



UNITE

2022 REQUEST FOR INFORMATION REPORT

Comments and Suggestions to Advance and Strengthen Racial Equity, Diversity, and Inclusion in the Biomedical Research Workforce and Advance Health Disparities and Health Equity Research



National Institutes of Health
Turning Discovery Into Health

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EXECUTIVE SUMMARY

In 2021, the National Institutes of Health (NIH) launched the [UNITE initiative](#),¹ an agency-wide effort committed to ending structural racism and advancing racial equity and inclusion practices to positively influence the biomedical research enterprise. As part of this initiative, the U Committee, a subcomponent of the UNITE initiative, was charged with listening and learning to understand perceptions of diversity, equity, and inclusion (DEI) issues in the biomedical research workforce. With the goal of understanding through listening and learning, the U Committee published a [Request for Information \(RFI\)](#)² in March 2021 that invited respondents to provide feedback on approaches NIH can take to advance racial equity within all facets of the biomedical research workforce and expand research to eliminate or lessen health disparities and health inequities. In this report, the U Committee summarizes the comments received in response to the RFI, including five key topic areas that emerged, and six cross-cutting themes that underscore changes NIH can consider to improve DEI within NIH and across the biomedical research enterprise. This feedback represents the opinions of the RFI respondents and is summarized in this report to help inform NIH's future plans and approaches.

SUMMARY OF COMMENTS BY TOPIC AREA

The UNITE RFI resulted in more than 1,100 responses from individuals and organizations across the biomedical research community, with respondents representing groups including academia, health care professionals, NIH staff, other Federal staff, nonprofits and professional societies, researchers, trainees, and students. The responses encompassed a wide range of feedback that were grouped into five key topic areas, which include 1) Grants Process, 2) Student-to-Workforce and Career Pathways, 3) Biomedical Research Workforce, 4) Health Disparities and Health Equity Research, and 5) Community Partnerships and Outreach (Figure 1).



Figure 1: Key Topic Areas of Feedback

Grants Process

The grants process was the most common topic across responses and respondent types. Overall, the NIH grant review process and lack of diversity in review panels were identified as significant drivers of bias and funding gaps across individuals underrepresented in science. Several responses indicated that the grant application process and submission requirements are burdensome, difficult, and not always well understood. Funding policies and priorities were also mentioned as major contributors to gaps in funding in response to the question about existing policies, procedures, and practices that perpetuate disparities and bias. There were additional suggestions related to expanding the pool of funded investigators through select pay procedures and grant caps for highly funded investigators. Respondents focused on aspects of the grants process that they commented disadvantage early-career researchers, researchers from racial and/or ethnic minority groups, individuals underrepresented in science more broadly, and lower-resourced research institutions.³ Recommendations to address these gaps included greater support for the application and submission process, revising grant review criteria, anonymizing the grant review process, increasing diversity of review panels, and requiring DEI training for those involved in grant review.

Student-to-Workforce and Career Pathways

Barriers to training and lack of access to educational opportunities, persisting from early childhood through early career, were highlighted as significant challenges for groups underrepresented in science. Respondents noted that racial and ethnic minority students often do not have exposure to science, technology, engineering, and math (STEM) during K-12 education, which impacts overall career trajectories. These respondents provided recommendations on how NIH can best foster student engagement and interest in STEM from kindergarten through undergraduate years. Moreover, responses suggested that financing training and education is a key barrier for students from groups underrepresented in science who hope to pursue a career in biomedical research. Mentorship and strong academic networks were also noted as crucial to career success. However, respondents reported struggling to find strong mentorship, with some experiencing isolation and ‘othering’ within the predominantly White, male-dominated world of academia.

Biomedical Research Workforce

Respondents described how implicit and explicit biases affect hiring and promotion decisions within the NIH workforce and the broader biomedical research ecosystem. Respondents asserted that diversifying NIH leadership and hiring committees would bring more members of racial and ethnic minority groups into the workforce and into supervisory positions, ultimately helping the NIH workforce to be more representative of the U.S. population. Respondents acknowledged that overall diversification of NIH and the broader biomedical workforce will require prioritization and diversification of recruitment, hiring, promotion, and retention strategies that eliminate barriers faced by groups underrepresented in the workforce. Respondents also encouraged NIH to support career advancement by providing targeted mentoring, outreach, and training opportunities for racial and ethnic minority staff members.

Health Disparities and Health Equity Research

A lack of adequate funding prioritization within NIH and limited knowledge among reviewers about health disparities and health equity research methods were cited as key barriers to expanding and advancing health disparities and health equity research. Respondents urged NIH to prioritize these research areas across Institutes and Centers (ICs) and to increase resources and support for the National Institute on Minority Health and Health Disparities (NIMHD). Many comments discussed the need for cross-culturally appropriate, inclusive study designs. Comments also discussed data disaggregation and cohort studies to better understand the impact of research findings on underrepresented communities.

Community Partnerships and Outreach

Respondents commented on how meaningful partnerships with community organizations can eliminate or remove barriers that negatively impact groups underrepresented in the biomedical research workforce. Respondents highlighted that partnerships also support community-engaged research designed to address or reduce health disparities. While some respondents noted that current NIH efforts to build and enhance partnerships and outreach are well-designed, others highlighted that NIH could better incentivize researchers to incorporate community-based approaches. Respondents emphasized that community partnerships require trust and collaboration and that more can be done to enhance NIH-funded research by integrating community members at every stage of the grant process.

Cross-Cutting Themes

Along with the five key topic areas that emerged from the data, six cross-cutting themes were identified from respondents' comments that captured common messages across all topic areas. These themes are 1) Expand the Scope of Inclusion, 2) Implement DEI Initiatives, 3) Operationalize Diversity Metrics, 4) Enhance and Expand DEI Training, 5) Improve Communication and Outreach, and 6) Acknowledge Structural Racism and Its Impact. These themes are presented in Figure 2. They emerged independent of RFI topic area, respondent type, or response focus. Three themes were related to the overall concepts of structural racism and DEI: broad requests to expand NIH's definition of DEI; concern that NIH's focus on structural racism, as represented in this RFI, will not be followed by significant, tangible action; and disagreement regarding the existence or implications of structural racism in the biomedical workforce. Three additional themes were raised as recommendations frequently across topic areas. Respondents called upon NIH to expand reporting and transparency of DEI metrics within the grant application and review process, across the NIH workforce, and as relevant to NIH-funded intramural and extramural research. Similarly, respondents encouraged NIH to strengthen and mandate DEI training for various internal and external NIH groups, including NIH staff, grant reviewers, and principal investigators supported under grant awards. Finally, improved communication was highlighted as a fundamental way to improve NIH institutional partnerships, community engagement, the grant submission process, and relationships with current or potential NIH trainees and staff.

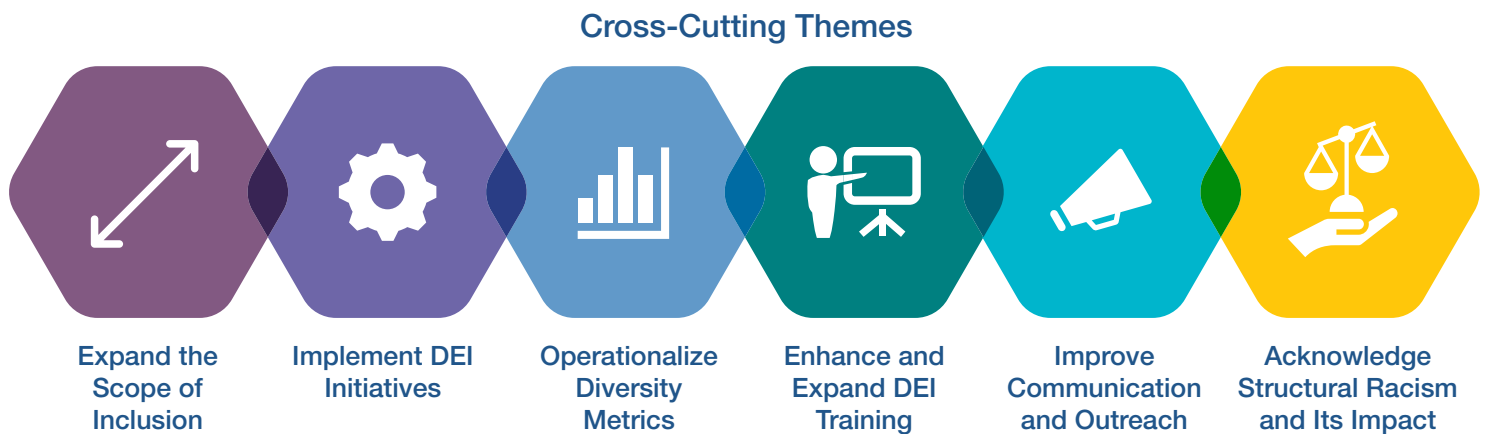


Figure 2: Cross-Cutting Themes

INTRODUCTION

Recent national discourse and research regarding social justice and structural racism underscore ongoing inequities in biomedical research and healthcare. The 2011 report by Ginther et al.⁴ highlighted significant racial gaps in the NIH-supported research workforce and disparities in success rates and funding for racial and ethnic minority researchers that still exist, though to a lesser degree, more than a decade later. Peer-reviewed research provides evidence of historical and structural disparities that have influenced NIH grant funding supporting Black researchers on topics that impact [underserved communities](#).⁵ As articulated by the recent Executive Order (EO) 14035,⁶ [Diversity, Equity, Inclusion, and Accessibility \(DEIA\)](#) aims to ensure that the Federal Government, the nation’s largest employer, acts as a model for DEIA practices in the workplace and provides a space where all employees are treated with dignity and respect. NIH strives to foster a biomedical research community and internal workplace free from hostility and discrimination grounded in race, religion, sex (including sexual and gender minority status), disabilities, and all other federally protected characteristics. The ability for NIH to remain at the forefront of biomedical research requires fostering diversity across skill sets, viewpoints, and backgrounds.

The [UNITE initiative](#) was established by the National Institutes of Health (NIH) in February 2021. The goal of the initiative is to identify and address structural racism within the NIH-supported and greater biomedical research community. On March 1, 2021, NIH released the [Request for Information \(RFI\): Inviting Comments and Suggestions to Advance and Strengthen Racial Equity, Diversity, and Inclusion in the Biomedical research Workforce and Advance Health Disparities and Health Equity Research](#).² The intent of the RFI was to seek input from scientific associations, academia, advocacy groups, health professionals, the broader biomedical research community, NIH staff, non-scientific communities, and the general public to inform the development of plans and approaches for promoting and advancing [racial equity](#), [diversity](#), and [inclusion](#); and to support a more robust health disparities and [health equity research](#) portfolio. The topics and sub-topics presented for comment are summarized in Table 1.

Table 1: RFI Main Topics and Sub-Topics

RFI Main Topics and Sub-Topics
<p>All Aspects of the Biomedical Workforce</p> <ul style="list-style-type: none"> • Perception and reputation of NIH as an organization • New or existing influence, partnerships, or collaborations • Factors that present obstacles to training, mentoring, or career path • Barriers inhibiting recruitment and hiring, promotion, retention, and tenure • Successful actions NIH and other institutions and organizations are currently taking
<p>Policies and Partnerships</p> <ul style="list-style-type: none"> • Existing NIH policies, procedures, or practices • Best practices or proven approaches to build new or enhance existing partnerships and collaborations
<p>Research Areas</p> <ul style="list-style-type: none"> • Significant research gaps or barriers to expanding and advancing the science of health disparities/health inequities research and proposed approaches to address them
<p>Further Ideas</p> <ul style="list-style-type: none"> • Additional ideas for bold, innovative initiatives, processes, or data-driven approaches

The RFI received more than 1,100 responses and closed on April 23, 2021. This report summarizes feedback provided in response to the RFI, providing a broad overview of the analytic approach, topics, and themes of the responses, and recommendations proposed by respondents. Specific examples, including de-identified quotes from RFI respondents, are included, as appropriate, to expand upon broad concepts or to provide specific recommendations that address concerns raised by respondents. This report reflects perceptions that may be unique to or frequently raised by certain categories of respondents (e.g., NIH staff, advocacy organizations, and academic institutions).

This report aims to capture, organize, and provide a summation of the responses to the RFI. As a result, some of the issues and recommendations raised may not be within NIH's purview as a Federal agency with a primary goal of funding biomedical research. To the extent possible, the report attempts to clarify recommendations that are specific or applicable to NIH and its partners within the biomedical workforce (e.g., academic institutions, industry employers). In addition, some proposed actions may already be under consideration or in motion at NIH or within the broader biomedical community.

Terminology within the report reflects respondents' language to the greatest extent possible to avoid inaccurate interpretation or overinterpretation of respondent comments. Frequently used terms are defined in [Appendix 1](#) and linked within the text, and clarification is provided when respondent terminology may differ from standard NIH definitions. The feedback summarized in this report represents the opinions of the RFI respondents and is intended to help inform NIH's future plans and approaches.

METHODS

NIH encouraged individuals and organizations from multiple sectors to submit responses to the RFI between March 1 and April 23, 2021. Organizations were asked to submit a single response reflective of the organization's views or the views of the organization's membership. Responses were submitted via online portal or email and could focus on any or all RFI topics. The RFI was posted publicly to the NIH UNITE website and was shared through multiple channels, including email and social media channels, in order to reach a broad audience.

THREE-PHASE ANALYSIS

The RFI analysis consisted of three phases designed to examine the responses and identify emerging themes and topics: Phase 1 Data Preparation, Preliminary Review, and Codebook Development; Phase 2 RFI Tool Coding; and Phase 3 RFI Tool Analysis and Identification of Key Topic Areas and Themes (Figure 3). Phase 1 focused on an open-ended review of the responses to develop codes and emerging themes. In Phase 2, codes from Phase 1 were used to categorize and analyze all RFI responses using the [NIH Office of Portfolio Analysis](#) RFI Tool^a ("RFI Tool"). Phase 3 included an analysis of the data from the RFI Tool coding, combined with Phase 1 themes, to provide a final analysis and report of the data.

a. The RFI Tool simplifies and streamlines coding and analysis of responses received from RFIs and other text collections. It is available exclusively to NIH staff.

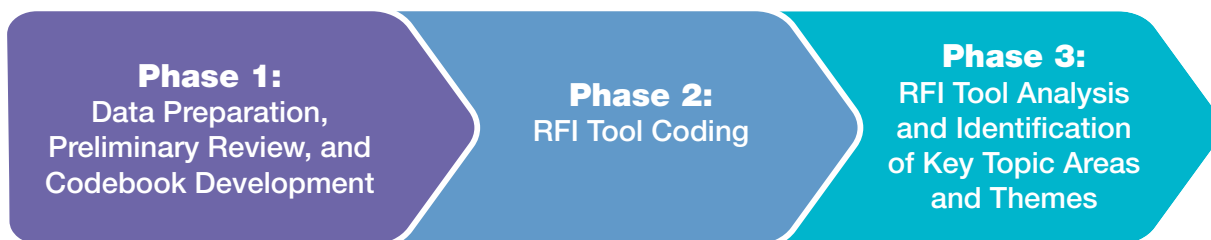


Figure 3: Phases of RFI Data Coding and Analysis

Phase 1: Data Preparation, Preliminary Review, and Codebook Development

RFI responses submitted via an online portal or email were merged into one dataset for analysis. During Phase 1, analysts utilized an open coding approach,⁷ which consisted of reading the RFI data and identifying potential codes. Coders frequently met to discuss responses, ask questions, and reach a consensus as needed. A preliminary data review provided information on emerging themes and topics within RFI responses. At the end of this phase, coders compiled and recommended codes for inclusion in the codebook for use in Phase 2. The codebook included working definitions for each code.

Phase 2: RFI Tool Coding

After finalizing the codebook, coders utilized the RFI Tool to code all responses. Analysts frequently met to discuss specific responses, challenges, or operational definitions of codes. Responses to the RFI were coded deductively, using unique topic codes and high-level codes that were uniform across RFI topics. Where evident, responses to the first question were coded as having a positive or negative perception of NIH. The coding scheme for individual topics was broken into subcategories, where appropriate, to provide additional depth and insights specific to the topic. Respondent type (e.g., NIH staff, academia, nonprofit) was an optional, self-reported single response selection at the time of RFI submission.^b

Phase 3: RFI Tool Analysis and Identification of Key Topic Areas and Themes

Analysts used features within the RFI Tool to query codes and expand upon and identify key topic areas and cross-cutting themes. Analysts used the most frequent codes to guide deeper analysis within those topics, which included re-reading responses to develop a complete understanding of the topic. The RFI Tool also allowed for analysis by respondent type, providing for a segmented examination of the data. Codes within the RFI Tool were analyzed by respondent type. Specific respondent types are mentioned if a particular person's response differed from or added additional perspective to the overall collective view. Where it was evident, coders also tagged responses by the groups that were discussed (e.g., [early-stage investigators](#), students). The analysis team discussed these preliminary themes for accuracy and insights before the final reporting of the data and analysis.

Represented among respondents were members of academia, advocacy groups, community partners, health professionals, industry representatives, professional societies, post-doctoral researchers, students, NIH staff, and members of the public (Figure 4). They provided valuable insights across five key topic areas. Each of these topics, as well as six cross-cutting themes, are discussed in their corresponding sections.

b. Respondent affiliations from historically black colleges and universities (HBCUs) were coded using the HBCU list from the U.S. Department of Education. <https://sites.ed.gov/whhbcu/one-hundred-and-five-historically-black-colleges-and-universities/>

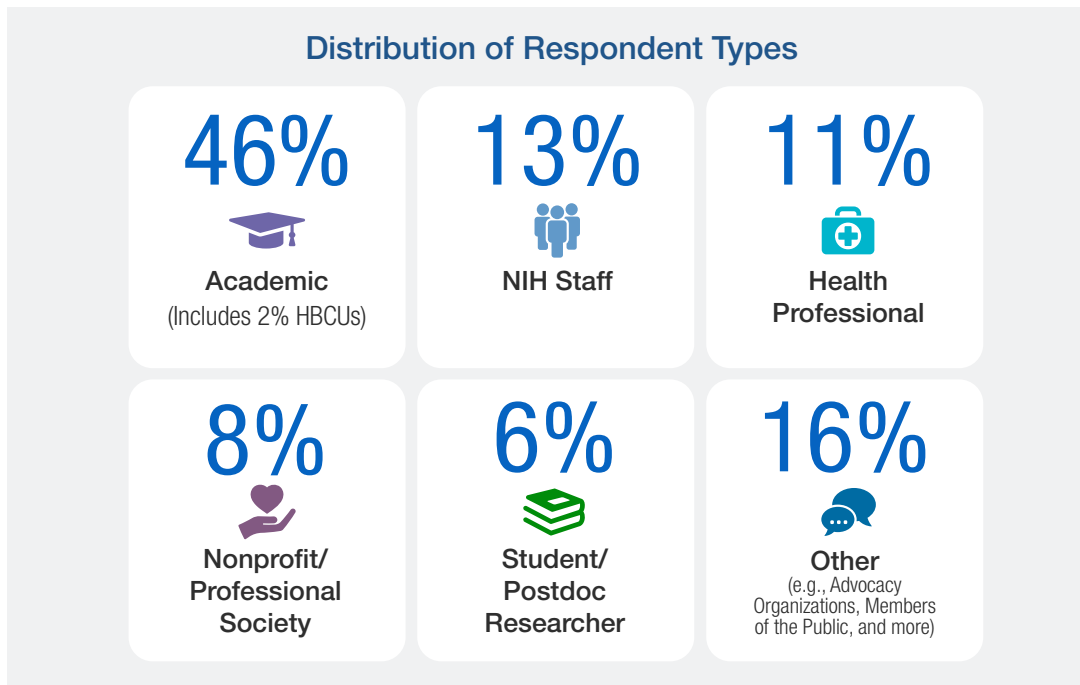


Figure 4: Distribution of Respondent Types

Each section of this report outlines the main topics that emerged from the analysis and relevant sub-topics. For each key topic area, the text begins with a short description of the overarching thoughts of respondents and a summary table of their recommendations. These are followed by more detailed descriptions that arose from the RFI responses, as well as salient quotes from respondents. The organization of the report is intentionally centered on the respondents’ thoughts, ideas, and words.

Key Topic Areas of Feedback



Cross-Cutting Themes



Figure 5: Key Topics and Cross-Cutting Themes

SUMMARY OF COMMENTS BY TOPIC AREA

This report aims to summarize the responses to the RFI. As a result, some of the issues and recommendations raised may not be within NIH’s purview as a Federal agency with a primary goal of funding biomedical research. Terminology within the report reflects respondents’ language to the greatest extent possible to avoid inaccurate interpretation or overinterpretation of respondent comments. The summary tables are not an exhaustive list of all recommendations received, but rather the most commonly suggested. Specific respondent types are mentioned if their responses differed from or added additional perspective to the overall collective view.

GRANTS PROCESS

The [grants process](#), in its entirety, was the most common topic mentioned across respondent types. This key topic area encompasses grant procedures and policies defined and administered by NIH. This includes many things that impact the [extramural research workforce](#) such as understanding funding opportunity announcements (FOAs), preparing applications, submitting applications, completing application review, and disbursing grant funding. Most responses discussed grants specifically, although some of the responses could be generalizable to other funding mechanisms. Respondents noted that despite the 2011 article by Ginther et al.⁴ highlighting the significant gaps in funding and success rates for Asian and Black or African American investigators, the gaps remain more than a decade later, though to a lesser degree. Respondents further described aspects of the grants process that they believe lead to these gaps in funding and make it less likely for researchers from racial or ethnic minority groups to receive awards compared to their White peers. This funding gap, which respondents cited was demonstrated again by Hoppe et al. in 2019,⁵ ultimately contributes to a lack of diversity within the extramural research workforce. Responses also indicated concerns regarding funding gaps related to research topics, areas, and methodologies. Numerous improvements were recommended to stages of the NIH grant process, from funding opportunities to preparing and submitting applications, through application review, and finally for grant priorities and funding.

A summation of respondents’ grant process recommendations is detailed in Table 2.

Table 2: Summary of Recommendations for Grants Process

Topic	Recommendations
Grant Application Process	<ul style="list-style-type: none"> • Provide more outreach from NIH, especially to researchers and trainees from racial and ethnic minority groups and lower-resourced institutions, to support grant application and submission efforts • Clarify and simplify application and submission instructions and requirements • Offer workshops and institutional grants to provide support for application submissions and grant administration • Expand time frames between publication and submission deadlines for FOAs

Topic	Recommendations
Grant Review Process	<ul style="list-style-type: none"> • Change or remove the environment and investigator criteria • Anonymize review • Add review criteria on diversity and mentorship, including the Principal Investigator (PI) and team, the commitment of the institution and the PI, and the relevance to health disparities research • Diversify review panels • Require DEI training for reviewers and Scientific Review Officers (SROs)
Funding Priorities and Selection of Grants	<ul style="list-style-type: none"> • Utilize select pay or expanded paylines for applicants who are underrepresented in science and for applications proposing health disparities and health equity research • Increase transparency and standardize select pay policies across NIH • Institute random selection lotteries for meritorious applications • Cap funding for higher-resourced investigators and institutions

Grant Application Process

The grant application process and submission requirements were reported as burdensome, difficult, and not always well understood. These challenges were described as particularly concerning for first-time applicants, members of racial or ethnic minority groups, [lower-resourced institutions](#), and community-based groups. These applicants are less likely to have access to the [administrative infrastructure](#) to support application and submission requirements. Furthermore, early-career investigators from [groups underrepresented in science](#) and from lower-resourced institutions often lack experienced mentors to help navigate the application process. Responses suggested that these challenges perpetuate gaps in funding and success rates for racial and ethnic minority researchers. Recommendations were made to simplify application and submission instructions and to eliminate preliminary data requirements to increase the success of first-time applicants.

Another issue raised was the short period between the publication date and application due date for FOAs. Investigators at institutions that lack administrative infrastructure have difficulty preparing competitive applications within such a short time frame. Relatedly, it was suggested that NIH expand [outreach](#) to investigators and administrators on how best to navigate the grant application system. Such outreach could include workshops for staff in administrative support offices (e.g., offices of sponsored research) to provide education on application procedures and to assist in submitting applications. Another recommendation suggested that direct support from mentors and outreach from NIH staff, particularly [Program Officials \(POs\)](#), could reduce some of the application and submission challenges investigators face. The respondents specifically mentioned a desire for guidance on grant writing and application and submission requirements, as well as encouragement to resubmit applications.

“Low-resourced institutions often lack an effective office of research and sponsored programs, and junior faculty often need extensive support in preparing and submitting successful proposals. Institutional grants to support such offices, which in turn assist the faculty in preparation and submission of successful grant proposals, would have a great impact.”

Grant Review Process

The grant review process was most frequently cited as a major contributor to [bias](#) and funding gaps for racial and ethnic minority researchers and other individuals underrepresented in science. This feedback was consistent across respondent types and RFI topics. Respondents with negative perceptions of NIH expressed that the current state of the review process—in particular, the lack of diversity in review panels—contributed to those perceptions; however, this feedback also extended to other items relevant to grant review, including [grant review criteria](#).

Grant Review Criteria and Criterion Scores

Grant review criteria were perceived as biased, and respondents expressed beliefs that these criteria contributed to identified funding gaps for racial and ethnic minority researchers.⁸ The primary criteria considered and scored during the review of an application include significance, investigator(s), innovation, approach, and environment.⁹ Many respondents identified the investigator and environment criteria as specific sources of bias. Investigator scores were perceived to affect women and racial and ethnic minority applicants negatively. The environment criterion was viewed as negatively impacting applications from lower-resourced institutions that often lack [research infrastructure](#) to compete with applications from well-funded, higher-resourced institutions. Respondents suggested changing the investigator and environment criteria by de-emphasizing, removing, or rating them only as acceptable/not acceptable to enable reviewers to focus solely on the merits of the proposal at hand.

“Make history of mentoring students from under-represented groups a score-driving criteria.”

Several responses also recommended anonymizing the review process to help reduce bias that inadvertently leads to better scores for applications from well-known and well-funded investigators compared to those from less well-known investigators. An anonymized review would require removing identifying information on investigators and institutions from grant applications. Respondents also note that more experienced PIs, the distribution of which skews White and male, appear to receive

better scores based on name recognition and reputation. An anonymized peer-review process, such as that piloted in the [Transformative R01 program](#),¹⁰ was listed as an example of a way to enable reviewers to judge proposals more adequately on the merits of the science and research plan and focus on significance, innovation, and approach.

Suggestions to revise the grant review criteria to reflect support for DEI among investigators and in the research topic area were made by respondents. A common suggestion was to consider diversity as a score-driving criterion during grant review. The score could reflect the diversity of the research team, the [Principal Investigator's](#) and institution's commitments to diversity, and the project's relevance to health disparities and health equity research. Another suggestion was to integrate mentorship of students and [trainees](#) into the scored review criteria. This score could incorporate mentoring history and mentoring activities.

Diversity of Grant Review Panels

Comments often noted concerns regarding how the lack of diversity on NIH review panels perpetuates bias. Respondents reported that low funding rates for health disparities and health equity research are partly due to low rates of diversity in training and/or background among reviewers. Responses noted that panels typically do not include strong representation from members of racial and ethnic minority groups or early-career researchers and often lack diversity in areas of research expertise. Respondents noted that reviewers often do

not understand or value qualitative approaches, mixed methods, or community-based approaches. Identifying grant reviewers who are well-versed and have adequate expertise and perspective to evaluate health disparities and health equity research was suggested. A recommendation was made to diversify review panels by expanding the pool of potential reviewers beyond those who have received R01 or other substantial funding.

Respondents recommended that providing grant review training opportunities to early-career researchers, researchers from racial and ethnic minority groups, and researchers from lower-resourced institutions without significant funding would help prepare them for service on review panels, and ultimately improve panel diversity. Respondents advocated that study sections should reflect the diversity of the applicant pool, if not the general population. Proposed recommendations included allowing investigators to self-nominate for consideration on review panels and limiting terms of service for study section members to allow for higher turnover. This term limit would increase the opportunities to include a greater diversity of reviewers and perspectives.

Respondents suggested that reviewers are influenced by implicit biases, including [affinity bias](#), in which individuals demonstrate an unconscious tendency to prefer others similar to themselves. This bias can lead reviewers to give better scores to investigators with demographics and areas of expertise similar to their own. There

“[NIH should require] evidence-based training in DEI and implicit bias for all peer reviewers, study section chairs, and NIH staff involved in grant review. Efforts should be made to measure the effectiveness of bias training once implemented.”

were suggestions that NIH should enhance fairness in the grant review process through education and monitoring. One recommendation was to provide education and training in implicit bias and other aspects of DEI for those participating in the grant review process, including grant reviewers and [Scientific Review Officers](#). Another recurring recommendation was regular evaluation of grant reviewers and [summary statements](#) for quality and biases.

Funding Priorities and Selection of Grants

Respondents called on NIH to diversify the extramural research workforce through grant funding procedures. Several factors were identified as current barriers to funding, including the use of [paylines](#) and [select pay](#) procedures by NIH. Paylines are [Institute or Center \(IC\)](#)-specific funding cutoff points for grant applications, and select pay is used to fund outside of these cutoff points to ensure balance across the pool of grants and expand the breadth of topics and approaches to funded research. A perceived lack of transparency surrounding select pay processes and the research priorities of individual ICs may also contribute to funding gaps. Moreover, IC funding policies and funding priorities were perceived as major contributors to the lack of funding diversity. The responses stated that the select pay process is biased, particularly regarding how POs

“The composition of study sections being comprised only of people who have been awarded NIH grants is important because these people understand the grant application and review process best. However, this becomes a systemic problem when the vast majority of investigators funded by NIH (in some fields more than others) are of the majority (i.e., White males). It is not too difficult to see that if there is a panel comprised mostly of White males who were mentored by White males, if they review applications produced by other White males who had similar training then these reviewers may view these applications more favorably.”

choose applications to recommend for select pay. Repeated funding to support the same investigators and research institutions was also an identified issue. Some responses cited Taffe and Gilpin's article highlighting racial disparities in NIH funding, which suggested that meritorious grant applications from Black PIs that score above the payline have a lower likelihood of receiving funding compared to similarly scored applications from White PIs.⁸

Recommendations to mitigate and reduce funding gaps for researchers from groups underrepresented in science included increasing transparency and standardizing the select pay process across NIH. Another recommendation included expanding paylines, akin to the approach taken with [early-stage investigators](#), and providing select pay for meritorious applications from racial and ethnic minority groups and for health disparities and health equity research. Respondents also suggested instituting random selection lotteries for meritorious applications and implementing grant caps for highly funded investigators and institutions to free up funding for others.

STUDENT-TO-WORKFORCE AND CAREER PATHWAYS

Respondents asserted that access to education and exposure to research training is critical for groups underrepresented in science, from early childhood through early career. Diversification of the [biomedical research workforce](#) requires identifying and bridging gaps in the [student-to-workforce pathway](#),¹¹ which is defined as the path students take to explore, identify, and pursue a career in biomedicine. Research and policy work in this area frequently attempt to address “leaky” student-to-workforce pathway issues where-in students leave the pathway by choosing majors or career paths outside of science, technology, engineering, and math (STEM). Students from underrepresented racial and ethnic groups, particularly those from low-income backgrounds with limited financial support, often do not have exposure to STEM early in life and face significant financial and educational barriers in pursuit of research careers.¹¹ Respondents discussed the leaky student-to-workforce pathway and the significant challenges students, trainees, individuals underrepresented in science, and early-career researchers face that slow or halt progress and potentially lead to long-term retention issues within the biomedical research workforce. For this report, the biomedical research workforce refers to the collective of individuals who comprise the internal NIH research workforce and the extramural biomedical research workforce.

A summation of respondents' recommendations for strengthening the student-to-workforce pathway and addressing issues related to career pathways in the biomedical research field is detailed in Table 3.

Table 3: Summary of Recommendations for Student-to-Workforce and Career Pathways

Topic	Recommendations
Pre-Graduate Curricula and Exposure to STEM	<ul style="list-style-type: none"> • Develop and fund improved pre-graduate STEM education aimed at diverse groups of scholars • Increase outreach to pre-graduate students by members of the biomedical research community • Support diversity bridge programs and opportunities to engage in research
Financing Undergraduate and Graduate Training	<ul style="list-style-type: none"> • Address disparities in student loans and repayment programs • Support graduate students through fast-track programs and connections to post-doctoral positions • Increase funding to current NIH training programs that support diverse trainees
Research Training	<ul style="list-style-type: none"> • Invest in research infrastructure to support training programs at lower-resourced institutions • Make institutional training grants accessible • Expand diversity funding mechanisms to better support early-career researchers
Barriers to Career Development	<ul style="list-style-type: none"> • Increase salaries of graduate students and research trainees • Increase or expand benefits for graduate students, post-doctoral trainees, and early-career researchers • Improve opportunities for work-life integration through workplace flexibilities • Create protected time for and reward academic and scientific service
Mentorship and Academic Networks	<ul style="list-style-type: none"> • Support mentorship initiatives for the intramural NIH and extramural research workforce • Add mentoring requirements to grant criteria • Incentivize institutions and faculty to support and expand mentorship programs • Create partnerships between lower-resourced and high-resourced institutions for mentoring and collaborations • Maintain and add funds to effective mentoring programs • Improve training, evaluation, and oversight for mentors • Offer recognition and reward to strong mentors • Expand networking and collaboration opportunities for trainees and early-career researchers

Pre-Graduate Curricula and Exposure to STEM

Respondents encouraged creation of funding opportunities that support [pre-graduate students](#) in STEM education and/or focus on diversifying the biomedical research student-to-workforce pathway, as early exposure to STEM is critical in fostering interest in STEM topics and encouraging more students to pursue STEM careers. Several recommendations included suggestions for both extramural and NIH [intramural researchers](#) to increase outreach to pre-graduate students. There were also suggestions for improved support for programs that allow pre-graduate, racial and ethnic minority students to engage in research and participate in NIH activities (e.g., research camps or summer programs). Expanded partnerships between government agencies, community colleges, [minority serving institutions \(MSIs\)](#), and lower-resourced institutions were suggested to improve students' exposure to scientific opportunities. The [NIH Science Education Partnership Awards \(SEPA\)](#)¹² was listed as one example of an effective partnership program that supports researchers and K-12 schools.

“The Science Education Partnership Awards (SEPA), which create partnerships between researchers and K-12 schools, is an example of an effective partnership that often reaches teachers and students who are underrepresented in biomedical research. As a grantee for 30 years, [I have] seen the benefits of this program in practice, bringing teachers from across the country into the laboratories of working scientists where they had the opportunity to gain first-hand experience working on a research project.”

Financing Undergraduate and Graduate Training

As students enter their undergraduate years and aspire to graduate-level STEM education, a primary concern cited was the difficulty of financing education in the U.S. and the long-term burden of student loan repayment. Respondents commented that removing financial barriers associated with expensive and lengthy degree pursuits will allow more individuals from underrepresented racial and ethnic communities to enter and sustain scientific careers without taking on a lifetime of financial burden. Respondents specifically highlighted how students from low-income families face financial difficulties pursuing science degrees. Rising student loan rates contribute to wealth inequity,¹³ contributing to a lack of diversity within the field. Many respondents, therefore, suggested the U.S. government pay down student debt and address disparities in student loans and student loan repayment opportunities. While NIH may have limited ability to relieve the burden of student loans, respondents encouraged NIH to consider additional financial support for students, trainees, and early-career researchers.

“[T]he prospect of remaining financially unviable for 8 years after undergraduate heavily favors those able to take financial risk, persons with significant familial or spousal wealth, persons without dependents or persons with limited debt or financial obligations to family in-country or abroad. This is not a recipe for diversity and cannot be maintained in academia.”

Additionally, respondents called on NIH to expand funding opportunities to a broader pool of investigators by expanding programs that support early-career researchers and to make training and career development mechanisms more easily accessible to trainees without extensive publications, presentations, or previous funding history. Respondents recommended devoting additional funds to existing initiatives and/or implementing these programs more broadly across NIH. Programs that reduce the effort required to apply

to training opportunities or allow trainees to streamline or reduce total time spent in training were highlighted. These programs would enable trainees to enter their chosen fields earlier and receive greater financial support earlier in their careers.

Several types of programs at NIH and academic institutions were frequently cited as beneficial, including those that connect trainees to peers at other research training programs; those that provide opportunities for collaboration; those that provide hands-on experience; and those that provide mentorship experiences. The [NIH Distinguished Scholars program](#)¹⁴ is an example of a cohort-based model that improves trainees' sense of community and belonging. Respondents commented that these programs may provide particular advantages for trainees at lower-resourced institutions, who may not have access to opportunities, research infrastructure, or connections that increase competitiveness when applying to graduate school, post-doctoral positions, or full-time research positions. To improve experiences within existing programs, respondents encouraged NIH to address bias and cultural issues that may cause trainees from groups underrepresented in science to feel unsupported or out of place, leading to less-than-optimal outcomes for these individuals.

Research Training and Infrastructure

“[We need] NIH funding opportunities for improving infrastructure (purchase of scientific equipment) at academic institutions that have shown a historical commitment to educating students from underrepresented groups.”

All training programs do not lead to equal opportunities for students who stay in the student-to-workforce pathway. Most responses expressed challenges faced at lower-resourced institutions, which they noted might include MSIs, [R2 universities](#) (i.e., less intensive research environments than [R1](#)-designated universities, which have the highest level of research activity), and community colleges. Respondents from [Historically Black Colleges and Universities \(HBCUs\)](#) expressed this concern and urged

NIH to invest in HBCU researchers and provide funding to strengthen research environments. Respondents noted that adequate research infrastructure—the facilities, materials, and resources needed to conduct scientific research—is necessary to support strong training programs.

Partnerships between lower- and higher-resourced institutions were highlighted as a method of helping lower-resourced institutions improve research infrastructure and training programs. For example, respondents suggested the creation of funding initiatives for collaborative grants between institutions, which could allow researchers at under-resourced institutions to benefit from stronger research infrastructure at potential partner programs.

Additionally, incentivizing higher-resourced institutions to partner with under-resourced centers could allow for resource sharing and collaboration. Some encouraged NIH to create a database of researchers who are interested in and available to collaborate with researchers at other institutions and to create a mechanism to incentivize higher-resourced institutions to collaborate with lower-resourced institutions. The National Human Genome Research Institute's [Genome Research Experiences to Attract Talented Undergraduates into the Genomics Field to Promote Diversity](#) (the GREAT Program)¹⁵ was highlighted as a current NIH program that requires research-intensive applicant institutions to partner with under-resourced institutions, providing trainees opportunities to pursue further training via institutional partnerships. The creation of sustainability plans for cross-institute engagement was highlighted as a practical approach to building enduring partnerships and facilitating long-term resource sharing.

Barriers to Career Development

As highlighted by respondents, many students and trainees face significant financial barriers at the beginning of their careers. Unfortunately, the low salaries and lack of tangible benefits (e.g., affordable insurance, childcare, and housing) associated with biomedical research training may exacerbate this problem. Those who continue in biomedical research careers may face additional challenges that affect career advancement, including a lack of value placed on the extensive work they do outside their individual research programs, which may include committee work related to DEI issues, community outreach and engagement, and mentorship of students and trainees.

Salary

Recommendations to address financial instability among graduate students and post-doctoral trainees most frequently included the need to increase salaries. Respondents noted instances in which researchers from racial and ethnic minority groups declined opportunities due to a lack of appropriate compensation despite achieving academic excellence in their chosen fields. Poorly compensated opportunities advantage more privileged candidates, creating disparities in career trajectories. Respondents encouraged NIH to increase the salaries of graduate students and research trainees to set an example for academic training programs across the nation.

“If you want to strengthen DEI in science, you need to provide stability and support to those coming from less-advantaged backgrounds so they can develop without the grinding fear of no money/no job every year.”

Benefits and Work-Life Integration

Respondents felt that graduate students and post-doctoral trainees also require access to benefits, including relocation funds, retirement packages, health insurance, caregiving support (e.g., elder and childcare), and housing and transportation benefits. These benefits are not always available as part of compensation in biomedical research careers, which exacerbates financial challenges. Given these financial considerations, respondents suggested that better benefits and tangible support could attract greater numbers of scientists from lower-resourced communities, especially when considering employment opportunities in areas with a higher cost of living.

“A work/life balance is different for everyone and different within cultures. The typical timeframe for starting a family overlaps with the typical timeframe for growing a career. There is a cumulative disadvantage throughout one’s career if a research step is missed early. NIH should consider differing timelines for early-stage investigators.”

Responses also described the biomedical research field as demanding and not conducive to work-life integration. Respondents expressed a desire for improved workplace flexibility, noting that trainees and early-career researchers are particularly vulnerable to being derailed by a lack of workplace support. Workplace flexibility was specifically highlighted as important for members of multi-generational households and individuals who are caregivers. Tribal communities were described as particularly affected by these concerns, as respondents suggested grant timelines and the demands of biomedical research do not always align with community obligations and cultural activities.

Valuation of Academic and Scientific Service

Many respondents reported that contributions to the research community, such as mentoring and community outreach, which do not support individual research programs, are significantly undervalued. Further, staff from underrepresented racial and ethnic groups are frequently encouraged or tasked to participate in and lead DEI-related activities, a phenomenon referred to as the “[minority tax](#).” These individuals are also often in high demand as mentors to support students from similar racial and ethnic backgrounds. These activities may take them away from research and academic responsibilities without significant acknowledgment from supervisors or institutional leadership, thus impeding career advancement. Respondents emphasized that staff from underrepresented racial and ethnic groups should not be obligated or expected to carry the burden of culture change. However, mentorship and participating in DEI-related activities should be adequately valued. Recommendations to address these challenges included creating protected time for academic and scientific service and directly rewarding these contributions when considering promotions, tenure decisions, and grant applications.

“Service requests are often much higher for faculty of color than for faculty from the majority culture. These requests often involve serving on search committees and other institutional committees to address diversity requirements and being [asked] to provide presentations or serving on panels for students to see role models of scientists of color. These requests can add up and take significant time away from research, publishing, grant writing, etc. It would be helpful to acknowledge these contributions officially in [promotion and tenure] instead of credit being predominantly focused on [publications] and grants. In fact, if our institutions are really committed to growing URM [underrepresented minorities] lines and making them successful, then institutionally funded, protected time to serve on committees, provide role model seminars, mentor URM students, etc. should be considered, as well as [promotion and tenure] credit.”

Mentorship and Academic Networks

Respondents noted that for [undergraduate students](#), graduate students, and post-doctoral trainees, mentorship and academic networks are crucial components to success in biomedical research. Mentorship was cited as providing guidance and resources, both tangible and intangible, that are critical for ensuring continued educational progress and career development. Academic networks were highlighted as offering opportunities for collaboration, peer support, and a sense of belonging. Many respondents emphasized how difficult it is for individuals from racial and ethnic minority groups to advance in their careers without consistent mentor relationships and robust academic networks.

Mentor Availability and Prioritization

Respondents identified a variety of barriers that prevent trainees, especially those from underrepresented racial and ethnic backgrounds and those training at MSIs, from finding influential mentors. Respondents stated that most well-known and successful biomedical researchers are White men, many of whom were trained by White men. Mentees were cited as often preferring to seek out mentors of a similar demographic background. Because the biomedical research workforce currently lacks diversity, respondents noted, trainees struggle to find mentors who can share in the experience of being both a member of a group underrepresented in science

and a researcher in their field. While respondents recognized that this exclusion may not always be intentional, it can perpetuate the lack of diversity in the workforce. In their comments, some current mentors acknowledged that they were not effectively mentored themselves and therefore did not feel prepared to mentor their students.

Recommendations from respondents included improved training, evaluation, and oversight for mentors and rewarding or otherwise incentivizing strong and supportive mentors. In addition, respondents stated that NIH should create and expand programs that facilitate partnerships to pair students and trainees from lower-resourced research institutions with mentors from higher-resourced institutions and/or create co-advising fellowships. These fellowships would enable students attending lower-resourced institutions to be co-mentored by a researcher at their current site and a researcher from a higher-resourced institution. Moreover, respondents highlighted existing NIH programs that aim to expand mentorship opportunities for trainees and called for these initiatives to be expanded. These programs included cohort-based mentoring programs such as the [Research Initiative for Scientific Enhancement \(RISE\)](#),¹⁶ the [Initiative for Maximizing Student Development \(IMSD\)](#),¹⁷ [Maximizing Access to Research Careers \(MARC\)](#),¹⁸ and the [National Research Mentoring Network \(NRMN\)](#).¹⁹

“High quality mentoring is essential to success in graduate studies and independent research, and mentorship can help underrepresented scientists continue into research-track careers. Studies show that these scientists have unique mentoring needs and may benefit from a culturally sensitive mentor who can help guide them with challenges unique to their background. The implementation of a mentoring requirement for all grants that support research trainees, regardless of funding mechanism, can boldly reinforce the importance of mentorship at all stages, as well as draw attention to the unique mentoring needs of underrepresented individuals.”

Valuation of Mentorship

Mentorships are critical to career success in the biomedical research field. Respondents noted that most mentors do not receive training, incentives, additional funding, or even additional time to foster positive mentorships. Many highlighted the need for mentors to receive DEI training to help them engage with mentees in a cross-culturally informed way and with cultural humility. When the only mentors available for students from racial and ethnic minority groups are themselves members of [underrepresented groups](#), there is an undue burden on those mentors, particularly when such activities are not a valued criterion for consideration in mentors’ career advancement. This cycle also leads to smaller networks of mentors and mentees, which can impact future career success.

“One cannot separate mentorship from science. We cannot excuse people who are perceived ‘brilliant,’ yet treat the trainees in their laboratories as dispensable labor. A careful evaluation by institutions of their faculty’s mentorship, not based on number of trainees and number who attain faculty positions, but rather peer-and trainee-evaluations, as is often done in liberal arts setting, will hopefully substantiate this as a review criterion for promotion. We likely know of many mentors, and are likely the product of some of them, who create special environments where scientists can thrive in a positive and rewarding environment. We need to ‘quantify’ this in some way in order to proactively reward these environments. They will lead to happier trainees regardless of the type of scientific career they go on to pursue.”

Academic Networks and Networking Opportunities

Despite the importance of building academic networks, many students and trainees report challenges and limited networking opportunities. These challenges can be exacerbated when students and trainees attend smaller schools or MSIs, or do not work with highly prestigious or well-published mentors. Some described experiencing unfriendly and even hostile academic networks, which were seen as a contributor to student-to-workforce pathway barriers. Responses indicated continued implicit and explicit bias toward individuals from racial and ethnic minority groups and individuals underrepresented in science, both within NIH and the extramural research workforce. Reported racist comments, [microaggressions](#), and “[othering](#)” create environments in which individuals from racial and ethnic minority groups feel unwelcome and face numerous obstacles to success. These experiences can lead students and researchers to leave the biomedical research workforce earlier and at higher rates. Respondents encouraged NIH to expand networking and collaboration opportunities for trainees and early-career researchers.

“Continued feelings of tokenism, alienation, and a lack of support persist.... Peer networks are often found to be unwelcoming, which can prevent development of crucial relationships that lead to collaboration and advancement.”

Some respondents suggested that NIH host more scientific forums to provide networking opportunities. Respondents also recommended that NIH take a more direct approach and expand visiting scholars, exchange, or shadowing programs that foster collaboration. Other recommendations included mitigating the financial and geographic barriers to researchers interacting with the larger research community through free or low-cost NIH-sponsored events that utilize virtual platforms and other technologies designed to promote networking and collaborations.

BIOMEDICAL RESEARCH WORKFORCE

As noted by respondents, supporting DEI across the biomedical workforce requires participation from individuals and institutions at every level. For this report, the biomedical research workforce refers to the collective of individuals who comprise the internal NIH research workforce (primarily intramural researchers) and the extramural biomedical research workforce (NIH-funded researchers and trainees). [Appendix 1](#) further delineates these categories. The [internal NIH workforce](#) includes both research and [non-research](#) staff. Respondents commented about DEI issues within the biomedical research workforce, including recruitment, hiring, promotion, and retention within biomedical research and the importance of diversity in leadership and hiring committees. Responses were categorized to indicate whether they were related to the NIH internal workforce, extramural research workforce, or the entire biomedical research workforce.

A summation of respondents’ recommendations related to the biomedical research workforce is detailed in Table 4.

Table 4: Summary of Recommendations for Biomedical Research Workforce

Topic	Recommendations
Recruitment, Hiring, Promotion, and Retention	<ul style="list-style-type: none"> • Advance researchers from underrepresented groups across all scientific career stages at NIH through improved recruitment, hiring, promotion, and retention practices • Diversify NIH staff to be more representative of the U.S. population • Provide more outreach and assistance with the NIH job application and submission process • Review the USAJOBS process to reduce bias and improve equity • Encourage or require the extramural research community to diversify staff and build a more diverse student-to-workforce pathway • Rethink and reimagine the range of staff across skillsets, degrees, and backgrounds that can positively contribute to biomedical research • Make training more accessible to a wide range of educational degrees and levels • Work with research institutions to support long-term mentoring

Recruitment, Hiring, Promotion, and Retention

In general, responses indicated the perception that NIH is committed to cultivating a diverse internal workforce and is leading the biomedical research workforce overall toward greater [equity](#) and representation. Some respondents viewed NIH positively for its long-term and growing efforts to support diversity across the biomedical research community, with some applauding the UNITE initiative as an example of this commitment. However, other respondents criticized NIH’s lack of progress toward actionable solutions to its stated DEI goals. They recommended NIH implement, evaluate, and report on appropriate initiatives and policy changes that could help eradicate DEI issues in the biomedical research workforce.

Internal NIH Workforce

Respondents called on NIH to ensure that its internal workforce is representative of the demographics of the U.S. population and asked NIH to serve as a role model for the extramural research community in this commitment. Responses from NIH staff and those within academia described the NIH recruitment and hiring processes as barriers to employment at NIH for job seekers from groups underrepresented in the workforce. Respondents expressed concern that beginning with [USAJOBS](#),²⁰ the Federal Government's official employment site that connects job seekers with Federal employment opportunities, applicants from groups underrepresented in the workforce are often disadvantaged due to challenges in meeting certifications and developing a resume that leads to an official offer from NIH.

“These gate keeping processes are locking people like me out of NIH and pretty much ensuring that my career will fail.”

Respondents encouraged expanding outreach via in-person and virtual workshops and job fairs for sharing information on the NIH job application and submission processes. Moreover, suggestions indicated that these efforts would be particularly beneficial for individuals from groups underrepresented in the workforce and those training or employed at MSIs. Though outside NIH's purview, respondents suggested an overall review of the USAJOBS process to ensure that all applicants receive fair and unbiased chances to work within the Federal Government.

Respondents also reported a lack of career advancement opportunities for some members of the internal NIH workforce. For example, respondents observed a lack of successful transitions between NIH post-doctoral trainees and full-time NIH positions, particularly for members of groups underrepresented in science.

Extramural Biomedical Research Workforce

Several concerns about the extramural biomedical research workforce were noted, including overall lack of diversity within the workforce and persistent barriers to success for members of groups underrepresented in science. Comments addressed the unique challenges of researchers at lower-resourced institutions and described the pressure felt by researchers from racial and ethnic minority populations. Respondents from academic research settings indicated that academia still feels like an “old boys club” due to a lack of diversity, encompassing race, ethnicity, gender, and other demographic characteristics. There was a perception that success is determined by how well one is connected. Although there have been efforts to diversify graduate and post-doctoral pools, respondents reported comparatively fewer resources to support individuals from underrepresented racial and ethnic groups in obtaining faculty and leadership positions in the extramural research workforce.

Common suggestions were for NIH to prioritize and build a more diverse student-to-workforce pathway and encourage and/or require, where possible, the diversification of the extramural research workforce. One specific suggestion was for NIH to support researchers from racial and ethnic minority groups by working with academic research institutions to improve their hiring practices and long-term mentoring. Moreover, lower-resourced MSIs reported challenges retaining highly productive researchers. Specifically, successful, well-published researchers from underrepresented racial and ethnic groups who are employed at lower-resourced MSIs are often recruited by higher-resourced institutions that can offer higher pay and/or less intensive teaching demands. This pattern creates a continuous cycle in which lower-resourced institutions repeatedly invest in and train new researchers in a way that ultimately may limit long-term institutional growth.

The extramural biomedical research community was encouraged to rethink and reimagine the range of staff that can positively contribute to biomedical research. Specific suggestions were made to expand and diversify the biomedical research community by welcoming interdisciplinary professionals into the field, such as experts in health communication, policy, law, public health, and community-based partnerships. Recommendations to support diversity of background also included increasing access to various educational degrees or training programs by creating free or low-cost certifications or open access online courses that would lower barriers and expenses for research training.

Internal NIH and Extramural Biomedical Research Workforce

Several factors were reported as impacting both the internal NIH workforce and the workforce at extramural research institutions. Commonly cited issues included barriers affecting members of groups underrepresented in science across hiring, promotion, retention, and tenure practices. Respondents noted that workplace discrimination causes individuals to leave academia or stagnate in their careers as they are passed over for promotion and opportunities. Work environments are sometimes isolating and hostile for researchers from groups underrepresented in science, respondents observed, which may lead to adverse personal and professional effects. Several respondents alleged continual implicit and explicit bias toward members of racial and ethnic minority communities within NIH and the extramural research workforce. They noted that issues should be able to be raised without fear of retaliation, such as missed opportunities and promotions.

According to respondents, retention of diverse staff at NIH and within academia is critically important and may require a culture shift. Respondents noted that due to lower salaries, lack of benefits and work-life integration, and explicit or implicit bias directed toward members of racial and ethnic minority groups, talented scientists are drawn to non-STEM careers or non-academic biomedical careers. Respondents delineated several barriers to promotion and tenure within NIH and across academic research institutions. Several respondents described an over-emphasis on publications and grant funding required for promotion and tenure, which can limit individuals who are trained or employed at lower-resourced institutions. As previously discussed in the [Student-to-Workforce and Career Pathways](#) section, efforts spent on academic and scientific service are often not considered in promotion and tenure decisions. Respondents reported that this practice signals that DEI-related activities are not prioritized or valued.

Academic respondents, including respondents from HBCUs, suggested that limited academic networks and a lack of strong mentor relationships impede applicants from groups underrepresented in science when searching for employment at NIH and academic institutions. [Nepotism](#) and [cronyism](#)—situations where family and friends are given unfair advantages—were commonly discussed by respondents, particularly concerning hiring practices. Affinity bias was often noted, where individuals have an unconscious tendency to prefer others

“Minoritized faculty are more likely to mentor and train students from minoritized groups. Yet, mentoring is not considered to be a core element in the retention, promotion, and tenure (RTP) process at colleges and universities. Until universities are encouraged or required to value mentoring as part of the RTP process, it will always disadvantage faculty from minoritized groups, who will continue to mentor students from BIPOC groups.”

“An unwelcoming environment is indescribable, but deeply felt, especially among underrepresented faculty and students.”

“Imposter syndrome/difficulty in asking for help - minority faculty may be dealing with racism on their campuses or from their colleagues and this can make it more difficult for them to ask for help since they are afraid that people will judge them poorly for needing help.”

like them, leading to preference in hiring, mentorship, promotion, and selection to participate in committees. Some stated that when underrepresented racial or ethnic minority staff are invited or selected for coveted roles and positions, they perceive a sense of tokenism, wherein their presence is solely due to the need to fulfill diversity requirements rather than their talent and expertise. Furthermore, HBCU respondents described a sense of self doubt that when they obtain roles, it may not have been due to their merits

and achievements (or conversely, that others perceive it was not due to their merits). Taken as a whole, these impacts create significant barriers for the career paths for individuals from groups underrepresented in science in their pursuit of careers in the biomedical research workforce.

Diversity in Leadership and Hiring Committees

Diversity in leadership and hiring committees was highlighted as playing an important role in improving diversity within the biomedical research workforce. Many respondents noted that groups underrepresented in science are underrepresented in leadership and hiring committees. Comments also noted that while Asian Americans are overrepresented in the STEM workforce, this group remains underrepresented in leadership and administrative positions. Comments highlighted that women, particularly those who are members of racial or ethnic minority groups, are also underrepresented in these positions.

Most of the discussion related to this topic focused on the internal NIH workforce. However, some comments also applied to the extramural biomedical research workforce. Several respondents indicated that diversifying the NIH internal workforce begins with diverse hiring committees and NIH leadership. They described how the mentality of hiring an individual based on a perception of a “good fit” can lead to biases and barriers, often leading decision-makers to prioritize similarity over diversity. Respondents also reported a perception that some NIH job postings are not open to diverse and qualified candidates because preferred or known candidates have already been identified prior to the publication of the job announcement. Additionally, respondents emphasized that leaders must set the tone and expectations around the importance of diversity and empower staff to openly discuss DEI-related issues in the workplace.

“[M]any of the hiring and selection managers aren’t from diverse backgrounds and lean toward hiring people who look like them.”

A lack of diversity in leadership and hiring committees across the biomedical research workforce is believed to result in hiring, promotion, and retention bias within NIH and the extramural research workforce. Targeted mentoring and training are viewed as necessary for underrepresented racial or ethnic minority researchers to succeed in the biomedical research workforce. Furthermore, ongoing implicit bias training for investigators and leadership at NIH was deemed essential for advancing DEI. Responses noted the importance of diversity in leadership teams, grant review panels, hiring committees, and individuals in decision-making or gate-keeping roles.

HEALTH DISPARITIES AND HEALTH EQUITY RESEARCH

As identified by respondents, research on health disparities and health equity offers pathways to ensure all communities can obtain equitable health outcomes and can access necessary health care resources. Respondents reported that [health disparities research](#) was less valued or supported by NIH, which respondents stated contributes to inequities in funding and lack of diversity in the workforce.

A summation of respondents’ recommendations related to health disparities and health equity research is detailed in Table 5.

Table 5: Summary of Recommendations for Health Disparities and Health Equity Research

Topic	Recommendations
<p>Prioritization and Support of Health Disparities and Health Equity Research</p>	<ul style="list-style-type: none"> • Improve prioritization and funding of health disparities and health equity research • Increase resources and funding for NIMHD • Ensure all NIH ICs support health disparities and health equity research • Emphasize the value of qualitative, mixed methods, social science, translational, community-based, community-engaged, and multi-disciplinary research models • Support culturally sensitive and inclusive study designs • Prioritize research on underrepresented populations and consider data disaggregation techniques and/or cohort studies that would examine the needs of individuals from underrepresented groups • Increase funding opportunities that address the health effects of bias, racism, and xenophobia • Focus on disease areas with significant disparities across underserved communities

Prioritization and Support of Health Disparities and Health Equity Research

Respondents urged NIH to prioritize health disparities and health equity research to better understand the health needs of populations that experience [health disparities](#). Many respondents also emphasized the importance of adequate funding for this research, noting that a failure to support health disparities and health equity research will lead to limited advancements and inadequate strategies to improve health disparities and outcomes. Respondents, predominantly those from academia, perceived that the devaluing of health disparities and health equity research is partially due to biases in the grant review process that impact funding opportunities. There were calls for NIH to expand resources for NIMHD that will enable the Institute to increase funding for extramural research and staffing. Respon-

“Collaboration of NIH institutes with NIMHD on addressing health disparities/inequities needs to be heightened to increase the funding of studies on health inequities throughout NIH. While this has increased in the last few years, this has to be taken to a greater scale to result in meaningful advancement of our understanding of health.”

dents also emphasized the need for all NIH ICs to increase funding and prioritize health disparities and health equity research. Respondents stressed that this research is crucial across ICs and should not be the sole purview of NIMHD.

Comments highlighted how specific groups—including women; Asian Americans, Native Hawaiians, and Pacific Islanders (AANHPI); individuals from Tribal communities; members of sexual and gender minority groups (SGM); and members of the disabled community—remain largely overlooked, even in considering recent health disparities and health equity research. Responses encouraged disaggregation of data within these groups, use of cohort studies to examine the needs of subgroups, and more consideration of intersectionality. Respondents also proposed specific funding opportunities that would address health care needs in these communities, as well as continued research investment on the health effects of bias, racism, and xenophobia.

Respondents noted that there are many researchers from groups underrepresented in science interested in studying health disparities and health equity, yet respondents assert there are biases that prevent certain types of research from receiving NIH funding. Respondents suggested NIH emphasize the value of qualitative, mixed methods, social science, translational, community-based, and multi-disciplinary research models. They perceived these research approaches as valuable for assessing the magnitude and nuances of health disparities. Respondents also highlighted the importance of culturally sensitive and inclusive study designs, which are essential for understanding population interests and recruiting diverse patient populations.

COMMUNITY PARTNERSHIPS AND OUTREACH

Complementary to the responses discussed above, respondents noted that NIH should support and encourage [community-engaged research](#) to address health disparities and health equity. Respondents identified that when a specific underserved community or population is the focus of a research study, guidance from community members in the development of study design and execution can ensure the methods and interventions appropriately reflect the needs of communities.

Many responses emphasized the value of developing relationships with community-based organizations and community members. Some comments highlighted organizations in specific communities (e.g., Tribal communities) and others referred to organizations more broadly (e.g., local health organizations). NIH was encouraged to improve community outreach to build or strengthen partnerships with community groups. Respondents noted that community partnerships involve biomedical researchers and community members working together toward common goals, with each partner bringing resources and strengths, resulting in stronger research studies and more relevant health outcome measures.

A summation of respondents' recommendations for improved community partnerships and outreach is detailed in Table 6.

Table 6: Summary of Recommendations for Community Partnerships and Outreach

Topic	Recommendations
Building Community Partnerships	<ul style="list-style-type: none"> • Build community partnerships to encourage community participation in the development of programs and initiatives, understanding of, and participation in NIH research studies • Require or incentivize applicants to incorporate community-based approaches into their research • Invite community members to serve as investigators, participate in the grant review process, and serve as an intermediary between investigators and study participants • Build partnerships upon trust and in a collaborative manner

Building Community Partnerships

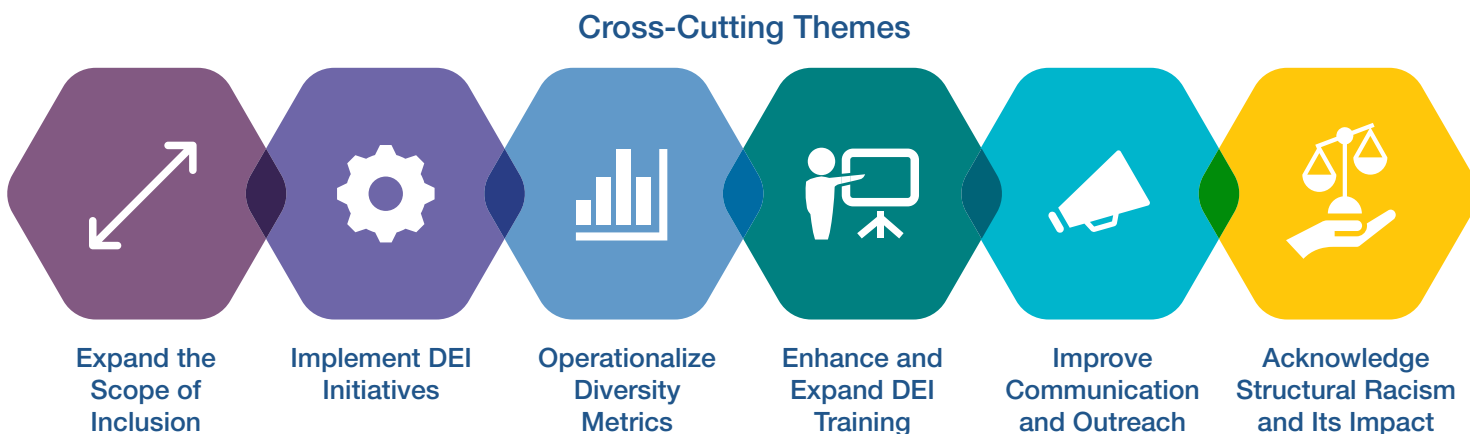
Respondents highlighted that partnerships between communities and researchers can contribute to the sustainability of effective interventions and support participation by groups underrepresented in science. There was an emphasis among respondents on the value of developing relationships with community-based organizations, with many encouraging NIH outreach to build and strengthen partnerships with these groups. Respondents suggested more active leveraging of community networks, including developing community-based recruitment centers to increase participation in biomedical research.

Respondents indicated that community engagement is critical to ensuring that research reflects the needs and outcomes of the community of interest. Respondents highlighted the significance of partnerships and engagement that promote community participation. Responses noted that it is vital to include community voices in program development and grant review to build trust and provide critical insights. They recommended NIH increase funding for community partnerships. Responses recognized that increasing interest in community-based partnerships and addressing barriers, such as associated costs, will take time. Several policy-level recommendations were offered, such as requiring or incentivizing applicants and grantees to incorporate community-based approaches into their research. Other recommendations included expanding the grant time frame to allow for community-engaged research and providing funding to community partners that includes the administrative and delivery costs of participating in research projects. Respondents described the importance of partnerships with Tribal communities and Tribal Colleges and Universities (TCUs) that are built upon trust. These responses noted that building trust begins with understanding and asking communities about the research areas that are paramount to their communities, working collaboratively, and reporting the results to the communities and participants. Respondents expressed a desire for more outreach and collaboration with TCUs, including investment in American Indian and Alaska Native students to support the biomedical research workforce pathway.

“Encourage study co-design with community stakeholders from the beginning, which can both provide critical insights and build trust. This should include racial and ethnic minorities, leaders from poor geographical communities, small rural county governmental representatives, representatives from multiple sectors, etc.”

CROSS-CUTTING THEMES

A collection of concepts emerged throughout responses that were not unique to any one RFI topic area, respondent type, or response focus. These areas were identified from respondents’ comments as cross-cutting themes that span all aspects of DEI planning at NIH and the biomedical research workforce. Collectively, these cross-cutting themes may help to inform actions in support of DEI across the biomedical research workforce.



EXPAND THE SCOPE OF INCLUSION

There were requests to expand NIH’s definition of DEI. Often, responses suggested NIH has ignored groups that may be viewed as “less” marginalized. Respondents encouraged NIH to expand its focus to consider factors beyond race and ethnicity and include attention to demographic factors such as SGM status, age, geography, and disability status. These respondents frequently highlighted inclusion and [accessibility](#) concerns for many underrepresented populations and brought attention to how intersectionality may further impact opportunities for members of racial and ethnic minority groups.

Some responses also highlighted the fact that the NIH definition for underrepresented scientists does not include Asian Americans; however, respondents noted that individuals from Asian American subgroups (e.g., Hmong, Vietnamese, Filipino, Laotian, Cambodian Americans) are vastly underrepresented in STEM fields. Respondents stated their perception that some diversity-oriented NIH training opportunities are inaccessible to Asian American researchers.

Respondents also noted that grouping diverse communities into single categories does not appropriately account for the heterogeneity within communities and may inadvertently mask the challenges experienced by individuals. For example, subgroups within the AANHPI population show evidence of significant health disparities in areas of diabetes, cancer, and mental and behavioral health disorders.¹⁴ However, these disparities are often difficult to assess when data is presented for the entire AANHPI population without examining differences across subgroups. Some respondents called for the disaggregation of racial and ethnic data when reporting NIH internal and biomedical research workforce data, as well as when reporting data on the demographics of participants in NIH-funded research, particularly when considering AANHPI, Hispanic/Latino, and Middle Eastern and North African populations.

“While this RFI and the response here is primarily focused on racial equity, we note the importance of intersectionality in properly addressing structural racism and discrimination and hope the agency will consider in its work all groups facing inequities in the biomedical research workforce, including racial and ethnic minorities, women, persons with disabilities, LGBTQ individuals, and first-generation college students as well as other individuals from diverse backgrounds.”

IMPLEMENT DEI INITIATIVES

There were concerns that NIH's focus on structural racism, as represented in this RFI, would not be followed by significant, tangible action or implementation. Although some respondents indicated positive perceptions of NIH's recent acknowledgment of structural racism, many stated that further action is needed. Responses indicated that although NIH has had longstanding awareness of the lack of diversity in funded research and the biomedical research workforce, NIH could do more to implement concrete actions aimed at eliminating bias and advancing DEI.

Moreover, some respondents stated they could not identify any DEI programming or initiatives at NIH, while others noted they could not identify examples of successful programs. They called on NIH to implement actionable solutions and continuously report on the progress of DEI initiatives.

“The recent announcement that NIH acknowledges the existence of structural racism and disparities was a good start but it must be followed by brave action, in the knowledge that attempts to move towards equity will come under attack from privileged groups protecting their favorable position.”

OPERATIONALIZE DIVERSITY METRICS

“Tangible goals are essential. NIH must set measurable objectives... The broader ecosystem of accountability, recognition, and rewards is the future.”

Respondents called on NIH to collect, assess, track, and report data on diversity and the outcomes of related policies, procedures, and processes. Respondents urged NIH to increase accountability by measuring the progress and impact of the UNITE initiative and other DEI-related programming. Other recommendations for improved accountability included sharing and publishing

demographic data on both the NIH and biomedical research workforces, sharing and publishing information on the diversity of grant reviewers, and publicly reporting the outcomes of the grant review process (e.g., score distribution). Additionally, responses encouraged NIH to expand reporting and transparency regarding DEI metrics, particularly within the grant application and review process. Respondents encouraged NIH to implement a data-driven strategy to build a more inclusive workforce and meet the UNITE initiative's broader goals.

ENHANCE AND EXPAND DEI TRAINING

Improvements to DEI training, mandating training for specific groups, and increasing training volume and frequency, both at NIH and across the biomedical research workforce, were frequently suggested. Implementing mandatory training was recommended for grant reviewers, internal NIH staff, PIs supported by NIH grants, academic and research mentors, early-stage investigators, trainees, and fellows. Respondents frequently encouraged NIH to transition beyond simple implicit bias training to a more comprehensive evidence-based training.

IMPROVE COMMUNICATION AND OUTREACH

Improved communication was highlighted as a fundamental way to enhance NIH institutional partnerships, community engagement, the grant application process, and relationships with current or potential NIH trainees and staff. Many submissions called for NIH to increase and improve internal and external communication to support DEI. Respondents drew particular attention to the need for better communication with underrepresented communities and lower-resourced institutions.

A few suggested communication priorities included simplifying NIH communication to avoid language barriers; expanding targeted outreach to administrative support staff and investigators at MSIs and lower-resourced institutions; and improving outreach to students, trainees, and early-career researchers from groups underrepresented in science. Some requested outreach formats included hosted discussions, listening sessions, seminars, and trainings and workshops.

“Communication will be key to the success of these efforts and visuals/words must be weighed carefully.... If there is an end goal for these current efforts... then I suggest that should be conveyed clearly and with assurances [that UNITE] is not a one and done.”

ACKNOWLEDGE STRUCTURAL RACISM AND ITS IMPACT

While most RFI respondents agreed with the hypothesis that structural racism presents obstacles for members of racial and ethnic minority groups in the biomedical research workforce, some denied the existence of structural racism. There was disagreement regarding the existence or implications of structural racism in the biomedical workforce amongst respondents. Some indicated that they did not feel there was a lack of diversity or evidence of structural racism at NIH or in the biomedical workforce, while some respondents described their perception of what they referred to as “reverse discrimination.” These subsets of respondents often expressed that career advancement and grant funding decisions should be strictly merit-based and without regard to diversity, equity, or inclusion considerations. These comments highlighted a belief that science is strongest when it is purely merit-based.

DISCUSSION

Analysis of responses suggested significant interest in the above-discussed topics on behalf of many types of respondents. Forty-six percent of responses came from members of academia, including 2% from HBCUs, although respondents spanned a variety of categories, including NIH staff, health professionals, and non-profit and/or professional societies. Most respondents indicated agreement with the ideas put forward in the RFI, i.e., that NIH carries a significant responsibility to address the systemic challenges and barriers affecting the NIH workforce and NIH-supported biomedical research community and that enhancing workforce diversity and equity across the biomedical enterprise are critical steps to achieving progress in these areas. However, a portion of respondents did not perceive or denied concerns related to structural racism or other forms of bias, inequitable treatment, or discrimination within NIH or the greater biomedical workforce.

Overall perceptions of NIH's attempts to address structural racism and inequities prior to the release of the RFI were mixed. Many respondents described NIH as supportive of workforce diversity but noted a lack of implementation and little tangible evidence of change. Many respondents described their perceptions of NIH as a predominantly White, male organization, especially at the leadership and senior levels. This perceived lack of diversity was also extended to the larger biomedical workforce.

Responses and recommendations for NIH spanned a broad array of topics. The grant process was most frequently cited by respondents, who asserted that review policies and lack of diversity on review panels are some of the most significant contributors to racial and ethnic funding gaps among extramural researchers. Relatedly, many respondents indicated that health disparities and health equity research is not adequately or equitably prioritized across all NIH ICs. Many comments noted grant reviewers often are not well trained to consider research designs and methodologies frequently used in health disparities research, including community-appropriate approaches, qualitative designs, and projects that focus on social or structural determinants of health, which further perpetuates lack of funding for health disparities research.

Training and mentorship; hiring, promotion, and retention; and community outreach and engagement were also areas of frequent focus. Respondents highlighted specific concerns across these topics and provided recommendations for NIH to address these challenges. Some recommendations were outside NIH's purview. Other recommendations were appropriate for NIH to consider and could also be applied by other employers, organizations, or partners across the biomedical workforce. Many respondents called upon NIH to lead by example to build trust in the biomedical community. They called for NIH to do this via increased outreach, engagement, and communications surrounding structural racism, diversity, equity, and inclusion.

Responses to this RFI highlighted the need to assess biases and barriers to DEI in policies, practices, and procedures at NIH and external research institutions. This RFI represents one of the earliest efforts of the NIH UNITE initiative and one of the broadest attempts to gather input on this important topic from NIH partners, collaborators, and the public. NIH appreciates the exceptional number of detailed, thoughtful responses from respondents who represent many facets of the biomedical workforce and broader community. Practical recommendations shared by respondents, summarized in this report, will assist NIH in identifying, developing, and implementing strategies that will allow the biomedical enterprise to benefit from a more diverse and inclusive research workforce and a more robust portfolio of research to better understand and address inequities in our existing system.

APPENDIX 1: GLOSSARY

All definitions marked with † are from the NIH Glossary.²¹ Definitions marked with * are defined within this report.

Term	Definition/Description
Accessibility	The design, construction, development, and maintenance of facilities, information and communication technology, programs, and services so that all people, including people with disabilities, can fully and independently use them. Accessibility includes the provision of accommodations and modifications to ensure equal access to employment and participation in activities for people with disabilities; the reduction or elimination of physical and attitudinal barriers to equitable opportunities; a commitment to ensuring that people with disabilities can independently access every outward-facing and internal activity or electronic space; and the pursuit of best practices such as universal design. ⁶
Administrative infrastructure	The support, tools, and capacity to manage the general business practices that are common to research administration, including the preparation and submission of grant applications and post-funding administrative functions.*
Affinity bias	The unconscious tendency by which individuals prefer others similar to themselves.*
Bias	Attitudes, behaviors, and actions that are prejudiced in favor of or against one person or group compared to another.*
Biomedical research workforce	The collection of individuals who comprise the NIH internal research workforce (primarily intramural) and the extramural biomedical research workforce (NIH-funded investigators, researchers, trainees).*
Black, Indigenous and People of Color (BIPOC)	This is a term specific to the United States and is intended to center the experiences of Black and Indigenous groups and demonstrate solidarity between communities of color. ²²
Community-engaged research	The process of engaging the community to help develop research questions, design a study, and collect data with the goal to answer a scientific question or meet a specific research need. Types of community-engaged research include action research, community-based participatory research, and participatory action research. ²³
Community engagement	The process of working collaboratively with and through groups of people affiliated by geographic proximity, special interest, or similar situations to address issues affecting the well-being of those people. ²⁴
Cronyism	Bestowing of favors to friends, colleagues, and associates based on personal relationships and connections rather than actual performance standards. ²⁵
DEIA Executive Order 14035	Aims to ensure that the Federal Government, the nation’s largest employer, is a model for Diversity, Equity, Inclusion, and Accessibility (DEIA) practices and a place where all employees are treated with dignity and respect. ⁶

Term	Definition/Description
Diversity	The practice of including the many communities, identities, races, ethnicities, backgrounds, abilities, cultures, and beliefs of the American people. ⁶
Early-career researchers	Individuals in the early stages of their career, including pre-doctoral researchers through early-stage investigators.*
Early-stage investigators	Program Director / Principal Investigator (PD/PI) who has completed their terminal research degree or is at the end of post-graduate clinical training within the past 10 years, whichever date is later, and has not previously competed successfully as PD/PI for a substantial NIH independent research award.†
Equity	The consistent and systematic fair, just, and impartial treatment of all individuals, including individuals who belong to underserved communities that have historically been denied such treatment. ⁶
Extramural research workforce	Researchers external to NIH for whom NIH provides funding support.*
Grant review criteria (scored)	Impact scores are based on grant reviewers' assessment of 1) significance, 2) investigator(s), 3) innovation, 4) approach, and 5) environment. ⁹
Grants process	Steps required for an application to proceed from planning and submission through to award. ²⁶
Groups underrepresented in science	Individuals from racial and ethnic groups that have been shown by the National Science Foundation to be underrepresented in health-related sciences on a national basis. The following racial and ethnic groups have been shown to be underrepresented in biomedical research: Blacks and African Americans, Hispanics or Latinos, American Indians or Alaska Natives, Native Hawaiians and other Pacific Islanders.
Health disparities research	Research that focuses on differences in health outcomes for defined disadvantaged populations that are worse than the White reference population. ²⁷
Health disparity	<p>A health difference that adversely affects disadvantaged populations, based on one or more of the following health outcomes:²⁶</p> <ul style="list-style-type: none"> • Higher incidence and/or prevalence and earlier onset of disease • Higher prevalence of risk factors, unhealthy behaviors, or clinical measures in the causal pathway of a disease outcome • Higher rates of condition-specific symptoms, reduced global daily functioning, or self-reported health-related quality of life using standardized measures • Premature and/or excessive mortality from diseases where population rates differ • Greater global burden of disease using a standardized metric

Term	Definition/Description
Health equity research	Research that interrogates the dynamic, cumulative, and interrelated structures of power, environmental conditions, and economic systems that produce inequities in health between different populations. Health equity research also identifies, promotes, and leverages unique community-informed protective factors that are traditionally undervalued and understudied. ²⁸
Health inequity	Systematic differences in the opportunities that groups have to achieve optimal health, leading to unfair and avoidable differences in health outcomes. ²⁹
Historically Black College or University (HBCU)	Any historically black college or university established prior to 1964 whose principal mission was and is the education of Black Americans and is accredited by a nationally recognized accrediting Agency or Association determined by the Secretary of Education to be a reliable authority as to the quality of training offered, or is, according to such an Agency or Association, making reasonable progress toward accreditation.†
Imposter syndrome	When high-achieving individuals who, despite their objective successes, fail to internalize their accomplishments and have persistent self-doubt and fear of being exposed as a fraud or imposter. ³⁰
Inclusion	The recognition, appreciation, and use of the talents and skills of employees of all backgrounds. ⁶
Institute or Center (IC)	The NIH organizational component responsible for a particular grant program or set of activities.†
Internal NIH workforce	All NIH staff, research and non-research staff, Federal employees, and contractors.*
Intramural research workforce	NIH internal researchers and staff who conduct biomedical research within the confines of NIH ICs.*
Lower-resourced institution	Institutions that are generally characterized as having insufficient resources and tend to serve large numbers of disadvantaged and/or low-income students. ³
Microaggression	Everyday verbal, nonverbal, and environmental slights, snubs, or insults—whether intentional or unintentional—that communicate hostile, derogatory, or negative messages to individuals based solely upon their marginalized group membership. Microaggressions repeat or affirm stereotypes about a minority group, and they tend to minimize the existence of discrimination or bias, intentional or not. ³¹

Term	Definition/Description
Minority serving institution (MSI)	Institutions of higher education that serve minority populations, and strive to give their constituents the social and educational skills needed to overcome racial discrimination and limited economic opportunities. ³²
Minority tax	Extra, financially uncompensated duties and responsibilities that minorities are asked to perform to increase diversity at their institutions, such as serving on a search committee that would otherwise be all White. ³³
Nepotism	Inappropriate action related to the appointment, employment, promotion, or advancement of a relative, recommending that a relative receive an award, or the advocacy of such actions for the benefit of a relative. ³⁴
NIH non-research workforce	NIH staff (e.g., administration, human resources, budget, facilities, and logistics) across the enterprise in non-research roles.*
Othring	The construction and identification of the self or in-group and the other or out-group in mutual, unequal opposition by attributing relative inferiority and/or radical alienness to the other/out-group. ³⁵
Outreach	Sending/receiving information or news, including targeted communication with certain groups or institutions.*
Payline	A percentile-based funding cutoff point determined by balancing the projected number of applications coming to an NIH Institute with the amount of funds available. Set after the budget is determined, paylines are not mandatory, are not made for all activity codes, and may be adjusted during the year.†
Pre-graduate student	An individual receiving education in the grades Kindergarten through twelfth grade, or undergraduate education.*
Principal Investigator (PI)	An individual designated by the applicant organization to have the appropriate level of authority and responsibility to direct the project or program supported by an award. The PI is responsible and accountable to the recipient organization or, as appropriate, to a collaborating organization, for the proper conduct of the project or program, including the submission of all required reports.†
Program Official (PO)	NIH official who is responsible for the programmatic, scientific, and/or technical aspects of a grant.†
R1 universities	Institutions that meet benchmarks across 10 indicators measured by the Carnegie Classification of Institutions of Higher Education indicating that the university engages in “very high research activity.” ³⁶

Term	Definition/Description
R2 universities	Institutions that meet benchmarks across 10 indicators measured by the Carnegie Classification of Institutions of Higher Education indicating that the university engages in “high research activity.” ³⁶
Racial and ethnic minorities	NIH uses the racial and ethnic group classifications determined by OMB in the Revisions to Directive 15, titled Standards for Maintaining, Collecting, and Presenting Federal Data on Race and Ethnicity. The minority racial and ethnic groups defined by OMB are American Indian or Alaska Native, Asian, Black or African American, and Native Hawaiian or other Pacific Islander. The ethnicity used is Latino or Hispanic. ²⁷
Racial equity	A process of eliminating racial disparities and improving outcomes for everyone. It is the intentional and continual practice of changing policies, practices, systems, and structures by prioritizing measurable change in the lives of people of color. ³⁷
Research infrastructure	The resources and services for conducting research, including major equipment or sets of instruments, knowledge-related facilities such as collections, archives or scientific data infrastructures.*
Research project grant (R01)	Provides support for health-related research and development based on the mission of NIH, R01s can be investigator-initiated or can be solicited via a Request for Applications. The R01 research plan proposed by the applicant must be related to the stated program interests of one or more of the NIH Institutes and Centers based on their missions. ³⁸
Scientific Review Officer (SRO)	NIH official who serves as the designated Federal official and has legal responsibility for managing the peer-review meeting, the procedures for evaluating the applications assigned to the scientific review group, and the determinations and management of conflicts of interest, as noted in 42 CFR 52(h).†
Select pay	The funding of a small number of programmatically important applications at the margin of the payline as recommended by Council.†
Student-to-workforce pathway	The path students take to explore, identify, and pursue a career in biomedical research.*
Summary statement	A combination of the reviewers' written comments and the SRO's summary of the members' discussion during the study section meeting. It includes the recommendations of the study section, a recommended budget, and administrative notes of special considerations.†
Trainees	Pre-doctoral and post-doctoral researchers training in biomedical research.*

Term	Definition/Description
Undergraduate student	An individual seeking one of two higher education degrees—an associate degree or a bachelor’s degree. ³⁹
Underrepresented group	Group of individuals underrepresented in the biomedical, clinical, behavioral, and social sciences, such as people with disabilities, people from disadvantaged backgrounds, and certain racial and ethnic groups such as Blacks or African Americans, Hispanics or Latinos, American Indians or Alaska Natives, and Native Hawaiians and other Pacific Islanders.†
Underserved communities	Populations that share a particular characteristic and/or geographic communities that have been systematically denied the full opportunity to participate in aspects of economic, social, and civic life. In the context of the Federal workforce, this term includes individuals who belong to communities of color, such as Black and African American, Hispanic and Latino, Native American, Alaska Native and Indigenous, Asian American, Native Hawaiian and Pacific Islander, Middle Eastern, and North African persons. The term also includes individuals who belong to communities that face discrimination based on sex, sexual orientation, and gender identity (including lesbian, gay, bisexual, transgender, queer, gender non-conforming, and non-binary (LGBTQ+) persons); persons who face discrimination based on pregnancy or pregnancy-related conditions; parents; and caregivers. It also includes individuals who belong to communities that face discrimination based on their religion or disability; first-generation professionals or first-generation college students; individuals with limited English proficiency; immigrants; individuals who belong to communities that may face employment barriers based on older age or former incarceration; persons who live in rural areas; veterans and military spouses; and persons otherwise adversely affected by persistent poverty, discrimination, or inequality. Individuals may belong to more than one underserved community and face intersecting barriers. ⁵
USAJOBS	The Federal Government’s official employment site (www.usajobs.gov) that connects job seekers with Federal employment opportunities. ²⁰

APPENDIX 2: SUMMARY OF RECOMMENDATIONS

Topic: Grants Process	Recommendations
Grant Application Process	<ul style="list-style-type: none"> • Provide more outreach from NIH, especially to researchers and trainees from racial and ethnic minority groups and lower-resourced institutions, to support grant application and submission efforts • Clarify and simplify application and submission instructions and requirements • Offer workshops and institutional grants to provide support for application submissions and grant administration • Expand time frames between publication and submission deadlines for FOAs
Grant Review Process	<ul style="list-style-type: none"> • Change or remove the environment and investigator criteria • Anonymize review • Add review criteria on diversity and mentorship, including the Principal Investigator (PI) and team, the commitment of the institution and the PI, and the relevance to health disparities research • Diversify review panels • Require DEI training for reviewers and Scientific Review Officers (SROs)
Funding Priorities and Selection of Grant	<ul style="list-style-type: none"> • Utilize select pay or expanded paylines for applicants who are underrepresented in science and for applications proposing health disparities and health equity research • Increase transparency and standardize pay policies across NIH • Institute random selection lotteries for meritorious applications • Cap funding for higher-resourced investigators and institutions

Topic: Student-to-Workforce and Career Pathways	Recommendations
Pre-graduate Curricula and Exposure to STEM	<ul style="list-style-type: none"> • Develop and fund improved pre-graduate STEM education aimed at diverse groups of scholars • Increase outreach to pre-graduate students by members of the biomedical research community • Support diversity bridge programs and opportunities to engage in research
Financing Undergraduate and Graduate Training	<ul style="list-style-type: none"> • Address disparities in student loans and repayment programs • Support graduate students through fast-track programs and connections to post-doctoral positions • Increase funding to current NIH training programs that support diverse trainees
Research Training	<ul style="list-style-type: none"> • Invest in research infrastructure to support training programs at lower-resourced institutions • Make institutional training grants accessible • Expand diversity funding mechanisms to better support early-career researchers
Barriers to Career Development	<ul style="list-style-type: none"> • Increase salaries of graduate students and research trainees • Increase or expand benefits for graduate students, post-doctoral trainees, and early-career researchers • Improve opportunities for work-life integration through workplace flexibilities • Create protected time for and reward academic and scientific service

Topic: Student-to-Workforce and Career Pathways	Recommendations
Mentorship and Academic Networks	<ul style="list-style-type: none"> • Support mentorship initiatives for the internal NIH and extramural research workforce • Add mentoring requirements to grant criteria • Incentivize institutions and faculty to support and expand mentorship programs • Create partnerships between lower-resourced and high-resourced institutions for mentoring and collaborations • Maintain and add funds to effective mentoring programs • Improve training, evaluation, and oversight for mentors • Offer recognition and reward to strong mentors • Expand networking and collaboration opportunities for trainees and early-career researchers

Topic: Biomedical Research Workforce	Recommendations
Recruitment, Hiring, Promotion, and Retention	<ul style="list-style-type: none"> • Advance researchers from underrepresented groups across all scientific career stages at NIH through improved recruitment, hiring, promotion, and retention practices • Diversify NIH staff to be more representative of the U.S. population • Provide more outreach and assistance with the NIH job application and submission process • Review the USAJOBS process to reduce bias and improve equity • Encourage or require the extramural research community to diversify staff and build a more diverse student-to-workforce pathway • Rethink and reimagine the scope of staff that can positively contribute to biomedical research • Make training more accessible to a wide range of educational degrees and levels • Work with research institutions to support long-term mentoring

Topic: Health Disparities and Health Equity Research	Recommendations
<p>Prioritization and Support of Health Disparities and Health Equity Research</p>	<ul style="list-style-type: none"> • Improve prioritization and funding of health disparities and health equity research • Increase resources and funding for NIMHD • Ensure all NIH ICs support health disparities and health equity research • Emphasize the value of qualitative, mixed methods, social science, translational, community-based, community-engaged, and multi-disciplinary research models • Support culturally sensitive and inclusive study designs • Prioritize research on underrepresented populations and consider data disaggregation techniques and/or cohort studies that would examine the needs of individuals from underrepresented groups • Increase funding opportunities that address the health effects of bias, racism, and xenophobia • Focus on disease areas with significant disparities across underserved communities

Topic: Community Partnerships and Outreach	Recommendations
<p>Building Community Partnerships</p>	<ul style="list-style-type: none"> • Build community partnerships to encourage community participation in the development of programs and initiatives, understanding of, and participation in NIH research studies • Require or incentivize applicants to incorporate community-based approaches into their research • Invite community members to serve as investigators, participate in the grant review process, and serve as an intermediary between investigators and study participants • Build partnerships upon trust and in a collaborative manner

APPENDIX 3: TABLE OF ABBREVIATIONS

Abbreviation	
AANHPI	Asian American, Native Hawaiian, and Pacific Islander
BIPOC	Black, Indigenous and People of Color
DEI	Diversity, Equity, and Inclusion
DEIA	Diversity, Equity, Inclusion, and Accessibility
EO	Executive Order
FOA	Funding Opportunity Announcement
GREAT	Genome Research Experiences to Attract Talented Undergraduates into the Genomics Field to Promote Diversity
HBCUs	Historically Black Colleges and Universities
ICs	Institutes and Centers
IMSD	Initiative for Maximizing Student Development
MSI	Minority Serving Institution
NIH	National Institutes of Health
NIMHD	National Institute on Minority Health and Health Disparities
PD	Program Director
PI	Principal Investigator
PO	Program Official
RFI	Request for Information
SGM	Sexual and Gender Minority Groups
SRO	Scientific Review Officer
STEM	Science, Technology, Engineering, and Math
TCU	Tribal Colleges and Universities

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