Enhancing Diversity in Science

Working Together to Develop Common Data, Measures, and Standards

A Workshop Summary Report
Washington, DC
May 2012

Enhancing Diversity in Science

Working Together to Develop Common Data, Measures, and Standards

A Workshop Summary Report
Washington, DC
May 2012

Consortium of Social Science Associations (COSSA)
1701 K Street NW, Suite 1150
Washington, DC 20006
202-842-3525
www.cossa.org

Members of the Enhancing Diversity in Science Workshop Planning Committee

SARAH SCHOOLCRAFT CONRAD
Association of American Medical Colleges (AAMC)

MARY ANN MCCABE
George Washington University School of Medicine

ANGELA L. SHARPE
Consortium of Social Science Associations (COSSA)

JEAN H. SHIN
American Sociological Association (ASA)

KAREN STUDWELL
American Psychological Association (APA)

RICHARD (RIC) WEIBL
American Association for the Advancement of Science (AAAS)
Center for Careers in Science and Technology

GEORGE L. WIMBERLY
American Educational Research Association (AERA)

MARTHA ZASLOW
Society for Research in Child Development (SRCD)

JOAN LEVY ZLOTNIK
Social Work Policy Institute, National Association of Social Workers (NASW)

This publication may be downloaded free of charge from the COSSA website at http://www.cossa.org/diversity/diversity.html.

For more information about the Collaborative for Enhancing Diversity in Science (CEDS), please email Angela L. Sharpe at diversity@cossa.org.

Recommended Citation: Consortium of Social Science Associations (COSSA). 2012. *Enhancing Diversity in Science: Working Together to Develop Common Data, Measures, and Standards, A Workshop Summary Report*. Washington, DC: COSSA

Table of Contents

ENHANCING DIVERSITY IN SCIENCE

WORKING TOGETHER TO DEVELOP
COMMON DATA, MEASURES, AND STANDARDS
A Workshop

May 24, 2012

Doubletree by Hilton,
Washington DC - Crystal City

CEDS
Collaborative for Enhancing Diversity in Science

Acknowledgements

The planning committee of the Enhancing Diversity in Science Workshop acknowledges the hard work and commitment of the leaders of the collaborative organizations who worked to make the workshop a reality. We especially appreciate all the work done by Consortium of Social Science Associations' (COSSA) Deputy Director Angela L. Sharpe to organize the workshop.

The committee also recognizes the contributions of those who addressed the workshop attendees, including: **Joan Levy Zlotnik** (NASW), **Sally T. Hillsman** (ASA), **Yvonne Thompson Maddox** (NICHD), **Lawrence A. Tabak** (NIH), **Cora B. Marrett** (NSF), **Felice J. Levine** (AERA), **Ann Nichols-Casebolt** - Virginia Commonwealth University (VCU), **Roberta Spalter-Roth** (ASA), **Walter Schaffer** (NIH), **Laurel L. Haak** - Open Researcher and Contributor ID (ORCID), **Edward Salsberg** - Health Resources and Services Administration (HRSA), **Ann Bonham** (AAMC), **William Trent** - University of Illinois-Urbana Champaign, **Ernest Márquez**-Society for Advancement of Chicanos and Native Americans in Science (SACNAS), and **Debra Joy Pérez** (RWJF). We also thank the leaders of the professional associations and scientific societies who participated in the meeting (see Appendix A); their commitment of time and effort to work across disciplines enhanced the meeting enormously.

In addition to the professional associations that supported the workshop, we are thankful to those who provided funding for the meeting, including:

Federal Supporters

Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD)

in collaboration with

National Institutes of Health (NIH)
Office of Behavioral and Social Sciences Research (OBSSR)
Office of Research on Women's Health (ORWH)
National Institute on Drug Abuse (NIDA)
National Institute on Minority Health and Health Disparities (NIMHD)

National Science Foundation (NSF)
Directorate for Education & Human Resources (EHR)
Historically Black Colleges and Universities Undergraduate Program (HBCU-UP)
Research on Gender in Science and Engineering (GSE)
Directorate for Social, Behavioral and Economic Sciences (SBE)
Division of Behavioral and Cognitive Sciences (BCS)
Social Psychology Program
Division of Social and Economic Sciences (SES)
Economics Program
Science of Organizations Program
Sociology Program

Foundation Partners

Alfred P. Sloan Foundation (Sloan)
Robert Wood Johnson Foundation (RWJF)
William T. Grant Foundation (W.T. Grant)

Collaborative for Enhancing Diversity in Science (CEDS)
American Association for the Advancement of Science (AAAS) Center for Careers in Science and Technology
American Educational Research Association (AERA)
American Psychological Association (APA)
American Sociological Association (ASA)
Association of American Medical Colleges (AAMC)
Consortium of Social Science Associations (COSSA)
National Association of Social Workers (NASW)
Society for Research in Child Development (SRCD)

Finally, we acknowledge the writer of this report, Anne Bridgman.

Executive Summary

Studies of the United States scientific workforce repeatedly and consistently show that ethnic and racial minorities are underrepresented across all science disciplines. In 2007, an interdisciplinary group of professional associations and scientific societies[1] began working together to draw attention to the need to enhance diversity in the sciences. In 2008, that informal coalition held a leadership retreat, "Enhancing Diversity in Science: A Leadership Retreat on the Role of Professional Associations and Scientific Societies," which focused on the need to broaden participation in the sciences and brought together 98 leaders from 37 professional associations, and scientific societies, as well as representatives from universities, federal agencies, and private foundations. The overwhelming consensus from that meeting warned that if the United States is to remain the world's leader in science it must respond to a number of critical challenges.

The meeting further underscored the lack of very basic scientific tools, relevant metrics, and standardized data across a broad spectrum of educational institutions. These included the elements needed to evaluate the efficacy of diversity programs, comprising both individual and group efforts, and numerous programs aimed at effectively mentoring and retaining individuals throughout their careers. Establishing such a capacity would help generate and maintain the broad support of policymakers and the public necessary to meet the goal of producing a diverse scientific workforce. In addition to the need for common data and measurement, the leaders agreed that approaches are also necessary for tracking rates of participation in the sciences of underrepresented minorities at different career stages.

Given the great necessity for measurement and tools to assist in implementing many of the recommendations from the 2008 Leadership Retreat report, along with recommendations from other reports that aim to enhance and increase diversity in science, these organizations decided to continue their joint efforts. In 2009, the groups formalized their partnership, creating the Collaborative for Enhancing Diversity in Science (CEDS). In March 2009, CEDS, in conjunction with 60 diverse organizations across the spectrum of education and science, held a congressional briefing, "Building a Diverse Scientific Workforce: Collaboration for Competitive and Healthy Nation[2]," to discuss the importance and challenges of increasing the diversity of America's scientific workforce.

Workshop organizers invited prominent researchers, leaders from the National Institutes of Health (NIH) and the National Science Foundation (NSF), and representatives of universities, professional associations, scientific societies, and foundations working to increase diversity in the sciences to make presentations. An initial set of presentations provided overviews of the issues related to participation and achievement in the sciences across diverse groups, evaluation of approaches to support diversity in the sciences, and efforts to develop common measurement approaches. Afterwards, workshop participants broke into smaller groups to focus on building consensus on issues related to broadening participation in the scientific fields.

Collaboration on a common set of high-priority measures has the potential to inform, target, and strengthen efforts to increase diversity in the sciences across participating institutions. The process of working toward common measurement in itself also provides an opportunity for mutual updates on data tracking efforts and initiatives that government agencies sponsor, and in which colleges, universities, foundations, and nonprofits participate.

[1] AAAS Center for Careers in Science and Technology, the American Educational Research Association (AERA), the American Sociological Association (ASA), the American Psychological Association (APA), the Association of American Medical Colleges (AAMC), the Federation of American Societies for Experimental Biology (FASEB), the Institute for the Advancement of Social Work Research (IASWR) and the Society for Research in Child Development (SRCD)

[2] http://www.cossa.org/diversity/briefing/WorkforceDiversityBriefing.pdf

The workshop was sponsored by the: ***Eunice Kennedy Shriver* National Institute of Child Health and Human Development** (NICHD) *in collaboration with the* **National Institutes of Health** *[Office of Behavioral and Social Sciences Research (OBSSR), Office of Research on Women's Health (ORWH) National Institute on Drug Abuse (NIDA), National Institute on Minority Health and Health Disparities (NIMHD)],* the **National Science Foundation** (NSF) [Directorate for Education & Human Resources *(EHR) -- Historically Black Colleges and Universities Undergraduate Program (HBCU-UP), and Research on Gender in Science and Engineering (GSE);* Directorate for Social, Behavioral and Economic Sciences (SBE) -- *Division of Behavioral and Cognitive Sciences (BCS) (Social Psychology) and the Division of Social and Economic Sciences (SES) – Economics, Science of Organizations, and Sociology],* the **Alfred P. Sloan Foundation** (Sloan), **Robert Wood Johnson Foundation** (RWJF), and the **William T. Grant Foundation** (W.T. Grant).

> "Diversity and excellence have always been keys to science, to scientific advancement, to creativity and innovation and to productivity. Diversity in science has long been recognized as requiring that we encourage variability in theoretical, methodological, and other perspectives. It took us somewhat longer to recognize that diversity and excellence in science also require that we not only tap all the talent available by broadening the community of scientists to include those from diverse backgrounds, but that we also acknowledge that such inclusiveness is fundamental to the vitality and excellence of science."
>
> *—Sally T. Hillsman, executive officer, American Sociological Association*

Overarching Workshop Recommendations

This meeting strongly confirmed that steps are needed to increase the comparability of both administrative and survey data collected on diversity in the scientific workforce. Achieving agreement on what data elements are high priority to collect and on specific measures to use will make it possible to aggregate findings across studies and to coordinate efforts to increase diversity across agencies, universities, and organizations. At present, unfortunately, there is little consistency in what data are collected and how they are collected.

Just as important, there is widespread acknowledgement of the crucial need to understand the effectiveness of approaches, such as fellowships and mentoring, to strengthening diversity in the workforce, though it is generally agreed that there is a need for an integrated summary of the research in this area that cuts across disciplinary boundaries. Similarly, there is agreement that in addition to studying effects on individual targets of intervention efforts, research is needed that considers the social context, environment, and culture of the institutions, programs, and/or departments in which these students and professionals participate, allowing for a nuanced understanding of perceptions and experiences with programs to enhance diversity. The inclusion of data collected from program providers as well as program participants is important for both bringing programs to scale and to sustaining them.

Finally, methodological consideration across the range of different data collection methods is also imperative. Efforts are required to minimize respondent burden, include the highest data priority elements, and provide data formats that allow the

"Where evidence is weak, we should build a knowledge base to support better decisions in the future."

—Cora Marrett, deputy director, National Science Foundation

basis for summary variables that inform the efforts to diversify and encourage enrollment and retention of students and professionals.

Overarching Recommendation No. 1:

Establish a federal interagency working group of federal science agencies and the Department of Education to examine and define common data elements that all federally supported programs and individuals would be required to collect for tracking and evaluation purposes. The White House Office of Science and Technology Policy (OSTP) should take the lead and the National Institutes of Health (NIH) and the National Science Foundation (NSF), the primary supporters of federal research and training, should serve as co-chairs of this interagency working group, similar to their collaboration on the STAR Metrics program.

The first task of the federal interagency working group should be to jointly sponsor a National Academy of Sciences' (NAS) study with two goals: (1) to summarize existing evaluation studies of programs, approaches, and interventions to support diversity; and (2) to review current data collection efforts by agencies, colleges and universities, and other organizations in order to make recommendations on common data elements.

Overarching Recommendation No. 2:

Develop a permanent central web-based repository for data on diverse populations in the science pipeline, as well as publications focusing on this issue.

Overarching Recommendation No. 3:

Launch a new set of fellowships focused on increasing diversity in the scientific workforce using a public/private partnership and taking into account recent research and practice on the structuring of fellowships and training experiences.

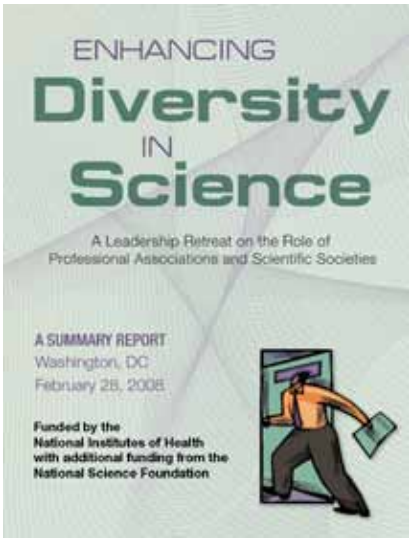
Introduction

Studies of the United States scientific workforce repeatedly and consistently show that ethnic and racial minorities are underrepresented across all science disciplines. In 2007, an interdisciplinary group of professional associations and scientific societies[1] began working together to draw attention to the need to enhance diversity in the sciences. In 2008, that informal coalition held a leadership retreat, "Enhancing Diversity in Science: A Leadership Retreat on the Role of Professional Associations and Scientific Societies," which focused on the need to broaden participation in the sciences and brought together 98 leaders from 37 professional associations, scientific societies, as well as representatives from universities, federal agencies, and private foundations. The overwhelming consensus from that meeting warned that if the United States is to remain the world's leader in science it must respond to a number of critical challenges.

The meeting further underscored the lack of very basic scientific tools, relevant metrics, and standardized data across a broad spectrum of educational institutions. These included the elements needed to evaluate the efficacy of diversity programs, comprising both individual and group efforts, and numerous programs aimed at effectively mentoring and retaining individuals throughout their careers. Establishing such a capacity would help generate and maintain the broad support of policymakers and the public needed to meet the goal of producing a diverse scientific workforce. In addition to the need for common data and measurement, the leaders agreed that approaches are also necessary for tracking rates of participation in the sciences of underrepresented minorities at different career stages.

Given this great need for measurement and tools to assist in implementing many of the recommendations from the 2008 Leadership Retreat report, along with recommendations from other reports that aim to enhance and increase diversity in science, these organizations decided to continue their joint efforts. In 2009, the groups formalized their partnership, creating the Collaborative for Enhancing Diversity in Science (CEDS). In March 2009, CEDS, in conjunction with 60 diverse organizations across the spectrum of education and science, held a congressional briefing, "Building a Diverse Scientific Workforce: Collaboration for Competitive and Healthy Nation[2]," to discuss the importance and challenges of increasing the diversity of America's scientific workforce.

In 2012, CEDS organized a follow-up workshop to the 2008 Leadership Retreat, entitled *Enhancing Diversity in Science: Working Together to Develop Common Data, Measures, and Standards*. The one-day meeting brought together a broader group of individuals, including workforce and diversity experts, researchers, and federal agency representatives to discuss this critical mission and engage with leaders in professional associations and scientific societies, universities, federal agencies, research organizations, and private foundations to address efforts to broaden participation in all areas of science through the development and adoption of common measures.



[1] AAAS Center for Careers in Science and Technology, the American Educational Research Association (AERA), the American Sociological Association (ASA), the American Psychological Association (APA), the Association of American Medical Colleges (AAMC), the Federation of American Societies for Experimental Biology (FASEB), the Institute for the Advancement of Social Work Research (IASWR) and the Society for Research in Child Development (SRCD)

[2] http://www.cossa.org/diversity/briefing/WorkforceDiversityBriefing.pdf

Workshop Summary

Collaboration on a common set of high-priority measures has the potential to inform, target, and strengthen efforts to increase diversity in the sciences across participating institutions. The process of working toward common measurement in itself also provides an opportunity for mutual updates on data tracking efforts and initiatives that government agencies sponsor, and in which colleges, universities, foundations, and nonprofits participate. Workshop organizers invited prominent researchers, leaders from the National Institutes of Health (NIH) and the National Science Foundation (NSF), and representatives of universities, professional associations, scientific societies, and foundations working to increase diversity in the sciences to make presentations. An initial set of presentations provided overviews of the issues related to participation and achievement in the sciences across diverse groups, evaluation of approaches to support diversity in the sciences, and efforts to develop common measurement approaches. Afterwards, workshop participants broke into smaller groups to focus on building consensus on issues related to broadening participation in the scientific fields.


Hillsman

Sally T. Hillsman, executive officer of the American Sociological Association (ASA), kicked off the program with an overview of the purpose of the workshop and a summary of the outcomes from the 2008 leadership retreat. "What we would like this workshop to accomplish is to address the need to establish a more comprehensive and cohesive effort to track the many and various efforts of government, universities, private foundations, and scholarly associations; to enhance minority participation and success in the sciences; to move toward a longer-term collaboration on developing a common set of high-priority measurements that have the potential to significantly inform, target, and strengthen efforts to increase diversity in the sciences, and to do so across all institutions and organizations that are participating and essential to these efforts; and finally, to provide an opportunity for sharing updates on existing data-tracking efforts and initiatives that government agencies are sponsoring, in which universities, foundations, and nonprofits are engaged," she said.


Maddox

During her welcoming remarks, **Yvonne Maddox**, deputy director of the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD), built on Hillsman's overview. "We really do need to have the data to substantiate where we are and what's really happening," she said. "We need to start with a base that each of us can operate around and [ensure] that we use the same terminology, [and] we use the same approaches to gathering this information."

> "The collective intellectual capital in the United States and the capacity of our nation to maintain its leadership role across the sciences depends on broadening the base of scientific participation. In a world where intellectual capital is fast becoming more important than other forms of capital, diversity in the scientific workforce is indeed essential."
>
> *—Felice J. Levine, executive director, American Educational Research Association*

Maddox also encouraged workshop participants to consider the value of having a diverse workforce. Many Fortune 500 companies and top-ranked academic institutions have superficial commitments to diversity, she observed. In addition, Maddox said, "We need to appreciate that when we discriminate or when minorities are not included in research or not included in science, not

included in math, not included in technology, that everybody is disadvantaged. It's not just the individual who is from that diverse population, but it's the whole enterprise that is actually harmed."

Having such knowledge, while important to all NIH institutes and centers, has particular relevance to issues that NICHD focuses on such as health disparities in infant mortality and prematurity. Diversity helps us to aspire to a level of excellence that is missing when only engaging with homogeneous groups. Thinking this way will allow the field to not only recruit but also retain people to work in the sciences, Maddox stressed.

Framing the Issues


Levine

The task of the workshop was to map out the steps needed to improve data collected to enhance diversity in science, explained **Felice J. Levine**, executive director of the American Educational Research Association (AERA), who provided a framework for the issues at hand. "We scientists love data," said Levine. "We must collect scientifically valid data to advance science." But what data are needed, and how should it be collected and analyzed? Levine suggested three areas that should be studied:

I. **The Science Education Pipeline:** Collect, organize, make available, and analyze data related to the presence of minorities and women in all stages of science education. Data should address such questions as: How many people of diverse backgrounds are at each stage? How do people sort themselves into various career trajectries? At what points are crucial decisions made? Answering these questions requires large-scale, systemic, often longitudinal data systems with attention to the articulation between levels of education, career, and scientific fields.

II. **Diversity Promotion Efforts:** Evaluate the many efforts undertaken to increase diversity, addressing issues such as the importance of targeted scholarships and fellowships, the impact of mentors, the role of affirmative action at the undergraduate and graduate levels, the value of elementary school outreach, whether summer research internships matter, and the role of program leadership, financial support, and teaching innovations.

III. **Personal Characteristics and the Sciences:** Learn more about the personal characteristics of those who have chosen, or not chosen, to pursue careers in science, asking, for example: What leads minorities and women to choose careers in science? At what ages do they decide? What family members or others influence their decisions? How much do subjective views of math and verbal skills matter in career choice? What barriers do people perceive? What roles do discrimination and/or institutional biases play? Are some kinds of undergraduate institutions more likely than others to have students who go on to pursue advanced degrees? Do underrepresented minorities perceive the costs and benefits of those advanced degrees differently than White males? How can we develop reliable, empirically testable theory that helps explain what matters in the career choices of underrepresented minorties?

It is also crucial, noted Levine, that the knowledge that is produced from the research is used instead of just sitting on a shelf. In that light, researchers, professional associations, and funders should build on what comes out of this meeting to develop better measures of how well the field is doing in promoting diversity in science.

Levine also pointed out that there have been many important, data-driven studies in these areas, but there is a "lack [of] the kind of rigorous, replicated research or, often, a *priori* designs" that are needed. And, she said, "While there are indicators and instances of collaboration and communication, we are not close to where we need to be." The bottom line, according to Levine, is: "Seldom can we put these findings of different studies together in ways that might help us to develop testable theo-

ries about what variables are important and what interventions work, with whom, and why."

Developing common standards and metrics and establishing a repository for data would allow the field to advance its understanding of how to increase diversity. "In undertaking this effort, we will want to attend to such standards as they need to come into play, one, in individual studies and evaluations; two, in the development and enhancement of large-scale databases; and three, in the improvement of administrative records and data systems of federal and state governments on which we know, for all of our sciences, we are going to increasingly rely," Levine emphasized.

According to Levine, federal scientific and statistical agencies will need to be part of the process, particularly the National Center for Education Statistics at the U.S. Department of Education and the National Center for Science and Engineering Statistics at the National Science Foundation.

Experimenting with interventions is another possible approach, Levine continued. Oversubscribed programs designed to attract women or minorities to careers in particular scientific disciplines might choose their beneficiaries at random and follow both those chosen and those not chosen to determine if the intervention affected the choices of or success in science careers, she suggested. Or a funding agency might challenge a group of universities to develop four different mutually acceptable models for promoting diversity in science and then randomly assign each model to six different universities to implement; if common metrics were collected at each school, perhaps by the same investigating team, they might indicate whether some models offer more than others, regardless of the implementing institution.

The field should not overlook the value of qualitative research, nor should it ignore the ways in which qualitative data can be preserved and shared, Levine warned. One might, for example, learn a good deal from in-depth interviews with women, minorities, and White males who started on the path to a science doctorate but dropped out, including whether these reasons vary by field or institution. Knowing whether motivations for dropping out or persisting differ by race, ethnicity, gender, or field of science would be of considerable value. "Completely separate studies are unlikely to take us far in these directions," stated Levine. "But if a common core protocol were developed and if the qualitative data were coded using the same [protocols] and following a common science, much could be learned," she added.

Levine said she hoped the workshop would "advance the ball that we kicked off in 2008 and be a step toward developing the knowledge we need in order to promote the diversity in science that's necessary, not just for individual fairness and fulfillment, but also for the nation's well-being."

Although there has been some progress since the 2008 retreat, "today, the stakes for our nation are, if anything, greater," Levine cautioned. To highlight her point, Levine noted that, the week the workshop was held, media reports revealed that for the first time since the nation began, births from ethnic minority groups exceeded those from White Americans. "We simply cannot afford a society in which the potential of three-quarters of American children is not fully developed and tapped and where the talent is not capitalized to the benefit of science," she concluded.

Summary of Presentations

The Importance of Diversity from the Perspective of the National Institutes of Health (NIH)


Tabak

By 2042, minorities will comprise the majority in the United States. In this context, as the NIH looks at the issues surrounding diversification of the biomedical workforce, it finds that the data is "sobering." U.S. Census results from 2010 suggest that Blacks or African Americans, Hispanics or Latinos of any race, and all Native persons in the country "are woefully underrepresented amongst our principal investigators," observed, **Lawrence A. Tabak**, NIH's principal deputy director. "The bottom line is that … our principal investigators, our workforce, our scientific leaders in biomedical research do not reflect the nation."

Pipeline issues play a large role in underrepresentation. The good news, according to Tabak, is that underrepresented minorities represented about a third of college-age students in 2008. However, underrepresented minorities made up about 17 percent of the baccalaureates in science and engineering.

He said this drop-off is not unexpected since "we know that not everybody is going to be a science major in college."

The larger problem is that "only seven percent of Ph.D. earners … are members of underrepresented groups," Tabak said. "Each year, only about 500 underrepresented minorities receive advanced degrees in biology, chemistry, and physics. That is, of course, an enormous opportunity for improvement." Non-underrepresented minorities convert from the baccalaureate to the Ph.D. at a 10 percent level, while underrepresented minorities do so at half that rate. So just maintaining the proportion would require a doubling of that transition rate.

At the other end of the pipeline, there is racial disparity in NIH grant awards, especially for Black applicants, Tabak said. A report commissioned by NIH and the corresponding *Science* article[1], which Tabak called "a very sobering piece of work," found a gap in success rates that amounted to ten percentage points between White and Black applicants, even after controlling for a range of demographic, educational, and employer characteristics.

Citing the *Science* article, Tabak said that award probabilities correlate with the NIH funding rank of an applicant's institution. This means that applicants at a top-30 NIH-funded research institution are more likely to get an award than those at institutions ranked 31 through 100, with the likelihood dropping off even more for those at institutions ranked 101 through 200.

However, even at institutions ranked in the top 30, there's a disparity in funding for Black applicants, Tabak pointed out. "So it's not only about the grant research infrastructure ... [and] it's not only about the great colleagues, there's something else going on," he maintained. The only thing that seems to make a difference for Black applicants is prior grant review experience, which creates a conundrum—you don't get on a study section/review panel until you have a grant, but unless you get a grant, you're not going to be on a study section/review panel.

Tabak and NIH Director Francis Collins responded to the conclusions in the Ginther et al. article in their own *Science* piece, *"Weaving a Richer Tapestry in Biomedical Science,"*[2] in which they proposed a multipronged plan of action to address these problems. The plan included the following steps:

- Evaluate extant training programs so as to phase out programs that do not work and expand those that are successful.
- Increase the number of early-career reviewers.
- Continue to seek nominations for study section duty from the broadest and most diverse set of institutions nationwide, including self-nominations.
- Examine the grant-review process, including potential biases.
- Develop interventions and support for individuals preparing grant applications.
- Gather expert advice on additional steps.

[Note: Subsequent to the May 24 workshop, the Advisory Committee to the NIH Director (ACD) Working Group on Diversity in the Biomedical Research Workforce grappled with these and related issues and released its report, *Draft Report of the Advisory Committee to the Director Working Group on Diversity in the Biomedical Research Workforce* ,[3] on June 14, 2012.]

[1] "Race, Ethnicity, and NIH Research Awards," by Donna K. Ginther, Walter T. Schaffer, Joshua Schnell, Beth Masimore, Faye Liu, Laurel L. Haak, and Raynard Kington http://www.sciencemag.org/content/333/6045/1015.full

[2] "Weaving a Richer Tapestry in Biomedical Science," by Lawrence A. Tabak, Francis S. Collins http://www.sciencemag.org/content/333/6045/940

[3] Draft Report of the Advisory Committee to the Director Working Group on Diversity in the Biomedical Research Workforce June 13, 2012, http://acd.od.nih.gov/Diversity%20in%20the%20Biomedical%20Research%20Workforce%20Report.pdf

The Importance of Broadening Participation from the Perspective of the National Science Foundation (NSF)


Marrett

Cora Marrett, NSF's deputy director, discussed the importance of investing in "the science of broadening participation,[4] " a component of the foundation's strategic plan. Broadening participation is important because missing out on or overlooking talent has implications for the nation and for individuals, Marrett stated.

"The science of broadening participation draws especially on the models, the ideas, the frameworks that can evolve from particular disciplines," she explained. Therefore, as we consider systematic, methodologically advanced ways to broaden participation, the field must draw on the range of disciplines, many of which are represented at the workshop, she pointed out.

Marrett announced to workshop participants that the White House recently issued a *call to action* to federal agencies emphasizing the President's interest in using evidence and rigorous evaluation in budget, management, and policy decisions to make government work more effectively. Consequently, agencies are asked to demonstrate the use of evidence in their budget submissions. "Where evidence is suggestive, we should consider it," Marrett said. "Where evidence is weak, we should build a knowledge base to support better decisions in the future."

In addition, the Office of Management and Budget (OMB) and the Council of Economic Advisers (CEA) are focused on the administrative and policy levers that drive an increasing share of federal investments into evidence-based practices. As part of this effort, OMB and CEA plan to organize a series of topical discussions with senior policy officials and research experts in the agencies, Marrett said. In doing so, they are saying, "We want to drive greater investments into the kinds of things that rest on solid evidence," according to Marrett. Moreover, she explained, that NSF has its Science of Broadening Participation (SBP) initiative, which is led by the agency's Directorate for the Social, Behavioral, and Economic Sciences (SBE) and supported by the Directorate for Education and Human Resources (EHR). Marrett explained that other NSF programs are interested in and need the systematic, logical, theoretically driven work that must underlie the science of broadening participation. But, she noted that some of the programs have discontinued or downplayed their efforts in this area because the research they have funded has been scattershot and largely anecdote-driven. The programs "have very little evidence on … what makes a difference under what conditions," said Marrett, who pointed out that NSF is carefully reviewing all its programs on this topic.

For example, the programs in the Division of Human Resource Development such as the Louis Stokes Alliances for Minority Participation (LSAMP)—which focuses on girls' involvement in science and engineering—have attended more to outputs than outcomes. She emphasized that "we know more about what those outputs look like than about the processes that have yielded them." NSF wants work that can illuminate the puzzles, understand the complexity, and devise new models and methods. That information needs to be part of an effort that is collaborative across disciplines and sectors—for the good of advancing science and the nation.

Marrett concluded her comments with a plea: "Because you've got the expertise, [and] … the commitment, and collaboratively…I think we are certainly poised to make those advances that really are so significant for the nation and the well-being of our population."

The Role of Universities and Colleges and/or Specific Departments in Attracting and Retaining Diverse Students and Diverse Faculty/Researchers

According to **Ann Nichols-Casebolt**, the associate vice president for research at Virginia Commonwealth University (VCU), the questions that should be asked when examining the role of universities and colleges in attracting and retaining diverse

[4] SBP involves the development and testing of theories aimed at discovering and understanding the causality, components, and contingencies for social interactions and behavioral processes. The focus within SBP is on the psychological, sociological, behavioral and economic causes and consequences associated with effectively broadening participation, and is broader than a focus on a particular program or policy as in program evaluation. http://www.nsf.gov/pubs/2012/nsf12037/nsf12037.jsp.


Nichols-Casebolt

students and diverse faculty and researchers are: What do we know? What can we do? And what are some of the challenges that face our institutions?

At the same time, academic institutions know "quite a bit about recruiting and retaining students in general," she acknowledged, but noted that they need to look at initiatives that focus on the sciences. "We cannot just send out flyers to high-school students and expect that they are going to be coming to college," Nichols-Casebolt stressed.

Universities also need to determine how to engage students outside the classroom, Nichols-Casebolt said. Many institutions have robust undergraduate research opportunities, which many believe make a difference in students' engagement. She cited the Council on Undergraduate Research's efforts to support these kinds of initiatives. Such programs mean engaging faculty who don't normally work with undergraduates. "It goes institution-wide," she emphasized. "Our schools of medicine must get excited about engaging with undergraduate students and high school students and in bringing them into the basic sciences' and the health sciences' laboratories to get them excited about science."

Nichols-Casebolt stressed that institutions must also determine how to measure the success of training grants so that evaluation criteria are consistent. VCU is looking at the issue institutionally so that overall programming success is measured uniformly. Another one of our roles is to look at programs as institution-wide, even if there are different funding streams coming in, acknowledging that financial constraints challenge administrative efforts to track these.

Funding constraints also affect other aspects of the diversity issue, such as the cost of graduate stipends. Nichols-Casebolt pointed out that senior faculty members have less time for mentoring students and junior faculty, as funding for their own research becomes more competitive. In addition, obtaining funding for postdocs and graduate students is a growing struggle, she said. Students are increasingly turning to opportunities outside of academia instead of furthering their educations, a pattern that bears noting as the economy tightens.

VCU, is "very much interested in the pipeline and trying to figure out how to best allocate our resources," said Nichols-Casebolt, who added that, in so doing, it's important to be able to share data across institutions. "If we can't share that because our definitions are different than some other institution's definitions, it's going to be a problem," she said. Centralized data collection, Nichols-Casebolt concluded, is key.

The Role of Professional Associations and Scientific Societies in Gathering and Tracking Data


Spalter-Roth

Roberta Spalter-Roth, the director of research and development at the American Sociological Association (ASA), shared insights from ASA-supported research on enhancing diversity in science. She and her colleagues have conducted research to examine who goes into sociology—including a longitudinal survey called "Bachelor's and Beyond," a survey of sociology department chairs, and a post-Ph.D. longitudinal survey. Spalter-Roth shared the following findings:

- There have been small increases in minority membership in ASA over the past 10 years, with most participating in sections that focus on social structure and historical context.
- Individuals who went through ASA's Minority Fellowship Program are more likely than other early career Ph.D.s to become ASA section officers (this finding comes from a recent NSF-funded study).[5]
- On-the-job activities, such as internships and mentoring programs, help minority sociology majors (who tend to have parents with lower levels of education) obtain

[5] Spalter-Roth, Roberta, Olga V. Mayorova, Jean H. Shin, and Patricia White. 2011. *The Impact of Cross-Race Mentoring for "Ideal" and "Alternative" PhD Careers in Sociology*. Research Brief. Washington, DC: American Sociological Association. (see http://www.asanet.org/images/research/docs/pdf/Impact_of_Crossrace_Mentoring_Report_2011.pdf)

jobs that are closely tied to sociology and lead to career satisfaction.[6]

- Having a White male dissertation advisor increases minority fellows' chances of employment at Research I institutions.
- Male alumni of the Minority Fellowship Program are more likely to work at Research I universities than female alumnae, who constitute 60 percent of the program's participants.
- Only a small number of African Americans become full professors of sociology, but the situation may be improving. Additional research is needed.[7]
- Since 1995, there has been a small but steady increase in the number of new minority baccalaureates and Ph.D.s in sociology.

Spalter-Roth also discussed several upcoming ASA diversity related studies and efforts, including the next round of the "Bachelor's and Beyond" survey; the 2012 department survey; the latest job market survey; an evaluation of new strategies for increasing minority use of Teaching Resources and Innovations Library for Sociology (TRAILS), ASA's on-line library of teaching and learning materials; and a new round of comparative research on women of color in the Minority Fellowship Program.

Spalter-Roth emphasized that a key issue in enhancing diversity is allocating the time and resources to bring together those who could engage in cross-disciplinary work. She closed by advocating for dissemination of research findings on this topic to be presented attractively, accessibly, and at no cost.

The Role of Federal Agencies in Data Collection


Schaffer

The National Institutes of Health (NIH) is "really being clear about the importance of diversity in NIH research," according to **Walter Schaffer**, a senior scientific advisor for extramural research at NIH. Because the agency carries out health-related research, and because there are health disparities across various underrepresented groups, the agency has a unique and compelling need to promote diversity in the biomedical, behavioral, clinical, and social sciences research workforce.

But despite having had programs aimed at promoting diversity since the mid-1970s, statistics show NIH isn't doing well in terms of representation of African Americans and Hispanics among principal investigators, Schaffer said. In short, "NIH has had a less than impressive impact on the diversity of the NIH-funded workforce over the past 30-plus years," he said.

When NIH looked at where people drop out of the science pipeline, the agency found significantly fewer Hispanics and Blacks in college compared to high school. NIH also found significant differences in R01 (investigator-initiated) award probability by race and ethnicity, with Blacks who apply having a 15 percent likelihood of getting such an award, Asians having a 25 percent probability, and Whites having an almost 30 percent probability.

Schaffer briefly highlighted several forthcoming efforts to address disparities, similar to this current May 24, 2012 workshop, as well as papers and extended studies.[8] "One of the things that came up when [NIH] started looking more carefully at this [issue] is that some of the characteristics that [it] may be interested in in terms of predicting success are not included in structured data," according to Schaffer, who said needs and gaps in the current data collection include:

[6] Spalter-Roth, Roberta, Nicole Van Vooren, and Mary S. Senter. 2009. *Decreasing the Leak from the Sociology Pipeline: Social and Cultural Capital to Enhance the Post-Baccalaureate Sociology Career*. Research Brief. Washington, DC: American Sociological Association. (see http://www.asanet.org/images/research/docs/pdf/Decreasing%20the%20Leak%20from%20Soc%20Pipeline.pdf)

[7] Spalter-Roth, Roberta and William Erskine. 2007. *Race and Ethnicity in the Sociology Pipeline*. Research Brief. Washington, DC: American Sociological Association. http://www.asanet.org/images/research/docs/pdf/Race%20and%20Ethnicity%20in%20Soc%20Pipeline.pdf

[8] Ginther, Donna K., Schaffer, Walter T., Schnell, Joshua, Masimore, Beth, Liu, Faye, Haak, Laurel L. and Kington, Raynard S., Diversity in Academic Biomedicine: An Evaluation of Education and Career Outcomes with Implications for Policy (September 22, 2009). Available at SSRN: http://ssrn.com/abstract=1677993 or http://dx.doi.org/10.2139/ssrn.1677993

- Data on "stocks and flows." The total population in each defined cohort (not limited to NIH-associated projects); the number that enter and exit from defined populations; and whether it's possible to associate the movement taking place with various characteristics of the individuals, demographic variables, length of training, salaries, expansion and contraction of the overall labor market, and other factors.

- Data currently available. The number of graduate students, Ph.D. and M.D. graduates, postdocs, scientists with international degrees, scientists who work in industrial and other settings, as well as current job openings and changes in employment over time.

- Reliable data. Some existing data are not reliable; some populations may be undercounted by half. Schaffer explained that when using these sorts of workforce dynamics to build simulations, to describe conditions and the state of affairs, and to make adjustments, there are "factors that may be influencing people's flow through that system." It is a "big problem if you're off by a factor of two." While you "can still build models … the credibility of those models is not particularly good," he said.

- Complete data. The field lacks data on scientists with international degrees. The Bureau of Labor Statistics' data are broken down by degree and job classification. There are also incomplete data on M.D.s involved in research careers, along with data on current job openings.

According to Schaffer, data gaps in the area of evaluation include:

- Microdata with identifiers, including demographic information about participants in each program, the nature of their experiences, program-appropriate outcomes, and outcomes associated with characteristics of the program, structured data, and name ambiguities.

- Identifying information on NIH research grants that involve postdocs.

During his presentation, Schaffer announced that NIH plans to work with NSF and the Department of Education to tighten and accelerate data collection and analysis, improve the General Social Survey (GSS)[9] and the Survey of Doctorate Recipients (SDR)[10] and link that information to administrative NIH data. As part of this effort, Schaffer stressed that it will be essential to implement privacy safeguards.

The agency is also working with the Bureau of Labor Statistics to increase the usefulness of Census data and is exploring low-burden administrative options for collecting data, including Science and Technology for America's Reinvestment: Measuring the Effect of Research on Innovation, Competitiveness and Science (STAR) Metrics[16]. In addition, Schaffer announced that NIH and five other federal agencies are working on a new project called ScienCV that would put together a portable collection of CV-like information aimed at reducing the time it takes to fill out grant application forms.

He noted that there are some efforts underway that involve collecting program-specific outcome information, developing metrics related to program goals, and developing better indicators of scientific output (moving beyond counting grants, publications, and citations, for example).

What Research and Evaluation Experts Can Teach Us About Developing and Using Metrics

Laurel L. Haak, the executive director of Open Researcher & Contributor ID (ORCID), expressed concern that the field is not

[9] General Social Survey - a nationally representative personal interview survey of the United States adult population that collects data on a wide range of topics: behavioral items such as group membership and participation; personal psychological evaluations including measures of well-being, misanthropy, and life satisfaction; attitudinal questions on such public issues as crime and punishment, race relations, gender roles, and spending priorities; and demographic characteristics of respondents and their parents.

[10] Survey of Doctorate Recipients - a longitudinal study of individuals who received a doctoral degree from a U.S. institution in a science, engineering, or health field.

[16] STAR Metrics is a multi-agency venture led by NIH, NSF, and the White House Office of Science and Technology Policy (OSTP). The project is a partnership of these agencies with 81 research institutions designed to document the outcomes of science investments to the public. It is comprised of 14 data elements from those research institutions and has de-identified information on people associated with federal grants. It also provides information on how much they get paid from those grants. The data are used to look at the way in which federal grants affect the hiring practices and other types of employment opportunities available at universities.


Haak

sufficiently focused on broadening participation. "I don't get a sense from this community that there is any sense of urgency around increasing participation and broadening participation … [and] because there's no urgency, we don't do it," she asserted.

Haak encouraged the community to look at gender representation in addition to race and ethnicity and consider other ways to measure people, recognize similarities, adopt data definitions and collection standards.

Haak also stressed the need to implement supporting data systems. According to Haak, when determining what data should be collected, five components can be looked at by institution, individual, and cross-cutting factors: (1) What resources are made available by the funder to the program? (2) What are the activities and services provided by the funded organizations? (3) Who is the program audience and who is participating? (4) What measurable outcomes are expected and how are participants affected? and (5) How is progress toward clearly identified program goals tracked?

She identified several previous undertakings that can inform this work, including NIH's efforts to determine: how to take data from existing systems (so no additional surveys are needed), how to use that data, whether recruitment is being carried out and whether people are being retained, whether careers are affected, how institutions and the broader enterprise of science is affected, and whether the field is getting closer to its goal of becoming more diverse.

Haak told workshop attendees that it is "entirely possible—not easy, but possible—to work together, not just across disciplines, but also across sectors … to define and promulgate a core set of goals and associated measurables." Toward that end, ORCID, which applies a transagency personal identifier to each program participant, would help, she said.

Haak noted that "the biggest and hardest thing for everybody," is the evaluation of these programs, which "involves asking questions that we may not want the answers to." People should not be scared to cut programs that aren't working", she said. "Otherwise, we're spending a lot of money on programs and activities that do not work and are not spending enough money on those that do work. We are not going to get where we want to go with that kind of approach. We have to not be afraid," Haak concluded.


Salsberg

Edward Salsberg, the director of the National Center for Health Workforce Analysis (NCHWA), part of the Health Resources and Services Administration (HRSA), described the Center's goal: to expand data collection and analysis to inform both the public and private sector about workforce needs. "Increasing diversity is clearly one of NCHWA's top priorities, as well as being important for HRSA," Salsberg said.

According to Salsberg, NCHWA is looking at both Census-type information and sample surveys, as part of its effort to build on existing sources of information. Current projects include:

- A report on diversity in the health professions, to be published later this year, which uses existing sources of data, particularly the American Community Survey[11] and the Integrated Postsecondary Education Data System database[12] (produced by the U.S. Department of Education), to provide information about 35 health professions with breakdowns by race, ethnicity, and gender of people in each of those professions;

[11] The American Community Survey (ACS) - an ongoing survey that provides data every year -- giving communities the current information they need to plan investments and services. Information from the survey generates data that help determine how more than $400 billion in federal and state funds are distributed each year.

[12] Integrated Postsecondary Education Data System (IPEDS) database - a system of interrelated surveys conducted annually by the U.S. Department of Education National Center for Education Statistics (NCES). IPEDS gathers information from every college, university, and technical and vocational institution that participates in the federal student financial aid programs. The Higher Education Act of 1965, as amended, requires that institutions that participate in federal student aid programs report data on enrollments, program completions, graduation rates, faculty and staff, finances, institutional prices, and student financial aid.

- The National Sample Survey of Nurse Practitioners[13], which is in the field now and involves original data collection; and

- A national database on physicians, which will include demographic, education, training, and practice information. NCHWA is developing it by encouraging health professions to collect core data and working with national associations that represent state licensure boards.

Salsberg discussed the value of collecting data about individuals in the sciences at multiple points in time. He cited as an example work done by the Association of American Medical Colleges (AAMC), which collects data beginning when a student applies to take the MCAT, is in medical school, graduate school, residency training, and at the point of maintenance of board certification and licensure. "There is the potential to do a longitudinal analysis of individuals," Salsberg said.

He also discussed the "great benefit of collaboration," noting that "clearly, the effort to increase diversity can't be any one occupation or any one professional area. It really has to be a collaborative effort across not only the health and science professions but really across the community at large." To that end, it would be very helpful to establish a focal point in the community that is responsible for tracking and assessing progress aimed at improving diversity, said Salsberg, who encouraged workshop participants to think about where the locus of responsibility should lie.


Bonham

Ann Bonham, the chief scientific officer at the Association of American Medical Colleges (AAMC), noted that the field has not seen a significant increase in diversity in the applicants or medical student pools, despite efforts at various institutions and federal agencies, including the AAMC.

Diversity among faculties is not much different from past years, Bonham stated. "We try to make this look a little bit more positive," she said. "But it's really, frankly, not that different." In 2009, instructors (incoming faculty who are not assistant professors) were about 4.4 percent Black or African American and about 5.2 percent Hispanic. About 1.4 percent of full professors were Black or African American. Looking at newly appointed assistant professors, the same trend emerges. "What this indicates to us as a whole is that we have lower retention and promotion rates [among specific underrepresented minority groups], which indicates to us a pipeline issue that goes beyond the M.D. that continues in the faculty ranks," she explained.

The field lacks data on what kind of work these people are doing—clinical, administrative, or research—"we have no idea about what they do," Bonham said. The field also doesn't know much about differences within ethnic groups, such as distinctions by socioeconomic status. Bonham discussed several of the programs AAMC is working on, including the Universities for Health Equity through Alignment (U-HEALTH) initiative, funded by the NIH's National Institute of Minority Health and Health Disparities. U-HEALTH will examine universities' and medical schools' data collection to better inform the health profession's workforce development and to help a cohort of urban institutions achieve its health equity goals.

Bonham also pointed out that the field needs to think about how it defines the success of health equity and increasing diversity. While many recognize the value of diversity, team science, and transdisciplinary or multidisciplinary research, institutions' merit, promotion, reward, and recognition systems don't always acknowledge the value. "I think how we determine success and increasing diversity creates an environment that is either welcoming or non-welcoming for the assorted students and faculty who may be very interested in doing research and team-based science, including community-based participatory research, population research, and other kinds of prevention research," she said.

[13] The National Sample Survey of Nurse Practitioners (NP) – a data collection designed to: (1) Improve estimates of NPs providing services; (2) describe the settings where NPs are working; (3) identify the positions/roles in which NPs are working; (4) describe the activities and services NPs are providing in the healthcare workforce; (5) determine the specialties in which NPs are working; (6) explore NPs' satisfaction with and perception of the extent to which they are working to their full scope of practice; and (7) assess variations in practice settings, positions, and practice patterns by demographic and educational characteristics.

The Unique Perspectives of Racial/Ethnic Groups When Gathering Data Across Institutions


Trent

William Trent, a professor of education policy, organization and leadership as well as sociology at the University of Illinois, Urbana-Champaign, pointed out the importance of balancing scientific needs against overwhelming underrepresented minorities with requests for data and emphasized that "the need for unobtrusive data collection methods is critical given the size of some of these vulnerable populations." He noted that on many campuses, students of color are being deluged with surveys.

Trent also suggested that knowing the structural features of participation in science is less of a challenge today than understanding the "crucial experiences that these young people are going through," including how they define success.

Issues of "categorical clarity" also need to be understood, Trent underscored. "This is a disaggregation issue. Though progress has been made in understanding the nuances of racial identity over the past several decades, current measurements don't begin to address the complexity of trying to capture the necessary information to fully understand the dynamics of racial identity and the ways it may affect many people's educational experiences.

Consider, for example, the issue of disaggregating "Black" into more detailed categories (as has been done among Asians and Latinos), including immigrant Blacks, who are overrepresented at many of the most selective colleges and universities, Trent continued. Another factor to consider is the increasing rates of intermarriage across race, leading to the use of mixed-race designations. "It is important that we better understand any underlying processes of differentiation within subgroups if we are to clearly identify policies and practices that, for example, differentially impact native Blacks," Trent said. "Such distinctions and differentiations are likely to increase rather than diminish in the coming years."

In this regard, Trent suggested that federal TRIO-funded programs (outreach and student services programs designed to identify and provide services for individuals from disadvantaged backgrounds) could be a source of useful data. Learning how students who enter scientific fields have been supported cumulatively through their lives by programs such as Head Start, Upward Bound, Talent Search, and the Summer Research Opportunity Program would be helpful in learning more about the effects of such efforts.

Trent also pointed to research on the importance of academic and civic engagement for underrepresented students in the sciences. "Most studies indicate that these forms of participation are more important for underrepresented students," he explained.

Trent closed by noting that "there is growing social science evidence to inform both the range and kind of data needed to improve our understanding of ways to enhance the diversity of participants in STEM, and these are usable measures." But many groups may be reluctant to use survey measures because "we don't always have the psychometric properties that are required for the immediate inclusion of some of these items," he concluded.


Márquez

Ernest Márquez, the president of Society for Advancement of Chicanos and Native Americans in Science (SACNAS) and a former program director at NIH, shared his personal experience as an immigrant and emphasized the importance of the people who supported him at every stage of his education. "That really made the bridge for me," he said about his support system and mentors, which he believes are key to the success of minority youths. From the variety of jobs he has held, he learned the value of having "some kind of metrics to be able to measure how well you're doing."

But first, he maintained, it's crucial that the field begin to see the issue of underrepresentation as an urgent matter. "Our national imperative is to recognize and engage our increasingly diverse U.S. population, to build a strong domestic STEM workforce, to broaden participation in our nation's science, to increase our nation's scientific competitiveness in the global market—these are urgent issues," Márquez said.

While studies of what happens along the science pipeline have identified dropouts at different program levels, bridge programs have been developed in response to help students stay in those programs. But the numbers haven't improved a lot, according to Márquez. To address this situation, Márquez recommended:

- Making efforts to understand better how different grants—such as NSF grants, NIH's Minority Access to Research Careers (MARC) grants, and others—affect an individual's success.
- Ensuring that programs contain evaluation criteria.
- Giving individuals unique identifiers that will help the field track people as they go through institutions and programs.
- Disaggregating Blacks and Hispanics into more detailed categories.
- Expanding mentoring opportunities, as occurs with SACNAS.

In closing Márquez cautioned participants to "measure what you treasure, not necessarily treasure what you measure."


Pérez

Debra Joy Pérez, assistant vice president for research and evaluation at the Robert Wood Johnson Foundation (RWJF), spoke about why diversity matters in her work. Not only does the foundation have a strong commitment to diversity "because it's the right thing to do," she said, but also because diverse perspectives matter to the work RWJF does in health and health care, enhancing decision making and problem solving, and allowing heterogeneous groups to come to better conclusions faster.

This diversity work is also important because the foundation seeks to help the most vulnerable among us—people who are mostly minority, low-income, first-generation, and less-educated, who suffer the most severe consequences of racial and ethnic disparities. Disparities in education, Pérez said, translate to disparities in income, which in turn translate into growing disparities in health. Throughout the life cycle, there are serious gaps in mortality rates between minorities and Whites. Minorities get sicker younger, have more severe illness, and die sooner than Whites.

Pérez argued that factors such as foreign-born status, generational status, and migration should be included in any data collected around education. "Growing up Black in America is not the same as growing up Black in Liberia, Ghana, or Kenya," she noted. These factors should also be taken into consideration in mentoring programs and they have implications for disparities in education and health, but perhaps not in the direction one might think, she said. For example, foreign-born students may have more of an advantage in education than, say, Black Americans who have grown up in intergenerational poverty.

In terms of recruiting minority professors, universities leave a significant part of the population behind if they recruit only international faculty, she said. The same holds true for applications to NIH for research support, she said, citing statistics that show that while 68 percent of Asians in the United States are foreign-born, 87 percent of Asian NIH applicants are foreign-born. While 40 percent of Latinos in the United States are foreign-born, 56 percent of Latino NIH applicants are foreign-born. For Blacks, the difference is even more profound. While 6 percent of Blacks in the United States are foreign born, 43 percent of Black NIH applicants are foreign-born Blacks. "What does that say about how we're preparing the U.S.-born Black in America?" she asked.

Pérez encouraged scientists to ask questions when they think about diversity, including: Who is diverse? What do we mean by diversity? "When you think about programs that are intended to address diversity and support underrepresentation, are you looking for that one-thirty-second Native American or are you looking for that Native American who lives in the reservation that's trying to make a difference in their community?" she asked.

According to Perez, the field needs to tailor programs to the populations they're targeting. "So if we want more men in nursing, we target men in nursing," she noted. "If we care

about Black and Latino representation, then target programs for those particular groups," recognizing that the situations and backgrounds of the people who make up those groups vary and the programs should be tailored to their needs.

Pérez described three programs funded by the Foundation that focus on diversity:

- *New Connections*, a RWJF program targeting historically underrepresented scholars who work in academia but never completed their Ph.D.s. (there are currently 1,200 scholars in the program).
- *Sisters of the Academy*, a program for African-American women who are trying to succeed in academia. The program holds boot camps at which mentors are matched with students to work on publications. The RWJF supported *Brothers of the Academy* is a similar program for African-American men.
- *Twenty-Five Dollar Fund*, a RWJF program that is part of the Princeton Area Community Foundation. The program encourages investment in low-income minority students of promise.

In closing, Pérez said, "The difference that we make in a single person's life lasts a lifetime." She also praised the work of the workshop and reminded participants that "we are in a crisis" and "what you're doing here and attempting to do here for underrepresented minorities in academia is so critical."

Breakout Groups Summary and Next Steps

The morning presentations set the framework for the rest of the workshop. Over lunch and into the afternoon, participants broke into smaller groups to examine diversity issues in detail in order to make recommendations about how to address the workshop's goals. Subjects covered in the breakout groups were:

- What to Measure: Surveys and Indicators
- What to Measure: Programs and Interventions to Promote Diversity in the Scientific Workforce
- Whom to Measure
- How to Measure
- Processes for Sharing Best Practices/Research

WHAT TO MEASURE: SURVEYS AND INDICATORS

Themes

Agree on what variables should be collected in common as part of regular administrative data collection. There is a wide array of items and variables that institutions, associations, federal agencies, foundations, and other organizations currently collect. These variables are in administrative data such as student enrollment records, university transcripts, funding records, applicant/application information, surveys, as well as elements of program evaluations. However, there is little consistence in what is collected and little agreement on what should be collected, which prohibits comparison across time, disciplines, and institutions.

Contextualize data on individual students. In addition to collecting individual student-level data, there is a need to collect it at the institutional level. Information on individual students is most meaningful when we understand the social context, environment, and culture of the institutions, programs, and/or departments.

Articulate a theoretical and conceptual framework for data collection. Along with collecting common information across students and programs, it is important to understand what questions are asked, why the questions are significant to the data collection, and the overall value of the items.

Collect demographic variables and indicators from students. Participants acknowledged that it is very useful to have student level demographic data such as race/ethnicity, gender, age, and parents' education level as well as student's academic transcripts and funding history. It is also important to determine when or at what stage(s) we collect the data from students (e.g., when students are admitted to a program, complete a course, annually, and the years post Ph.D. Similarly, it is advantageous to get administrative data from transcripts.).

Questions Addressed by Breakout Group

- What are the most important survey measures and indicators from administrative data that are used to track entry, retention, and progress in research careers by persons from groups under-represented in science? Consider measures and indicators being collected by:
  - Universities (for example, concerning students at specific colleges and universities);
  - Associations (for example, focusing on members or professionals in a field);
  - Agencies (for example, focusing on applicants for or recipients of specific federal funding opportunities); or
  - Organizations (for example, participants in programs such as mentoring programs funded by a nonprofit).
- For universities, associations, agencies, or organizations already collecting such data: what survey measures and indicators have been most and least informative? What further information would have been valuable?
- For those universities, associations, agencies, or organizations not yet collecting such data: what survey measures and indicators would be most useful in informing your efforts?
- What are the limitations with existing survey measures and indicators being collected through administrative records for increasing our understanding of entry, retention, and career progress in populations tracked over time?
- What do you see as the potential for collaborating to work towards using common survey measures and administrative data in tracking groups over time?
- How might collaboration be structured? What process might be followed for arriving at a set of recommendations for common measures?
- What can we learn from other efforts to work towards common measures (for example, the Federal Interagency Forum on Child and Family Statistics[14] and the effort to develop common quality measures in nursing homes, or the work of the National Quality Forum's Measures Application Partnership[15])?

Gather data that permits a nuanced understanding of students' perceptions and experiences with external, institutional, and departmental programs and initiatives. Programs provide many types of support (e.g. financial, professional development, mentoring). At the same time, study the experiences of those who do not participate in programs or initiatives that provide such support, allowing for a comparison of students that deepens an understanding of their experiences as well as the impact of the programs and initiatives.

Include the collection of data from program providers as well as program participants. The perspective of those providing program services are important to sustainability and bringing programs to scale.

Address methodological considerations across the range of different data collection methods. The skillful use of quantitative and qualitative methods provides a level of depth not widely practiced. Data can come from existing administrative sources, regular tracking, and the use of surveys and program evaluations. Efforts are needed to make sure that respondent burden is minimized, the highest priority data elements are included, and the format of the data can provide the basis for summary variables that inform efforts to diversify and encourage enrollment and retention of students. Across the various data collection methods, consider potential challenges: confidentiality problems associated with small sample sizes, resources for data sharing across agencies and institutions, limitations of existing surveys, and avenues for broad dissemination of data and analyses. Finally, it needs to be acknowledged that such research and evaluation efforts require skilled people to do the analyses.

Recommendations

- **Encourage federal agencies to lead the effort to establish standard definitions, measures, methods, and policies. Institutions, associations, and founda-**

[14] The Federal Interagency Forum on Child and Family Statistics (Forum) - a collection of 22 Federal government agencies involved in research and activities related to children and families. The Forum was founded in 1994 and formally established in April 1997 under Executive Order No. 13045. The mission of the Forum is to foster coordination and collaboration and to enhance and improve consistency in the collection and reporting of Federal data on children and families.

[15] The Measure Applications Partnership (MAP) - a public-private partnership convened by the National Quality Forum (NQF). MAP was created to provide input to the Department of Health and Human Services (HHS) on the selection of performance measures for public reporting and performance-based payment programs. In convening MAP, NQF brings together stakeholder groups in a unique collaboration that balances the interests of consumers, businesses and purchasers, labor, health plans, clinicians and providers, communities and states, and suppliers.

tions must be intricately involved in this effort to facilitate a common understanding of the questions each is asking and has asked, and the intent of the questions.

- Establish an oversight organization to manage a repository of data, published studies and reports, survey instruments, and best practices so that information can be shared and disseminated.

- Examine the social and environmental context of institutions and programs, including policies, programs, mission, and culture. Stakeholders need to understand the context in which a program operates not just the program's purpose and outcomes.

- Provide incentives to enhance collaboration among stakeholders, including accrediting bodies, professional and scientific societies, foundations, universities, and federal agencies to develop common metrics, understand students' experiences across their academic and career trajectories, and assess the impact and effectiveness of institutional programs and initiatives.

- Build support for convening senior researchers and scholars to strengthen theory regarding the multiple metrics that are needed to understand the processes of enhancing diversity in science.

- Develop a unique identification number that is used by schools, testing companies, and federal agencies, so that they can match data consistently across time and career paths.

WHAT TO MEASURE: PROGRAMS AND INTERVENTIONS TO PROMOTE DIVERSITY IN THE SCIENTIFIC WORKFORCE

Themes

Focus on key demographic subgroups. To understand the effects of interventions (and participation in interventions), attention should be paid not only to underrepresented minorities overall, but also elements such as intersections of race and gender, immigrants, and those varying in terms of initial grade point average (GPA). A key question is whether interventions are targeting "low hanging fruit"—those who are already aiming for careers in science and who might benefit from further support—rather than those who are hesitant about embarking on science careers.

Target interventions at different points in the pipeline. Focus on those just getting into science as well as those progressing in a scientific career. Those who have just started scientific careers may have distinct early career issues. Interventions will need to have different components. For example, early career interventions may focus on supporting minority researchers' exposure to professional activities, such as proposal review committees and scientific meetings. Whereas new researchers may need support in developing a first research proposal and persevering through revisions, experienced researchers may need help in balancing other parts of the academic process such as teaching, mentoring, and service.

Questions Addressed by Breakout Group

- In evaluation studies that are examining programs and interventions to increase the representation of underrepresented groups in the sciences, what outcomes are being studied? What is the value of working towards common outcomes? What challenges exist?
- Are evaluation studies of programs and interventions doing a good job of examining why and how programs and interventions are working and what the key mechanisms are? What are the challenges to developing common measures of underlying processes in these programs and interventions?
- What is the potential for collaborating to work towards common measures in studies of programs and interventions? Are programs and interventions too tailored and specific? Could programs and interventions have some subset of measures in common?
- What process might be followed for arriving at a set of recommendations for common measures?

Discuss a unique ID within the context of pipeline issues. It is important to study the progression of individuals at different points in the pipeline, and to understand participation in different programs or interventions. A significant, complex issue is that individuals may participate in multiple interventions over time. Effects may reflect cumulative influences. This underscores the importance of having a unique ID that would make it possible to follow individuals as they complete graduate studies, submit proposals, attain licensure, complete publications, etc.

Distinguish between measures of program or intervention functioning and outcomes. A key issue is the cost investments and daily operations of the program relative to its outcomes. Measures of participation (including components participated in and duration of participation) are indicators of the appropriateness of an approach that can be studied separately from outcomes.

Extend the range of individual outcomes examined. Outcomes need to include the primary markers of progress in research careers, such as completion of graduate studies, nature of initial position, research funding, and publications. Consideration needs to be given to positive alternative career trajectories. There may be positive outcomes of training for scientific careers that do not involve pursuing research. As one example, it may be a positive to become a health practitioner who supports and participates in research but does not direct it. Additionally, there is a need to extend the range of outcomes to include indicators of individual well-being, including measures of identity as a scientist; sense of efficacy in career; subjective sense that one's work is having an impact; sense of stress and measures of physical illness; and maintaining close relationships.

Focus on outcomes at the level of the social context as well as at the level of the individual. In addition to studying effects on individuals, research is needed on effects of interventions on such variables as social climate (such as in an academic department); organizational commitment to diversity; attitudes of staff; and the overall compositional diversity that provides support from peers, mentors, and advocates.

Recommendations

- Draw upon important existing resources in examining the features of interventions and their outcomes. These include joint work by NSF and the U.S. Department of Education on developing standards for assessing the efficacy of programs, and the recently released document by the White House Office of Science and Technology Policy (OSTP) on design principles for science, technology, engineering, and mathematics (STEM) education programs.

- Develop common measures of effects of interventions on institutions and their climates, as well as individuals. Similarly, examine common measures of individual subjective sense of stress and well-being, as well as markers of progress in scientific careers.

- Broaden the range of measured outcomes to assure that they include positive alternatives to scientific careers, such as participation in health professions.

- Examine issues related to longitudinal follow up, including the potential to follow individuals at different points in their studies and careers and take into account their participation in multiple programs or interventions.

> "We need to appreciate that when we discriminate or when minorities are not included in research or not included in science, not included in math, not included in technology, that everybody is disadvantaged. It's not just the individual who is from that diverse population, but it's the whole enterprise that is actually harmed."
>
> *—Yvonne Maddox, deputy director, Eunice Kennedy Shriver National Institute of Child Health and Human Development at the National Institutes of Health*

WHOM TO MEASURE

Themes

Consider important issues to complement and intersect with traditional measures of race/ethnicity when deciding whom to measure to establish common data elements. These include socioeconomic status, neighborhood characteristics, immigration status, and migration patterns (residency, naturalization, enculturation, citizenship, mixed status within families) — that is, the series of contexts in which people live. Often, one variable is not an accurate representation of an individual's background. For example, family income may not be a sufficient parameter for people who have high education levels, yet low incomes.

Questions Addressed by Breakout Group

- What are important issues to take into account in defining demographic subgroups (such as groups differing in race/ethnicity and immigration status)?
- Are there emerging concerns about oversimplifying key demographic subgroups (for example, identifying immigrants as a single undifferentiated group)?
- Which groups are not considered now that need to be considered in terms of entry, retention, and progress in scientific careers?
- Are we failing to collect data in key settings (such as community colleges)?
- What is the potential for collaborating in identifying key demographic groups so that universities, federal agencies, and associations are all collecting data defining the key groups in the same way?

Determine the extent to which international students and workers should be taken into account when assessing participation in diversity programs and ultimately, participation in the U.S. science workforce.

Expand data collection to include the composition of the work environment to allow for a deeper understanding of scientists across work sectors. For example, it is important to understand the diversity of project teams including the faculty and/or principal investigator and other personnel.

Include veterans and those with disabilities in the list of demographic characteristics. It is important to consider and understand lived experiences and issues of identity that impact educational and work opportunities and trajectories. These variables can interact with characteristics such as race/ethnicity and socioeconomic status.

Pilot and assess approaches encouraging respondents to report on race/ethnicity. There are complex and legitimate reasons for not sharing, where race/ethnicity data is optional. Respondents may be more willing to share this information if potential importance and rationale are given.

Develop a standardized, universal form for collecting demographic information to be used by all federal agencies and offices of sponsored research. This has the potential to improve data quality and reduce amounts of redundant and inconsistent data across programs and universities.

Connect work on a standardized identifier with related efforts to create longitudinal administrative data sets, including STAR Metrics and State Longitudinal Data Systems (SLDS). In con-

sidering the need for a standardized identifier (as discussed elsewhere), the potential for merging with K-20 data systems should be taken into account. The expansion of SLDS can bridge learning about students and teachers, the impact of teaching, and other indicators of what universities do.

Assure, in survey data collection, that key populations are oversampled and followed over time. There is a need for the right sampling frame for anticipating future populations of significance.

Examine the range of scientific career roles encompassed in data collection and analysis. For example, individuals who did not complete terminal degrees may participate in the scientific workforce and should be included in data sets.

Broaden the window of data collection to include postsecondary faculty at non-Research I institutions and be attentive to their experiences and motivations. There should especially be a systematic identification of the experience at minority-serving institutions, community colleges, women's colleges, and for-profit institutions.

Identify existing data in administrative databases and transform these data into public-use files that can be analyzed, allowing for identification of any gaps. A great need exists for the coordination of data by funding agencies, educational institutions, and professional societies.

Recommendations

- **Establish a federal interagency working group, led by the federal science agencies, to conduct a data portfolio review to determine the demographic characteristics being collected across federal agencies.**

- **Encourage the federal interagency working group to create a standardized data intake form that allows sharing and analysis across agencies, and identify**

gaps in existing data collection efforts, building on the work of STAR Metrics and the U.S. Department of Education.

- Urge the federal interagency working group to build liaisons with professional associations, scientific societies, private foundations, and universities and colleges to understand the kinds of data available, existing gaps, and definitions of demographic groups for various disciplines, and to increase coordination.

HOW TO MEASURE

Themes

Apply rigorous scientific research methods to address a key set of issues. This includes, but goes beyond, cross-sectional data collection to include longitudinal studies. This also includes the use of multiple methods, including those that are both quantitative and qualitative. Stakeholders will have the most faith in findings if multiple methods are used.

Address the problem of low response rates, investing more heavily in using existing databases more creatively and not just relying on survey research. In order to maximize study participation and self-reporting of race, it is critical to explain to people why they are being asked to participate.

Determine the conditions and processes underlying why people do not respond to certain questions, given the problem of under-reporting, non-reporting, and biased reporting. To address this problem efforts should be supported that will research more effective ways to elicit accurate responses, develop technology that makes it easier for people to respond, and explain why answers to such questions are beneficial in both the short- and long-term.

Collaborate to improve measurement, developing common-core kinds of questions to allow for comparison across organizations and standard reporting requirements, so that the entities asking the questions can certify that they are doing so in a way that is reliable and valid. Recognize that there are different incentives for different stakeholders.

Questions Addressed by Breakout Group

- What are the challenges in terms of getting key respondents to participate in studies so that data are representative and generalizable?
- What about issues in providing valid data? Are there concerns with respondent bias? Processes for data collection?
- What confidentiality issues or Institutional Review Board (IRB) issues need to be taken into account?
- How do we tackle privacy concerns in reporting race and ethnicity? How do we encourage respondents to report race/ethnicity?
- What are the issues in retaining samples over time to look at career progress?
- To what extent have we been using multiple methods that would help us understand not just outcomes but also underlying processes of programs and interventions.

Recommendations

- Embrace multiple research methods—quantitative and qualitative, census and sampling, and longitudinal and cross-sectional. We can use emerging technologies here (as commercial websites do)—with a link explaining the reasoning behind the questions. It will be important to utilize emerging practices and technology to enhance reporting of race and participation in this area of research.

- Collaborate to improve measurement, developing both common-core kinds of questions and standard reporting requirements to allow for comparison across organizations. Encourage federal requirements as leverage for maximizing participation and responses. Develop a standard for collecting data that becomes normative, which can then be endorsed by various stakeholders.

- Correct for under-reporting, non-reporting, and biased reporting. Conduct research into why people are not responding to requests for information and into better ways to frame questions. Identify how to best define race/ethnicity (e.g. multiracial), ask about race/ethnicity, and identify proxy measures.

Questions Addressed by Breakout Group

- Are there steps that could be taken to improve communication of research results to policy and practice audiences?
- What would be effective mechanisms for sharing best practices and research findings with those working to enhance diversity in settings such as universities?
- Researchers in different disciplines are not necessarily reading each other's work on programs and interventions. Is there a need and potential for a repository (such as a website) of program and intervention research on entry, retention, and progress in scientific careers by diverse groups?
- Are steps being taken to look at results across quantitative and qualitative studies from different disciplines and settings to summarize them?
- Is there potential for a meta-analysis looking at results of program and intervention studies across disciplines and settings? Are the target groups of interventions and the intervention approaches too different to integrate in a meta-analysis?
- Might some data sources tracking key samples over time be made available for public use?
- Are there some analyses that would be important to conduct across data sets? What are potential foci?
- What three steps could be taken to move toward a repository of information sharing best practices and research?

PROCESSES FOR SHARING BEST PRACTICES/RESEARCH

Themes

Devise dissemination strategies that are comprehensive and can be also tailored to different audiences. As the first four breakout groups grappled with what to measure, who to measure, and how to measure, the fifth group considered how to ensure that the data that's collected and the subsequent analyses involved are disseminated to individuals and organizations who need it. Amid a discussion of the state of the art in research and effective practices, the fifth breakout group considered ways to get research results to both policy and practice audiences. While there is not a "one size fits all" model with regard to these dissemination strategies, the group felt there should be a way of constructing a comprehensive plan while still being sensitive to the different segments of the research and funding communities.

Encourage the establishment of a central source for information on evaluations and data. There was consensus that there should be a national organizing and advocating entity that would become a trusted source (as kind of a research "ecosystem") for people within higher education institutions, professional societies, and funding agencies who are interested in data on such recruitment and retention variables as placement, productivity, mentoring, and networks. There was also agreement that the dissemination process for sharing best

practices/research should take place with regard to both evaluations of diversity-oriented programs as well as the larger (or smaller) data sets that come from survey research and interviews of individuals. This process can be for identifying past or currently existing efforts, as well as keeping an eye on the emergence of new evaluations or data sets.

Develop resources to produce and maintain research in this area. The group identified that a critical step in moving forward would be the formation of a grant funding mechanism where researchers could attain support to continue the process and cycle of creating and disseminating the findings of research and evaluations on enhancing diversity in science.

Recommendations

- **Create national data standards and metrics that are accessible to higher education institutions, professional societies, and funding agencies, as well as a national repository for that data so that those researchers who are collecting it are able to speak the same language, databases can be shared, and data can be merged with any existing larger national data sets to learn more about what works. Create incentives for all stakeholders to adopt these common standards and metrics.**

- **Encourage federal science funding agencies, in collaboration with other private funding sources, to support the creation of a coordinated, interdisciplinary initiative such as a national data repository, which would require the maintenance of a website (and database).**

- **Develop a compendium of practices of what works and what does not work that is informed by meta-analyses when available. Continue interdisciplinary collaboration to advocate broadly for the recommendations from the workshop and identify knowledge gaps for future research endeavors.**

OVERARCHING WORKSHOP RECOMMENDATIONS

This meeting strongly confirmed that steps are needed to increase the comparability of both administrative and survey data collected on diversity in the scientific workforce. Achieving agreement on what data elements are high priority to collect and on specific measures to use will make it possible to aggregate findings across studies and to coordinate efforts to increase diversity across agencies, universities, and organizations. At present, unfortunately, there is little consistency in what data are collected and how they are collected.

Just as important, there is widespread acknowledgement of the crucial need to understand the effectiveness of approaches, such as fellowships and mentoring, to strengthening diversity in the workforce though it is generally agreed that there is a need for an

integrated summary of the research in this area that cuts across disciplinary boundaries. Similarly, there is agreement that in addition to studying effects on individual targets of intervention efforts, research is needed that considers the social context, environment, and culture of the institutions, programs, and/or departments in which these students and professionals participate, allowing for a nuanced understanding of perceptions and experiences with programs to enhance diversity. The inclusion of data collected from program providers as well as program participants is important for both bringing programs to scale and to sustaining them.

Finally, methodological consideration across the range of different data collection methods is also imperative. Efforts are required to minimize respondent burden, include the highest data priority elements, and provide data formats that allow the basis for summary variables that inform the efforts to diversify and encourage enrollment and retention of students and professionals.

Overarching Recommendation No. 1:

Establish a federal interagency working group of federal science agencies and the Department of Education to examine and define common data elements that all federally supported programs and individuals would be required to collect for tracking and evaluation purposes. The White House Office of Science and Technology Policy (OSTP) should take the lead and the National Institutes of Health (NIH) and the National Science Foundation (NSF), the primary supporters of federal research and training, should serve as co-chairs of this interagency working group, similar to their collaboration on the STAR Metrics program.

The first task of the federal interagency working group should be to jointly sponsor a National Academy of Sciences' (NAS) study with two goals: (1) to summarize existing evaluation studies of programs, approaches, and interventions to support diversity; and (2) to review current data collection efforts by agencies, colleges and universities, and other organizations in order to make recommendations on common data elements.

The rationale for this recommendation is that at present, evaluation studies of programs, approaches, and interventions to support diversity in the scientific workforce are carried out by separate disciplines with very little communication across them. Important research conducted focusing on graduate or early career programs in one field is not accessed or used in the development of programs in another field. This results in a failure to build on existing evidence across disciplines and wasted efforts by separate disciplines and organizations. Drawing together the evidence from evaluations and conducting a rigorous review would make an important contribution towards identifying effective and promising approaches *across fields*. Such a review could also identify methodological limitations and gaps in the evidence, informing the funding priorities for research in this area.

In addressing the second goal, the NAS study should identify common data elements that are presently available in existing administrative database records, as well as in survey data collections. A review of measures used in evaluation studies as part of the first goal of the study would provide an important starting point. However, this review of measures must extend beyond evaluation research to incorporate tracking of diversity in the scientific workforce (apart from intervention approaches) done through recurrent surveys and administrative data collection by universities, professional associations and scientific societies, and federal agencies, including nationally representative federal surveys. Of those measures currently being collected, this NAS study should identify the measures and indicators that have been most informative in tracking diversity within the scientific workforce and in informing intervention efforts. The study should also identify measures that appear promising but need scaling up in order to assess their utility, as well as those that have not been as instructive. The corresponding NAS report should identify the limitations of existing survey measures and indicators collected through administrative records. This would increase the understanding of entry, retention, and career progress in populations tracked over time.

Finally, this NAS study should identify any emerging issues such as the need to define demographic subgroups in the collection of these data and the need to collect data in key settings, including community colleges and minority-serving institutions (e.g., Historically Black Colleges and Universities, Hispanic-Serving Institutions, and Tribal Colleges).

Overarching Recommendation No. 2:

Develop a permanent central web-based repository for data on diverse populations in the science pipeline, as well as publications focusing on this issue. Federal science funding agencies, in collaboration with other private funding sources, should be encouraged to support the creation of a coordinated, interdisciplinary initiative in this regard. As the idea of a national data repository requires hosting, maintenance, the cost for technology and for staff, there is a need for a regular funding source.

The rationale for this recommendation, drawing upon the workshop presentations and discussions, is that researchers in different disciplines are not necessarily reading each other's work on programs and interventions. Thus, there is a clear need for a web-based repository of program and intervention research on entry, retention, and progress in scientific careers by diverse groups, as well as public-use data that can spur further replication and analysis.

The establishment of such a central source for information on evaluations and data would be an invaluable resource for higher education institutions, professional societies, and funding agencies interested in data and research findings on such recruitment and retention variables as placement, productivity, mentoring, and networks. Existing federally-funded online resources such as the *Self Sufficiency Research Clearinghouse and Early Care and Education Research Connections* also play a facilitating role in disseminating research and sharing best practices in data collection and research design. They also host webinars on selected high priority topics and training in the use of specific data sets.

The proposed website could not only serve as a repository for research and data on diversity in the sciences, but could also foster the sharing of research and development of the field. With regard to the permanence of the central web-based repository, the construction and housing should take place in a way that allows for ongoing collection of research on evaluations of diversity-oriented programs as well as findings and data sets that come from survey research and interviews of individuals, including administrative data sets that can be made available to the public. This process should involve identification of past or currently existing efforts, as well as identification of new evaluations, tracking and indicator efforts, and data sets.

Overarching Recommendation No. 3:

Launch a new set of fellowships focused on increasing diversity in the scientific workforce using a public/private partnership and taking into account recent research and practice on the structuring of fellowships and training experiences. This Collaborative for Enhancing Diversity in Science (CEDS)-sponsored workshop has shown that much has been learned about how to structure fellowship and training experiences to support diversity in the sciences more effectively.

The rationale for this recommendation, based on the workshop presentations and discussions, is that a new generation of predoctoral and postdoctoral fellowships and training experiences could be structured to take into account accumulated research and practice experience, including: (1) the importance of a supportive cohort and mentoring; (2) the significance of participation in the grants review process early on in scientific careers, which appears to be related to success in the NIH grant application process; (3) the need for predoctoral and postdoctoral fellowships to include a component targeting the fellow's main advisor, conveying key points for creating a supportive work environment for a minority scholar.

Social contexts as well as resources were identified as key issues for supporting the entry of diverse scholars into scientific careers and helping them progress in their professions.

Therefore, a public-private partnership is recommended to (1) review what has been learned about the structuring of fellowships for underrepresented minorities in the sciences, and (2) incorporate key features identified in the review into a new set of fellowships funded jointly by public and private partners to support minority scholars at the predoctoral and postdoctoral levels. As noted earlier, the review could be conducted as part of the proposed NAS study.

Conclusion and Next Steps

The recommendations above are connected to one another in several important ways. For example, in conducting a coordinated cross-disciplinary review of evaluation studies focusing on approaches to supporting diversity in the sciences, measurement issues could be systematically documented. This would help achieve the second NAS study goal in Recommendation Number 1— making suggestions on common data elements. At the same time, summarizing the findings from evaluation studies could provide the starting point for Recommendation Number 2 by bringing together critical materials for a website on research focusing on diversity in the scientific workforce. Finally, findings from such a review could inform Recommendation Number 3 in shaping a new generation of fellowships in a way that takes into account the results of the body of evaluation research on efforts to support graduate studies and early career progress in scientific disciplines by underrepresented minorities.

CEDS will continue its efforts and will take the immediate next step of initiating discussions on the three goals noted here.

Appendix A

Collaborating Organizations

American Association for the Advancement of Science (AAAS)

Center for Careers in Science and Technology

American Educational Research Association (AERA)

American Psychological Association (APA)

American Sociological Association (ASA)

Association of American Medical Colleges (AAMC)

Consortium of Social Science Associations (COSSA)

National Association of Social Workers (NASW)

Society for Research in Child Development (SRCD)

Appendix B

Workshop Participants

ANDREW AUSTIN-DAILEY
Director
Minority Fellowship Program
American Psychological Association
adailey@apa.org

JANET AWOKOYA
Senior Research Associate
Frederick D. Patterson Research Institute
United Negro College Fund
janet.awokoya@uncf.org

DAVID BECERRA
Assistant Professor, Social Work
Arizona State University
david.becerra@asu.edu

STEVEN BRECKLER
Executive Director for Science
American Psychological Association
sbreckler@apa.org

PETER BRUNS
Vice President (retired)
Howard Hughes Medical Institute
brunsp@hhmi.org

LINDA BYRD-JOHNSON
Senior Director, Student Service
U.S. Department of Education
linda.byrd-johnson@ed.gov

YOLANDA COMEDY
Director, Capacity Center
American Association for the Advancement of Science
ycomedy@aaas.org

SARAH SCHOOLCRAFT CONRAD
Senior Research Analyst
Diversity Policy and Programs
Association of American Medical Colleges
sschoolcraft@aamc.org

BETH CUNNINGHAM
Executive Officer
American Association of Physics Teachers
bcunningham@aapt.org

ANTHONY DEPASS
Assistant Vice President for Research Development
Long Island University
anthony.depass@liu.edu

RASHIDA DORSEY
Data Policy Analyst
Assistant Secretary for Policy and Evaluation
U.S. Department of Health and Human Services
rashida.dorsey@hhs.gov

RENA N. D'SOUZA
Professor and Chair
Department of Biomedical Sciences
Texas A&M Health Science Center
rdsouza@bcd.tamhsc.edu

KIMBERLY DUMONT
Program Officer
William T. Grant Foundation
kdumont@wtgrantfdn.org

EARNESTINE PSALMONDS EASTER
Program Director
National Science Foundation
epsalmonds@nsf.gov

LORENZO ESTERS
Vice President
Association of Public and Land-grant Universities
lesters@aplu.org

LISA EVANS
Scientific Workforce Diversity Specialist
Office of Extramural Research
National Institutes of Health
evansl@od.nih.gov

BETH FLOYD
Minority and Student Affairs Coordinator
American Sociological Association
bfloyd@asanet.org

MONICA GAUGHAN
Associate Professor
Health Policy and Management
University of Georgia
gaughan@uga.edu

LISA HARLOW
Professor of Quantitative Psychology
University of Rhode Island
lharlow@uri.edu

LARRY HEDGES
Board of Trustees Professor
Statistics
Northwestern University
l-hedges@northwestern.edu

EMORCIA HILL
Director of Research and Evaluation
Diversity Inclusion and Community Partnership
Harvard Medical School
emorcia_hill@hms.harvard.edu

JENNIFER HOBIN
Director of Science Policy
Federation of American Societies for Experimental Biology
jhobin@faseb.org

KATHERINE HOFFMAN
Membership Specialist, Diversity Programs
American Chemical Society
K_Hoffman@acs.org

SARAH HUTCHEON
Senior Associate
Office for Policy and Communications
Society for Research in Child Development
shutcheon@srcd.org

JERLANDO JACKSON
Professor and Director
Educational Leadership and Policy Analysis
University of Wisconsin-Madison
jjackson@education.wisc.edu

REGINA JAMES
Director, Division of Special Populations
Eunice Kennedy Shriver National Institute of
Child Health and Human Development (NICHD)
National Institutes of Health
regina.james@nih.gov

LISA KAESER
Senior Program Analyst
Eunice Kennedy Shriver National Institute of
Child Health and Human Development
National Institutes of Health
kaeserl@mail.nih.gov

MARILYN KING
Assistant Director
Minority Fellowship Program
American Psychiatric Association
mking@psych.org

MARY KIRCHHOFF
Director of Education
American Chemical Society
m_kirchhoff@acs.org

SUSAN KISTLER
Executive Director
American Evaluation Association
susan@eval.org

RICHARD LEMPERT
Professor Emeritus
University of Michigan
rlempert@umich.edu

LISA LINNENBRINK-GARCIA
Assistant Professor
Psychology & Neuroscience
Duke University
llinnen@duke.edu

SARAH MANDELL
Policy Assistant
Society for Research in Child Development
smandell@srcd.org

J. V. MARTINEZ
Research Program Manager (retired)
U. S. Department of Energy
jvmart@verizon.net

MARY ANN MCCABE
Associate Clinical Professor of Pediatrics
George Washington University School of Medicine
Affiliate Faculty in Psychology
George Mason University
mamccabe@cox.net

RICHARD MCGEE
Associate Dean Faculty Professional Development
Faculty Affairs
Northwestern University Feinberg School of Medicine
r-mcgee@northwestern.edu

JEAN MCKENDRY
Senior Researcher
Association of American Geographers
jmckendry@aag.org

KIMBERLY MEALY
Program Director
Education, Professional and Diversity Programs
American Political Science Association
kmealy@apsanet.org

LYNNE MOLTER
Professor and Chair
Engineering
Swarthmore College
lmolter1@swarthmore.edu

RICHARD NAKAMURA
Acting Director
Center for Scientific Review
National Institutes of Health
rnakamur@mail.nih.gov

LYNN OFFERMANN
Professor, Organizational Sciences
George Washington University
lro@gwu.edu

DEBORAH OLSTER
Deputy Director
Office of Behavioral and Social Sciences Research
National Institutes of Health
olsterd@od.nih.gov

CATHEE JOHNSON PHILLIPS
Executive Director
National Postdoctoral Association
cjphillips@nationalpostdoc.org

NORMA POLL-HUNTER
Director, Human Capital Portfolio
Diversity Policy and Programs
Association of American Medical Colleges
npoll@aamc.org

ALLIAN PRATT
Director, Strategic Issues
ASME (founded as the American Society of Mechanical Engineers)
pratta@asme.org

SAM RANKIN
Associate Executive Director
Washington Office
American Mathematical Society
smr@ams.org

ALYSON REED
Executive Director
Linguistic Society of America
areed@lsadc.org

TERRI REED
Vice Provost for Diversity and Inclusion
Office of the Provost
The George Washington University
treed@gwu.edu

JOAN REEDE
Dean for Diversity and Community Partnership
Diversity Inclusion & Community Partnership
Harvard Medical School
joan_reede@hms.harvard.edu

E. MICHELE RICHARDSON
Senior Advisor
Health Resources and Services Administration
mrichardson@hrsa.gov

HAVIDÁN RODRÍGUEZ
Provost & Vice President for Academic Affairs
Office of the Provost
University of Texas-Pan American
havidan@utpa.edu

PATRICIA ROOS
Professor, Department of Sociology
Rutgers University
roos@rutgers.edu

MONA ROWE
Associate Director for Science Policy
Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD)
National Institutes of Health
mona.rowe@nih.gov

ANGELA L. SHARPE
Deputy Director
Consortium of Social Science Associations
alsharpe@cossa.org

JEAN H. SHIN
Director, Minority Affairs Program
American Sociological Association
shin@asanet.org

PAULA SKEDSVOLD
Executive Director
Federation of Associations in Behavior & Brain Sciences
pskedsvold@fabbs.org

TOBIN SMITH
Vice President for Policy
Association of American Universities
toby_smith@aau.edu

JAMES STITH
Vice President, Emeritus
American Institute of Physics
jhstith@gmail.com

KAREN STUDWELL
Senior Legislative and Federal Affairs Officer
American Psychological Association
kstudwell@apa.org

BETH THACKER
Associate Professor, Physics
Texas Tech University
beth.thacker@ttu.edu

VERONICA THOMAS
Professor of Human Development
Department of Human Development and Psychoeducation
Howard University School of Education
vthomas@howard.edu

RICHARD WEIBL
Director
Center for Careers in Science & Technology
American Association for the Advancement of Science
rweibl@aaas.org

PATRICIA WHITE
Program Director, Sociology
National Science Foundation
pwhite@nsf.gov

SHOMARI WHITTAKER
Program Manager
Educational Affairs
American Association for Marriage and Family Therapy
swhittaker@aamft.org

GEORGE WIMBERLY
Director of Professional Development
American Educational Research Association
gwimberly@aera.net

KEREN WITKIN
AAAS Science and Technology Policy Fellow
Office of Research on Women's Health
National Institutes of Health
witkinkeren@od.nih.gov

BRIAN YODER
Director, Assessment, Evaluation, and Institutional Research
American Society for Engineering Education
b.yoder@asee.org

MARTHA ZASLOW
Director, Office for Policy and Communications Society for
Research in Child Development
mzaslow@srcd.org

JOAN LEVY ZLOTNIK
Director, Social Work Policy Institute
National Association of Social Workers
jzlotnik@naswdc.org

Appendix C

Workshop Agenda

7:30 am - 8:30 am	Continental Breakfast and Registration
8:30 am - 9:30 am	Welcome **Joan Levy Zlotnik** — National Association of Social Workers (NASW) Overview of Purpose and Outcomes of 2008 Leadership Retreat **Sally T. Hillsman** — American Sociological Association (ASA) Welcoming and Introductory Remarks **Yvonne Thompson Maddox** — *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD) Importance of Diversity from the Perspective of the National Institutes of Health (NIH) **Lawrence A. Tabak** — NIH Importance of Broadening Participation from the Perspective of the National Science Foundation (NSF) **Cora B. Marrett** — NSF
9:30 am - 9:50 am	Framing the Issues **Felice J. Levine** — American Educational Research Association (AERA)
9:50 am - 10:00 am	Break
10:00 am - 10:45 am	Panel I: The Role of Universities and Colleges and/or Specific Departments in Attracting and Retaining Diverse Students and Diverse Faculty/Researchers **Ann Nichols-Casebolt** — Virginia Commonwealth University (VCU) The Role of Professional Associations and Scientific Societies in Gathering and Tracking Data **Roberta Spalter-Roth** — American Sociological Association (ASA) The Role of Federal Agencies in Data Collection **Walter Schaffer** — Office of Extramural Research, NIH

10:50 am - 11:35 am	Panel II: What Research and Evaluation Experts Can Teach Us About Developing and Using Metrics **Laurel L. Haak** — Open Researcher & Contributor ID (ORCID) **Edward Salsberg** — Health Resources and Services Administration (HRSA) **Ann Bonham** — Association of American Medical Colleges (AAMC)
11:40 am - 12:25 pm	Panel III: Unique Perspectives of Racial/Ethnic Groups When Gathering Data Across Institutions **William Trent** — University of Illinois at Urbana-Champaign **Ernest Marquez** — Society for Advancement of Chicanos and Native Americans in Science (SACNAS) **Debra Joy Pérez** — Robert Wood Johnson Foundation (RWJF)
12:30 pm - 3:30 pm	Breakout Groups
(12:30 pm - 1:30 pm)	Working Lunch: Group 1: What to Measure: Surveys and Indicators Group 2: What to Measure: Programs and Interventions to Promote Diversity in the Scientific Workforce Group 3: Whom to Measure Group 4: How to Measure Group 5: A Process for Sharing Best Practices/Research
3:45 pm - 4:45 pm	Report Out **Mary Ann McCabe** — George Washington University School of Medicine
4:45 pm - 5:00 pm	Reflections and Closing Comments **Sally T. Hillsman** — ASA **Yvonne Thompson Maddox** — NICHD

Appendix D

Speakers' Biographies

Ann Bonham, Ph.D.

Ann Bonham, Ph.D., is the chief scientific officer at the Association of American Medical Colleges (AAMC). She directs the array of programs supporting all aspects of research and research training. As the primary AAMC contact for external research organizations, Dr. Bonham addresses policy issues affecting research through engagement with key officials in the public and private sectors. Dr. Bonham also works closely with AAMC constituents to address their research and research training needs, and represents AAMC on the national stage in forums dealing with research policy and administration. She serves on the Institute of Medicine Forum on Drug Discovery, Development, and Translation and the Department of Veterans Affairs National Research Advisory Council.

Dr. Bonham was awarded the 2012 Distinguished Alumni Award for Achievement from the University of Iowa Carver School Of Medicine, and was the 2010 recipient of the Society for Executive Leadership in Academic Medicine International Award for Excellence.

Prior to joining the association, Dr. Bonham served as executive associate dean for academic affairs and professor of pharmacology and internal medicine at the University of California at Davis School of Medicine. Dr. Bonham was a member of the UC Davis faculty for nearly 20 years and played a major role in the UC Davis' expansion of translational sciences and exemplified the School of Medicine's emphasis on combining research, education, and mentoring as interwoven and inseparable missions. As executive associate dean, Dr. Bonham oversaw the School of Medicine's research, undergraduate medical education, and faculty academic programs. During her tenure, UC Davis School of Medicine's research funding increased from $106 to $162 million and included an NIH Roadmap Clinical and Translational Science Center (CTSC), for which she chaired the executive committee and the oversight and governance committee. Research training grants also nearly tripled during Bonham's tenure and one of the grants UC Davis received was a Howard Hughes Medical Institute Training Grant: Integrating Medical

Knowledge into Graduate Education, on which Dr. Bonham was the principal director.

Dr. Bonham led the team which successfully competed for a $100 million philanthropic grant from the Gordon and Betty Moore Foundation for a new School of Nursing to create an innovative program that integrated interprofessional education, leadership training, evidence-based practice, and health information technology.

She previously served as chair of the Department of Pharmacology where, over a two-year period, she rebuilt the department, increasing NIH funding sixfold and the number of women faculty from one to five. She also served as vice chair of research for the Department of Internal Medicine and chief of the Division of Cardiovascular Medicine. She was twice awarded the UC Davis Kaiser Award for Excellence in Teaching Science Basic to Medicine and was honored with the American Medical Women's Association Gender Equity Award for providing a gender-fair environment for the education and training of women physicians.

Dr. Bonham's extensive experience in mentoring scientists and junior faculty, especially women in research, has advanced many careers. She is acclaimed for her role in initiating training opportunities, mentoring fellows and students who have accepted positions in academics and industry, bringing together investigators to work in teams toward common goals, and fostering collaborations with faculty and department chairs across disciplines.

Laurel L. Haak (Laure), Ph.D.

Laurel L. Haak (Laure), Ph.D., is the executive director of Open Researcher & Contributor ID (ORCID), an international and interdisciplinary non-profit organization dedicated to providing the technical infrastructure to generate and maintain unique and persistent identifiers for researchers and scholars. Dr. Haak earned a B.S. and M.S. in Biology at Stanford University, completed her Ph.D. in neuroscience at Stanford University Medical School, and conducted postdoctoral research at the National Institutes of Health.

Following postdoctoral work, she served as editor of *Science* magazine's NextWave Postdoc Network, a weekly publication of the American Association for the Advancement of *Science* (AAAS). Dr. Haak was also a program officer at the National Academies, where she directed workforce policy studies on international students, interdisciplinary research, women faculty, postdoctoral researchers, and innovation policy. Additionally, she served as chief science officer at Discovery Logic, a Thomson Reuters business, where she provided research evaluation and policy expertise and was responsible for strategic partnerships.

Sally T. Hillsman, Ph.D.

Sally T. Hillsman, Ph.D., is a research sociologist with expertise in crime, justice, and related evaluation and policy analysis. She has been the executive officer of the American Sociological Associations (ASA) since 2002. While at ASA, she was also the principal investigator of the T32 training grant from the National Institute of Mental Health (NIMH) and the National Institute on Drug Abuse (NIDA), the primary source of the association's Minority Fellowship Program (MFP) funding through 2010.

Prior to becoming ASA's executive officer, she was the deputy director of the National Institute of Justice (NIJ) at the U.S. Department of Justice (DOJ); vice president for research and technology at the National Center for State Courts in Williamsburg, VA; and associate director and director of research at the Vera Institute of Justice in New York City. She was also on the faculty in the department of sociology at Queens College of the City University of New York.

Dr. Hillsman earned her Ph.D. in sociology from Columbia University and her A.B. in economics and sociology from Mount Holyoke College. A noted expert on research and science policy issues ranging from data access to confidentiality, she has been a member of the ASA's Committee on Professional Ethics (COPE) and was a member of the Social and Behavioral Science Working Group of the National Human Research Protections Advisory Committee.

Among her honors, Dr. Hillsman was elected a fellow of the National Academy of Public Administration in 1992 and is a member of Phi Beta Kappa. She was the recipient of a Danforth Fellowship and a pre-doctoral fellowship from NIMH. She is now a trustee at the Vera Institute of Justice, which works closely with leaders in government and civil society to improve the services people rely on for safety and justice. Dr. Hillsman is also on the executive board of the Consortium of Social Science Associations (COSSA), a 30-year-old Washington, DC-based science advocacy organization, and on the board of directors of the National Humanities Alliance (NHA). In 2011, she was named a fellow of the American Association for the Advancement of Science (AAAS).

Felice J. Levine, Ph.D.

Felice J. Levine, Ph.D., is executive director of the American Educational Research Association (AERA). Previously, she was executive officer of the American Sociological Association (ASA). She also served as a program director at the National Science Foundation (NSF) and senior research social scientist at the American Bar Foundation. She holds A.B., A.M., and Ph.D. degrees in sociology and psychology from the University of Chicago.

Earlier in her career, Dr. Levine concentrated her research on social and at-risk beliefs and behaviors in children and youth. In recent years, her work has focused on research and science policy issues, research ethics, data access and sharing, and the scientific and academic workforce, including capacity building in the social and behavioral sciences.

Levine is senior author of *Promoting Diversity and Excellence in Higher Education through Department Change* and the 2004 report to NSF, *Education and Training in the Social, Behavioral, and Economic Sciences: A Plan of Action*. Levine is on the executive committee of the Consortium of Social Science Associations (COSSA), is chair of the board of directors of the Council of Professional Associations on Federal Statistics (COPAFS), and is secretary general of the World Education Research Association. She currently is collaborating on a major NSF-supported assessment of education research doctorate programs in U.S. universities. She is a fellow of AERA, the American Association for the Advancement of Science (AAAS), and the Association for Psychological Science (APS), as well as an elected member of the International Statistical Institute. She is also a past president of the Law and Society Association (LSA).

Yvonne Thompson Maddox, Ph.D.

Yvonne Thompson Maddox, Ph.D., is the deputy director of the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) at the National Institutes of Health (NIH), a position she has held since January 1995. In this role, Dr. Maddox guides the organizations and programs of the NICHD, advises the director on matters regarding the internal affairs of the $1.2 billion Institute budget, and oversees the extramural program that supports research on child development, developmental biology, nutrition, AIDS, intellectual and developmental disabilities, population issues, reproductive biology, contraception, pregnancy, and medical rehabilitation. From January 2000 to June 2002, Dr. Maddox also served as the acting deputy director of NIH.

Throughout her academic and government career, Dr. Maddox has been a champion of issues related to women and children. She leads two teams of international scientists as part of a joint India-U.S. partnership to improve reproductive health and maternal and child health in both countries. More recently, she developed a similar health partnership between the U.S. and several sub-Saharan African nations. As co-chair of NIH's working group to develop the strategic plan to eliminate health disparities, Dr. Maddox provided messages of awareness of and participation in medical research for affected communities to improve their health. Dr. Maddox also served as executive director of the Department of Health and Human Services' (DHHS) Cancer Health Disparities Progress Review Group and co-chair of the DHHS Initiative to Reduce Infant Mortality in Minority Communities.

During her career at NIH, Dr. Maddox has received numerous honors and awards, including the Presidential Distinguished Executive Rank Award, the Presidential Meritorious Executive Rank Award, the Public Health Service Special Recognition Award, and the NIH Director's Award. She was the 2002 inductee in the field of medicine to the Historical Black College and Universities (HBCU) Hall of Fame, and, in 2005, she received the American Academy of Physical Medicine and Rehabilitation Distinguished Public Service Award. Along with former U.S. President William Jefferson Clinton, Dr. Maddox received the Alpha Kappa Alpha Sorority Flame Award in recognition of her service to improve public health. She has also received several honorary degrees, is a member of the American Physiological Society, has served on many public service and academic boards, and has authored numerous scientific papers and review articles.

Dr. Maddox received her B.S. in biology from Virginia Union University, Richmond, and her Ph.D. in physiology from Georgetown University. She studied as a visiting scientist at the French Atomic Energy Commission, Saclay, France, and graduated from the Senior Managers in Government Program of the Kennedy School of Government, Harvard University.

Cora B. Marrett, Ph.D.

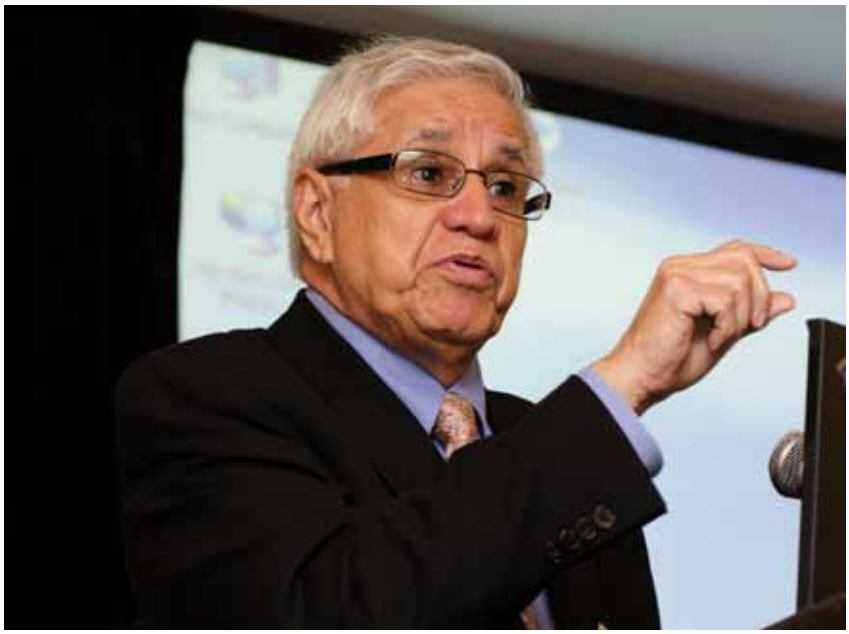
Cora B. Marrett, Ph.D., is deputy director of the National Science Foundation (NSF). She served as NSF's acting director, acting deputy director, and senior advisor, from January 2009 until her confirmation as deputy director in May 2011.

Prior to her appointment as acting director, Dr. Marrett was the assistant director for Education and Human Resources (EHR). In EHR, she led NSF's mission to achieve excellence in U.S. science, technology, engineering, and mathematics (STEM) education at all levels, in both formal and informal settings.

From 1992 to 1996, she served as the first assistant director for NSF's Social, Behavioral, and Economic Sciences (SBE) Directorate. Dr. Marrett earned NSF's Distinguished Service Award for her groundbreaking leadership of the new directorate.

From 2001 to 2007, Dr. Marrett was the University of Wisconsin System's senior vice president for academic affairs. She also served concurrently as professor of sociology at the University of Wisconsin-Madison. Before joining the University of Wisconsin, she was the senior vice chancellor for academic affairs and provost at the University of Massachusetts-Amherst.

Dr. Marrett holds a B.A. from Virginia Union University and an M.A. and a Ph.D. from the University of Wisconsin-Madison, all in sociology. She received an honorary doctorate from Wake Forest University in 1996, and was elected a fellow of the American Academy of Arts and Sciences in 1998 and the American Association for the Advancement of Science (AAAS) in 1996. In May 2011, Virginia Union University awarded Dr. Marrett an honorary degree as a distinguished alumna.



Ernest Márquez, Ph.D.

Ernest Márquez, Ph.D., Sc.D. (Honorary), is a biochemist and has been a lecturer in the biotechnology program at John Hopkins University for more than 14 years. He is currently president of the Society for Advancement of Chicanos and Native Americans in Science (SACNAS), a national non-profit society that promotes careers in the STEM sciences. Before retiring from the National Institutes of Health (NIH) in 2010, Dr. Márquez served as associate director for special populations of the National Institute of Mental Health (NIMH); health scientist administrator at the National Institute of General Medical Sciences (NIGMS); chief of the Office of Scientific Review at the National Institute of Nursing Research; and scientific review officer at NIGMS.

Prior to coming to the NIH, he worked in the biotechnology industry for eight years, serving as senior scientist and director of microbiology product development at Cambridge BioScience Corporation; senior scientist at Cambridge Research Laboratory, Ortho Diagnostic Systems; manager of immunology at Bioassay Systems Research Corporation; and a consultant to the biotech industry. Before entering the biotech field, Dr. Márquez was an associate professor with tenure in the department of microbiology at The Pennsylvania State University College of Medicine. He was awarded an honorary doctor of science by the trustees of the California State University in 2002.

Mary Ann McCabe, Ph.D.

Mary Ann McCabe, Ph.D., is a clinical psychologist in independent practice and an associate clinical professor of pediatrics at George Washington University School of Medicine. She is also affiliate faculty in psychology at George Mason University, where she has taught child development and public policy. Dr. McCabe does consulting work focused on bridging research with practice and policy. Dr. McCabe was a founding member of the Collaborative for Enhancing Diversity in Science (CEDS) and continues in a consulting capacity with this group. She is a member of the board of professional affairs of the American Psychological Association (APA) and chair of the APA Interdivisional Task Force on Child and Adolescent Mental Health. She serves on the selection committee for the American Association for the Advancement of Science (AAAS) Congressional Fellowship Program, which she chaired in 2012.

Previously the director of the Office for Policy and Communications of the Society for Research in Child Development (SRCD) from 2003 to 2009, Dr. McCabe oversaw activities in science policy, social policy, and knowledge transfer for practice, policy and the public (including working with the media for effective dissemination of science). She directed the SRCD congressional and executive branch fellowship programs and served on the advisory committee for the AAAS Congressional Fellowship Program (2007-2009).

Dr. McCabe was previously the director of health psychology and director of training in psychology at Children's National Medical Center, where she was a full-time faculty member from 1987 to 2003. Dr. McCabe was trained as an undergraduate in developmental research at Clark University, and then continued developmental research and clinical training for her doctorate at the Catholic University of America. She completed a clinical internship and advanced fellowships at the Children's Hospital of Boston, Judge Baker Children's Center, Dana Farber Cancer Institute, and Harvard Medical School.

Ann Nichols-Casebolt, Ph.D.

Ann Nichols-Casebolt, Ph.D., is Associate Vice President for Research Development in the Office of Research at Virginia Commonwealth University (VCU). She received her doctorate in Social Work from the University of Wisconsin-Madison, and assumed her first faculty appointment in the School of Social Work at Arizona State University. She joined the School of Social Work at VCU as Associate Dean in 1993 where she was responsible for student services, academic affairs, research development, and faculty development. She also served as the Director of the School's Doctoral Program from 1994-1998, and the Interim Dean of the School from July 2008-2010.

In December 2005, Dr. Nichols-Casebolt assumed the position of Associate Vice President for Research Development. In that position, she has taken the lead in addressing the needs of postdoctoral scholars; organizing and presenting grant application development workshops and resources; coordinating University-wide research initiatives; and co-chairing the Research Development Advisory Council (ReDAC) with the Vice President for Research. Her latest initiative was the creation of the Undergraduate Research Opportunities Program (UROP), a program to encourage, support and facilitate undergraduate research at VCU. Dr. Nichols-Casebolt also teaches a Responsible Conduct of Research course for graduate students within the Preparing Future Faculty program at VCU, and has recently completed a handbook for social work researchers, Research Integrity and Responsible Conduct of Research, published by Oxford University Press.

Dr. Nichols-Casebolt is active in many university committees and national professional organizations, including serving as chair of the VCU Social-Behavioral Institutional Review Board (IRB) panel until 2008, participating on the Professional Advisory Board for the VCU Institute for Women's Health, and on the Education, Incubator, and Steering Committees for the Center for Clinical and Translational Research. Dr. Nichols-Casebolt is co-director, along with Drs. Mary Secret and Janet Hutchinson, of the Virginia Family Impact Seminars, a seminar series designed to bring a family focus to state policy making. At the national level, Dr. Nichols-Casebolt has served in a leadership capacity in several social work organizations, including two terms as President of the Board of the Institute for the Advancement of Social Work Research (2002-2008). She also serves on the Editorial Board for the journal Social Work, and reviews manuscripts for several other professional journals. Her research interests are in the areas of poverty, social welfare policy and gender issues. She has published numerous journal articles and book chapters, has made frequent conference presentations, and has received several grants to fund her social work projects.

Debra Joy Pérez, M.A., M.P.A., Ph.D.

Debra Joy Pérez, M.A., M.P.A., Ph.D, is the assistant vice president for Research and Evaluation, at Robert Wood Johnson Foundation. Among other priorities, Dr. Pérez is responsible for supporting advancing the unit's goals of learning and spreading the Foundation's lessons from our past and current investments. She has been crucial in assisting the Foundation in becoming a more diverse place and to develop greater diversity in its pool of grantees.

Dr. Pérez received her BA from Douglass College, Rutgers University; a Master's from the University of Kent in Canterbury, England, a MPA from Baruch College, City University of New York. Dr. Pérez completed her interfaculty doctoral program at Harvard University, receiving a PhD in health policy. She was the recipient of W.K. Kellogg Foundation Scholar's in Health Policy program and a National Urban and Rural Fellow.

Edward Salsberg

In August 2010, Mr. Salsberg joined the Department of Health and Human Services as the director of the new National Center for Health Workforce Analysis, established by Affordable Care Act. The National Center, which is located in the Bureau of Health Professions (BPHR) within the Health Resources and Services Administration (HRSA), is responsible for providing health workforce information and data to assist national and state health workforce policies as well as health and education sector decision-making related to the health workforce. The Center will be a focal point for the collection, analysis, and dissemination of health workforce data.

Prior to joining HRSA, Mr. Salsberg was the founding Director of the Center for Workforce Studies and a Senior Director at the Association of American Medical Colleges (AAMC).The AAMC Center was established in 2004 to inform the medical education community, policy makers and the public as to the nation's current and future physician workforce needs. Prior to joining AAMC, Mr. Salsberg was the Executive Director of the Center for Health Workforce Studies which he established in 1996 at the School of Public Health at the University at Albany of the State University of New York (SUNY). From 1984 until 1996, Mr. Salsberg was a Bureau Director at the New York State Department of Health.

Mr. Salsberg is on the faculty at the George Washington University School of Public Health and Health Services. He is a frequent speaker across the country and has authored and co-authored numerous reports and papers on the health workforce. Mr. Salsberg has been a member of the U.S. delegation to the International Medical Workforce Collaborative since 1999 and was chair from 2003 to 2006. Mr. Salsberg received his Master's in Public Administration from the Wagner School at New York University.

Walter Schaffer, Ph.D.

Wally Schaffer currently serves as the Senior Scientific Advisor for Extramural Research, National Institutes of Health (NIH). Prior to his move to the immediate office of the Deputy Director for Extramural Research, Dr. Schaffer served as Acting Director of the Office of Extramural Programs. He has also served as the NIH Research Training Officer for the NIH and Deputy Director of the Division of Program Analysis in the Alcohol, Drug Abuse, and Mental Health Administration. He has been a Scientific Review Administrator and a Senior Staff Fellow for the National Institute of Alcohol Abuse and Alcoholism. He joined the NIH in 1978 after earning a Ph.D.in Biochemistry at the University of Texas Health Science Center at San Antonio and a B.S. in Chemistry (1974) from the University of Washington. His research interests include hormonal influence on age-related changes and the regulation of oxidative metabolism in the brain.

Roberta Spalter-Roth, Ph.D.

Roberta Spalter-Roth, Ph.D., is director of research and development at the American Sociological Association (ASA). The mission of this department is to provide information to support and inform the Association, its members, and the broader scientific community about trends in sociology and other social sciences including job markets, enrollments, degrees, departments, career trajectories, networks, salaries as well as the role of sociology and social sciences in the greater science project. The major R&D activities include designing studies and collecting, analyzing, and disseminating findings. As part of her job at ASA, she is Principal Investigator of a variety of National Science Foundation grants. These include: "Social Capital, Organizational Context, and the Job Market;" "Mentoring, Networks, and Underrepresented Minorities in the Science Pipeline;" and "Innovation in Digital Libraries: An Experimental Examination of the Production, Diffusion, and Use of STEM Teaching Materials."

She also directs the joint ASA/NSF small grants program to advance the discipline. With the research team, she produces and disseminates research on sociology as a profession and a discipline including studies of academic and non-academic career paths; gender, race, and ethnicity in the sociology pipeline; work/family issues, characteristics of sociology departments; and professional networks. Some of her most recent publications include "Faculty Salaries: Two years of Lost Purchasing Power;" "Social Science Jobs for New PhDs;" "Launching Majors into Satisfying Sociology Careers;" "Networks and the Diffusion of Cutting Edge Teaching and Learning Knowledge in Sociology;" and "The Impact of Cross-Race Mentoring for 'Ideal' and Alternative Careers." Most of these publications can be downloaded for free from the ASA website's "Research on the Profession" page (www.asanet.org).

Lawrence A. Tabak, D.D.S., Ph.D.

Lawrence A. Tabak, D.D.S., Ph.D., was appointed as the principal deputy director of the National Institutes of Health (NIH) on August 23, 2010. Previously he served as acting principal deputy director of the NIH from November 13, 2008 throughAugust14, 2009. Named as the director of the National Institute of Dental and Craniofacial Research (NIDCR) in September 2000, he held that post through August2010. Dr. Tabak has served as co-chair of several trans-NIH activities, including the NIH-wide initiative to enhance peer-review. While serving as the NIH acting deputy director in 2009, Dr. Tabak played a leadership role in coordinating the agency's response to the American Recovery and Reinvestment Act. Prior to joining NIH, Dr.Tabak was the senior associate dean for research and professor of dentistry and biochemistry & biophysics in the School of Medicine and Dentistry at the University of Rochester in NewYork. A former NIH MERIT recipient, Dr. Tabak's major research focus has been on glycoprotein biosynthesis and function. He continues to lead an active research laboratory within the NIH intramural program in addition to his administrative duties.

Dr. Tabak is a fellow of AAAS and a member of the Institute of Medicine of the National Academies. A native of Brooklyn, New York, he received his undergraduate degree from City College of the City University of New York, his D.D.S. from Columbia University, and a Ph.D. from the University of Buffalo.

William Trent, Ph.D.

William Trent, Ph.D., is professor of education policy, organization, and leadership as well as sociology at the University of Illinois, Urbana-Champaign. He has held research appointments at the Center for Education Policy at Duke University and the Center for the Social Organization of Schools at Johns Hopkins University. He has held administrative positions as associate chancellor at the University of Illinois, director of the Educational Opportunity Program at George Washington University, and Director of Project OPEN, a TRIO talent search program in Washington, D.C. His research focuses primarily on issues of educational inequality. He was a visiting scholar at the Education Policy Unit at the University of the Western Cape, South Africa, and served as member and chair of the visiting panel on research for the Educational Testing Service, member of the National Research Council (NRC) Board on Testing and Assessment, and co-chair of the NRC Committee on Educational Excellence and Testing Equity. He was also selected a Fulbright Senior Scholar, a College Board Scholar, and a Spencer Foundation Resident Fellow. Trent co-founded and co-chaired the Critical Examination of Race, Ethnicity, Class and Gender in Education SIG, chaired the AERA Affirmative Action Committee, assisted in the development of the Brown Lecture, and co-chaired and subsequently chaired the AERA-IES Postdoctoral Fellowship Program. He served as a member of the National Academy of Education Committee on Social Science Research Evidence on Racial Diversity in Schools and the working group on Standards, Assessments and Accountability.

Dr. Trent is a member of the Social Science Research Council's College Learning Assessment Committee and is currently Principal Investigator for an NSF project examining undergraduate STEM participation for women and underrepresented minority students.

Joan Levy Zlotnik, Ph.D., A.C.S.W.

Joan Levy Zlotnik, Ph.D., A.C.S.W., has more than 20 years of experience working in leadership positions within national social work organizations. Her pioneering work has focused on forging academic/agency partnerships and on strengthening the bridges between research, practice, policy, and education. She currently serves as the director of the Social Work Policy Institute (SWPI), a think tank established in the National Association of Social Work (NASW) Foundation. Prior to being appointed as director of SWPI, Dr. Zlotnik served for nine years as the executive director of the Institute for the Advancement of Social Work Research (IASWR), working closely with the National Institutes of Health (NIH), other behavioral and social science disciplines, and social work researchers. Under her leadership the growth in social work research was documented and training and technical assistance was offered to doctoral students, early career researchers, and deans on building social work research infrastructure and capacity.

Dr. Zlotnik is an internationally recognized expert on workforce issues and is the author of numerous publications addressing research/community partnerships, psychosocial services in long term care, and evidence-based practice. She holds a Ph.D. in social work from the University of Maryland, an M.S.S.W. from the University of Wisconsin-Madison, and a B.A. from the University of Rochester. Dr. Zlotnik is an NASW Social Work Pioneer©, was recognized by the National Institute of Health's (NIH) Social Work Research Working Group for her efforts on behalf of social work research at NIH, and was the Alumna of the Year in 2011 for the University of Maryland School of Social Work.

Appendix E

Workshop Planning Committee

Sarah Schoolcraft Conrad, M.S.

Sarah Schoolcraft Conrad, M.S., is a senior research analyst at the Association of American Medical Colleges (AAMC). Conrad has been with AAMC for six years and works in the Policy, Research and Knowledge Building portfolio in the division of Diversity Policy and Programs. She received her B.A. in psychology from the University of Maryland-Baltimore County, and her M.S. in human development and family studies from The Pennsylvania State University.

Mary Ann McCabe, Ph.D.

Mary Ann McCabe, Ph.D., is a clinical psychologist in independent practice and an associate clinical professor of pediatrics at George Washington University School of Medicine. She is also affiliate faculty in psychology at George Mason University, where she has taught child development and public policy. Dr. McCabe does consulting work focused on bridging research with practice and policy. Dr. McCabe was a founding member of the Collaborative for Enhancing Diversity in Science (CEDS) and continues in a consulting capacity with this group. She is a member of the board of professional affairs of the American Psychological Association (APA) and chair of the APA Interdivisional Task Force on Child and Adolescent Mental Health. She serves on the selection committee for the American Association for the Advancement of Science (AAAS) Congressional Fellowship Program, which she chaired in 2012.

Previously the director of the Office for Policy and Communications of the Society for Research in Child Development (SRCD) from 2003 to 2009, Dr. McCabe oversaw activities in science policy, social policy, and knowledge transfer for practice, policy and the public (including working with the media for effective dissemination of science). She directed the SRCD congressional and executive branch fellowship programs and served on the advisory committee for the AAAS Congressional Fellowship Program (2007-2009).

Dr. McCabe was previously the director of health psychology and director of training in psychology at Children's National Medical Center, where she was a full-time faculty member from 1987 to 2003. Dr. McCabe was trained as an undergraduate in developmental research at Clark University, and then continued developmental research and clinical training for her doctorate at the Catholic University of America. She completed a clinical internship and advanced fellowships at the Children's Hospital of Boston, Judge Baker Children's Center, Dana Farber Cancer Institute, and Harvard Medical School.

Angela L. Sharpe, M.G.

Angela L. Sharpe, M.G., is deputy director at the Consortium of Social Science Associations (COSSA). Sharpe is responsible for lobbying members of Congress and their staff on health and behavior research, and representing COSSA to executive branch agencies, particularly the Department of Health and Human Services. She co-chairs two COSSA-led coalitions, the Coalition for the Advancement of Health Through Behavioral and Social Sciences Research (CAHT-BSSR) and the Coalition to Promote Research (CPR), and leads the Collaborative for Enhancing Diversity in Science (CEDS). Sharpe is a member of the steering committee for the Ad Hoc Group for Medical Research and participates in a number of coalitions, including the Racial and Ethnic Health Disparities Coalition. She also writes for the COSSA biweekly newsletter, the "COSSA Washington Update."

Sharpe joined the COSSA staff in June 1995. She previously served as a legislative assistant to former Rep. Carrie P. Meek (D-FL) and to the late Rep. R. Lawrence Coughlin (R-PA). Prior to working on Capitol Hill, Sharpe worked for the Library of Congress's National Library Service for the Blind and Physically

Handicapped. She earned her Master in Government from The Johns Hopkins University. Her B.S. in industrial relations and B.S. in psychology are from the University of North Carolina at Chapel Hill.

Jean H. Shin, Ph.D.

Jean H. Shin, Ph.D., is director of the Minority Affairs Program at the American Sociological Association (ASA). He joined ASA staff in 2006 after seven years working at McDaniel College in Westminster, Maryland, where he was associate dean of academic affairs for first year students and an associate professor of sociology. Dr. Shin received his B.A. from the University of Virginia and his M.A. and Ph.D. from Indiana University-Bloomington. At ASA, he runs the Minority Fellowship Program (MFP), now in its 39th year; works with diversity-related committees and task forces; and works on higher education and science policy initiatives, as well as all student programming including high school sociology. He has been a member of the Collaborative for Enhancing Diversity in Science (CEDS) planning committee since its inception in 2007.

Karen Studwell, J.D.

Karen Studwell, J.D., is a senior legislative and federal affairs officer in the Government Relations Office of the Science Directorate at the American Psychological Association (APA). Studwell has been with APA for 11 years and serves as the primary APA liaison to the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD), the National Institute of Mental Health (NIMH), and the Institute of Education Sciences (IES). She received her bachelor's degree in business administration from Ohio University and her law degree from Seattle University.

Richard (Ric) Weibl

Richard (Ric) Weibl is director of the Center for Careers in Science and Technology and director of the Project on Science, Technology, and Disability at the American Association for the Advancement of Science (AAAS). His work in both roles focuses on the education, training, and career development of the science and engineering workforce of the future. Weibl works with AAAS professional and career development programs to strengthen their offerings and to create new partnerships with external groups in support of the career aspirations and professional development needs of future and current scientists. His priority in these roles has been to broaden the participation of women, minorities, and people with disabilities in science and engineering.

George L. Wimberly, Ph.D.

George L. Wimberly, Ph.D., is the director of social justice and professional development at the American Educational Research Association (AERA). He manages the AERA dissertation and postdoctoral fellowship programs, provides national exposure to these fellowship opportunities, and works directly with grantees and their institutions. Dr. Wimberly is the co-principal investigator on the National Science Foundation (NSF) funded project, Advancing Knowledge and Building the Research Infrastructure in Education and STEM Learning. Much of his research focuses on educational transitions and educational attainment among African American students. He previously worked in policy research at ACT, Inc., where he developed policy reports on college planning. Dr. Wimberly earned his Ph.D. in sociology from the University of Chicago.

Martha Zaslow, Ph.D.

Martha Zaslow, Ph.D., is director of the Office for Policy and Communications of the Society for Research in Child Development (SRCD) and a senior scholar at Child Trends. As director of SRCD's Office for Policy and Communications, Dr. Zaslow facilitates the dissemination of research to decision-makers and the broader public through congressional and executive branch briefings, research briefs, and press releases focusing on research in *Child Development*, the society's peer reviewed journal. She also monitors and keeps the SRCD membership apprised of social policy and science policy developments related to children and families. Additionally, Dr. Zaslow works with the SRCD policy fellows who have placements in the executive branch or Congress. As a senior scholar at Child Trends, Dr. Zaslow conducts research focus-

ing on the development of young children and programs and policies to support their development. She serves on the advisory council for the Child Care and Early Education Research Connections website as well as the Self-Sufficiency Research Clearinghouse. Dr. Zaslow recently served on the Secretary's Advisory Committee for Head Start Research and Evaluation and on the Committee on Developmental Outcomes and Assessments of Young Children of the National Academies of Science.

Joan Levy Zlotnik, Ph.D., A.C.S.W.

Joan Levy Zlotnik, Ph.D., A.C.S.W., has more than 20 years of experience working in leadership positions within national social work organizations. Her pioneering work has focused on forging academic/agency partnerships and on strengthening the bridges between research, practice, policy, and education. She currently serves as the director of the Social Work Policy Institute (SWPI), a think tank established in the National Association of Social Work (NASW) Foundation. Prior to being appointed as director of SWPI, Dr. Zlotnik served for nine years as the executive director of the Institute for the Advancement of Social Work Research (IASWR), working closely with the National Institutes of Health (NIH), other behavioral and social science disciplines, and social work researchers. Under her leadership the growth in social work research was documented and training and technical assistance was offered to doctoral students, early career researchers, and deans on building social work research infrastructure and capacity.

Dr. Zlotnik is an internationally recognized expert on workforce issues and is the author of numerous publications addressing research/community partnerships, psychosocial services in long term care, and evidence-based practice. She holds a Ph.D. in social work from the University of Maryland, an M.S.S.W. from the University of Wisconsin-Madison, and a B.A. from the University of Rochester. Dr. Zlotnik is an NASW Social Work Pioneer©, was recognized by the National Institute of Health's (NIH) Social Work Research Working Group for her efforts on behalf of social work research at NIH, and was the Alumna of the Year in 2011 for the University of Maryland School of Social Work.

Appendix F

Preliminary Listing of Categories for Data Collection

This list includes some potential categories for data collection. Common response categories would also be needed.

Student Demographics

1. Name
2. Age
3. Age at start of program
4. Age at degree
5. Race/ethnicity
6. Mixed race?
7. Immigrant status
8. Gender
9. Sex
10. Country of origin
11. Disability status
12. LGBT status

Student Financial Information

1. Current income
2. Parents' education
3. Parents' employment
4. Parents' occupation
5. Socioeconomic status at different points in life
6. Free/reduced lunch status in elementary and /or high school
7. Name of high school
8. Student loans
9. Student loan repayment
10. Wealth data
11. First-generation college
12. Pell Grant eligibility
13. Financial responsibilities, dependents

Family/Household information

1. Marital status (include categories for partnered and marriage- like relationship)
2. Household structure
3. Plans for having a family (at the graduate level)
4. Number of current children

Student Education

1. Time to terminal degree
2. Past schools attended
3. HBCU attendance
4. Other minority serving institution
5. Women's college
6. Enrolled in graduate program

Student Achievement

1. Performance measures
2. Scholarly activities
3. Types of classes
4. Grades
5. Research opportunities
6. Graduate college with a baccalaureate degree
7. Type of program
8. Years to complete graduate degree
9. Measures of self-efficacy

Student Professional Relationships

1. Mentors
2. Degree of mentoring
3. Programs participated
4. Socialization to the profession measures

Common CV Information

1. Schools attended (with dates)
2. Jobs/Appointments
3. Grants, Fellowships, Scholarships
4. Publications (journal, peer-reviewed pieces, books, graphs)
5. Committees served on
6. Membership in professional organizations

Institution Level Data

1. Mission
2. Culture
3. Programs
4. Faculty names
5. Diversity initiatives
6. Diversity across programs
7. Size—enrollment in programs
8. Student demographic information
9. Graduation rates by programs
10. Courses offered
11. STEM courses offered
12. Research opportunities on campus
13. Postdoctoral opportunities
14. Grants/Funding

Data Collection Logistics

1. Tools used to analyze data
2. How data is collected (administrative data vs. special collections)
3. How data is used
4. Longitudinal vs. cross-sectional data
5. Different kinds of equipment used in labs or to analyze data
6. Facility data

Consortium of Social Science Associations
1701 K Street, NW, Suite 1150 • Washington, DC 20006 • 202-842-3525 • www.cossa.org