuticals may affect racial groups differently, approaches to bringing farmers markets to food deserts, and the relationships between the number of alcohol outlets and neighborhood violence.

In 2021 the NIMHD received \$392 million, or less than one percent of the NIH’s \$43 billion budget. By comparison, the NIH’s highest-funded institute, the National Cancer Institute (NCI), received \$6.6 billion. While the disease of cancer results in \$200 billion in healthcare costs and \$150 billion in lost productivity annually, health disparities cost our country approximately \$93 billion in excess medical care and \$42 billion in lost productivity annually.

In comparing societal economic burdens to research spending, we find the NIMHD spends \$1 per \$344 of the estimated annual burden of health disparities, while the NCI spends \$1 per \$53 of annual cancer costs. This goes to show that compared to cancer research, health disparity research is relatively underfunded by a factor of about seven.

Barriers to Involvement

Not only are there racial health disparities, and underfunded research efforts to address them, but in 2021 only 2.6% of all NIH-funded research proposals went to Black scientists – a five-fold underrepresenta-

tion, considering that 13% of the US population is Black. Although Black researchers have historically faced lower funding application acceptance rates, as seen in the upper figure, the largest factor in this funding inequity is the overall low number of Black researchers putting in requests, as seen in the lower figure.

More needs to be done to promote underrepresented groups in scientific research. But first we need to ask, what factors are perpetuating inequality in this particular system?

Becoming a researcher usually means getting undergraduate and graduate degrees, which entails significant time commitment, undergraduate tuition expenses, and often-low graduate researcher stipends. Financial support from family and community members can make the difference in getting through the long and uncertain process of becoming a researcher. However, Black families are majorly disadvantaged in terms of wealth.

According to the 2019 *Federal Survey of Consumer Finances*, the median family wealth of Black families is \$24,100, less than one-fifth of the \$188,200 the median White family has. It’s therefore easier for White families than for Black families to contribute to the pursuit of higher education.

Another barrier is representation and mentorship. Mentors from similar backgrounds are important in helping aspiring scientists navigate the educational system while getting trained as a scientist. Teachers in grade schools and universities are critical assets for mentorship. However, according to the 2018 Census, while 15% of schoolchildren are Black, only 7% of public-school teachers are, a twofold underrepresentation. At the university level, 12% of undergraduate students and 7% of graduate students are Black compared with 3% of full-time faculty, a 4-fold and 2-fold underrepresentation.

System Change

When it comes to racial inequality in research spending, funding rates, and science and academia in general, the barriers to equality are multifaceted and run many levels deep. Inequities in research funding are ultimately tied to the poorer socio-economic status of Black people in the US. If we are ever truly going to be a country of equal opportunity, efforts need to be directed at repairing the racial socio-economic disparities rooted in our history.

Estimates of the wages lost due to slavery come to about \$10 trillion dollars – which is also the estimate of the current wealth disparity. This is the sum the American people owe to the 40 million descendants of the enslaved people that helped build our country.

The state of California’s groundbreaking reparations task force recently outlined proposals to fund the housing, tuition, and businesses

Representation Matters: What is the ‘Leaky Pipeline’?

By HEATHER HAMILTON

TURNERS FALLS – The “leaky pipeline” is a metaphor often used to describe the underrepresentation of different minoritized groups, such as Black Americans or women, in science, technology, engineering, and math-related (STEM) educational programs and professions. This metaphor asserts that entry into the pipeline, which leads to terminal degrees and careers in STEM, is accessible to all people, but that progressively larger numbers of people from minoritized groups are lost at each stage of the progression towards a career in STEM.

However, as Dr. Ebony Omotola McGee addresses in her book *Black, Brown, Bruised: How Racialized STEM Education Stifles Innovation*, this metaphor relies on outdated assumptions, and promotes victim-blaming. Rather than addressing the structural biases and racism that make STEM education anti-inclusive, the leaky pipeline metaphor and the solutions offered by the academy and industries to “plug” the “leaks” focus on fixing the minoritized student, teaching them to assimilate into the existing STEM culture.

Should we be asking our most vulnerable populations to become pluckier and more resilient? Or should we be working to dismantle the structures and cultures within STEM that actively discourage inclusivity?

Representation of America’s diversity in STEM fields – not just in race, but other in demographics like gender, class, and home community type (i.e. rural, suburban, or urban) – is important to promote innovation and collaboration. Groups composed of people with diverse identities and abilities have the potential to be better problem-solvers than homogenous groups. This idea is supported by the work of Scott E. Page, a professor of political science, complex systems, and economics at the University of Michigan, and his collaborators. A notable conclusion of their research is that, in some cases and under certain conditions, when solving complex problems in groups “diversity trumps ability.” And what is a scientist or an engineer but a professional problem-solver?

Thus, there is some incentive to promote diversity of thought and identity in STEM. But how can this be done equitably and respectfully while acknowledging the current culture in STEM? Addressing underrepresentation is itself a complex problem requiring a diverse

group of problem-solvers to find solutions.

Let’s begin at the beginning: entry into the STEM pipeline. Though the entry point is generally considered to be at the undergraduate level, recent studies have shown that early exposure is essential to building interest in STEM topics and self-efficacy in the abilities of young children. Shifting the focus of inclusivity efforts to younger groups, particularly elementary age, is therefore imperative to understanding and dismantling the barriers minoritized students face in pursuing advanced STEM education or careers.

Additionally, exposing young children to STEM professionals from underrepresented groups is arguably as important as exposure to concepts. It is easier for students to believe that they can pursue STEM careers when they see people who look like them working as STEM professionals.

Disparities in public education across race and class lines present significant barriers to this type of exposure. According to a September 2020 article in *Forbes* magazine by Talia Milgrom-Elcott, more than half of American school districts – and more than 90% of districts with majority Black or Latinx students – have issues recruiting and retaining STEM teachers, let alone STEM teachers with diverse identities. Many public schools have been forced to cut curricula for budget and assessment reasons, and this has not only meant a decline in art and music education, but also in science-related instruction. The lack of exposure continues into secondary school, and is more pronounced in high schools serving minoritized populations.

The assumption that key entry stages into the STEM pipeline are initially accessible to all communities is, therefore, false. The seeds that grow into underrepresentation in STEM professions are sown as early as elementary school, which highlights the importance of equitable education policy and funding at the primary and secondary school levels, as well as of alternative routes for exposure to science, and of the role that parents, families, and communities can play in encouraging children to pursue their STEM-related interests.

Keep reading this page over the next several months, as we address the lack of representation of minoritized groups in STEM and what scientists, policymakers, and the public can do to increase the diversity of students pursuing STEM education and careers.

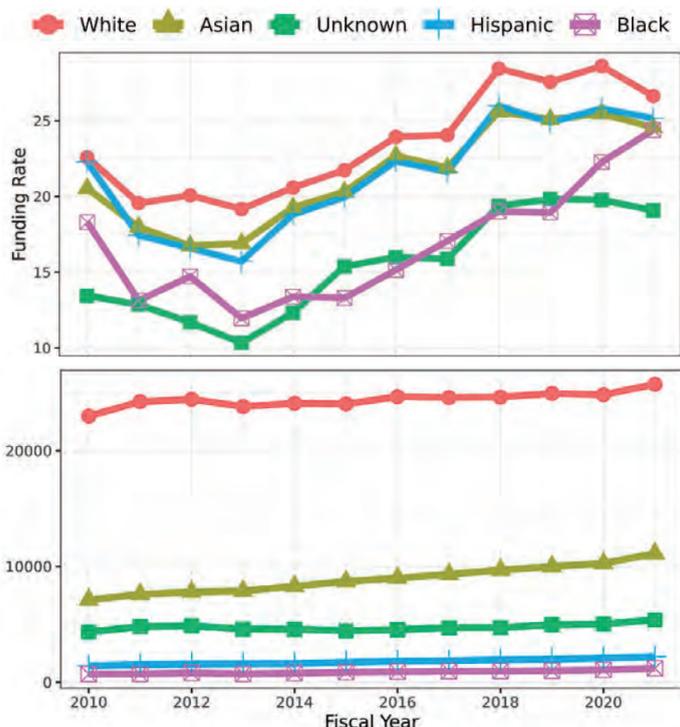
of descendants of enslaved people, and in Massachusetts, the town of Amherst has allocated several hundred thousand dollars to their African Heritage Reparation Assembly, which is also at the stage of developing proposals.

Beyond the importance of addressing socioeconomic barriers, targeted engagement efforts can impact the representation of minority scientists. Getting more information into minority communities about scientific training options and career trajectories can be a challenge, since these communities are already un-

derrepresented among educators and the scientific workforce.

Science educators and working professionals should consider putting more work into building these outreach efforts. This is not only the right thing to do, but will also help to democratize and broaden the reach of scientific institutions and principles, increasing their stability in an era of increasing misinformation and anti-science views.

A discussion of various science outreach activities, and their rationale, is covered in the accompanying piece.



Top: NIH funding rates, by race. Bottom: Total NIH-funded applicants, by race.

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