

Executive Summary of the Draft Report of the Advisory Committee to the Director Working Group on Diversity in the Biomedical Research Workforce

The National Institutes of Health (NIH) has long recognized that achieving diversity in the biomedical and behavioral research workforce is critical to ensuring that the best and brightest minds have the opportunity to contribute to the realization of our national research goals. Yet, despite longstanding efforts from the NIH and other entities across the biomedical and behavioral research landscape to increase the number of scientists from underrepresented groups, diversity in biomedicine still falls far short of mirroring that of the U.S. population. Additionally, a disturbing discrepancy in success rates for research grant (R01¹) applications between White applicants and Black applicants, even after controlling for numerous observable variables, was reported in 2011 by Ginther, et al. (see Section II).

To address the unacceptable status quo of minority underrepresentation in biomedical and behavioral research, NIH Director Dr. Francis Collins charged the Advisory Committee to the NIH Director (ACD) to form a Working Group on Diversity in the Biomedical Research Workforce (WGDBRW) to examine the findings and implications of the Ginther, et al. study results. Dr. Collins charged the WGDBRW with providing concrete recommendations toward improving the recruitment and retention of underrepresented minorities (URM), people with disabilities, and people from disadvantaged backgrounds across the lifespan of a biomedical research career from graduate study to acquisition of tenure in an academic position or the equivalent in a non-academic setting.

The WGDBRW met 13 times in person at the NIH's Bethesda campus or by telephone and used a variety of means to gather information beginning with a telephone conference on August 15, 2011. The WGDBRW:

- released a Request for Information (RFI) in January 2012
- held a public meeting February 14, 2012
- met with the ACD Working Group on the Biomedical Workforce on March 27, 2012
- conducted a workshop on the peer review system on March 28, 2012
- conducted a workshop on April 16, 2012, in collaboration with the White House Initiative with Historically Black Colleges and Universities, to solicit insight from a broad range of external stakeholders

Throughout this process, the WGDBRW also received input from two internal NIH committees, the NIH Diversity Task Force and the NIH Women in Biomedical Research Careers Working Group.

The WGDBRW analyzed available literature and gained considerable appreciation for the numerous benefits of a diverse workforce including increasing creativity, broadening the scope

¹ The Research Project Grant -R01- is the original and historically oldest grant mechanism used by the NIH. It provides support for health-related research and development based on the NIH mission.

of inquiry, narrowing the health gap, and promoting and ensuring fairness (see Section I). Moreover, diversity is a key driver of achievement in the workforce, particularly when innovation is a critical goal (Denson and Chang, 2009; Page, 2007; Hong, 2004; European Commission, 2003).

The WGDBRW carefully reviewed the publication, *Race, Ethnicity, and NIH Research Awards*. This NIH-commissioned study by Dr. Donna Ginther and her colleagues examined the funding probability of Ph.D. R01 applicants during fiscal years (FY)² 2000-2006 with respect to applicant race and ethnicity, using data from NIH's grants database (IMPAC II) and various other sources. Ginther, et al. found significant disparities in R01-funding probability for both Asian applicants (5.4 percentage points less likely) and Black applicants (13.2 percentage points less likely), compared to White applicants. When the researchers restricted the study sample to applicants who were U.S. citizens when they received their Ph.D., the difference observed between Asian and White applicants was no longer statistically significant, whereas the disparity between Black and White applicants persisted.

Marked differences in funding success were also observed depending upon the institution from which an applicant submitted their application. Applications from the 30 most highly NIH-funded institutions had a higher probability of funding than those from institutions ranked 31 to 200. In turn, applications from the 31 to 200 institutions were more likely to be funded than those from institutions ranked 201 and below. In all groups, a disparity was observed for Black Applicants relative to majority applicants in the same rank group.

After analyzing the Ginther et al. publication in detail, the WGDBRW requested and performed additional analyses to better understand the findings. These additional analyses confirmed the disparity in R01 funding between applications submitted by Black and White investigators in a later cohort (2006-2010) and revealed a large difference in the number of applicants and applications from underrepresented minorities compared to Whites. Of particular significance, the number of African American or Black applicants who applied for grants in the basic sciences was a very small fraction of the whole, 1 percent, compared to that of White applicants who comprised 64.6 percent of this pool.

From FY 1999 to 2009, following the first stage of the peer review process used by study sections, 73 percent of applications from Blacks were determined by review committees to not be of sufficient scientific merit to be "fully discussed" meaning they received no further review consideration, compared to 59 percent of applications from Whites. One consequence of this difference is that fewer applications from Black applicants are resubmitted for reconsideration because, in general, investigators are less likely to resubmit an application that was not discussed. See Section II and Appendix 5 for a full discussion of the WGDBRW's additional analyses.

² The federal fiscal year begins on October 1 and ends of September 30. The fiscal year is named by the calendar year in which it ends. For example, FY 2000 began on October 1, 1999 and ended on September 30, 2000.

While the WGDBRW had sufficient data to formulate the recommendations in this report, the Working Group recognizes that the NIH needs to be more attentive to collecting the data on an ongoing basis to better inform next steps and future actions that are required to address this problem. To that end, the WGDBRW developed a series of additional research questions for the NIH to explore to understand more fully the many factors that may influence the URM experience in biomedical and behavioral research. This represents only a starting point given the complexity of the issues, and an ongoing commitment to “continuous” review should be made.

Based on the available data, the WGDBRW formulated a number of recommendations relating to increasing the number of URM in the workforce pipeline (Section III), mentoring URM scientists and strengthening the infrastructure of comparatively under-resourced institutions with a documented track record of producing and supporting URM scientists (Section IV), and the potential role of bias (Section V). The group also made specific recommendations related to the NIH Intramural Research Program (Section VI). In sum, the WGDBRW’s 13 recommendations fall into five broad areas: data collection/evaluation; mentoring/career preparation and retention; institutional support; bias-related research and intervention testing; and NIH diversity strategy and infrastructure. The highest-priority recommendations are:

Data Collection and Evaluation

- NIH must ensure that appropriate resources for the systematic tracking, reporting, and evaluation of the immediate and long-term outcomes of all trainees (ranging from college students engaged in summer research activities through recipients of career development awards), regardless of NIH-funding mechanism.
 - Assign a unique identifier to every NIH-supported trainee, fellow, and career development recipient, including those supported on research project grants.
 - Require that all programs undergo systematic review and evaluation every 5 years. Those found to be particularly effective in increasing URM participation in the biomedical sciences should be used as models for other programs that are not as effective, and should be considered for expansion. (Recommendation #1)

Mentoring/Career Preparation and Retention

- NIH, through NIMHD serving the coordinating function, should partner with established minority scientific and professional groups and other trusted organizations to implement a system of mentorship “networks” for underrepresented minority students that will provide career guidance throughout their career development. (Recommendation #5)
- Additional support should take the form of an increased number of scholarships for undergraduates (building on the NIH intramural Undergraduate Scholarship Program) that include “payback” through participating in a meaningful research experience, and

additional fellowships for the anticipated increased numbers of URM graduate students in biomedical research. (Recommendation #3)

- NIH should establish a working group of the ACD, of racially and ethnically diverse scientists, to provide regular input to the Director of NIH, and the Institutes and Centers, regarding the state-of-the-art in effective programs that overcome or reduce disparities in research awards. (Recommendation #6)

Institutional Support

- Under the leadership of NIMHD, and in coordination with other Science, Technology, Engineering, and Mathematics (STEM) initiatives underway in the Department of Health and Human Services (HHS) and across other Federal government agencies, NIH should undertake a bold, well-funded, multi-year, incentive-based, competitive grant process to support infrastructure development in those comparatively under-resourced institutions with a documented track record of producing and supporting URM scientists as well as stimulating creative partnerships among these institutions and, where appropriate, including more resource-rich institutions.
 - The WGDBRW considers this action to be a bold, yet necessary initiative that reflects the urgency of the testimony presented during its deliberations. The group recommends that the NIH, along with other Federal partners, target substantial resources over 5 years to implement this recommendation at five or more training sites. (Recommendation #8)

Research and Intervention Testing

- NIH should establish a new Working Group of the ACD comprised of experts in behavioral and social sciences and studies of diversity with a special focus on determining and combating real or perceived biases in the NIH peer review system
 - Oversee the collection and analyses of quantitative and qualitative data relevant to the research project grant review and grant-making decision process.
 - Provide oversight to an analysis of the discourse content from peer review sessions so as to contribute to the understanding of potential bias.
 - Provide expert oversight to a text-based analysis of the commentary on individual grant reviews, including R01s and a subset of applications for those awards (career awards, fellowships, smaller research project grants, and others) most likely to precede an investigator submitting a R01 application. (Recommendation #9)
- NIH should first, pilot different forms of validated implicit bias/diversity awareness training for NIH scientific review officers and program officers to determine the most efficacious approaches. Once the best training approaches have been identified with NIH staff, pilot these programs with members of study sections to ascertain if their value is sustained. If they are, provide to all study section members. (Recommendation #10)

- NIH should design an experiment to determine the effects of anonymizing applications with respect to applicant identity as well as that of an applicant's institution. (Recommendation #11)

NIH Diversity Strategy and Infrastructure

- NIH should appoint a scientist as Chief Diversity Officer (CDO) and establish an NIH Office of Diversity resourced with a suitable budget. (Recommendation #12)
- Using the trans-NIH Earl Stadtman Investigator search process as a model, and learning from the program's experience, NIH should institute a more comprehensive search process for tenure-track investigators to ensure that a sufficiently diverse pool of candidates is identified. (Recommendation #13)

The WGDBRW was unable to precisely distinguish among funding disparities caused by bias (unintended or otherwise) during the peer review process (see Section V for a discussion of bias) and application quality, which in turn may be affected by a wide range of factors including mentorship, resource availability, release time from teaching/administrative responsibilities, all of which could potentially be influenced by institutional bias (unintended or otherwise). Thus, because the WGDBRW's analyses and discussions did not point to a single, definitive cause for NIH-funding disparities — and the group recognizes fully that causes are unlikely to be mutually exclusive — the WGDBRW has proposed a set of complementary interventions that may help clarify the root causes for funding disparities, significantly support the development and evaluation of programs that will increase diversity in the biomedical workforce, and that will do no harm.

The WGDBRW was impressed by the track record of the many institutions that have devoted themselves to the training or support of URM scientists. Many of these institutions have done so despite significant resource and infrastructure constraints which limit their ability to expand efforts in response to the need for increased numbers of URM the biomedical research workforce. As such, the WGDBRW was especially interested in testimony from a number of stakeholders concerned about how best to bolster the infrastructure, resources, and human capital of graduate-level academic institutions that have a major focus on training a diverse biomedical and behavioral research workforce and that are critical to the realization of the NIH's diversity objectives.

The WGDBRW recognizes that the implementation of these recommendations will require leadership, thoughtfulness, diligence, and appropriate funding by NIH. Given the importance of the issue of diversity to the nation, the WGDBRW commends the NIH on its willingness to address it directly. The Working Group expects that this report will serve as a framework that will assist the Agency to realize the fullest extent of its noble mission, and serves to recruit and support the efforts of others in the biomedical research enterprise.