National Institute of Nursing Research

Strategies to Enhance Diversity in the NINR-Supported Nursing Science Workforce

Final Report of Recommendations

September 2022

WE all SHOULD Know That DIVERSITY makes for a rich tapestry, AND WE MUST understand that all the threads of the tapestry are EQUAL in Value no matter what their color.

– Maya Angelou

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List of Acronyms

AACN	American Association of Colleges of Nursing
CSR	Center for Scientific Review
FOA	Funding Opportunity Announcement
FAQ	Frequently Asked Questions
NACNR	National Advisory Council for Nursing Research
NIH	National Institutes of Health
NINR	National Institute of Nursing Research
NOSI	Notice of Special Interest
NRRC	National Institute of Nursing Research Initial Review Group
NRSA	National Research Service Awards
NSF	National Science Foundation
PA	Program Announcement
WGD	NINR-Supported Nursing Science Workforce Workgroup

Executive Summary

The National Institute of Nursing Research (NINR) convened the *Strategies to Enhance Diversity in the NINR-Supported Nursing Science Workforce Workgroup (WGD)*, under the auspices of the National Advisory Council for Nursing Research (NACNR), with a charge to provide advice to NINR on effective strategies to enhance the diversity of the NINR-supported scientific workforce and to eliminate disparities in success rates for NINR grant and training applications among investigators from historically underrepresented populations in biomedical and health research. Between February and September 2022, the WGD met monthly to discuss the data, research, and policies relevant to diversity in the scientific workforce. The WGD developed nine overarching, forward-thinking themes, under which they included 16 actionable recommendations and 60 strategies that may be feasibly implemented within NINR.

Theme One: Increase Awareness of NINR Research Lenses	
Recommendation A: Broadcast NINR's new Strategic Plan and Research Lenses across multiple communication channels.	**Strategy A1:** Use multiple strategies to announce NINR's Research Lenses including local and state public broadcasting and social media. **Strategy A2:** Highlight research activities across each Research Lens through promotional videos and/or vignettes that highlight diverse investigators.
Recommendation B: Create funding and training opportunities that increase awareness of the importance of health equity research to NINR's mission.	**Strategy B1:** Develop NOSIs that highlight NINR's focus on achieving health equity. **Strategy B2:** Create PAs that address health equity to promote awareness on its scope as well as NINR's commitment to addressing health equity. **Strategy B3:** Provide specific examples of funded studies that represent the broad scope of health equity research, are synchronous with NINR's Strategic Plan, and are led by investigators from diverse backgrounds. **Strategy B4:** Commit to solicit and fund health equity research.
Theme Two: Increase Awareness of Nursing Science	
Recommendation C: Promote nursing science as a career through partnerships and collaborations.	**Strategy C1:** Partner with foundations and professional organizations. **Strategy C2:** Develop partnerships with schools of nursing, associate's degree programs, high schools, and other academic institutions, as well as community clinics, tribal colleges and clinics, and other community organizations, to create science pathway programs and student visits at NIH. **Strategy C3:** Conduct outreach, with tools such as posters and other educational materials, to promote nursing science outside of traditional nursing education and health science settings. **Strategy C4:** Create a Speaker's Roundtable on the role of the nurse scientist that includes NINR-funded investigators from diverse backgrounds, working in diverse settings.
Recommendation D: Promote nursing science as a career through culturally- and linguistically appropriate multimedia	**Strategy D1:** Create and distribute flyers, bulletins, and announcements to academic, community, and industry organizations. **Strategy D2:** Engage NACNR members and other NINR investigators from diverse backgrounds in multimedia imaging of nursing science. **Strategy D3:** Include families in outreach efforts to broaden their understanding of nursing science as a valued career trajectory that is

communications and other technology-driven channels.	advantageous and lucrative for all students, including high-performing students, families, and communities in addition to potential nurse scientists.
Recommendation E: Promote nursing science as a career through funding.	**Strategy E1:** Fund research supplements that include a stipend and living expenses for diverse undergraduate students to join a research team. **Strategy E2:** Fund research supplements for P grants that include a stipend, living expenses, and travel for undergraduate students from minority-serving institutions to attend an intensive summer research experience at a host institution or at NIH intramural programs and clinical centers. **Strategy E3:** Direct funding opportunities specific to nursing science to academic faculty in both minority-serving institutions and other institutions.
Theme Three: Expand the Underrepresented Nursing Science Applicant Pool	
Recommendation F: Partner with minority-serving institutions and organizations as well as NINR-funded investigators to promote nursing science.	**Strategy F1:** Identify minority-serving institutions that offer science tracks and engage with them through outreach and in-person visits from NINR leadership to promote nursing science. **Strategy F2:** Partner to develop resources to help future applicants from diverse backgrounds discern between terminal degrees of the practice versus terminal degrees of the nursing science discipline. **Strategy F3:** Provide tuition support to students from diverse backgrounds seeking to become nurse scientists.
Theme Four: Enhance the Structure of Research Grants	
Recommendation G: Ensure adequate timelines between funding opportunity announcements and due dates to promote applications from investigators at minority-serving institutions.	**Strategy G1:** Ensure that timelines are adequate from proposal release to submission deadline. **Strategy G2:** Ensure that timelines provide longer lead time for FOAs that include community engagement. **Strategy G3:** Provide training and workshops on upcoming grants well in advance of the funding opportunity deadline.
Recommendation H: Create new funding mechanisms to support under-resourced institutions and underrepresented investigators.	**Strategy H1:** Pilot a new tiered grant mechanism in which the first 4-5 year phase focuses on building capacity and the second 4-5 year phase focuses on developing the science. **Strategy H2:** Invite reviewers from minority-serving institutions and organizations to provide input on grant mechanisms and review processes.
Theme Five: Leverage Diversity Initiatives	
Recommendation I: Champion new diversity	**Strategy I1:** Identify three best practices in diversity and pilot these at NINR.

initiatives aligned with the new NINR Research Lenses.	**Strategy I2:** Increase the proportion of historically underrepresented investigators who are awarded R01 funding to ensure that the research portfolio is distributed equitably. **Strategy I3:** Take part in existing initiatives internal and external to NIH that aim to support diverse scientists.
Recommendation J: Conduct ongoing evaluation of NINR diversity initiatives.	**Strategy J1:** Develop a workgroup that includes representation from minority-serving institutions to evaluate the successes of diversity initiatives. **Strategy J2:** Develop evaluation tools to measure success of each implemented diversity initiative. **Strategy J3:** Develop benchmarks and track metrics for guiding future decisions in advancing workforce diversity.
Theme Six: Ensure Sufficient Diversity in Training Programs	
Recommendation K: Enhance the T32 program to support a balanced portfolio that adequately represents underrepresented racial and ethnic minorities.	**Strategy K1:** Dedicate one T32 program to a training program for an under-resourced minority-serving institution and reallocate a training slot to an external and experienced mentor to provide support for the first five-year cycle. **Strategy K2:** Partner with a minority-serving institution to fund a T32 that is focused entirely on underrepresented trainees. **Strategy K3:** Provide sufficient funding for protected time for faculty at minority-serving institutions. **Strategy K4:** Develop a new funding mechanism to help minority-serving institutions prepare to be competitive in the T32 stream. **Strategy K5:** Increase the proportion of historically underrepresented T32-funded pre- and post-doctorates to ensure equitable award distribution. **Strategy K6:** Invite reviewers from minority-serving institutions and organizations to participate in the grant review process. **Strategy K7:** Invite reviewers from minority-serving institutions to inform ongoing support of training initiatives. **Strategy K8:** Create a stepped approach to training program to enhance the building of research programs within non-R1 minority-serving institutions. **Strategy K9:** Ensure that funded training programs are equitably distributed.
Theme Seven: Enhance Mentorship for Underrepresented Scientists	
Recommendation L: Incentivize effective mentorship.	**Strategy L1:** Provide opportunities for mentorships through a rotation of training at NINR. **Strategy L2:** Develop new mechanisms that support mentorship from institutions beyond investigator's parent institution. **Strategy L3:** Mentor minority-serving institution research staff on NINR grant submission policies and procedures. **Strategy L4:** Fund level of effort for sponsors in F, K, and T grant mechanisms. **Strategy L5:** Partner with four regional research societies to conduct grant writing bootcamps for minority-serving institutions and non-R1 institutions with diverse faculty. Fund these societies to perform mock reviews with full-NIH-level critique and provide guidance for strengthening applications. **Strategy L6:** Provide annual training for researchers who are new to NIH/NINR.
Theme Eight: Mitigate Bias in the Grant Peer Review Process	

Recommendation M: Partner with the NIH Center for Scientific Review (CSR) to diversify study sections.	**Strategy M1:** Advocate that CSR review and evaluate bias in the review of applications from minority-serving institutions and investigators from diverse backgrounds. **Strategy M2:** Advocate that CSR create a transparent system for how individuals are invited to serve on review panels and to examine the diversity of panels. **Strategy M3:** Advocate for the evaluation of a random sample of reviews after completion of each review cycle to rigorously assess for bias and to provide empirical data needed to inform intervention.
Recommendation N: Provide training on diversity and bias in the grant review process.	**Strategy N1:** Train reviewers and Scientific Review Officers in how implicit and explicit biases can affect the review process and scientific rigor. **Strategy N2:** Lead by example through diversity and bias training of NRRC membership. **Strategy N3:** Invite reviewers from minority-serving institutions and organizations to participate in the development of training, evaluation, and other initiatives to promote diversity in the review process. **Strategy N4:** Add a diversity officer to the scientific review panels and/or Council. **Strategy N5:** Fund reviewers who have experience conducting health equity research to help train existing reviewers. **Strategy N6:** Develop peer-reviewed evaluation criteria specifically for the review of community-based research.
Theme Nine: Optimize Experiences with NINR Program Directors	
Recommendation O: Develop tools and/or resources to guide interactions between Program Directors and principal investigators from diverse racial and ethnic backgrounds during the application submission, pre-award, and post-award phases.	**Strategy O1:** Create an assistant navigator role for grant inquiries. **Strategy O2:** Develop guides and FAQs on the role of the Program Director, what investigators can expect in their interactions with Program Directors, and/or how to maximize the value of meetings with Program Directors. Ensure that these tools are developed using an algorithm to help guide investigators from diverse backgrounds through the system based on their needs. **Strategy O3:** Provide a timely and efficient follow-up mechanism, from Program Directors, such as callbacks.
Recommendation P: Provide guidance to Program Directors to equitably support grant applicants and awardees.	**Strategy P1:** Provide training for Program Directors to help navigate investigators to alternate Institutes if there is poor fit with NINR. **Strategy P2:** Provide training for Program Directors to support new and early-stage investigators in framing their applications to synchronize with NINR Research Lenses and Guiding Principles. **Strategy P3:** Provide training for Program Directors on delivering equitable support.

Background

Purpose and Charge

The National Institute of Nursing Research (NINR) is dedicated to solving the Nation's most pressing and persistent health challenges and informing practice and policy to optimize health and advance health equity. Diverse perspectives and ideas help create and progress the innovative solutions needed to address critical health challenges. Voices of individuals from populations that have been historically underrepresented in biomedical research are crucial to advance and sustain health equity and support nursing science's person-centered focus.

In order to enhance the diversity of its scientific workforce to be inclusive of multiple perspectives, NINR convened the *Strategies to Enhance Diversity in NINR-Supported Nursing Science Workforce Working Group (WGD)* under the auspices of the National Advisory Council for Nursing Research (NACNR). The WGD was charged with 1) developing recommendations for eliminating funding disparities and improving success rates for investigators from groups underrepresented in biomedical, clinical, behavioral, and social sciences research and 2) identifying actionable strategies to enhance the diversity of the NINR-supported nursing science workforce.

The WGD was comprised of academic and nonprofit sector experts and Co-Chaired by an NINR Extramural Program Director and a member of NACNR. A full list of WGD members can be found in **Appendix A**.

Committee Approach to Addressing the Charge

The WGD met monthly between February 2022 and September 2022. The WGD Co-Chairs guided the discussion towards identifying the scope of the problem including barriers to advancing workforce diversity ("The Why"), the strategies that could be employed to address the barriers ("The What"), and the implementation approaches that NINR could take to increase workforce diversity ("The How").

The Why: Data Review

To better understand "The Why", WGD members reviewed workforce diversity data from multiple data sources. First, they considered the scope of diversity across NIH- and NINR-supported investigators. These data showed that 75.6% of NINR-supported principal investigators of research grants were White, 13.4% were Asian, 4.3% were Black, and 2.3% were unknown (**Figure 1**). Only 2.5% of NINR-supported principal investigators of research grants were of Hispanic ethnicity (**Figure 2**). Across both NIH and NINR, White investigators were the most likely to be successful with R01 grants than any other race. Grant success rates in R01 grants among minority investigators were lower at NINR than at NIH in general (**Figure 3**). However, NINR had higher rates of training grant success among female investigators as compared to the NIH (**Figure 4**).

WGD members compared race and ethnicity data for NINR research grant applicants; NINR National Research Service Awards (NRSA) fellowship applicants; and doctorate-level graduates in science, engineering, and nursing from National Science Foundation (NSF) and American Association of Colleges of Nursing (AACN). These data indicated that the potential applicant pool of Black doctorate-level nurse graduates (14.3%) was larger than both the proportion of Black NINR research applicants (6.1%) and Black NINR fellowship applicants (11.3%). The potential applicant pool of Hispanic doctorate-level nurse graduates (5.7%) was higher than the proportion of Hispanic NINR research applicants (3.4%), but lower than NINR fellowship applicants (7.5%) (**Figure 5**). American Indian/Alaska Native population groups were substantially underrepresented in both graduate and NINR applicant data (**Figure 6**).

The WGD also compared race and ethnicity data for NINR-funded research career (K) grants, NINR NRSA institutional grants (T), and NINR NRSA trainee (F) grants awarded between 2015 and 2019, as compared to the diversity of doctoral-level graduates in science, engineering, and nursing within the same time period. These data indicated that the proportion of Black nursing doctoral graduates (14.3%) is substantially higher than the proportion of Black NINR research career recipients (4.0%), the proportion of Black NINR trainee recipients (11.4%), and the proportion of Black NINR fellowship recipients (12.3%) (**Figure 7**). Although the proportion of Black recipients of NINR grants was relatively low as compared to White recipients, the proportion of Black recipients represented a similar proportion of science and engineering doctoral graduates (5.7%).

The What: Aligning Strategies to Barriers

The WGD Co-Chairs centered the WGD's discussion on the factors *internal* to NINR that contribute to workforce diversity (i.e., scientific focus areas, diversity funding opportunities, training program structure, and the application review process); the factors *external* to NINR that contribute to workforce diversity (i.e., NINR branding, teaching and service obligations, institutional capacity, sustainment of scientific faculty, and mentorship); and funding disparities within the NINR-supported scientific workforce (i.e., structural racism, deficits in the application submission process, lack of institutional resources, the application review process, and the role of Program Directors). The WGD Co-Chairs guided the WGD in a broad discussion of barriers to diversity in the scientific workforce and strategies that could overcome identified barriers. WGD members completed post-meeting surveys to define the populations the recommendations should focus on and to provide further input on actionable strategies that may impact workforce diversity factors that are internal and external to NINR.

The How: Translation to Implementation

The WGD Co-Chairs led the WGD in a process of categorizing, prioritizing, and evaluating the feasibility of identified barriers and strategies. The WGD focused on recommendations and strategies that would have a high impact on advancing workforce diversity and those that would be actionable within NINR. Then, the group refined the recommendations into actionable recommendations and specific and measurable strategies to achieve the recommendations. **Appendix C** provides an overview of the WGD's meeting deliberations. WGD members completed post-meeting surveys to prioritize and evaluate the feasibility of the barriers they identified and to draft and refine their final recommendations.

Recommendations

After deliberating, "The Why," "The What," and "The How" of overcoming barriers to advancing diversity in the NINR-supported scientific workforce, the WGD developed nine overarching themes, 16 actionable recommendations, and 60 specific and measurable strategies to achieve the recommendations.

Theme One: Increase Awareness of NINR Research Lenses

There is an enduring perception that NINR does not support health equity and/or that its research focal areas do not resonate with a diverse workforce. NINR's new Strategic Plan includes a Research Lens on Health Equity and a Research Lens on Social Determinants of Health—both of which promote research areas and community-based research approaches that may resonate with investigators from historically underrepresented populations.

Recommendation A: Broadcast NINR's new Strategic Plan and Research Lenses across multiple communication channels

- **Strategy A1:** Use multiple strategies to announce NINR's Research Lenses including local and state public broadcasting and social media.
- **Strategy A2:** Highlight research activities across each Research Lens through promotional videos and/or vignettes that highlight diverse investigators.

Recommendation B: Create funding and training opportunities that increase awareness of the importance of health equity research to NINR's mission.

- **Strategy B1:** Develop NOSIs that highlight NINR's focus on achieving health equity.
- **Strategy B2:** Create PAs that address health equity to promote awareness on its scope as well as NINR's commitment to addressing health equity.
- **Strategy B3:** Provide specific examples of funded studies that represent the broad scope of health equity research, are synchronous with NINR's Strategic Plan, and are led by investigators from diverse backgrounds.
- **Strategy B4:** Commit to solicit and fund health equity research.

Theme Two: Increase Awareness of Nursing Science

Nursing science may not be viewed as a viable or competitive research career trajectory. Historically underrepresented student may be unaware of what nursing science is, its career trajectories, and its potential to support their communities and/or interests.

Recommendation C: Promote nursing science as a career through partnerships and collaborations

- **Strategy C1:** Partner with foundations and professional organizations (e.g., the National Coalition of Ethnic and Minority Nursing Association, among many others) that support racial/ethnic underrepresented groups.
- **Strategy C2:** Develop partnerships with schools of nursing, associate's degree programs, high schools, and other academic institutions, as well as community clinics, tribal colleges and clinics, and other community organizations, to create science pathway programs and student visits at NIH.
- **Strategy C3:** Conduct outreach, with tools such as posters and other educational materials, to promote nursing science outside of traditional nursing education and health science settings.
- **Strategy C4:** Create a Speaker's Roundtable on the role of the nurse scientist that includes NINR-funded investigators from diverse backgrounds, working in diverse settings.

Recommendation D: Promote nursing science as a career through culturally- and linguistically-appropriate multimedia communications and other technology-driven channels

- **Strategy D1:** Create and distribute flyers, bulletins, and announcements to academic, community, and industry organizations.
- **Strategy D2:** Engage NACNR members and other NINR investigators from diverse backgrounds in multimedia imaging of nursing science.
- **Strategy D3:** Include families in outreach efforts to broaden their understanding of nursing science as a valued career trajectory that is advantageous and lucrative for all students, including high-performing students, families, and communities in addition to potential nurse scientists.

Recommendation E: Promote nursing science as a career through funding

- **Strategy E1:** Fund research supplements that include a stipend and living expenses for diverse undergraduate students to join a research team.
- **Strategy E2:** Fund research supplements for P grants that include a stipend, living expenses, and travel for undergraduate students from minority-serving institutions to attend an intensive summer research experience at a host institution or at NIH intramural programs and clinical centers.
- **Strategy E3:** Direct funding opportunities specific to nursing science to academic faculty in both minority-serving institutions and other institutions.

Theme Three: Expand the Underrepresented Nursing Science Applicant Pool

At the institutional level, there is insufficient proactivity and accountability to promote diversity in the research workforce. More direct support is needed to expand the nursing science applicant pool, especially among investigators from historically underrepresented racial and ethnic groups.

Recommendation F: Partner with minority-serving institutions and organizations as well as NINR-funded investigators to promote nursing science

- **Strategy F1:** Identify minority-serving institutions that offer science tracks and engage with them through outreach and in-person visits from NINR leadership to promote nursing science.
- **Strategy F2:** Partner to develop resources to help future applicants from diverse backgrounds discern between terminal degrees of the practice versus terminal degrees of the discipline.
- **Strategy F3:** Provide tuition support to students from diverse backgrounds seeking to become nurse scientists.

Theme Four: Enhance the Structure of Research Grants

Existing funding mechanisms do not foster durability and sustainability for under-resourced minority serving institutions. Grant funding cycles are not long enough to develop and sustain community partnerships and collaborations, creating unrealistic expectations for success. Current funding mechanisms favor R1-level institutions and/or institutions within existing collaborative arrangements.

Recommendation G: Ensure adequate timelines between funding opportunity announcements (FOAs) and due dates to promote applications from investigators at minority-serving institutions

- **Strategy G1:** Ensure that timelines are adequate from proposal release to submission deadline.
- **Strategy G2:** Ensure that timelines provide longer lead time for FOAs that include community engagement.
- **Strategy G3:** Provide training and workshops on upcoming grants well in advance of the funding opportunity deadline.

Recommendation H: Create new funding mechanisms to support under-resourced institutions and underrepresented investigators

- **Strategy H1:** Pilot a new tiered grant mechanism in which the first 4-5 year phase focuses on building capacity and the second 4-5 year phase focuses on developing the science.

- **Strategy H2:** Invite reviewers from minority-serving institutions and organizations to provide input on grant mechanisms and review processes.

Theme Five: Leverage Diversity Initiatives
NINR does not sufficiently leverage diversity initiatives that other Institutes participate in and has not developed diversity-specific funding opportunities.

Recommendation I: Champion new diversity initiatives aligned with the new NINR Research Lenses
- **Strategy I1:** Identify three best practices in diversity and pilot these at NINR.
- **Strategy I2:** Increase the proportion of historically underrepresented investigators who are awarded R01 funding to ensure that the research portfolio is distributed equitably.
- **Strategy I3:** Take part in existing initiatives internal and external to NIH that aim to support diverse scientists.

Recommendation J: Conduct ongoing evaluation of NINR diversity initiatives
- **Strategy J1:** Develop a workgroup that includes representation from minority-serving institutions to evaluate the successes of diversity initiatives.
- **Strategy J2:** Develop an evaluation tool to measure success of each implemented diversity initiative.
- **Strategy J3:** Develop benchmarks and track metrics for guiding future decisions in advancing workforce diversity.

Theme Six: Ensure Sufficient Diversity in Training Programs
Training programs may currently perpetuate disparities by favoring grantees from resourced institutions. Under-resourced institutions may lack the necessary research infrastructure and capacity to be competitive for training awards, especially Institutional National Research Service Awards.

Recommendation K: Enhance the T32 program to support a balanced portfolio that adequately represents underrepresented racial and ethnic minorities
- **Strategy K1:** Dedicate one T32 program to a training program for an under-resourced minority-serving institution and reallocate a training slot to an external and experienced mentor to provide support for the first five-year cycle.
- **Strategy K2:** Partner with a minority-serving institution to fund a T32 that is focused entirely on underrepresented trainees.
- **Strategy K3:** Provide sufficient funding for protected time for faculty at minority-serving institutions.
- **Strategy K4:** Develop a new funding mechanism to help minority-serving institutions prepare to be competitive in the T32 stream.
- **Strategy K5:** Increase the proportion of historically underrepresented T32-funded pre- and post-doctorates to ensure equitable award distribution.
- **Strategy K6:** Invite reviewers from minority-serving institutions and organizations to participate in the grant review process.
- **Strategy K7:** Invite reviewers from minority-serving institutions to inform ongoing support of training initiatives.

- **Strategy K8:** Create a stepped approach to training program to enhance the building of research programs within non-R1 minority-serving institutions.
- **Strategy K9:** Ensure that funded training programs are equitably distributed.

Theme Seven: Enhance Mentorship for Underrepresented Scientists
There is a lack of strong mentorship that disadvantages underrepresented investigators and disconnects them from the competitive grant process.

Recommendation L: Incentivize effective mentorship
- **Strategy L1:** Provide opportunities for mentorships through a rotation of training at NINR.
- **Strategy L2:** Develop new mechanisms that support mentorship from institutions beyond investigator's parent institution.
- **Strategy L3:** Mentor minority-serving institution research staff on NINR grant submission policies and procedures.
- **Strategy L4:** Fund level of effort for sponsors in F, K, and T grant mechanisms.
- **Strategy L5:** Partner with four regional research societies to conduct grant writing bootcamps for minority-serving institutions and non-R01 institutions with diverse faculty. Fund these societies to perform mock reviews with full NIH-level critique and provide guidance for strengthening applications.
- **Strategy L6:** Provide annual training for researchers who are new to NIH/NINR.

Theme Eight: Mitigate Bias in the Grant Peer Review Process
There is a lack of diversity across both scientific discipline and demographic characteristics on review panels. Additionally, reviewer biases can negatively impact the review process.

Recommendation M: Partner with the NIH Center for Scientific Review (CSR) to diversify study sections
- **Strategy M1:** Advocate that CSR review and evaluate bias in the review of applications from minority-serving institutions and investigators from diverse backgrounds.
- **Strategy M2:** Advocate that CSR create a transparent system for how individuals are invited to serve on review panels and to examine the diversity of panels.
- **Strategy M3:** Advocate for the evaluation of a random sample of reviews after completion of each review cycle to rigorously assess for bias and to provide empirical data needed to inform intervention.

Recommendation N: Provide training on diversity and bias in the grant review process
- **Strategy N1:** Train reviewers and Science Review Officers in how implicit and explicit biases can affect the review process and evaluation of scientific rigor.
- **Strategy N2:** Lead by example through diversity and bias training of NRRC membership.
- **Strategy N3:** Invite reviewers from minority-serving institutions and organizations to participate in the development of training, evaluation, and other initiatives to promote diversity in the review process.
- **Strategy N4:** Add a diversity officer to the scientific review panels and/or Council.
- **Strategy N5:** Fund reviewers who have experience conducting health equity research to help train existing reviewers.

- **Strategy N6:** Develop peer-reviewed evaluation criteria specifically for the review of community-based research.

Theme Nine: Optimize Experiences with NINR Program Directors

There are numerous strengths of existing NINR programs and resources that can be built upon to optimize diverse investigator interactions with NINR Program Directors.

Recommendation O: Develop tools and/or resources to guide interactions between Program Directors and principal investigators from diverse racial and ethnic backgrounds during the application submission, pre-award, and post-award phases

- **Strategy O1:** Create an assistant navigator role for grant inquiries.
- **Strategy O2:** Develop guides and FAQs on the role of the Program Director, what investigators can expect in their interactions with Program Directors, and/or how to maximize the value of meetings with Program Directors. Ensure that these tools are developed using an algorithm to help guide investigators from diverse backgrounds through the system based on their needs.
- **Strategy O3:** Provide a timely and efficient follow-up mechanism, from Program Directors, such as callbacks.

Recommendation P: Provide guidance to Program Directors to equitably support grant applicants and awardees

- **Strategy P1:** Provide training for Program Directors to help navigate investigators to alternate Institutes if there is poor fit with NINR.
- **Strategy P2:** Provide training for Program Directors to support new and early-stage investigators in framing their applications to synchronize with NINR Research Lenses and Guiding Principles.
- **Strategy P3:** Provide training for Program Directors on delivering equitable support (i.e., the diverse settings in which applicants are based, strategies to move forward in the application process after rejection).

Conclusion

The WGD leveraged the diverse perspectives of a multidisciplinary team and a systematic, data-driven approach towards developing high-priority recommendations and feasible implementation strategies to promote and support diversity in the NINR scientific workforce. The WGD developed nine overarching, forward-thinking themes, under which they included 16 actionable recommendations and 60 strategies that may be feasibly implemented within NINR.

Appendix A: Workgroup Member List

Co-Chairs

Christopher Lee, Ph.D., RN, FAHA, FAAN, FHFSA
Barry Family/Goldman Sachs Endowed Professor
and Associate Dean for Research
Boston College
William F. Connell School of Nursing

Shalanda A. Bynum, Ph.D. MPH
Program Director
Division of Extramural Science Programs
National Institute of Nursing Research

Committee Members

Brian Castrucci, DrPH
President and CEO
De Beaumont Foundation

Daniel Dawes, JD
Executive Director
Satcher Health Leadership Institute
Morehouse School of Medicine

Cheryl Giscombe, Ph.D.
LeVine Family Distinguished Professor of Quality
of Life, Health Promotion, and Wellness
Associate Dean, PhD Division & Program
School of Nursing
The University of North Carolina at Chapel Hill

Laura Gitlin, Ph.D., FGSA, FAAN
Distinguished University Professor and Dean
College of Nursing and Health Professions
Drexel University
Executive Director, The Age Well Collaboratory

Emily Haozous, Ph.D., RN, FAAN
Research Scientist
Pacific Institute for Research and Evaluation

Mallory Johnson, Ph.D.
Professor
Department of Medicine
University of California, San Francisco

Randy Jones, Ph.D., RN, FAAN
Professor
Associate Dean for Partnership and Outreach
University of Virginia, School of Nursing

Phoenix Matthews, Ph.D.
Professor
Associate Dean for Equity and Inclusion
College of Nursing
University of Illinois at Chicago

Elias Provencio-Vasquez, Ph.D., RN, FAAN, FAANP
Dean and Professor
College of Nursing
University of Colorado Anschutz Medical Campus

Therese Richmond, Ph.D., RN, FAAN
Associate Dean for Research & Innovation
Andrea B. Laporte Professor
University of Pennsylvania School of Nursing

Roland Thorpe, Jr., Ph.D.
Associate Provost of Faculty Diversity
Professor
Bloomberg School of Public Health
Johns Hopkins University

Jing Wang, Ph.D., MPH, RN, FAAN
Dean and Professor
Florida State University College of Nursing
President, Asian American Pacific Islander Nurses
Association

Linda Washington-Brown, PhD, EJD, APRN-C, PNP,
FNP, ANP, FAANP, FAAN
Director, Florida Nurses Association South Region
Clinical Coordinator for Education, Research, and
Vaccination, Caring Place Clinic

Lisa Lucio Gough, Ph.D., (NINR Liaison)
Health Science Policy Analyst
Office of Science Policy & Legislation
National Institute of Nursing Research

Appendix B: Research Workforce Diversity Data

NINR-Supported Investigators

	75.6%	White
	13.4%	Asian
	4.3%	Black/African American
	2.3%	Unknown
	0.6%	> 1 Race
	0.2%	American Indian/Alaska Native
	0.0%	Pacific Islander/Native Hawaiian

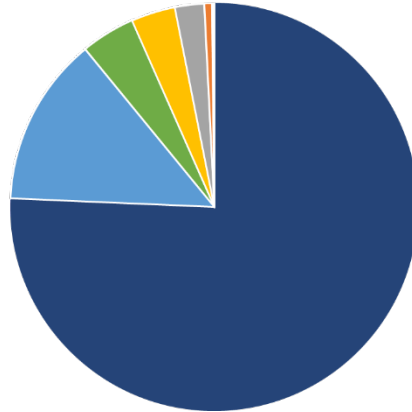*Figure 1.* NINR-Supported Principal Investigators of R-level Grants across Race FY2015-2019

NINR-Supported Investigators

	97.5%	Not Hispanic/Unknown
	2.5%	Hispanic
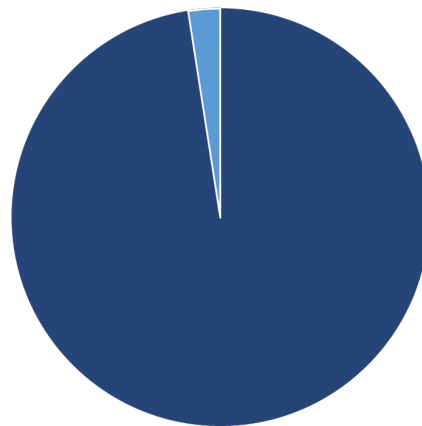
Figure 2. NINR-Supported Principal Investigators of R-level Grants across Ethnicity FY2015-2019
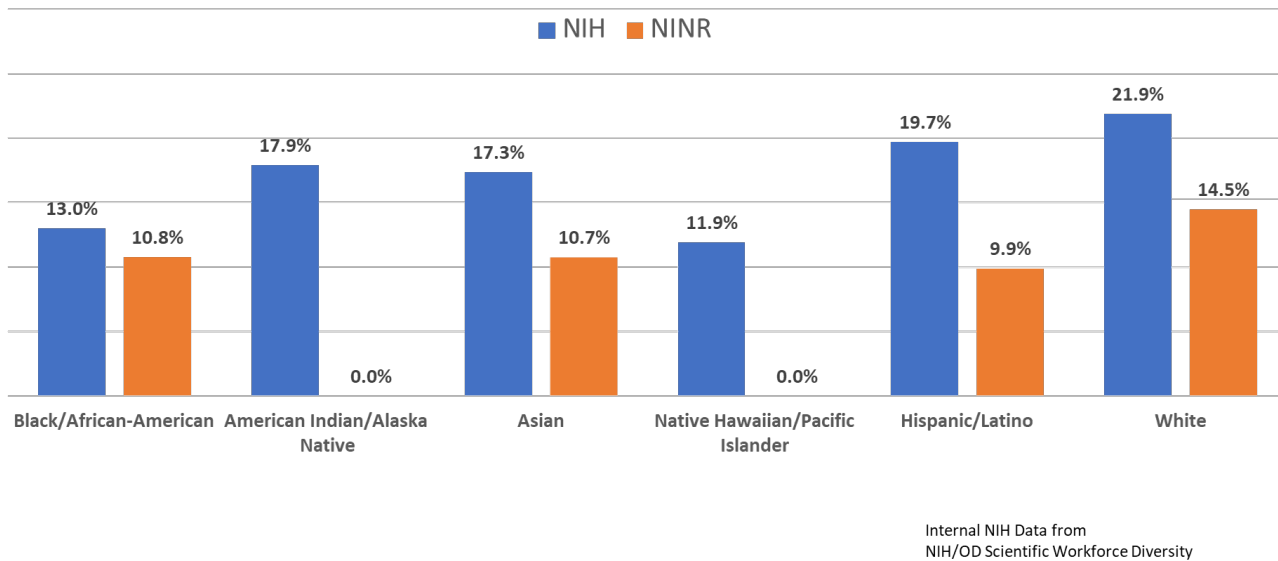
Figure 3. Comparison of NIH and NINR R01 Success Rates across Race/Ethnicity

NINR and NIH NRSA Training - Fellows
(All Fs)

	NINR Fellows FY2015-2019	NIH Fellows FY2016-2020
American Indian/Alaskan Native	0.0%	0.5%
Asian	9.4%	13.0%
Black/ African American	12.3%	4.2%
More than One Race	1.9%	4.2%
Native Hawaiian / Pacific Islander	0.0%	0.2%
Unknown/Withheld	5.6%	9.4%
White	70.8%	68.5%
Hispanic	7.5%	9.4%
Non Hispanic	87.7%	83.3%
Unknown/Withheld	4.7%	7.2%
Female	84.0%	51.5%
Male	8.5%	43.0%
Unknown/Withheld	7.5%	5.5%
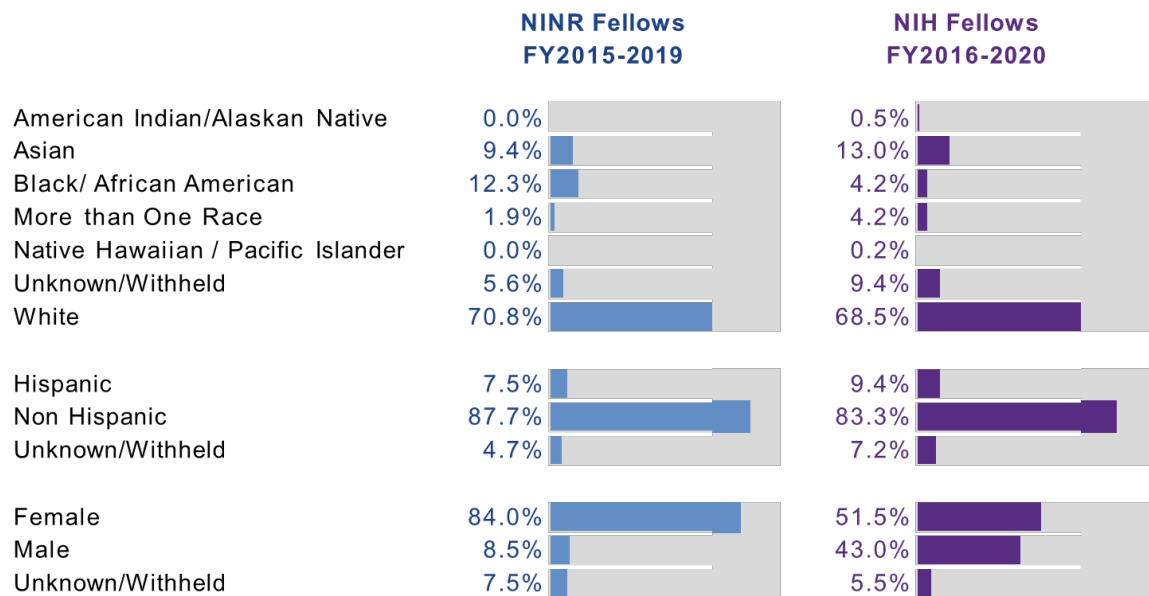
Note: Internal NIH/OER Data for NINR (FY2015-2019); NIH RePORT Data (FY2016-2020)

Figure 4. Comparison of NIH and NINR Training Grant Success Rates across Race, Ethnicity, and Gender

	NINR Research Grant Applicants[1] (2015-2019) (N=4,705)	PhD Science & Engineering Graduates[2] (2015-2018) (N=98,594)	PhD Nurse Graduates[3] (2015-2019) (N=3,356)		NINR NRSA Fellowship Applicants[4] (2015-2019) (N=266)	PhD Science & Engineering Graduates[2] (2015-2018) (N=98,594)	PhD Nurse Graduates[3] (2015-2019) (N=3,356)
African American/ Black	6.1%	5.7%	14.3%		11.3%	5.7%	14.3%
American Indian, Alaska Native	0.3%	0.4%	0.9%		0.8%	0.4%	0.9%
Asian	12.3%	9.5%	7.8%[5]		9.0%	9.5%	7.8%[5]
Native Hawaiian, Pacific Islander	0.3%	0.1%	(included with Asian)		(no applicants)	0.1%	(included with Asian)
More Than One Race	1.3%	2.3%	1.6%		0.4%	2.3%	1.6%
White	62.3%	66.5%	70.6%		65.8%	66.5%	70.6%
Unknown or Withheld	17.5%	7.9%	n/a[6]		12.0%	7.9%	n/a
Hispanic*	3.4%	7.6%	5.7%		7.5%	7.6%	5.7%
Non Hispanic	78.0%	92.4%	94.3%		87.7%	92.4%	94.3%
Unknown or Withheld	18.6%	n/a[6]	n/a[6]		4.7%	n/a	n/a

Figure 5. Characteristics of NINR Research Grant and NRSA Fellowship Applicants Compared to PhD Graduate Data from NSF and AACN

NINR American Indian or Alaska Native Research Applicants 0.3%

STEM PhDs: American Indian or Alaska Native 0.4%

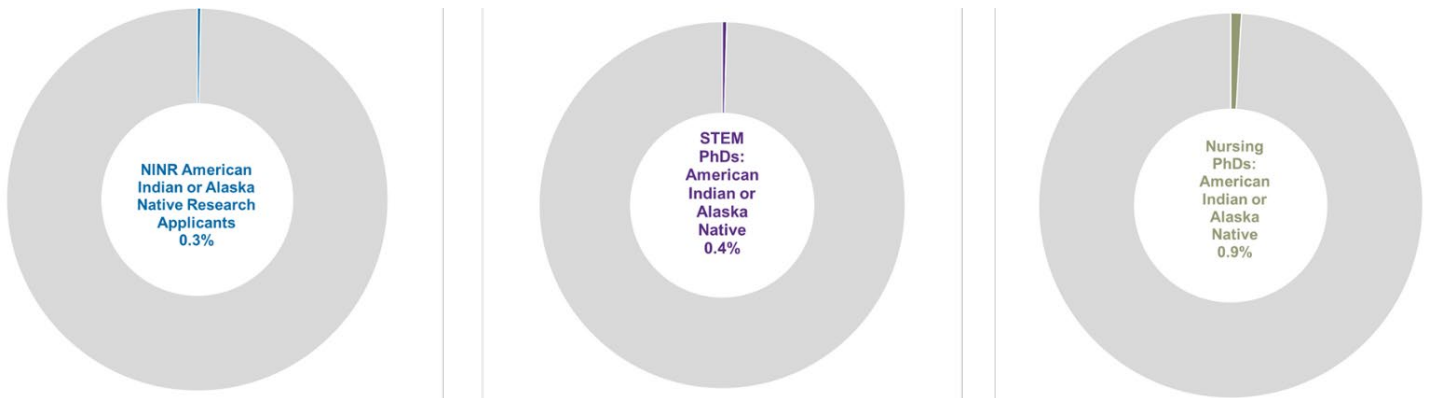Nursing PhDs: American Indian or Alaska Native 0.9%

Figure 6. Comparison of NINR Applicant to Potential Pool of Applicants among American Indian/Alaska Native Applicants

	NINR Mentored Researchers (Ks)[1] 2015-2019	NINR NRSA Institutional Trainees (Ts)[4] 2015-2019	NINR NRSA Fellows (Fs)[4] 2015-2019	PhD Science & Engineering Graduates[2] 2015-2018	PhD Nurse Graduates[3] 2015-2019
African American/ Black	4.0%	11.4%	12.3%	5.7%	14.3%
American Indian, Alaska Native	0.0%	0.0%	0.0%	0.4%	0.9%
Asian	26.0%	10.2%	9.4%	9.5%	7.8%[5]
Native Hawaiian, Pacific Islander	0.0%	0.0%	(no applicants)	0.1%	(included with Asian)
More Than One Race	2.0%	0.0%	1.9%	2.3%	1.6%
White	68.0%	75.0%	70.8%	66.5%	70.6%
Unknown or Withheld	0.0%	3.4%	5.7%	7.9%	n/a[6]
Hispanic*	4.0%	9.1%	6.4%	7.6%	5.7%
Non Hispanic	96.0%	88.6%	82.3%	92.4%	94.3%
Unknown or Withheld	0.0%	2.3%	11.3%	n/a[6]	n/a[6]

Figure 7. Characteristics of NINR Mentored (K) Researchers, NRSA Institutional (T), and NRSA Individual (F) Trainees

Appendix C: Meeting Summaries

Meeting One
The WGD reviewed and discussed workforce diversity data, then discussed the structures, policies, and practices *internal* to NINR that limit a diverse workforce. WGD members suggested that NINR's focal areas have not historically resonated with a diverse workforce and the communities they serve. They discussed at length the potential for certain grant mechanisms to be strategically leveraged for diversity. WGD members also talked about limits in institutional capacity that can negatively affect grant competitiveness, with the most resourced institutions often receiving multiple grants. They suggested that there was an insufficient pool of historically underrepresented/historically excluded applicants and highlighted a need for mentorship, training, and policies that would motivate these potential investigators. The group talked about how review boards may not be diverse enough to understand the needs of diverse investigators and their communities. The WGD also discussed the structures, policies, and practices *external* to NINR that limit a diverse workforce. WGD members talked about limited understanding of nursing science as a STEM pathway. They also discussed the need to consider university hiring practices, mentorship programs, and partnerships that would support historically underrepresented investigators and the potential for an additional burden to be placed on an already heavy workload. Finally, the WGD discussed the factors that lower NINR funding success rates, such as the lack of resources, the diversity of the review panel, and Program Director experiences with historically underrepresented investigators.

Meeting Two
The WGD reviewed the race and ethnicity of NINR grant applicants as compared to the race and ethnicity of prospective NINR grant applicants (i.e., doctorate-level graduates in nursing, science, and engineering). WGD members discussed whether their recommendations should consider the range of underrepresented populations or focus on race and ethnicity. They determined that a focus on race and ethnicity was a pressing need, but would create strategies that would cross-cut other underrepresented populations (e.g., age, disability, gender/sexual identity). The WGD focused on strategies to address the *internal* barriers to workforce diversity, such as NINR focus areas, funding announcements that promote/support diversity, the structure of training programs, and the application review process. Proposed strategies included funding mechanisms set aside for partnerships between smaller institutions with resourced institutions, grants with longer funding cycles to support community relationship-building, broader scope of expertise on review panels, resource centers and capacity building for historically underrepresented grantees, grants that are written to promote study of smaller and/or more remote populations, grant mechanisms that support community interests, and training programs for implicit bias and equity.

Meeting Three
The WGD reviewed race and ethnicity data of NINR-funded research career, trainee, and fellowship recipients. WGD members focused their discussion on strategies to address the *external* barriers to workforce diversity, such as the perception that NINR does not fund research topics that resonate with historically underrepresented populations, a lack of awareness of nursing science as a career path, insufficient institutional capacity to pursue funding and partnerships, and institutional racism. Proposed strategies included increased awareness of NINR's new Research Lenses; improved communication from NINR staff about the new Strategic Plan; funding mechanisms (e.g., summer programs) and organizational partnerships to improve nursing science as a viable career path in populations with diversity barriers (e.g., undergraduates, first generation college students, high school students); non-

traditional partnerships with nonprofits, professional organizations, communities; and structural racism training.

Meeting Four

The WGD focused their discussion on funding disparities in the NINR-supported workforce, such as unfair review and funding outcomes, limited potential applicant pools, inability to obtain and sustain mentorship, insufficient resources to support grant submissions, and differences within interactions with Program Directors. Their proposed strategies included partnerships between small institutions and resourced institutions, mechanisms to ensure more equitable distribution of grant funds, training to reduce implicit biases, relationship building with historically underrepresented communities, equitable review processes, diverse review panels, developmental grant mechanisms for early-stage investigators, increased support for first generation students, and phased funding mechanisms to promote community building and sustainability.

Meeting Five

The WGD began merging barriers into common themes and prioritized those that were most pressing to workforce diversity. Among internal barriers to workforce diversity, resonance with NINR's scientific direction, the structure of NINR training programs, funding mechanisms, and peer review processes were identified as high priority barriers to address. Among external barriers to workforce diversity, the need for mentorship, the lack of institutional capacity, and challenges in sustaining faculty were identified as high priority. WGD members then generated common themes across the strategies they identified. The WGD considered NINR's role as a champion, partner, or advisor and the different pathways to research success, including institutional/business barriers and development/support needs. WGD members also talked about how diversity initiatives should cross-cut all mechanisms, including training, funding, and representation on review panels including study section chairs.

Meeting Six

The WGD utilized pre-meeting surveys to evaluate the barriers to workforce diversity that were amenable to change within NINR; the level of NINR's involvement in the change (i.e., lead, partner, advisory); and of highest priority (i.e., high, moderate, or low). Among internal factors, the most highly ranked barriers were lack of resonance with NINR's focus areas; funding mechanisms that do not favor historically underrepresented investigators; limited leverage of diversity initiatives and funding mechanisms; and reviewer biases and lack of knowledge, skills, and diversity. Among external factors, the most highly ranked barriers were lack of awareness of nursing science as a career path, the lack of strong mentorship, and unfair review processes. Insufficient institutional capacity was considered a high priority barrier, but not as actionable as the other barriers. The WGD began an exercise to translate their priority barriers and strategies into actionable recommendations.

Meeting Seven

The WGD utilized a pre-meeting survey to continue the exercise of translating priority barriers and strategies into actionable recommendations. The WGD Co-Chairs compiled the actionable recommendations and reviewed them with WGD members to consolidate, exclude, or revise them as needed. The WGD also suggested shifting the priority barriers into forward-thinking overarching themes (e.g., "lack of resonance with NINR topic areas" was translated into "increase awareness of NINR Research Lenses"). The WGD categorized recommendations and the actionable strategies to implement each recommendation under each of these overarching themes. The WGD Co-Chairs presented these themes, recommendations, and actionable strategies to NACNR.

Meeting Eight

After the presentation to NACNR, the WGD discussed the NACNR presentation and carefully conducted a final review of the set of themes, recommendations, and actionable strategies. WGD members made minor revisions to ensure that each strategy was clear, actionable, and included sufficient detail for NINR to use as a guide for implementation going forward. The WGD Co-Chairs made appropriate revisions to the final set of recommendations to submit to NINR and Council.

Post-Meeting Surveys

Six post-meeting surveys were conducted to further capture input from the WGD. Survey One asked the WGD to identify the populations of focus for their recommendations and to develop draft actionable strategies for internal NINR factors related to workforce diversity. Survey Two asked for draft actionable strategies for external NINR factors related to workforce diversity and potential NINR allies for communicating the 2022-2026 NINR Strategic Plan. Survey Three asked the WGD to consider specific strategies to support research capacity building initiatives for minority serving institutions, for NINR to support mentorship to foster a diverse workforce, to advance awareness and understanding of the NIH grant review process among underrepresented investigators, and to help Program Directors better support grant applicants and awardees. Survey Four asked the WGD to prioritize their identified barriers to workforce diversity, to evaluate the feasibility of addressing those barriers within NINR, and to identify the role NINR could have in addressing the barriers. Survey Five presented the high priority barriers that were deemed feasible and actionable for NINR to implement and asked the WGD to draft recommendations that were specific and actionable. Finally, Survey Six presented a synthesis of the WGD's draft recommendations and provided them an opportunity to consider whether the recommendations should be revised, consolidated, or excluded. The results from Survey Six informed the development of the final WGD recommendations.