

NIH Scientific Workforce Diversity Progress Report and Recommendations

ACD Diversity Working Group

Hannah A. Valantine, MD

NIH Chief Officer for Scientific Workforce Diversity

114th NIH ACD Meeting | June 8, 2017



National Institutes of Health
Office of the Director
Scientific Workforce Diversity

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NIH Scientific Workforce Diversity: Progress Report and New Recommendations

Presentation Outline

- Review of progress on 2012 ACD recommendations
- Three clustered areas
 - NIH Institutional Oversight and Support
 - Mentoring, Career Development, Recruitment, Retention
 - Research and Interventions
- Where are we now? Demographic data
- Proposed new 2017 ACD recommendations

13 Recommendations from the 2012 Report of the ACD WGDBRW

NIH Institutional Support and Oversight Recommendations

- ✓ Chief Officer for Scientific Workforce Diversity
- ✓ ACD Working Group on Diversity
- ✓ Tracking and Evaluation

Mentoring, Career Development, Recruitment, Retention

- ✓ Support for Underserved Institutions
- ✓ Mentoring Networks
- ✓ Undergraduate Scholarships
- ✓ IRP Diversity
- ✓ K-12 Support

Research and Intervention Recommendations

- ✓ Review Feedback for All Applications
- ✓ Racial Funding Disparity
- ✓ Peer Review Working Group
- ✓ Bias Education
- ✓ Anonymous Bias Study

NIH Institutional Oversight and Support

- Chief Officer for Scientific Workforce Diversity (COSWD)
 - Mission: *NIH leads and catalyzes scientific workforce diversity through data-driven innovations to recruit and retain the most talented scientists*
 - Strategic goals
 - Extramural and intramural implementation plans
 - Communication plan: Newsletter; blogs; website
 - diversity.nih.gov
- ACD WG on Diversity
 - Progress to date and new recommendations
- NIH Steering Committee Diversity Working Group
 - Evaluation, tracking

NIH Institutional Oversight and Support

Tracking and Evaluation

- Evaluation – retrospective
 - Diversity administrative supplements
 - IC-specific diversity programs
 - NIGMS - RISE, MARC, IMSD
 - NCI - CURES
 - NIAID - INRO
- Evaluation – prospective
 - Center for Evaluation and Coordination (CEC) as a model:
 - BUILD; NRMN
- Tracking
 - Electronic submission (Diversity supplements; Progress Reports)
 - Monitoring through eRA Commons ID
 - ORCID ID

Mentoring, Career Development, Recruitment, Retention: Building Infrastructure Leading to Diversity (BUILD)

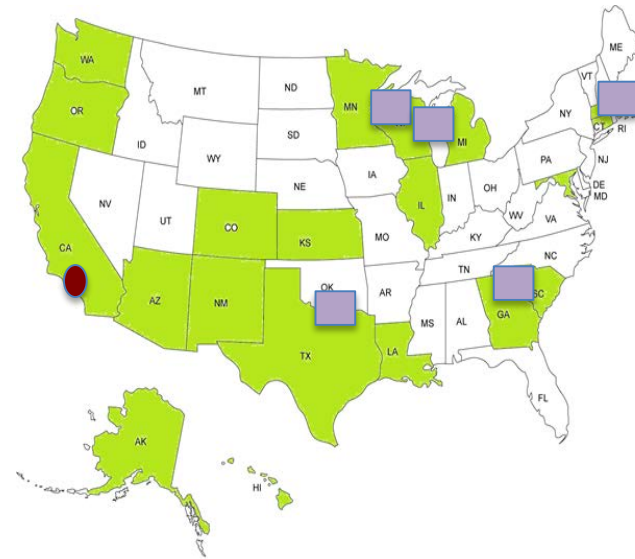
Awards made October 2014

BUILD: 10 sites/experiments

NRMN

CEC

Total: \$250 million (5 years)



BUILD

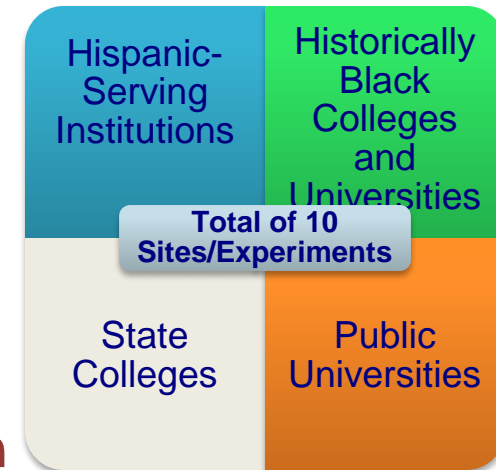
- California State University Long Beach
- California State University Northridge
- Morgan State University
- Portland State University
- San Francisco State University
- University of Alaska Fairbanks
- University of Detroit Mercy
- University of Maryland Baltimore County
- University of Texas El Paso
- Xavier University of Louisiana

National Research Mentoring Network (NRMN)

- Boston College; Morehouse SM; U. Min.; U. North Texas; U. Wisconsin

Coordination and Evaluation Center (CEC)

University of California Los Angeles



Scientific Approach to Enhancing the Diversity of the Biomedical Research Workforce

- BUILD:10 experiments each with:
 - Hypothesis
 - Intervention and control groups
 - BUILD vs Non-BUILD institutions
- Three levels of impact: **student**, **faculty**, and **institution**
- Integration of **social science research** and **psychosocial interventions** into the process of training and mentoring
- Rigorous **assessment and evaluation** of the training and mentoring interventions implemented across the program
 - Hallmarks and metrics of success



DIVERSITY
PROGRAM
CONSORTIUM

*Supported by the National
Institutes of Health*

BUILD: “Clinical Trial” Model of Investigation

Independent Variables

Gender
Race/Ethnicity
Disability Status
Socio-economic Status
Institutional Factors
Test Scores
Major
GPA

Activities or Interventions

Financial Support
Academic Advising & Support
Research Training & Support
Novel Curricula
Mentoring
Diversity Training
Career Development

Short to Medium-Term Outcomes

Engagement in Research

Enhanced
Self-Efficacy & Science Identity

Pursuit & Persistence in
Biomedical Science Disciplines

Scientific Presentations and
Authorship of Manuscripts

Social Integration

Satisfaction with Faculty
Mentorship

Intent to Pursue Biomedical
Research Career

Medium to Long-Term Outcomes

Completion of Undergraduate
Degree in Biomedical Science

Evidence of Biomedical Career
Preparedness

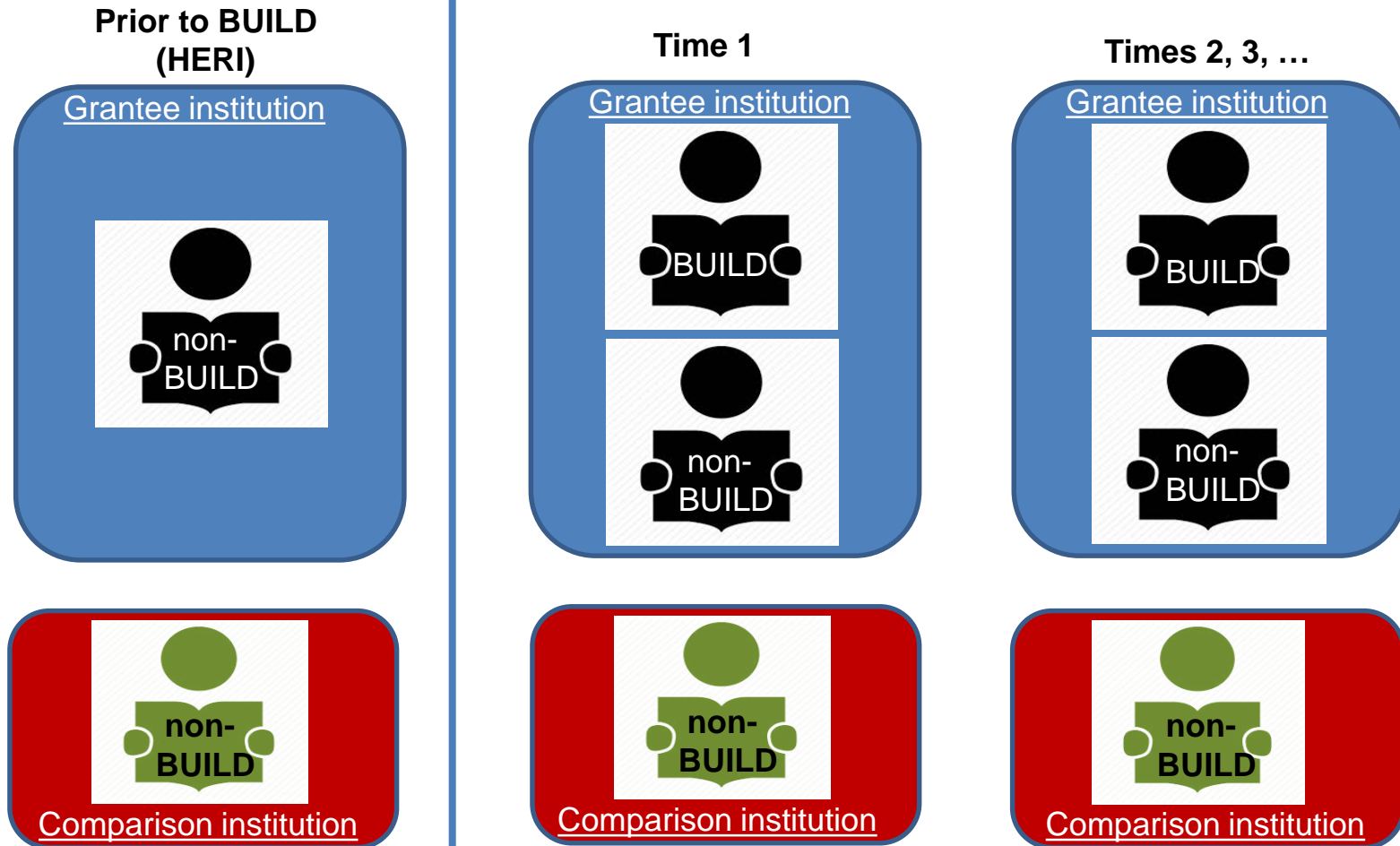
Application & Acceptance to
Graduate Programs

Research Fellowships &
Scholarships



Consortium-Wide Evaluation Design:

*BUILD; BUILD vs non-BUILD Institutions



*Intervention vs control groups within BUILD institutions

BUILD: Testable Interventions

Impact on pre-defined outcomes of:



**DIVERSITY
PROGRAM
CONSORTIUM**

*Supported by the National
Institutes of Health*

Site- Specific

- Reducing stereotype threat
- Diminishing imposter syndrome
- Overcoming microaggressions
- Mitigating unconscious bias
- Increasing cultural awareness and sensitivity
- Emphasizing cultural assets
- Engaging family and support systems

Consortium- Wide

- Science identity
- Providing financial assistance
- Providing authentic research experiences
- Implementing active learning courses
- Forming supportive cohorts and learning communities
- Mentor training
- Creating professional networks

Example: Site-specific Intervention

Stereotype Threat

- Social contextual phenomenon that occurs when environmental signals and being in the numerical minority elicit worries that one's actions will reinforce negative stereotypes about one's race/ethnicity, leading to underperformance
 - “Cognitive tax”
- ST is a stronger predictor for URM early exit from STEM majors than lack of academic preparation



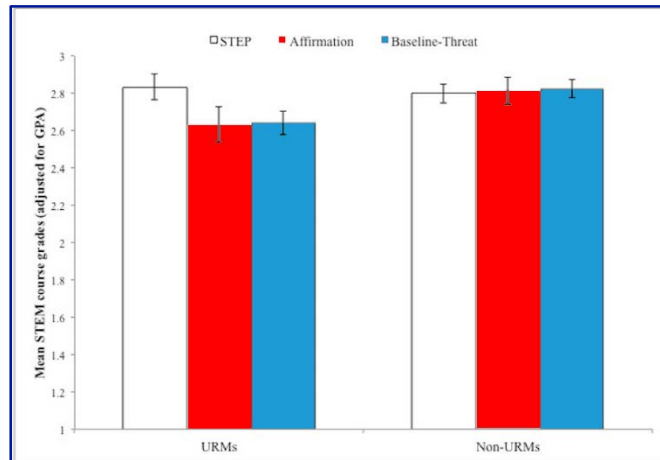
BUILD Experiment on Stereotype Threat (ST)

San Francisco State University

- Speaking Truth to EmPower (STEP)
- Hypothesis: STEP will protect URMs' intellectual performance from ST and bolster URMs' intellectual safety
- Randomized controlled trial, 3 conditions (URM, non-URM for each)
 - 1. Baseline threat (control)
 - 2. Values affirmation (“standard of care”):
 - Focus, reflect, and write about positive life factors: friends, family, personal interests
 - 3. STEP intervention
 - Combines knowledge (tutorial) and actions (imagine individualized ST “lived experiences” and plan what to do)

Results: BUILD Experiment on Stereotype Threat

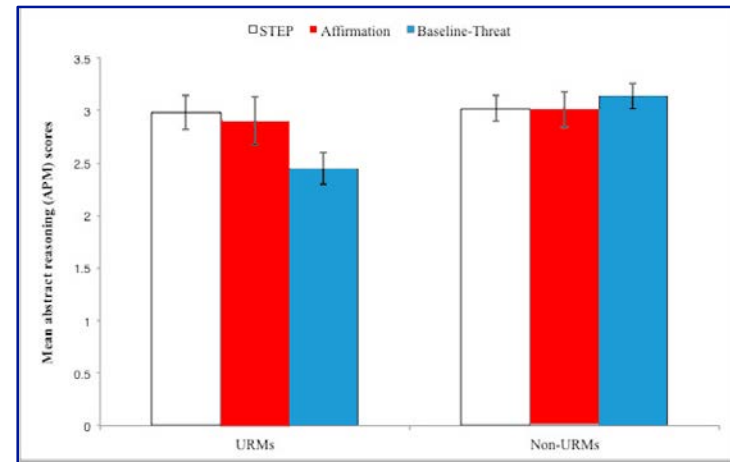
Course Grades



URM

Non-URM

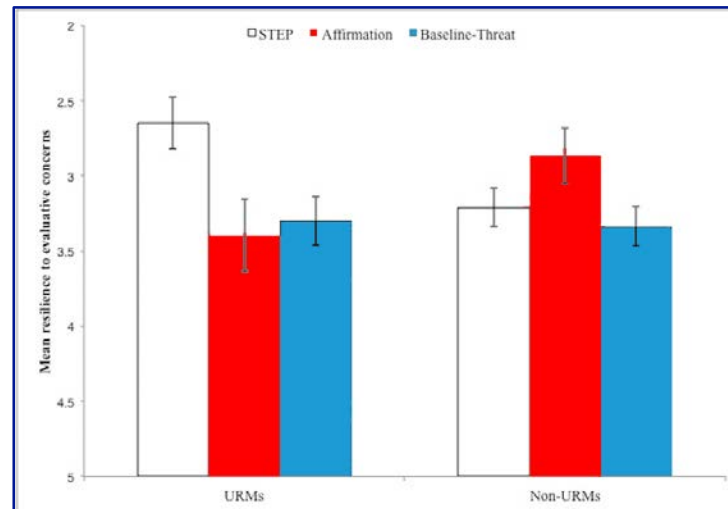
Abstract Reasoning



URM

Non-URM

- Baseline Threat
- Values Affirmation
- STEP



URM

Non-URM

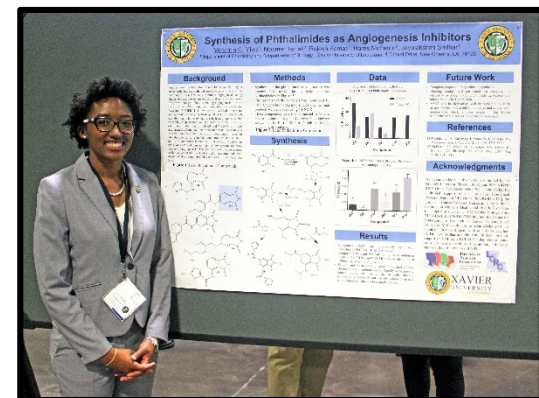
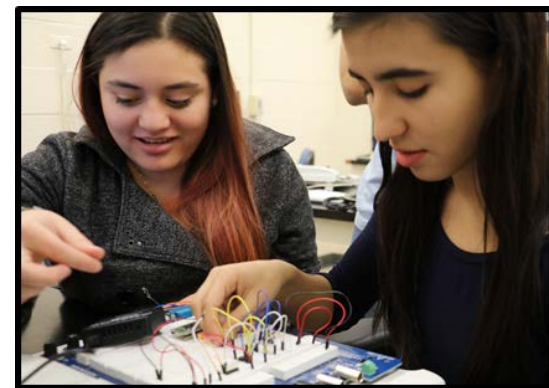
Resilience

A 'Speaking Truth' Intervention Protects Underrepresented Minorities' Intellectual Performance and Safety in STEM. Avi Ben-Zeev et al, unpublished data (under review)

Example: Consortium-wide Student-Focused Intervention

A strong science identity leads to persistence in science - certain activities and interventions increase science identity:

- A research-infused curriculum
- Engagement in laboratory research
- Presentations of research findings
- Understanding and overcoming the psychosocial barriers to feeling a sense of belonging in the scientific community (site-specific)



is **impostor syndrome**
holding you back?

CRITICAL
RACE
THEORY

Stereotype Threat
Negative Stereotype
STEREOTYPES
↓
STEREOTYPE THREAT
Exam and neg ↔ ↓ Performance drops

Measuring Science Identity

Survey Items

- ☐ “I have a strong sense of belonging to a community of scientists”
- ☐ “I derive great personal satisfaction from working on a team that is doing important research”
- ☐ “I think of myself as a scientist”
- ☐ “I feel like I belong in the field of science”

Answer scale: 1=strongly disagree, 5=strongly agree

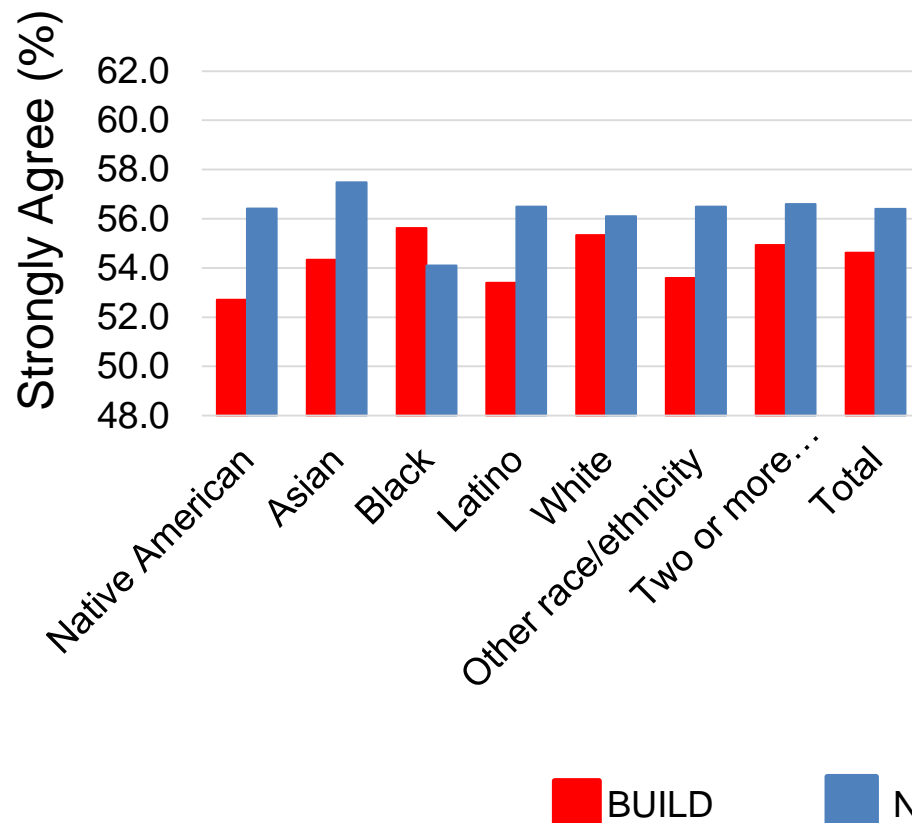
Short-Term: Exposure to BUILD activities will result in stronger “science identity”

Longer-Term: Stronger science identity will in turn predict (a) persistence in biomedical major, (b) graduation with biomedical bachelors degree and (c) matriculation to graduate school in biomedical science

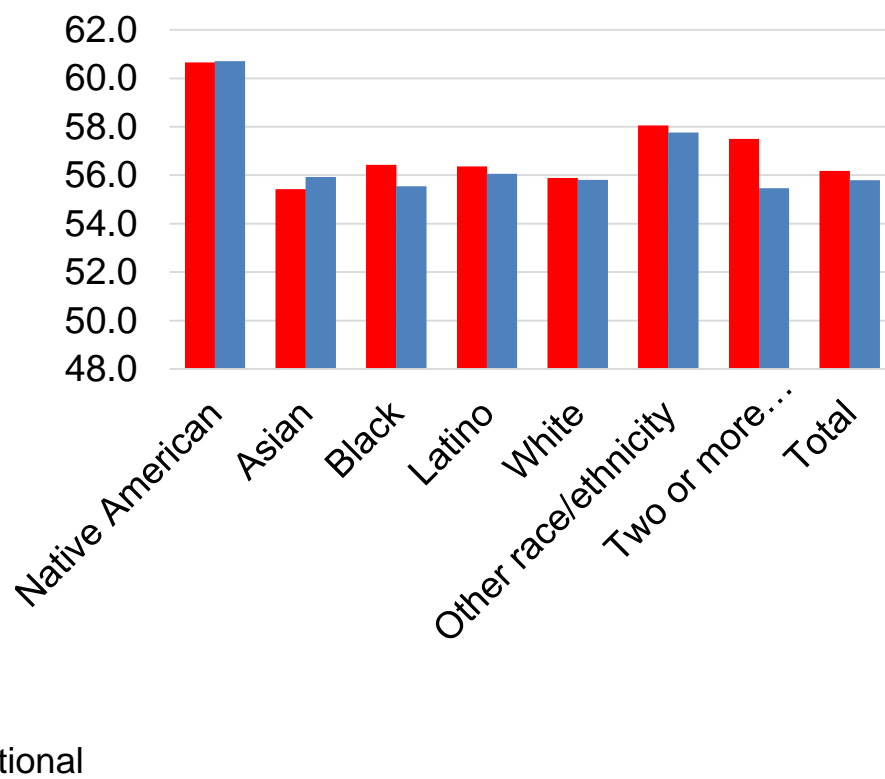


Science Identity STEM Freshmen by Race/Ethnicity – BUILD vs non-BUILD Institutions

Incoming Freshmen*



Freshmen - End of Year*



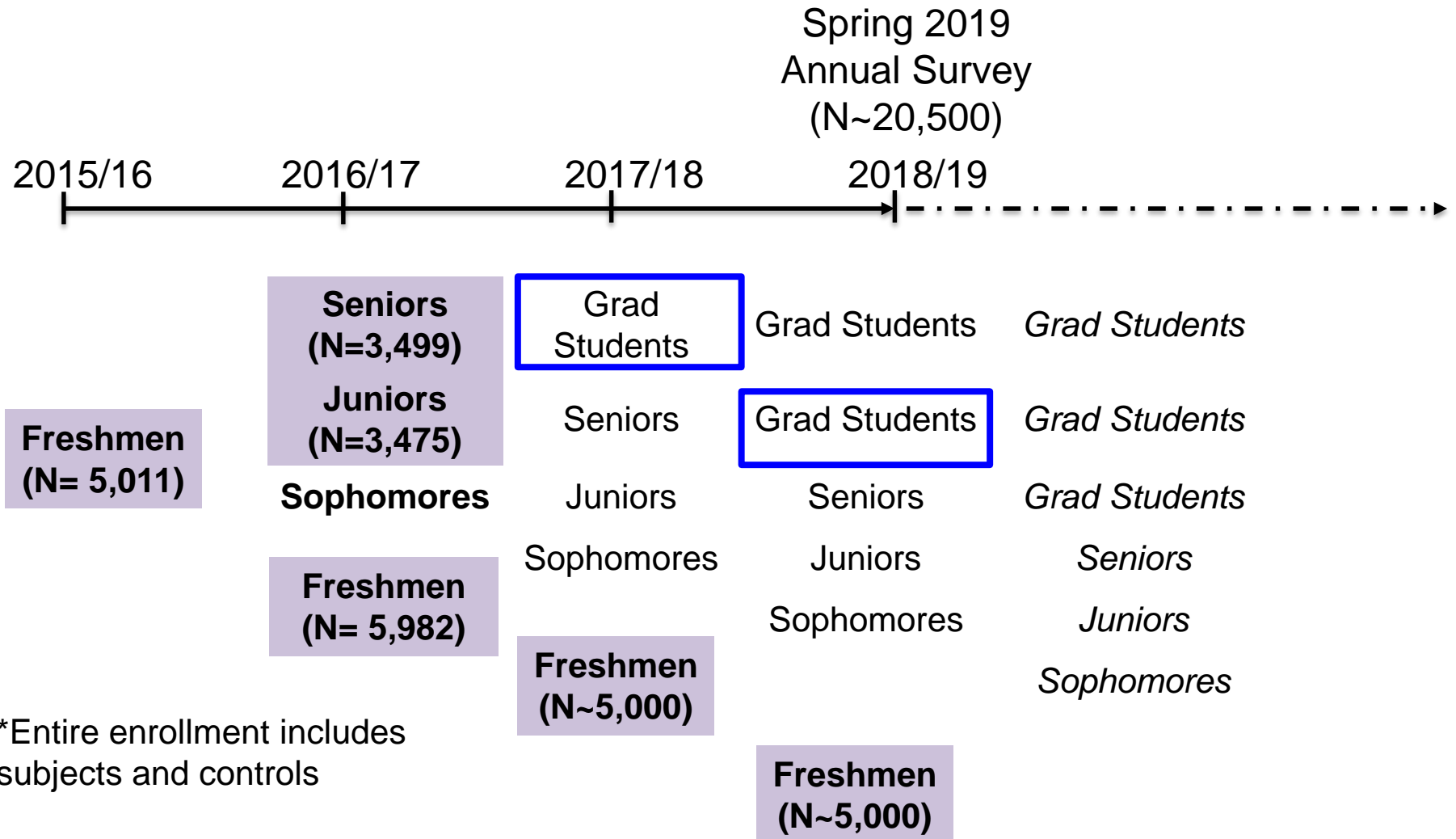
* Source Data:

Incoming Freshmen: From Fall 2016 HERI

Freshmen End of Year: From Spring 2016 HERI

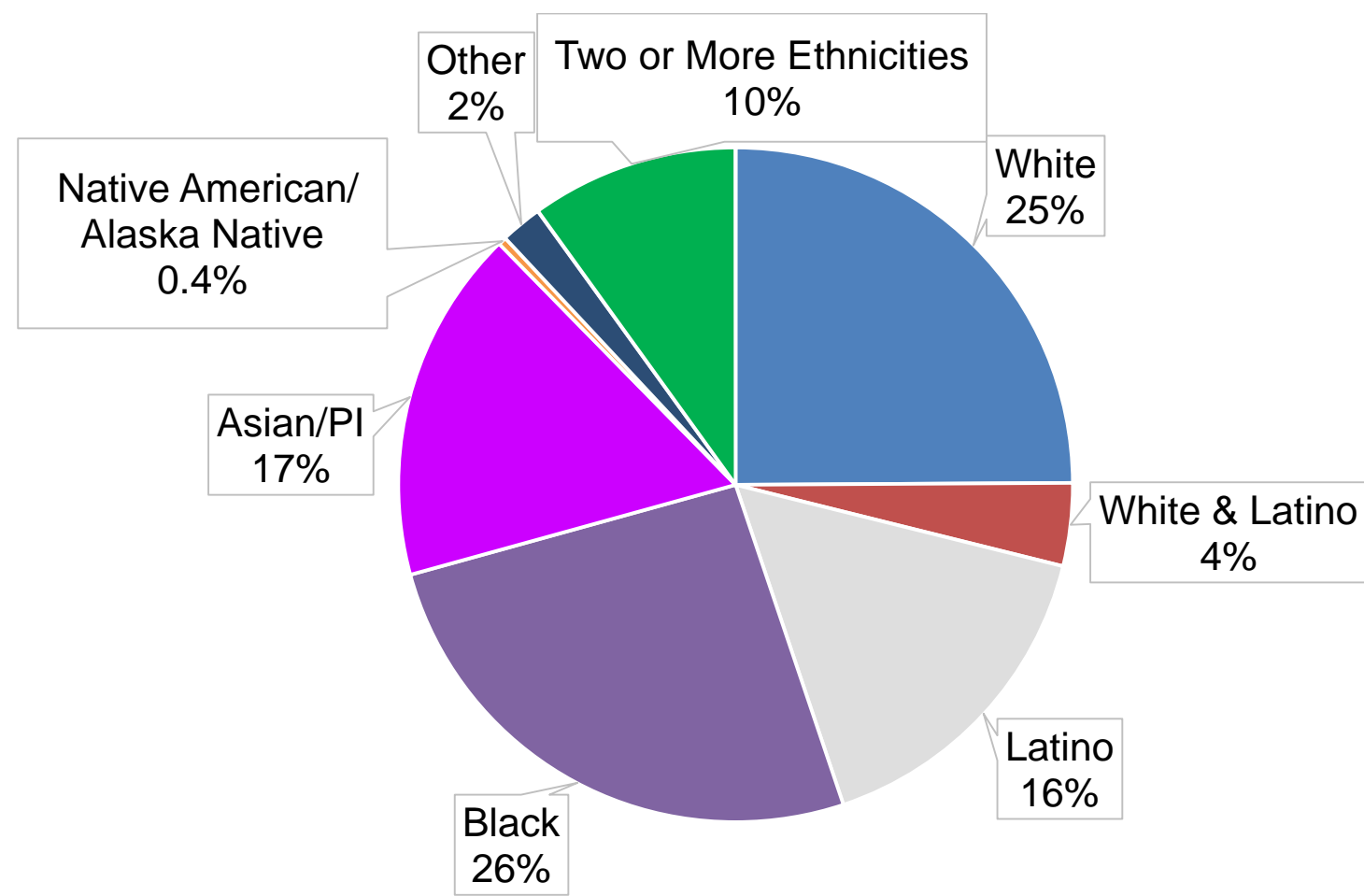
National Comparison = same non-BUILD institutions Fall & Spring

Recruitment/Enrollment* of BUILD Student Participants - Cohorts 2015-2019



Some Data Trends.....

Race and Ethnicity of Consortium-Wide Evaluation Student Participants: BUILD Institutions

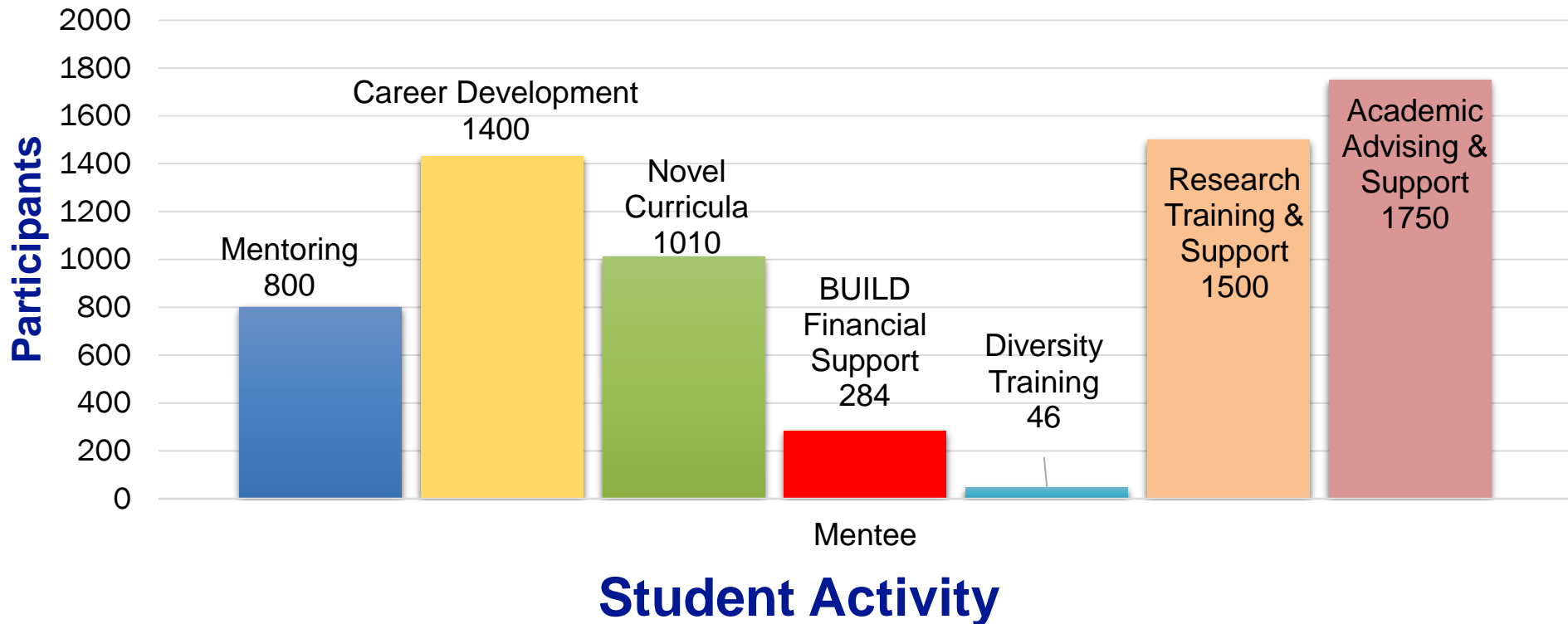


Note: Based on first cohort of freshmen in 2015

Student Activity Tracking Tool

- Individuals tracked by their activities and linked to outcomes
- Data is tracked in the same way
- Stores all data in one location
- Ensures data will be accessible in future years

Example of Tracking Data



Race/ethnicity of trainees who submitted grant applications post-NRMN training (as of March 24, 2017), N = 66

Certain interventions contribute to increased self-efficacy, resulting in improvements in research-related success

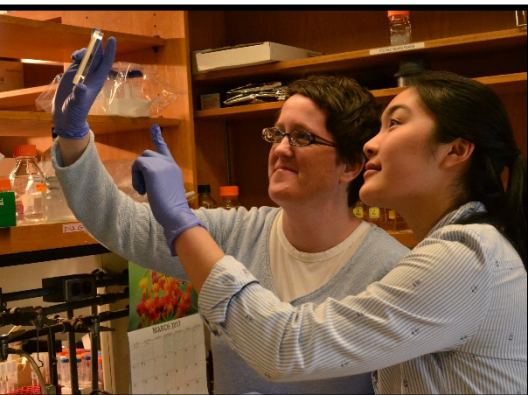
Interventions include:

- Rigorous pilot project funding process
- Protected time for research
- Grant writing workshops
- Grant writing coaches

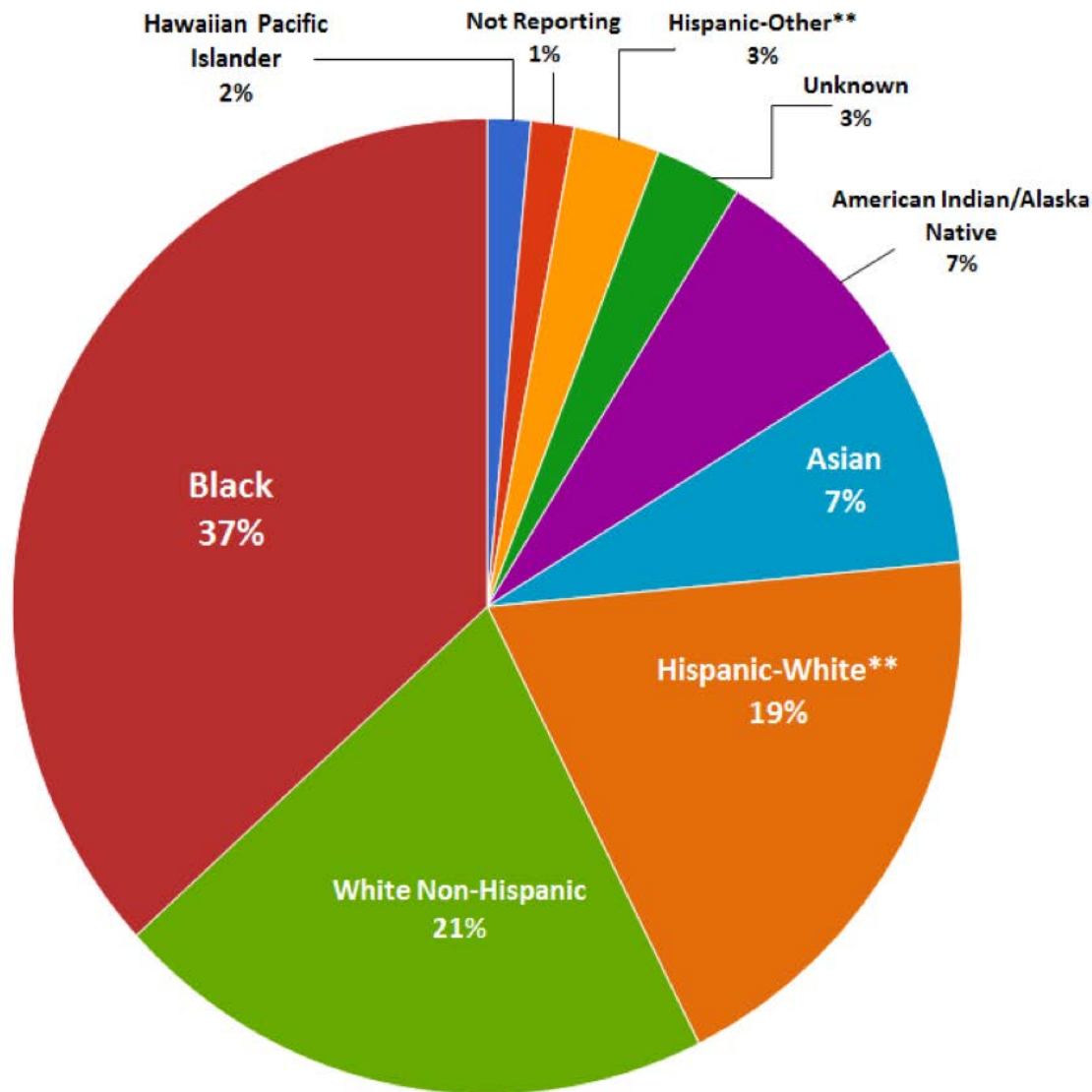


Surveys address self-efficacy

Hallmarks include: presentations at meetings, publications, external funding

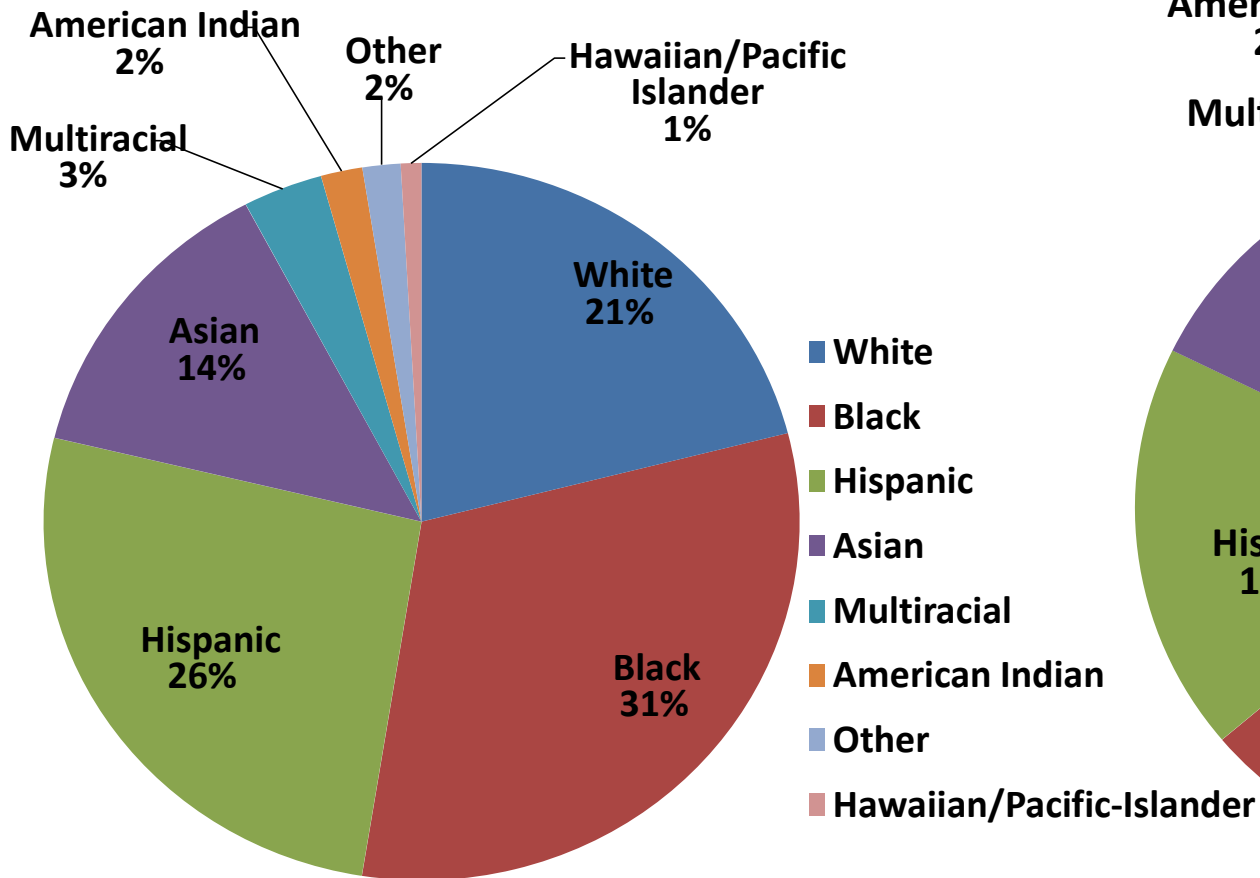


Race/ethnicity of trainees who submitted grant applications post-NRMN training (as of March 24, 2017), N = 66

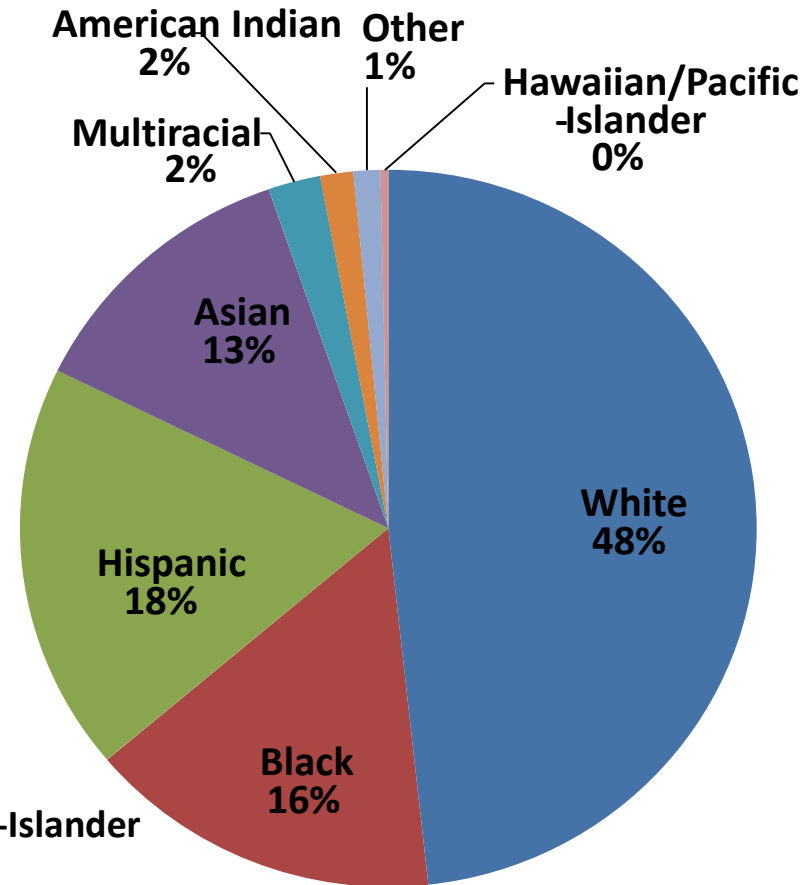


NRMNet Registrant Race and Ethnicity (6/1/17)

Mentees: N = 3,574



Mentors: N = 1,929



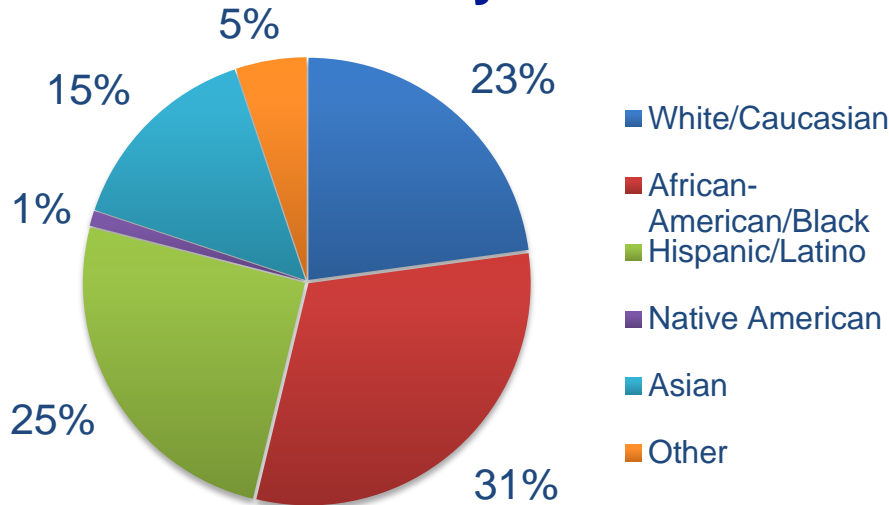
Targeted Recruiting and Retention: Enhancing NIH Intramural Diversity

- Scientific opportunities in the intramural research program (IRP)
- Underrepresentation: Pipeline, attrition
 - Women
 - Race/ethnicity
- Enhancing diversity in the IRP – SWD partnership
 - Recruitment and retention of tenure-track scientists
 - SWD tools
 - Implicit bias education

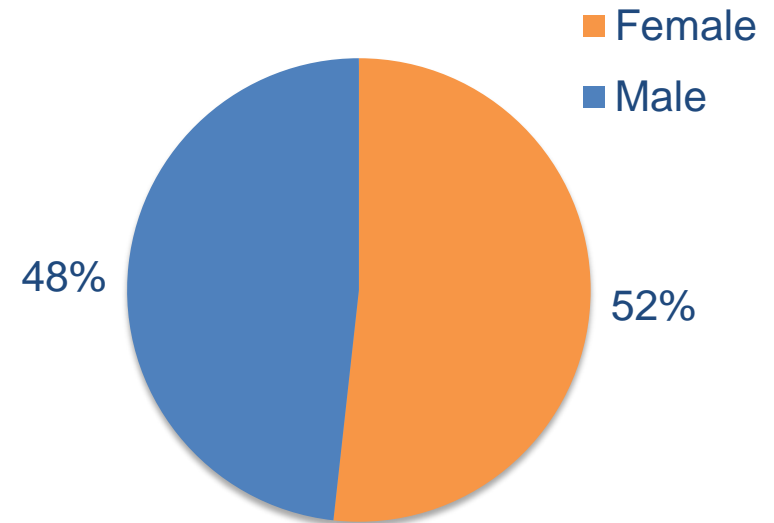
Expanding Diversity of Candidate Pools: Junior Career Stage

Postdoctorates and Assistant Professors

Race/Ethnicity



Gender



- ~ 667 total, top 1/3rd culled
- 4-10 years post-doctorate (most 4-7)
- Authorship in top journals
- 10+ publications: 357
- 100+ citations: 407
- 200+ citations: 311



JAMA
The Journal of the American Medical Association



The NEW ENGLAND
JOURNAL of MEDICINE

Endocrinology

JNeurosci
THE JOURNAL OF NEUROSCIENCE

BMC
Pediatrics

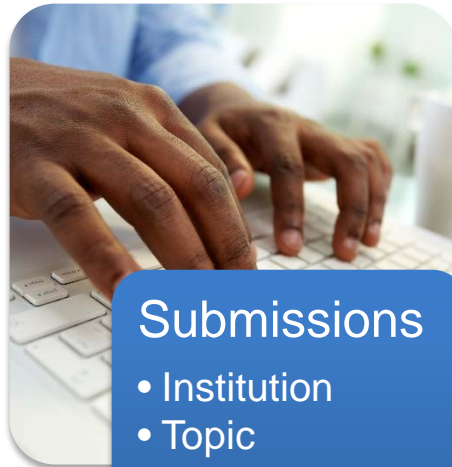
Neuron

nature
immunology

 **PLOS** | ONE

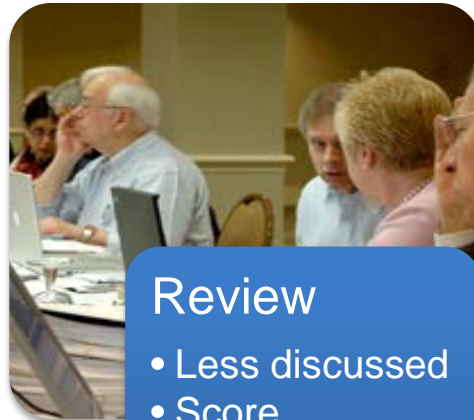
Research and Interventions: Addressing Racial Funding Disparities

Intervention Targets



Submissions

- Institution
- Topic



Review

- Less discussed
- Score
- Fewer re-submissions
- Topic



Funding

- IC Council review
- Paylines, select pay
- Topic

Mentoring/coaching pilot to enhance submission and re-submission

- Information on re-submission outreach
- Anonymized application review study

- IC select pay analysis
- Topic further analyses
 - Health disparities
 - Minority health

Anonymized Review Study to Assess Bias in Peer Review

- Request for Proposals: 2016, study now underway
- 1,200 R01s (previously submitted, 3 cohorts)
 - AA/B applicants
 - WH applicants (matched on sex, institutional types, score)
 - Randomly selected sample of WH applicants
 - Multiple reviewers will assess each anonymized or non-anonymized application, using standard CSR review criteria
- Will evaluate resulting scores for differences that may be due to race awareness, institution reputation, sex, and seniority

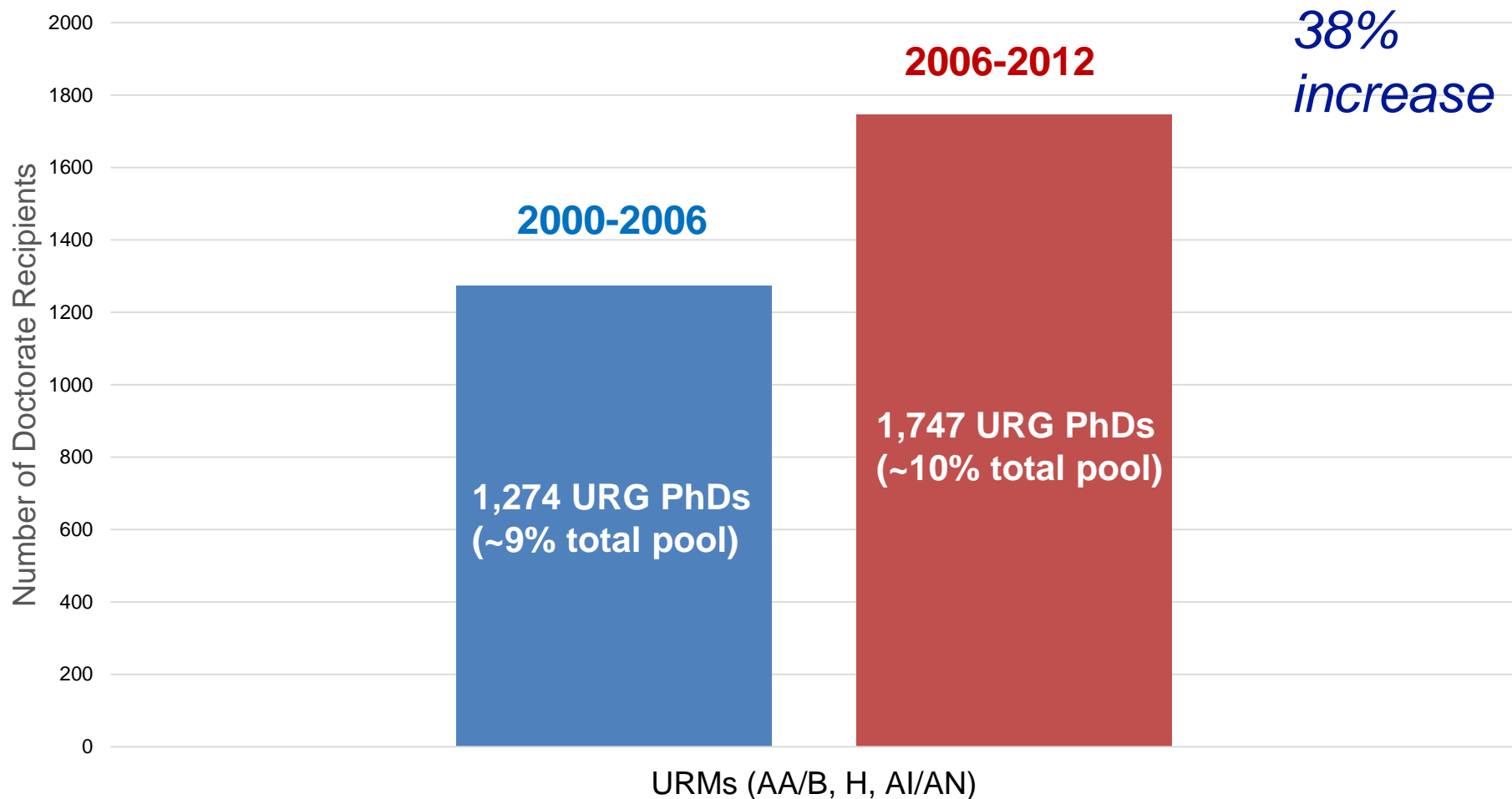
Ongoing Projects and Analyses

- NIH Steering Committee Diversity Working Group
 - Diversity supplements: electronic tracking, work under way
- Addressing Gender Inequality in the NIH Intramural Research Program Action Task Force
 - Implementation under way
- ACD Working Group Subcommittee on Workplace Climate and Harassment
 - With EDI, work under way, scientifically designed survey early 2018

Where Are We Now?

Setting the Stage for Next Steps

Average Number of URM Doctorate Recipients
2000-2012

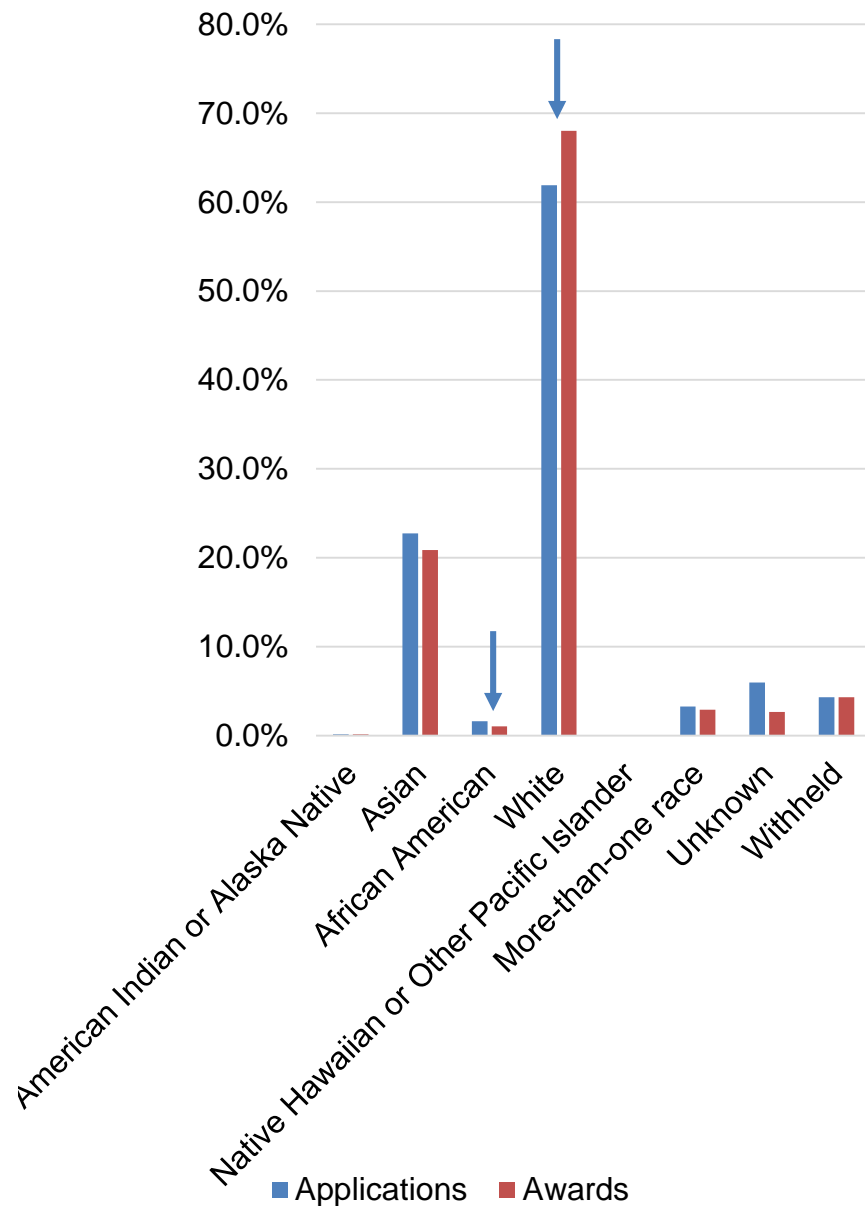


Where Are We Now?

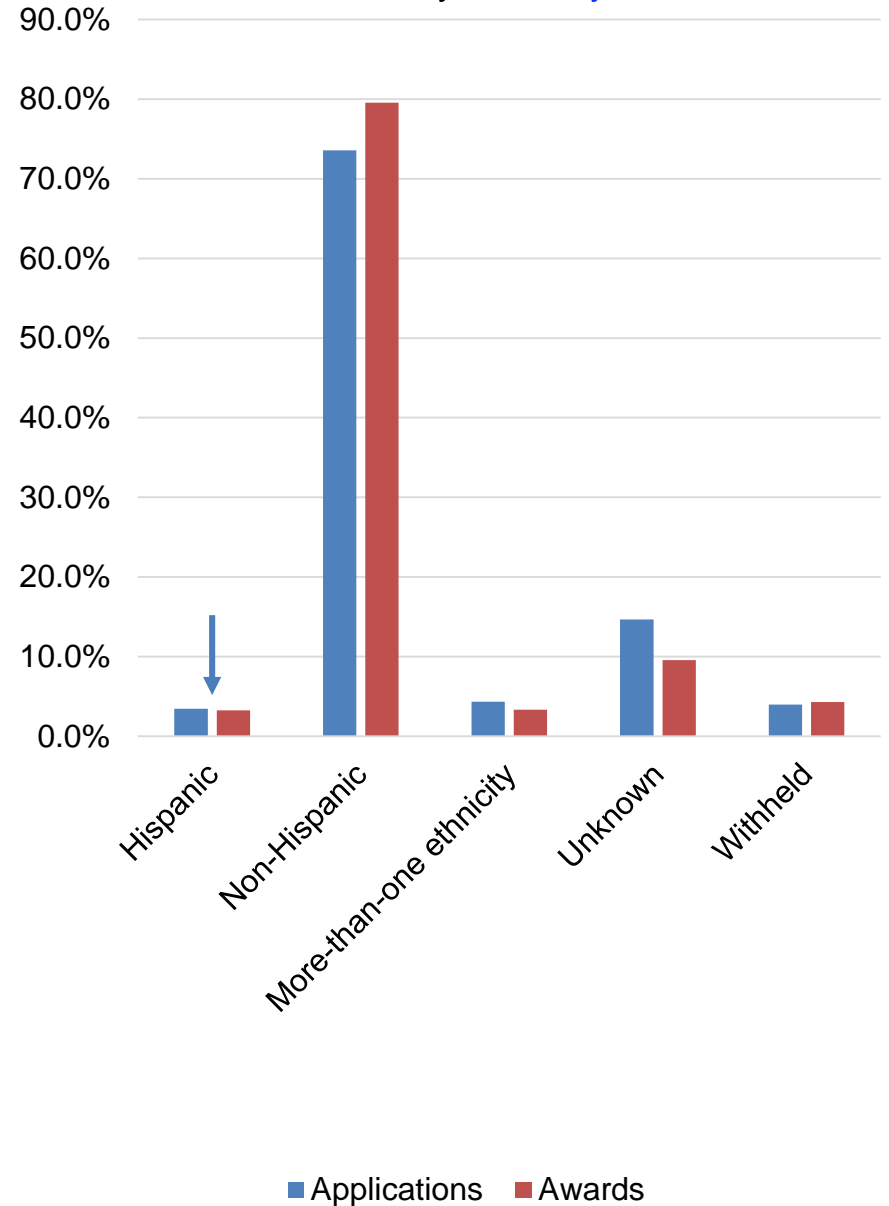
Setting the Stage for Next Steps

- ~10% of all PhD earners, 2006-2012:
- ~780 AA/B (~4% of entire pool)
 - 1% of all NIH RPG awards, 5.3% of all K awards (2006-2015)
- ~950 Hispanic (~5.7% of entire pool)
 - 3.3% of all NIH RPG awards, 5.7% of all K awards (2006-2015)
- 30 AI/AN (0.2% of entire pool), 30 NH/PI (0.2% of entire pool)

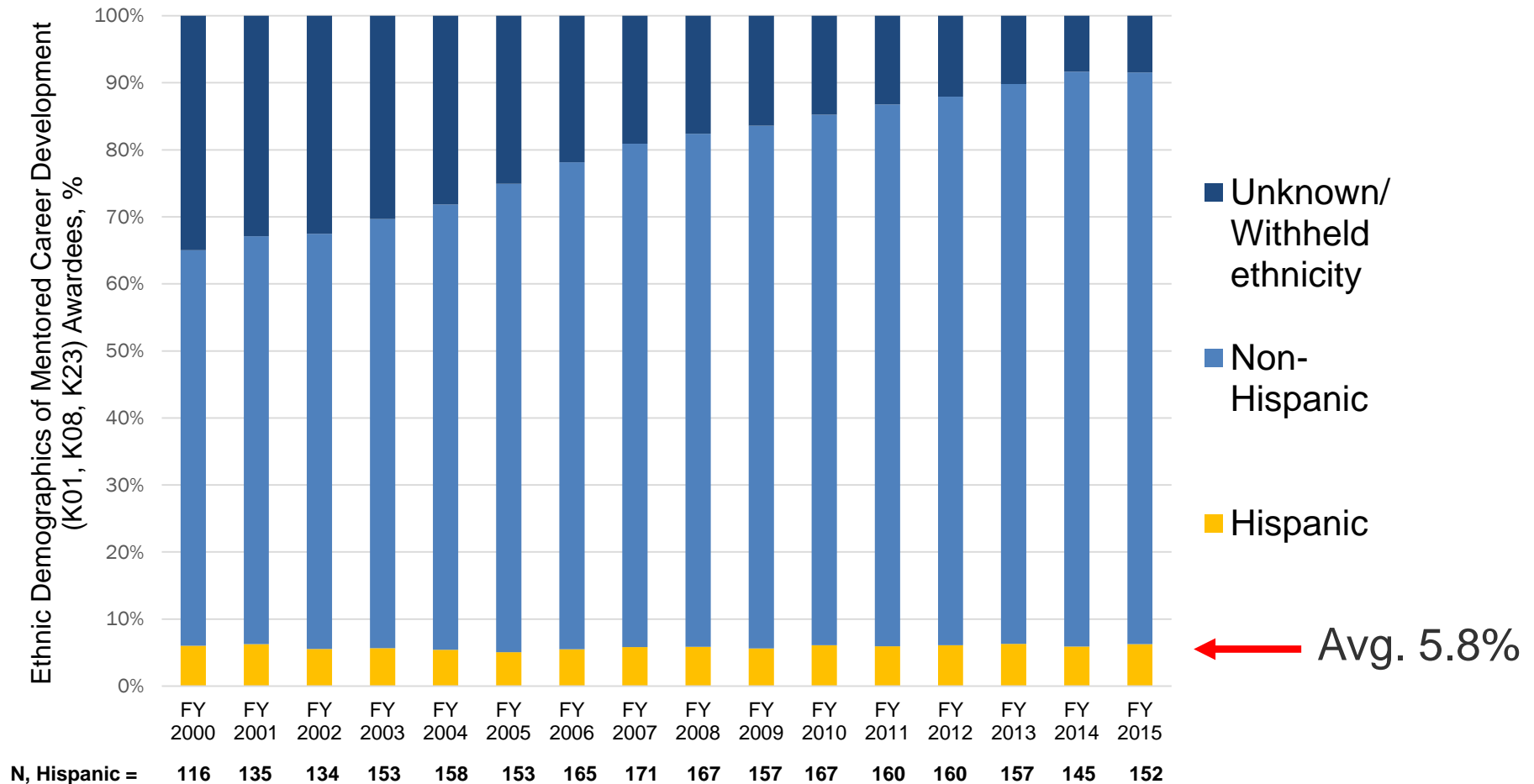
RPG Applicants and Awardees by Percent of Total, All NIH-supported Fields, 2006-2015, by Race



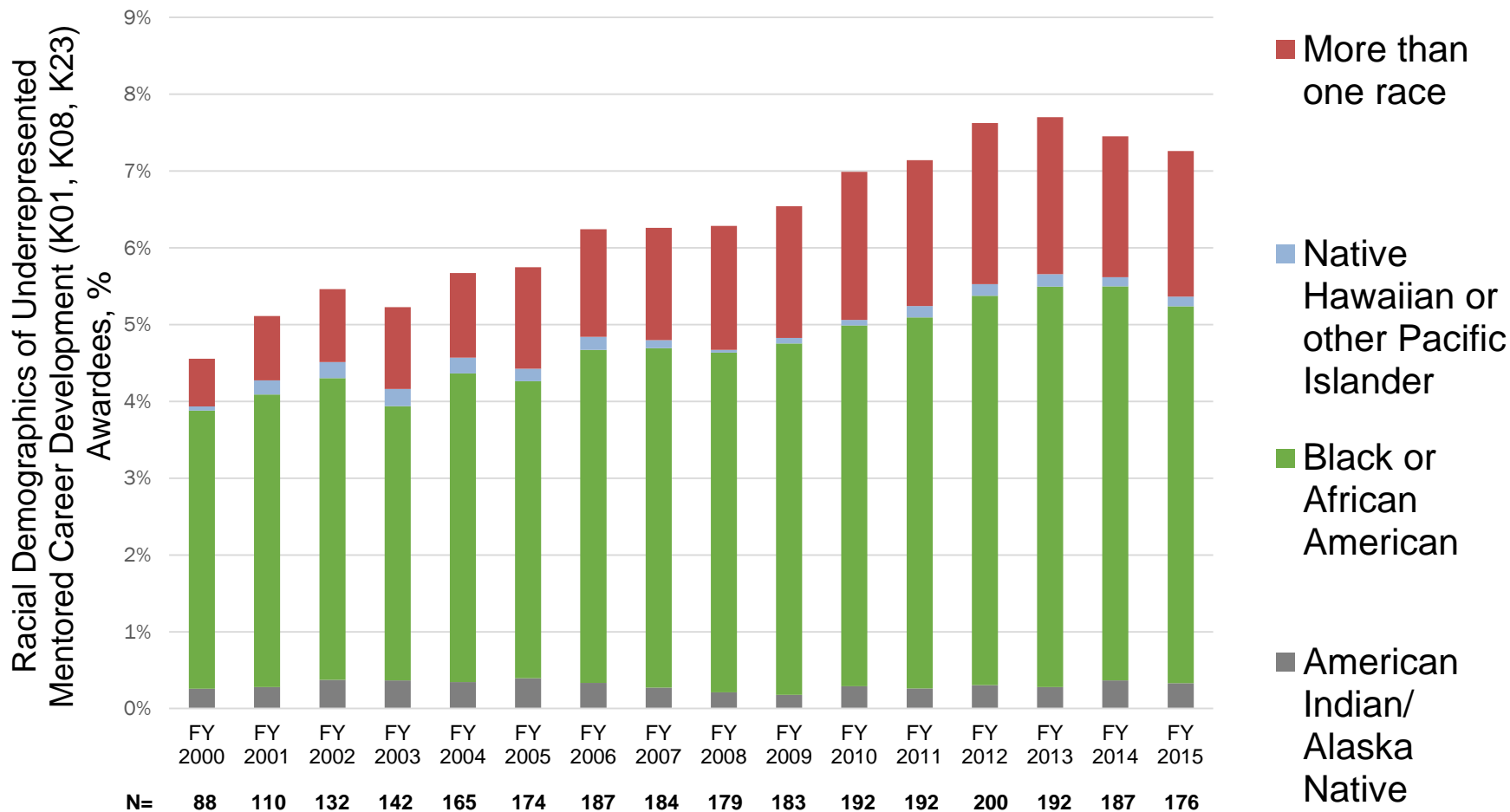
RPG Applicants and Awardees by Percent of Total, All NIH-supported Fields, 2006-2015, by Ethnicity



% Hispanic K Awardees Constant Over Time

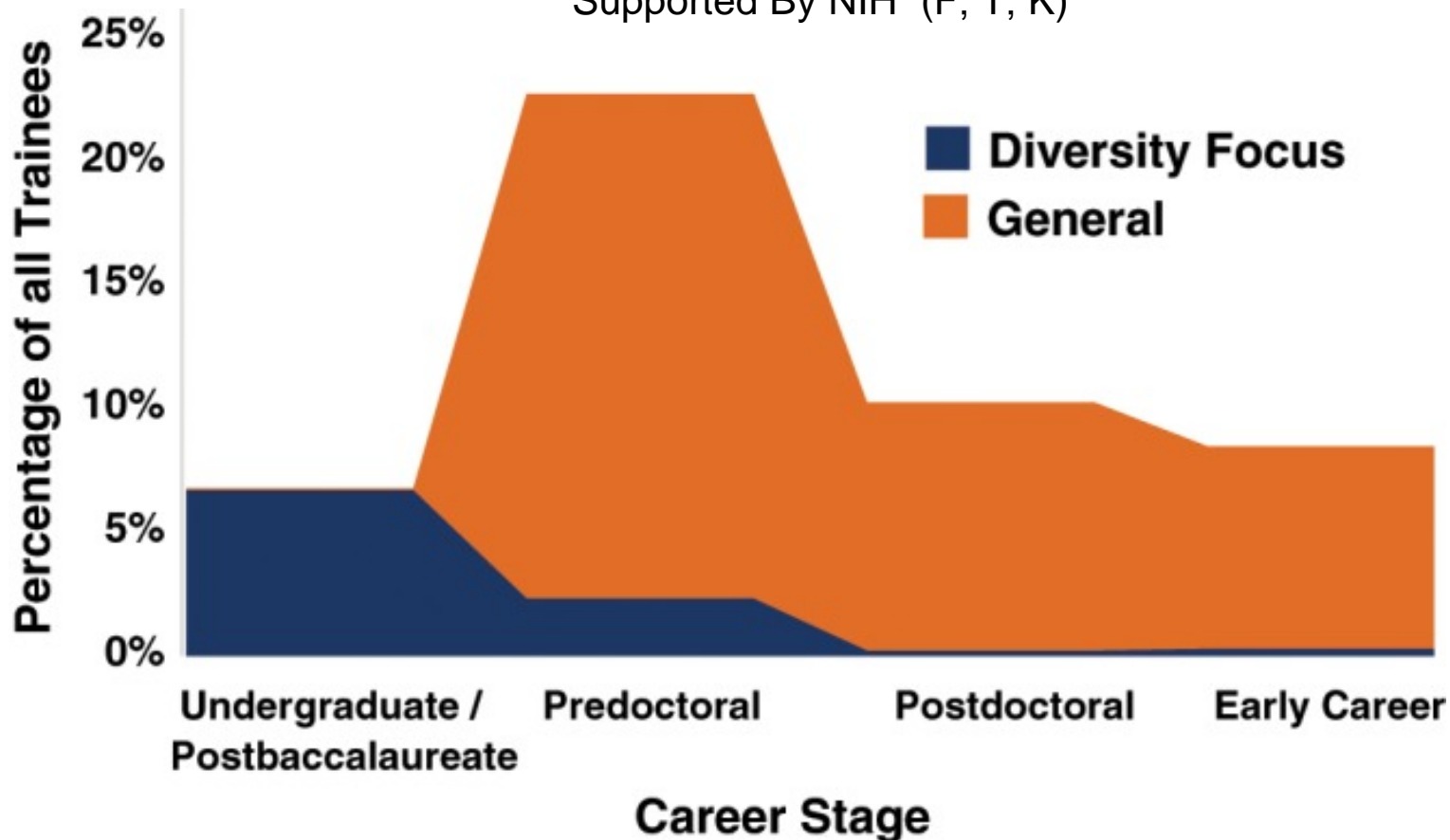


% AA/B K Awardees Increased Over Time



2017: Opportunity to Focus on Transition from Training to Career Independence

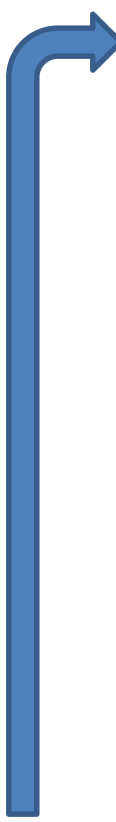
Estimate Of Fiscal Year 2015 Percentage Of Trainees And Early-career Scientists Being Supported By NIH (F; T; K)



Valantine HA, Lund PK, Gammie AE. From the NIH: A Systems Approach to Increasing the Diversity of the Biomedical Research Workforce. *CBE Life Sci Educ*. Fall 2016;15(3). pii: fe4.

2017 New Recommendations

Shifting Focus to Institutional Change: Promote Transparency and Accountability

- 
- Promote systematic review and transparency of hiring and promotion procedures and policies to intramural and extramural research leadership
 - Transparency: collect and make public aggregate diversity metrics (NIH, institutions)
 - Provide tools for enhancing recruitment and retention
 - Evaluation of impact

2017 ACD WGD Recommendations

NIH Institutional Support and Oversight

- #1 Systematic review and transparency of hiring and promotion
- #2 Collect, publicize diversity metrics retrospectively
- #3 Identify NIH policies that create institutional barriers
- #4 Enhance DPC collaboration with ACD WGD
- #5 Expand SWD resources
- #6 Institutional partnering to disseminate successful recruitment and retention models

Mentoring, Career Development, Recruitment, Retention

- #7 Focus diversity programming on career independence transition
- #8 Recognize value of teaching
- #9 Hubs of Innovation pilot
- #10 SWD Recruitment and Retention toolkit

Research, Interventions

- #11 Fund science of workforce diversity
- #12 Review, track funding outcomes beyond R01s
- #13 Analyze impact of methodologies and institutional prestige on research funding

NIH Institutional Support and Oversight:

Key Elements

- Institutional partnering to share successful recruitment, retention models
- Publicize aggregate diversity data (NIH, institutions)
 - Hires, promotions
 - Applicant, grant-topic diversity
- Promote, disseminate institutional best practices
 - Implicit-bias education and mitigation
- Create and share climate survey
- Training grants
 - Diversity focus
 - Expand funding of fellowships
 - Expand SWD resources to meet growing mandate for data collection, programming

Mentoring, Career Development, Recruitment, Retention: *Key Elements*

- Focus diversity programming, strategies, and policies on the transition from trainee to independent careers
 - Institutional accountability for faculty careers
 - Length of training, other barriers to career advancement
- Hubs of Innovation: public-private partnerships
- SWD open-source recruitment and retention toolkit
- Recognize value of teaching
 - Expand workforce diversity of research faculty: role models
 - Expand IRACDA
- Continue interagency collaboration on K-12

Research and Interventions: *Key Elements*

- Fund science of workforce diversity
 - Effect of workforce diversity on science and science products (identity is a proxy for cognitive diversity)
 - Expand and scale CEC to evaluate NIH diversity programs
- Review and track NIH policies, practices that affect funding outcomes
 - Mechanisms for funding translational, clinical, community-based research
 - Research grant structure (MPI, # applicants per discipline per institution)
- Investigate impact of methodologies, topic choice, and institutional prestige on funding outcomes
 - CSR anonymized review study
 - NIH-wide funding, review expertise for health-disparities research

Great minds think
differently ...

@NIH_COSWD 

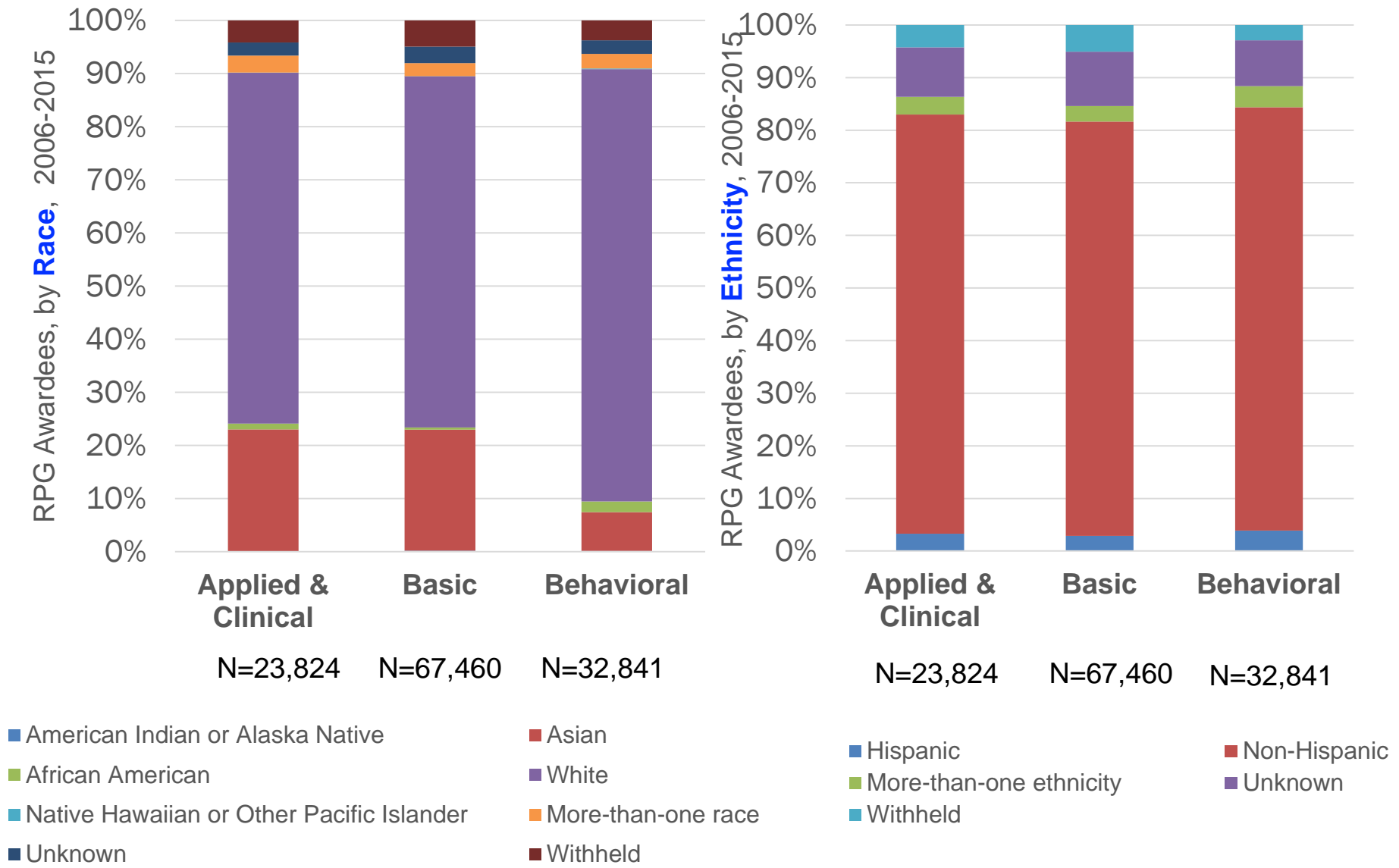


National Institutes of Health

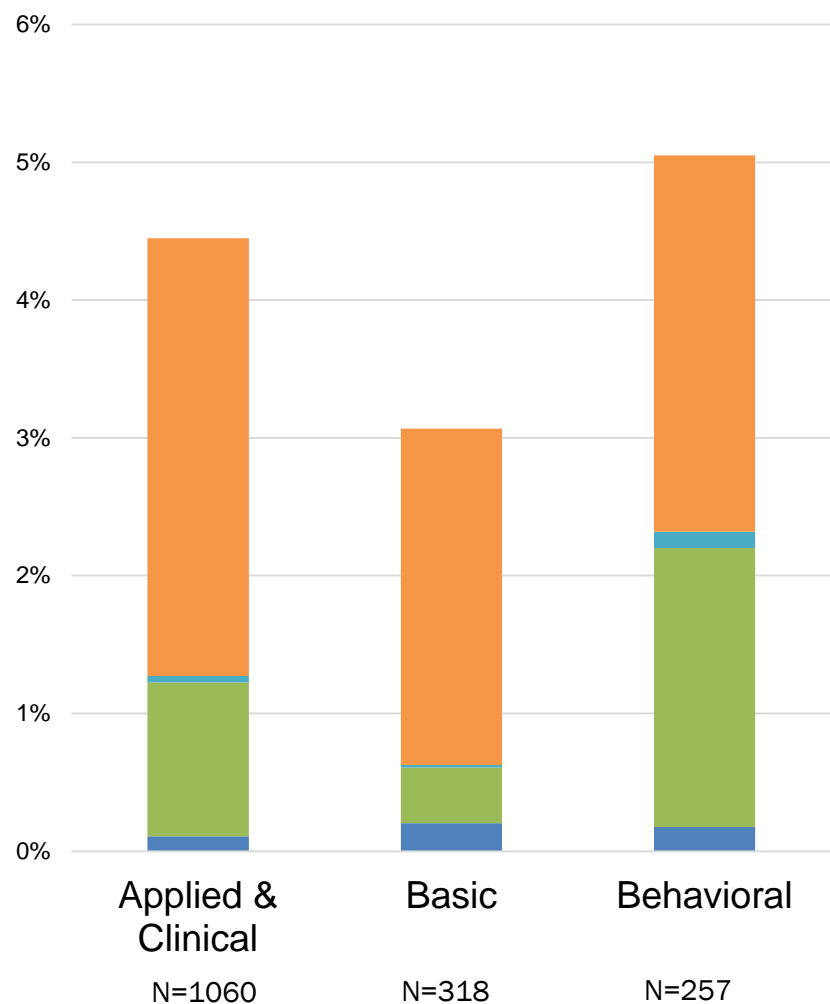
Office of the Director

Scientific Workforce Diversity

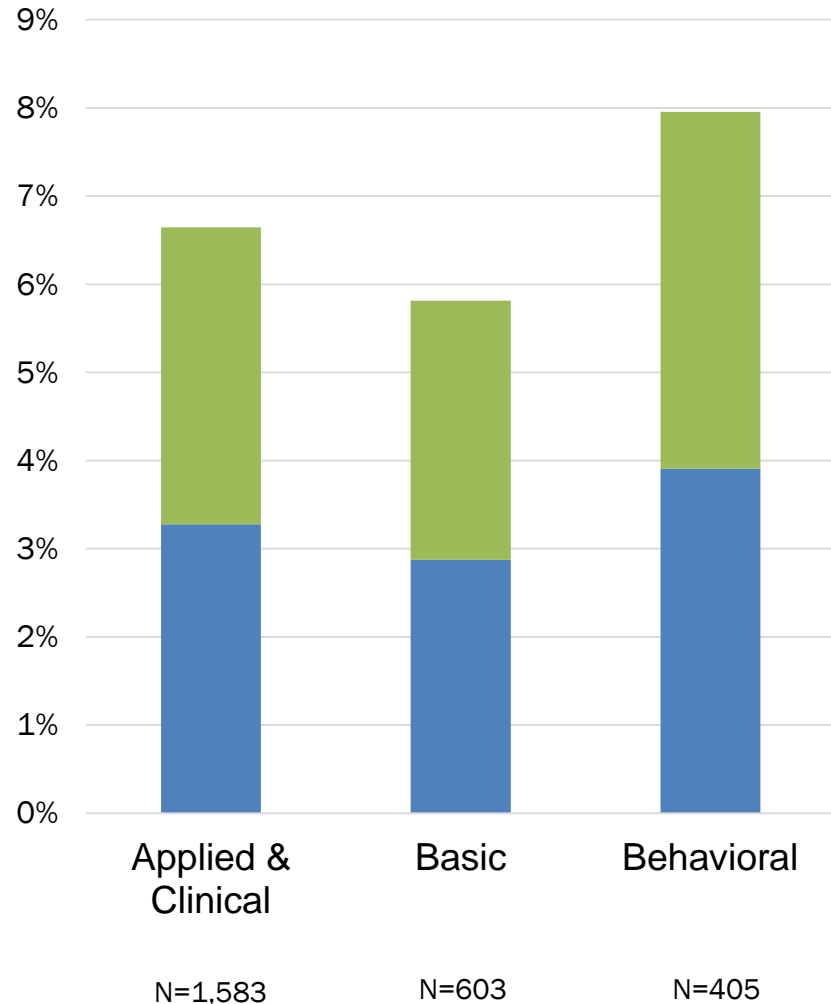
RPG Awardees by Race, Ethnicity, and Field of Study, 2006-2015



RPG Awards to Underrepresented Racial and Ethnic Groups, by Field of Study, 2006-2015



- American Indian or Alaska Native
- African American
- Native Hawaiian or Other Pacific Islander
- More-than-one race



- Hispanic
- More-than-one ethnicity