NATIONAL HUMAN GENOME RESEARCH INSTITUTE/NIH/DHHS

SUMMARY

SECOND WORKSHOP

OF THE

MAP TRAINING COORDINATORS

24 FEBRUARY 2008

Ramada Inn, Rockville Maryland 20852

25 FEBRUARY 2008

5TH Floor Conference Room

5625 Fishers Lane

Rockville, MD 20852

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I. INTRODUCTION

The main emphasis of this meeting was to have an intense discussion of how the overall program will be tracked and evaluated. To help the staff and the Minority Action Plan (MAP) grantees achieve this goal, there were: (1) a discussion of "Opening an African American STEM Program to Talented Students of All Races: Evaluation of the Meyerhoff Scholars Program, 1991-2005," by Kenneth Maton, et al; (2) a workshop presented by Kenneth Maton on the elements of evaluation; (3) a discussion of draft documents of data to be collected on participants and outcome goals; and (4) a preliminary discussion of what should be the goals for the various programs and the milestones and relevant activities that would result in programs meeting these goals. It was the expectation that these discussions and the ones to follow within the sub-committees between now and the annual fall meeting would be the development of a plan of action for implementation by the fall meeting. The point was made that this discussion was pertinent to the evaluation of the overall program and that individuals MAPs still had an obligation to evaluate the effectiveness of their individual programs. It was also pointed out that individual MAP programs should have goals that were consistent the overall program goals and that MAPs had the flexibility to include additional goals, if appropriate. The agenda (Appendix I) and Roster (Appendix II) are attached.

II. DIRECTOR'S PRESENTATION

Francis Collins, Director of the National Human Genome Research Institute reviewed briefly the successes of the Human Genome Program and the HapMap Project. He indicated that the scientific successes were because the community had a bold and aggressive vision which NHGRI implemented; he would like the MAP program to be as audacious as the scientific programs. He did state that the scientific workforce should mirror the people it serves and that NHGRI's MAP program was initiated for that specific purpose. It is important to know if this program is working; what is the evidence; and what happened to the participants over the long run. The only way we can demonstrate success is to have a rigorous plan in place to defend the program. As stated many times before, this program is a high priority for NHGRI and we are in it for the long term. However, we need a sense of what can be achieved over what time period.

Francis acknowledged the support of the Advisors whose expertise and commitment to the MAP have been invaluable, Clif Poodry from NIGMS who leads a program with similar objectives and has provided advice to NHGRI for several years, and Ken Maton for agreeing to discuss the evaluation of the Meyerhoff Scholars Program.

Participants' Exchange with the Director:

- NHGRI needs to think more broadly about how this program influences the scientific enterprise. Besides looking at the participants, it will also be important to understand how this program transforms departments and institutions. There is significant evidence that Principal Investigators are now passionate about this program, compared to when it was first initiated. However, this type of impact is difficult to capture and quantify.

- NHGRI needs to have a vision of what is considered "success." We should not be risk adverse.

- NSF has a similar program that requires grantees to address "the broader impact," but there has been no rigorous evaluation of this because the activities vary, such as lecturing to high school students, student research projects, etc. NSF also has the Louis Stokes Alliance for Minority Participation (LSAMP) Program and the Alliances For Graduate Education And The Professoriate (AGEP)- http://www.nsf.gov/pubs/2004/nsf04575/nsf04575.htm.

III. ACTIVITIES RELATED TO EVALUATION

A. Participants' Discussion of "Opening an African American STEM Program to Talented Students of All Races: Evaluation of the Meyerhoff Scholars Program, 1991-2005," by **Kenneth Maton, et al. (Appendix III).**

In the beginning of the Meyerhoff Scholars Program, participation was limited to African American males. With time, the program was opened up to African American females and in 1996-1997, the program was open up to all students who met the program's criteria for inclusion. The Maton, et al paper examines the impact of opening up the admission process to talented students of all races; specifically it examines the number and quality of entering African American students; the program experience; the perspective of African American Meyerhoff students regarding integration of the program; and whether students entered science, technology, engineering and math (STEM) doctoral programs. Briefly, the study shows that: the program went from 100% African Americans from 1991 to 1996 to an average of 65% African American, 18% European Americans, 15% Asian Americans, and 2% Latino between 1996-2006. The incoming students had the following academic scores: African Americans from 1991-1996--GPA of 3.6 and total SAT of 1199. From 1996 to 2006- African Americans--GPA of 3.7 and SAT total of 1247; European Americans--GPA 4.0 and SAT total of1359, Asian Americans--GPA of 4.1 and SAT total of 1321. For all groups the highly rated components of the program were financial support (rated highest) and summer bridge, being part of a community and peer academic interactions (equal ratings). When the program accepted only African Americans, 14% pursued a doctoral degree in a STEM area; after integration, 27% of African Americans pursued a doctoral degree in a STEM area. The percentages for European Americans were 39% and 19% for Asian Americans. Outcome data were presented on students who were accepted into the program and declined. These percentages of those going into a STEM graduate program were: 5% for participants when program only accepted African Americans. After integration the percentages were 5% for African Americans; 4% for European Americans and 4% for Asian Americans.

The discussion revolved around the following: were the later African American students better prepared after integration; how did evolution of the program affect the outcome, such as students indicating an early interest in pursuing a medical degree were not accepted; would the data for African Americans change if only the top 65% in the segregated program were included in the analyses; were the data confounded by changes in the university's admission policies; why were

European American and Asian American students not interviewed about their views of the program; information about the GRE scores and institutions where students are pursuing their graduate programs would have been enlightening.

Some of the lessons for the MAP program are:

- it is important to know why participants do not succeed. One way to get this information is to have exit interviews. In such a situation, who does the interviewing is very critical.
- Having a comparison group is very important.
- MAP programs should be looking at: **accountability**—did you do what you said you were going to do; **efficacy**—what were the goals and did it work (It was noted that some URMs do not go directly from undergraduate to graduate school, so follow-up is critical; and **data collection--**because the number of students participating in the MAP programs is small, it is essential that similar data be collected on similar programs.

B. Evaluation Workshop (Ken Maton)

Dr. Maton started the discussion by giving a brief description of the Meyerhoff Scholars Program (http://www.umbc.edu/meyerhoff/) which includes undergraduate students and a very small group (7-8 per year) of graduate students. Initially there was some resistance on campus about the exclusivity of the program (STEM areas only and African American males only). The success of the program can be contributed to: summer bridge program that prepares students for academic life on campus, parental involvement, intensive counseling, access to tutors, requirement to have a B average of better in the sciences, involvement with summer research programs in the summers, and students having to disclose to their peers information about their academic progress.

The evaluation of the program is a full-time commitment for Dr. Maton. He has been involved in the program from its inception and is assisted by a group of students who receive academic credit for their participation. As part of the program participation, students are required to give their consent which allows access to their undergraduate and any future graduate transcripts, information submitted as part of the application and standardized test score data. They must also consent to be interviewed individually or in focus groups or to complete surveys and questionnaires concerning their academic experience. Their records are confidential and are only available to the evaluation team. His methods for tracking students includes e-mails, contact with parents, web, face book and private investigators. Those who have graduated or declined to participate in the program are compensated minimally for their participation in follow up activities.

Motivations for some students applying for the program are the scholarship support and parents having the sense that their children will be in a safe environment. On the other hand, some students do not want to be in an environment where they are so closely monitored. Some students have a choice between UMBC and a top ivy league school, they might opt for the ivy league school. They are also very bright students who have already decided that they want to go to medical school and therefore do not apply.

According to Dr. Maton, two-thirds of the program success is due to the selection process. The summer bridge program and the attitudinal surveys determine the motivation of students for research. The greatest predictor for success are those students who rate very highly " I am excited by the idea of doing scientific research." Scholarship support for the entire four years is also very important. Parents are also excited about the financial support.

Additional information that the Training Coordinators would have like to have seen include: socioeconomic data (surrogates include parents' schooling and/or income; zip codes), reasons why 10% of students are allowed to opt out of a summer research experience (some of these students are tutors during the summer bridge program), how to promote students who are interested in science, but may want to pursue alternative careers after their undergraduate experience, measures to show that this experience has been transformative for the institution, has this program helped other students in science (trickle down effect-URMs are making good

grades in science, so can I), what motivates students to apply for the Meyerhoff Scholars program.

C. Review and Discussion of MAP Draft Documents

In an effort to jump start the discussion about what data should be collected on MAP grantees, a document was distributed for discussion.

- Background Data to be Collected **(Appendix IV).** It was suggested that the following items be added: date of birth; whether US citizen or permanent resident of the US; marital status; and surrogates for socioeconomic status. It was strongly recommended that the OMB categories for race and ethnicity be used.
- Goals (**Appendix V)**. There was a very brief discussion of this topic. Participants were asked to go back to their institutions and gather data that could be used to determine relevant goals. The subcommittees were tasked with coming up with preliminary goals that would be finalized at the fall meeting.

  NIGMS has just developed goals for its PREP, a post baccalaureate program for students who need additional research experience to be admitted to top tier US education and research institutions. (**Appendix VI)**.

  "*….there is an expectation from the MORE Division that at least 90% of the PREP participants will apply to Ph.D. programs, with at least 75% of them gaining admission and enrolling in these programs after a one-year PREP internship. It is expected that after 7 years following PREP participation, at least 75% of the students would have obtained their Ph.D. degrees and at least 90% of them will have accepted postdoctoral positions 2 years after they finish their Ph.D. degrees."*

  This document has the types of goals that we are looking for with respect to our individual career level programs.

IV. TRAINING COORDINATOR-GENERATED TOPICS

There were two topics discussed. A brief summary of the discussion follows.

- Why URMS drop out of science graduate programs/How to keep URMs in science graduate programs? (Moderators: Alison Gammie and Jeff Long)

  Some of the reasons why URMs drop out of science graduate programs included: lack of role models, majority faculty or advocates (professional, but may be non-scientists) who will take in interest in them and their careers; lack of peer groups to discuss concerns and give/receive encouragement; lack of an institutional commitment to retain URMs; some URMs not being fully prepared for "life as a scientists;" naïveté about the differences between a structured undergraduate program and a semi/non-structured graduate program; academic unpreparedness and lack of informal programs to help, such as tutoring or collaborative studying, etc.

  Some of the solutions recommended for keeping URMs in science graduate programs included: an institutional commitment to promoting URMs, such as increasing the number of URM faculty, training and rewarding faculty who pay special attention to students who are struggling academically or socially; provide students with two advisors; ask families in the community to host students; connect URMs to other institutional programs that target URMs; be aware of the social needs of URMs.

The participants cautioned that (1) URMs should not be viewed as one group; many are well prepared academically for graduate school, have had an intensive and rewarding research experience, and have the necessary support internally and externally to succeed. (2) Successful interventions will depend on each program determining why their students drop out or are struggling. (3) Faculty should hold all students to the same high standards. (4) Mentors must ensure that the publications of URMs are equal in number and quality to non-URMs.

- How to identify post doctoral URM candidates—where they are and how to attract them to our programs?(Moderators: Louise Pape and Ken Nelson)

  Some suggestions include: contacting program directors of NHGRI T32 programs; access NIGMS website for program directors that provide graduate training for URMs; going to professional conferences to discuss the science that is supported through your MAP/T32 and then talking about financial support; using a variety of methods to let the community know that you are looking for postdoc candidates, such as informative websites, contacting professional societies that have committees that deal with URM issues; contacting your friends that you went to graduate school with; schools sponsoring trips to other universities/research institutions to allow their graduate students to visit potential laboratories for postdoc research; in the third or fourth year of a graduate program, mentors discussing postdoc opportunities with graduate students, etc.

  Participants cautioned that: (1) The publication records of some URMs are not as strong as non-URMs and this might affect their ability to get offers for postdoc opportunity in the best labs. (2) Some faculty assume that anything related to minority programs, while well intentioned, is of lesser quality.

V. SUBCOMMITTEE REPORTS

- **Graduate/Postdoctoral Subcommittee (Louise Pape, Moderator).**

  The main project for this group for the past several months has been the development of a website displaying key information bout funding opportunities. The next challenge is designing the website that is user friendly.

- **Undergraduate Subcommittee (Debra Murray, Moderator)**

  This subcommittee is involved with three projects: (1) identifying undergraduate research programs that want to expose students to an intensive summer research experience; (2) developing a recruiting package that includes all MAP programs that can be used by all MAP recruiters; and (3) having sessions at large professional society meetings bout MAP programs and the science that takes place in these institutions.

- **K-14 Subcommittee (Carla Easter and Vicky Schneider, Moderators)**

  NHGRI has developed a website for K-12 educators to discuss, collaborate, and find resources of value to science teachers interested in genetics in K-12 and collegiate classrooms, as well as in other environments. Special care has been taken to allow teachers to find one another nationally for collaborations and discussions. Sponsored by the NHGRI, the site has launched and is now available at http://www.coge.nih.gov. NHGRI has also developed a newsletter that is distributed to about 400 science teachers nationwide. These resources are also being made available to community colleges which have been identified as an untapped resource for both teaching materials and as potential participants in MAP programs.

The Johns Hopkins University MAP has developed a resource of high school and undergraduate research opportunities for students and parents seeking resources. Information about this resource will also be linked to the CoGE website.

VI. ACTION ITEMS

- **FUNDING OPPORTUNITIES (Subcommittees and NHGRI staff)—**design and place the funding opportunities document on the NHGRI website. Subcommittees will propose to NHGRI possible dates for a teleconference. **Due date: March14.**
- **STANDARD INFORMED CONSENT DOCUMENT (All MAP Grantees)---**send Bettie copies of your informed consent document that participants sign. A common document will be developed that will be recommended for use by MAP grantees. Grantees will have the flexibility to add additional items that are required by their individual programs and/or their institutions. NHGRI staff will develop a draft which will be discussed and refined by the subcommittees. **Due date: March 21.**
- **SURROGATES FOR SOCIOECONOMIC STATUS (All MAP Grantees).** Provide NHGRI staff with suggestions for how to capture socioeconomic status. Due date: March 21.
- **PROGRAM GOALS (All MAP Grantees).** Subcommittees with jurisdiction over the various programs should come up with targets based on their own program experiences and of similar programs that they know about or at their institutions. These goals should be discussed by the committee with a goal of providing percentages and times that the goals should be achieved. This should be a major topic of discussion at the fall meeting. Bettie will send to the committee information from the NSF regarding numbers and percentages of students (undergraduate, graduate and postdoctoral) in the sciences relevant to genomics. **Due date: March 7.**

APPENDIX I

2008 TRAINING COORDINATORS WORKSHOP
24 February 2008 at
Ramada Inn (Soon to be the Legacy)
1775 Rockville Pike
Rockville, MD 20852

25 February 2008 at
5625 Fishers Lane (5th Floor Conference Room)
Rockville, MD 20892

February 24-- THE RAMADA INN (THE LEGACY) Rockville, Maryland

6:00 p.m.	Meet and Greet
6:15	Welcome and Introductions
6:30	Training Coordinator Generated Topics1:
	Why URMS drop out of science graduate programs/How to keep URMs in science graduate programs? (Moderators: Alison Gammie and Jeff Long)
	How to identify post doctoral URM candidates—where they are and how to attract them to our programs? (Moderators: Louise Pape and Ken Nelson)
7:30	Subcommittee Reports Graduate/Post Graduate (Moderator: Louise Pape) Undergraduate (Moderator Debra Murray) K-12 (Moderator: Carla Easter)
8:30	Break
8:45	Discussion of Paper: Opening an African American STEM Program to Talented Students of All Races: Evaluation of the Meyerhoff Scholars Program, 1991-2005 (Seth Ruffins, Kim Nickerson, and Merna Villarejo, Moderators)
10:00	Adjourn

1 Additional topics suggested were: (1) Kinds of relationships that we can develop with national societies and (2) Housing for summer participants.

February 25—5th Floor Conference Room; 5625 Fishers Lane, Rockville, MD

8:00 a.m.	Continental Breakfast
8:30	Remarks Francis Collins, MD, PHD, (Director, National Human Genome Research Institute
9:00	Evaluation of the Meyerhoff Scholars Program Ken Maton, PhD (University of Maryland, Baltimore County)
10:30	Discussion
11:00	Break
11:30	Discussion of MAP Data Collection
12:30	Working Lunch
	Discussion of MAP and Other Similar Programs' Goals Postdoctoral Fellows Graduate Students Undergraduate K-12
1:30	Discussion of MAP Outcomes
2:30	Open Discussion
3:00	Adjourn

APPENDIX II

National Human Genome Research Institute (NHGRI)
National Institutes of Health
Department of Health and Human Services

SECOND ANNUAL WORKSHOP OF MAP TRAINING COORDINATORS

24 FEBRUARY 2008

RAMADA INN (THE LEGACY)
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APPENDIX III

Opening an African American STEM Program to Talented Students of All Races: Evaluation of the Meyerhoff Scholars Program, 1991-2005

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Prepared for Harvard Civil Rights Project volume, “Is Access to Higher Education Shrinking? Impacts of Shifts in Race-Conscious Policies & Their Alternatives.

Abstract

This paper examines changes in the The Meyerhoff Scholars Program at the University of Maryland, Baltimore County since it opened the admissions process to students of all races in fall, 1996. Results indicate a decline in the percentage of entering African American students from 100% (1991-1995) to 64.5% (1996-2005), and in the number of entering African American students admitted per year from 40.4 to 32.4 (a 20% decline). The change notwithstanding, the high school GPA scores of the entering African American students have increased over time, and SAT scores remained comparable. Furthermore, survey findings do not indicate any evidence of decline in the quality of the African American student experience in the program, nor of lower quality of experience compared to European American and Asian American Meyerhoff students. African American student perspectives about opening the admissions were mixed in the early years of program integration, with some positive and some negative; various reasons for each point of view were provided. Students in more recent years, however, who have only experienced the program as integrated, have been positive about the diversity of the program. In terms of program outcomes, African American graduates before and after the change each entered STEM Ph.D. programs at a greater rate than respective African American comparison students. European American Meyerhoff students similarly achieved higher rates of STEM Ph.D. entrance than European American comparison students, with no differences between Asian American Meyerhoff and comparison students. Implications of the findings for program admissions policy and for future evaluation efforts in this area are discussed.

The Meyerhoff Scholars Program at University of Maryland, Baltimore County (UMBC) was developed in 1988 in response to the low levels of performance of well-qualified African American science, technology, engineering and mathematics (STEM) majors, with a special interest in enhancing the performance of African American males. Baltimore philanthropists Robert and Jane Meyerhoff provided initial program funding, and have continued to contribute over the years. Other funding has come from national agencies, foundations, corporations, and individual donors. The program developers, led by UMBC's then Vice-Provost (and since 1992 UMBC's president), sought to develop a comprehensive, multi-component program that addressed the broad range of factors linked to minority student STEM success (cf. Maton & Hrabowski, 2004). Letters soliciting nominations were sent to principals and guidance counselors throughout Maryland requesting their "best and brightest" African American males; even among this group relatively few had succeeded in STEM fields on the UMBC campus, or nationally. Forty nominations were received that year, and 19 African American males became the first Meyerhoff Program students in 1989. In 1990, the program admitted 15 African American males and females. During the next five years, 1991-1995, as funding availability increased, between 34 and 47 African American students were admitted each year. However, in 1996, in a political climate of lawsuits related to the use of race in scholarship programs and college admissions, and in particular the landmark lawsuit challenging the University of Maryland, College Park's Banneker Scholarship, the university opened the program to students of all races—those with an interest in the advancement of minorities in STEM fields.

The Maryland Attorney General's Office provided feedback on the proposal to open admissions to applicants of all races interested in working with underrepresented minority groups. The proposed change was a direct response to the Podberesky v. Kirwan (1994, 1995) rulings, in which the United States Supreme Court let stand the decision of a Federal Appeals Court which struck down the race-exclusive admissions policy of the Banneker Scholarship Program for talented African Americans. Following the court decision, UMBC made a strategic, conscious decision to open Meyerhoff Program admissions, even though some on campus, including various minority groups, wanted to continue to have a race-exclusive program on the grounds that national agencies continued to provide funding only for minorities and because of the pride associated with a program for African Americans known for its excellence. However, the university chose not to engage in a legal battle in order to avoid attracting negative publicity and creating confusion about who could be in the program.

The decision process was not easy. Discussions were held with faculty, students, and staff about the pros and cons of bringing students from other racial groups into the program. The most compelling argument was that the underrepresentation of minorities in science was a national issue – not solely a minority issue – and that it was necessary to prepare many more Americans of all types both to understand the issue of underrepresentation and to develop skills in order to address this national challenge. Thus, while some argued opening admissions was akin to letting others "take over their program," the case was made that UMBC would continue to focus on the primary goal of producing minority scientists, especially African Americans, while also producing European American and Asian American scientists with a commitment to supporting minority students aspiring to become researchers, physicians, and engineers.

Discussions next focused on strategies for determining non-minority students' interest in the underrepresentation of minorities in STEM fields. The program developed 1) language to include in recruitment materials focusing on the new criterion, and 2) questions to help the Meyerhoff selection committee assess students' interest in the underrepresentation issue. Indices used for determining the interest of non-minority students based on their application materials included willingness to discuss issues of race, poverty and academic performance; involvement with activities and organizations that were (likely) ethnically diverse (e.g., multicultural clubs, athletic teams); tutoring minority children; and related activities.

The decision to integrate the program also meant an additional commitment by the university to find resources for scholarships for European American and Asian American students and to support these students financially in the Meyerhoff Program. A critical issue was to ensure that there was no difference of treatment between minority and non-minority students. Although the national agencies and a number of foundations were willing to provide funding for minorities, the campus reallocated money internally to support the students from other racial/ethnic groups. The leadership of the campus (e.g., budget committee and the president, working in conjunction with other leaders of the campus) came to this understanding. Scholarship funds, thus, for African American and Hispanic students primarily come from the federal government, corporations, and private

foundations. Scholarship money for Asian American and European American students primarily comes from the university budget.

Currently, between 45 and 65 Meyerhoff students are selected each year. The number selected is directly dependent on the amount of available funding. The majority (55-65%) of entering students each year are African Americans. The program is situated on a predominantly white campus (34% minority), with more than half of the undergraduates and 60 percent of the doctoral students pursuing STEM degrees.

The primary purpose of the current paper is to examine the impact of the opening of the admissions process to talented students of all races, resulting in a change from a race-exclusive to a race-integrated program. Specifically, the program impact in five areas is addressed: 1) the number of entering African American students, 2) the quality of entering African American students; 3) the program experience of students; 4) the perspective of African American Meyerhoff students about the integration of the program, and 5) program outcomes (i.e., entrance into STEM Ph.D. programs). The findings are relevant to the larger issue of what adaptations and changes can be made to race-specific programs in this anti-affirmative action era; the design of the research has relevance to future attempts to evaluate changes in this arena.

Historical and Policy Context

The long history of racism in the U.S. has segregated racial and ethnic groups in many ways. Although constitutional rights were strongly defended by the majority group, minorities were systematically excluded from many opportunities throughout our history. This exclusion created social inequalities that have proved difficult to resolve. The public policy of affirmative action in the 1960s represented an attempt to address the history and thereby the destiny of historically oppressed minorities through abolishing race and gender based discrimination in such processes as employment and admission to colleges and universities (Crosby, Iyer, Clayton, & Downing, 2003). It was proposed as a response to the need for equal representation of minorities and an attempt to eradicate racism from all social institutions. Nevertheless, in recent years this policy has received strong criticism and resulted in divisive debates.

One aspect of the remedy to increase diversity was setting aside quotas for underrepresented ethnic minorities applying to college. Opponents of affirmative action argued that these quotas were another version of discrimination. The first major lawsuit, the University of California Regents v. Bakke case, outlawed this practice, aimed at increasing the equal representation of minorities. In spite of the court decision, universities were allowed to use race as an admission criterion. Moreover, race-exclusive or race-conscious scholarship and fellowship programs were created to increase the ethnic diversity at colleges and universities. Nevertheless, these programs were subjected to controversial debates as well. Ultimately, many have been re-structured to be inclusive of all races and ethnic groups following counterarguments and court cases outlawing affirmative action policies (Schmidt, 2005a; Hebel, 2003).

Increasing diversity in higher education is thought to have multiple benefits for the whole society and for underrepresented ethnic groups in particular (Bowen & Bok, 1998; Cohen, 2003; Crosby, Iyer, Clayton, & Downing, 2003; Gurin, Nagda, & Lopez, 2004). Since the inception of affirmative action policies, the number of minorities granted admission to colleges and universities has increased significantly, increasing from 16 to 27 percent from 1976 to 1996 (National Center for Educational Statistics, 2001). However, the abandonment of affirmative action in some states reversed this effect (Bok, 2003; Cohen, 2003; Horn & Flores, 2003; Marin & Lee, 2003), although the proponents of the new policies claim the opposite. For example, in Florida, the Talented 20 program was adopted, which eliminated race-based admissions in favor of merit-based admissions to students in the top 20% of their high school classes. The number of minority admissions to top tier universities decreased while there was a slight increase in admissions to historically Black and historically Hispanic universities (Marin & Lee, 2003). Card and Krueger (2004) analyzed the impact of the elimination of affirmative action policies in California and Texas, two of the nation's largest states. After these policies were abolished in 1996 and 1997, the overall admissions rate for African Americans and Hispanics decreased about 30 to 50 percent in both states.

Although percent plans, granting admission to high achieving graduates of high schools (e.g., the top 10 or 20 percent), devised after the elimination of race-based admission programs increased the rates of admission and enrollment to undergraduate programs for some minorities, they have not proven to be a positive change overall, and especially for the African American population. Highly selective institutions

in these states have generally seen declining enrollments. In Texas, a decline in the enrollment of underrepresented minorities has been observed in spite of the percent plan after the elimination of competitive minority scholarships in 1999 (Card & Krueger, 2004). Most important, one has to question the level of academic preparation of the top subset of students in poorly funded and low achieving schools.

A recent dramatic change has been observed in many universities following the Supreme Court decisions on two cases involving the University of Michigan, Ann Arbor. Specifically, a 2004 survey showed that 11 of the 29 surveyed universities had declines in their admission of African American or Hispanic students (Selingo, 2005). For example, at the University of Michigan, where these 2003 court cases emerged, African American enrollment declined from 2002 to 2004 by 7.9% and Hispanic enrollment by 15.6%. Since early 2003, almost 70 universities have changed their policies regarding race-conscious programs and started to recruit non-minority students as a result of complaints and threats of legal action from advocacy groups (Schmidt, 2005b). This occurred in spite of the positive ruling of the court, reflected in Justice Sandra Day O'Connor's powerful statement on the value of diversity: "In order to cultivate a set of leaders with legitimacy in the eyes of the citizenry, it is necessary that the path to leadership be visibly open to talented and qualified individuals of every race and ethnicity" (Grutter v. Bollinger et al., 2003). Justice O'Connor's expectation that "25 years from now, the use of racial preferences will no longer be necessary" (Grutter v. Bollinger et al., 2003) underscores the time urgency of work to enhance the recruitment and achievement of minorities in higher education, including the effort examined in this paper.

Contentious arguments between the proponents of the new policy and advocates of affirmative action continue to lead to controversy, with conclusions often based on values rather than evidence. Research is sorely needed to examine the changes in the aftermath of abandoned affirmative action policies and changes in scholarship and fellowship programs designed to increase minority admissions to higher education institutions. In the current research, the focus is not on changes in statewide and general university admissions policies for freshman, the area of most of the research to date. Rather, it is on the opening of the admissions process to talented students of all races in a comprehensive scholarship and support program for students with career interests in the STEM area.

Underrepresented African American Students in the Sciences, Technology, Engineering and Mathematics: The Meyerhoff Scholars Program

The primary goal of the Meyerhoff Scholars program is to help African American students achieve at the highest levels in STEM areas and go on to STEM Ph.D. programs, in which they are dramatically underrepresented. Research has indicated that the low rates of success of underrepresented minority (URM) students in the sciences at the undergraduate level appear due to four sets of factors. These include academic and social integration, knowledge and skill development, support and motivation, and monitoring and advising (cf. Maton & Hrabowski, 2004). The Meyerhoff Program was developed with the specific intention of comprehensively addressing these needs, with an initial, exclusive focus on African American students. The focus of the current study is the viability of the strategy of responding to the anti-affirmative action climate by maintaining a primary focus on African American (and other URM) students, while opening the admissions process to include other students as well.

The academic criteria necessary for acceptance into the Meyerhoff Scholars Program have been increasing steadily over the years. The first entering cohort had mean SAT-Verbal scores of 507, mean SAT-Math scores of 611, a mean combined SAT of 1118, and a high school GPA of 3.60. The most recent, 2005 entering cohort of Meyerhoffs had mean SAT-Verbal scores of 644, mean SAT-Math scores of 664, a mean combined SAT of 1308, and a mean high school GPA of 4.04. As a rule, prospective Meyerhoff students cannot have received lower than a B in any high school science or math course, and many have completed a year or more of calculus in high school. Preference is given to those who have taken advanced placement courses in math and science, have research experience, and provide strong references from science or math instructors. Additional admissions factors considered include a commitment to stay in the sciences, a genuine interest in becoming a researcher, an openness to taking academic advice, a willingness to participate in study groups and to do community service, and a strong interest in the advancement of underrepresented minorities in STEM fields.

In 1996, the Meyerhoff Scholars Program was recognized nationally with the Presidential Award for Excellence in Science, Math and Engineering Mentoring. Previous research has established the effectiveness of the program in enhancing the entrance of African American students into STEM Ph.D.

programs, and examined some of the key processes that lead to these positive outcomes (Gordon & Bridglass, 2004; Maton, Hrabowksi & Schmitt, 2000; Maton & Hrabowski, 2004).

The program incorporates 15 different components, briefly described below (cf. Maton & Hrabowski, 2004; for a more detailed description, see Gordon & Bridglass, 2004).

Financial Aid. The Meyerhoff Program provides students with a comprehensive financial package including, in many cases, tuition, books, and room and board. This support is contingent upon maintaining a B average in a STEM major.

Recruitment. The top 100-150 applicants and their families attend one of the two recruitment weekends on the campus.

Summer Bridge Program. Meyerhoff students attend a mandatory pre-freshman Summer Bridge Program, and take courses in math, science, and African American studies. They also participate in STEM related co-curricular activities, and attend social and cultural events.

Study Groups. Group study is strongly and consistently encouraged by the program staff, as study groups are viewed as an important aspect of success in STEM majors.

Program Values. Program values include support for academic achievement, seeking help from a variety of sources, peer supportiveness, high academic goals (with emphasis on Ph.D. attainment and research careers), and giving back to the community.

Program Community. The Meyerhoff program provides a family-like social and academic support system for students. Students live in the same residence hall during their first year and are required to live on campus during subsequent years.

Personal Advising and Counseling. The program employs full-time advisors who monitor and support students on a regular basis. Staff focus not only on academic planning and performance, but on any personal problems students may have as well.

Tutoring. The program staff strongly encourages Meyerhoff students to either tutor others or be tutored to maximize academic achievement (i.e., to get 'As' in difficult courses).

Summer Research Internships. Each student participates in multiple summer research internships at leading sites around the country, as well as some international locations.

Research Experience during the Academic Year. A number of students participate in the MARC U*STAR program, which requires research involvement in a faculty member's lab during the student's junior and senior years.

Faculty Involvement. Key STEM department chairs and faculty are involved in the recruitment and selection phases of the program. Many faculty provide research opportunities for students in their labs.

Administrative Involvement. The Meyerhoff Program is supported at all levels of the university, including ardent support from the President (the program co-founder).

Mentors. Each student is paired with a mentor who is in a science profession.

Community Service. All students are encouraged to take part in a community service activity, which often involves volunteer work with at-risk Baltimore youth.

Family Involvement. Parents are included in social events, and kept advised of their child's progress.

Method

Research Participants

Meyerhoff Sample. The 692 Meyerhoff students from the third entering class (1991) through the most recent class (2005) comprise the primary Meyerhoff sample in this study. The first two entering classes (1989 and 1990) were not included since they were much smaller in size than those that followed. The primary sample includes 526 African American, 88 European American, and 79 Asian American students (12 entering Latino students were not included in the primary sample due to their limited number). The average entering class size between 1991 and 2005 was 46.9 students, with a range from 34 to 63. The average high school GPA for the primary sample was 3.8, average SAT Verbal 608.1, average SAT Math 661.9, and average SAT combined 1270; 49.1% were male.

The number of Meyerhoff students completing process evaluation surveys over the years differed, depending on the specific survey item (some items were added in later years). For the 1991-1995 entering classes, the number of students completing surveys ranged from 91 (45%) to 156 (77%), depending on the item. For the 1996-2000 entering classes, the number of students completing items ranges from 100 (63%) to 110 (69%) for African Americans, 24 (67%) to 28 (78%) for European

Americans, and from 22 (67%) to 24 (73%) for Asian Americans. From 1999 to 2001, a subgroup of 40 African American students took part in process evaluation interviews, and a subgroup of students [note: need to get number] took part in exit interviews from 2002 to 2005.

"Declined" Comparison Sample. The "Declined" sample consists of 246 students who were offered Meyerhoff scholarships between 1991 and 2000, but declined the offer. Almost all of these students attended universities other than UMBC. This sample includes only students who took at least three science, engineering, and/or mathematics courses during their freshman year. The sample does not include entering students after 2000 since the Declined students are included in analyses of post-college outcomes only (i.e., limited to students who have had, to date, at least five years to graduate college). The Declined sample includes 196 African American, 26 European American, and 24 Asian American students. The Meyerhoff and Declined samples differed significantly on several of the pre-college academic background variables, and gender (see Appendix A).

Measures

Demographic and Academic Background Variables. Ethnicity, gender, university entrance date, SAT scores (both math and verbal), and high school GPA were obtained from university application records.

Graduate Education. The STEM graduate education outcome variable contained eight post-college categories: 1) entered Ph.D. STEM program; 2) entered M.D./Ph.D. program; 3) entered STEM Masters program; 4) entered medical school; 5) entered other STEM professional school (e.g., dental); 6) no post-college education in STEM (includes students who did not complete college, those who graduated in a non-STEM major, STEM graduates who did not pursue graduate or professional education, and those who attended non-STEM graduate programs); 7) those still enrolled at the undergraduate level in a STEM major; and 8) those whose graduate status is unknown (to date). If a student entered a STEM Masters program upon graduation but later entered a STEM Ph.D. program, the latter (i.e., the higher degree program) was coded. However, if a student entered a STEM Ph.D. program but left the program with a terminal masters, or entered a Ph.D./M.D. program but only completed the M.D. aspect, then the degree actually received was counted. For primary analyses, focused on the Meyerhoff program goal of enhancing the number of STEM Ph.D.s, students in the first two categories (entered STEM Ph.D. or M.D./Ph.D.) were compared to those in the other six.

Process Evaluation Survey Items. Survey items assessed student perceptions of the value of various aspects of their experience in the program. Nine items that appeared especially relevant in the current context were selected (from the larger set of items) for analysis: 1) summer bridge program; 2) feeling a part of the Meyerhoff community; 3) study groups; 4) Meyerhoff staff advising; 5) summer research experience; 6) financial support; 7) social experiences with peers; 8) academic interactions with peers; and 9) program cultural activities. Over the years, who was surveyed, the wording of the survey items, the wording of the anchors on the 5-point Likert scale used, and how the survey was administered have varied (see Appendix B). Any or all of these factors may affect survey responses, and thus comparisons on item responses over time must be viewed cautiously. Given this fact, only descriptive information (means, standard deviations) is provided related to change over time, with no statistical tests performed. A number of students completed surveys on two or more occasions over the years (about 45% of the 1991-1995 entering classes and 12% of the 1996-2000 entering classes); for these students, responses on the most recent survey was used (the only exception was if the most recent survey was the 1996 survey, which used a very different rating format than the others; see Appendix B).

Procedure

All students completed an informed consent form at the time they applied to the program, or else at the start of the program, along with a form providing permission to obtain college and graduate school transcripts from registrar offices. Information on post-college destination was obtained from multiple sources, including program records (in the case of Meyerhoff students), the students, family members, or through internet or paid searches. Information was confirmed (or clarified) by phone calls to graduate and professional school registrar offices. Process evaluation surveys and interviews were conducted by graduate research assistants.

Results

Entering Students: Number and Percentage African American

From 1991 to 1995, the five years preceding the opening of the program to students of all races, there were a total of 202 entering African American students, an average of 40.4 students per entering class (Table 1). During the subsequent five years, 1996-2000, following the opening of the

admissions process to students of all races, a total of 158 African American students entered the program, an average entering class of 31.6 students. This represents a 21.8% decline in the number of entering African American students. In terms of change in class composition, the decline from 100% (202/202) to 69.0% (158/229) African American is statistically significant, X^2 (1) = 75.0, p<.001. During the five most recent years, 2001-2005, there were 166 entering African American students, an average of 33.2 per entering class. This represents a 5.1% percent increase in the number of entering African American students from the preceding five years. However, there was a substantially larger increase of 49.23% in other entering students (from 71 to 106) during these years. In terms of change in class composition, the overall result was a decline from 69.0% (158/229) African American in 1996-2000 to 61.0% (166/272) in 2001-2006, a difference that approached but did not achieve statistical significance, X^2 (1) = 3.6, p<.06.

Comparing the five years prior to the opening of admissions to all ten years since admissions have been opened (1996-2005 combined), there was a decline in the average number of entering African American students per year from 40.4 to 32.4, representing a 20% decline. In terms of change in class composition, the decline from 100% (202/202) African American to 64.5% (324/501) was statistically significant, X^2 (1) =95.6, p<.001.

Entering Students: High School GPA, SAT Scores, and Gender

The five cohorts of entering African American students prior to the opening of the admissions process, 1991-1995, achieved an average high school GPA of 3.6. The next five entering cohorts of African American students, 1996-2000, achieved a 3.8, and the most recent five cohorts, 2001-2005, a 3.9 (Table 2). An analysis of variance comparing the three groups was statistically significant, F (2) =28.6, p < .001, with post hoc tests indicating that each succeeding cohort achieved a statistically higher GPA than the preceding one.

The 1991-1995 cohorts of entering African American students achieved an average verbal SAT of 555.3, the 1996-2000 cohorts 623.6, and the 2001-2005 cohorts 620.4. The extent of increase, about 65 points, is comparable to that which followed the Educational Testing Service re-centering of SAT Verbal scores in the mid 1990s (due to the declining mean scores over prior decades; Durans, 2002). Due to the confounding factor of recentering, statistical tests were not performed; it appears, however, that the SAT Verbal scores of applicants have not changed much over time.

The 1991-1995 cohorts of entering African American students achieved an average math SAT of 644.5, the 1996-2000 cohorts 657.3, and the 2001-2005 cohorts 652.0. The Math SAT scores at the levels observed would not have been affected much by the SAT re-centering (Durans, 2002). Due to the potential confounding factor of recentering, statistical tests were not performed; it appears, however, that the SAT Math scores of applicants have not changed much over time.

In terms of combined SAT scores, the 1991-1995 cohorts of entering African American students achieved 1199.6, the 1996-2000 cohorts 1280.4, and the 2001-2005 cohorts 1272.1. Due to the confounding factor of recentering, statistical tests were not performed; it appears, however, when the re-centering of Verbal scores is taken into account, that the SAT combined scores of applicants have not changed much over time.

Slightly more than half, 51.5%, of the 1991-1995 entering African American students were male, and somewhat less than half, 45.6% and 47.9%, respectively, of the 1996-2000 and 2001-2005 cohorts were male. Chi-square analyses did not reveal statistically significant differences between the 1991-1995 and 1996-2000 cohorts, X^2 (1) =1.2, *ns,* the 1996-2000 and 2001-2005 cohorts, X^2 (1)=0.1, *ns*, or the 1991-1995 and the 1996-2005 cohorts (combined), X^2 (1)=1.2, *ns*.

In terms of ethnic group differences, analyses of variance for the 1996-2000 entering students revealed statistically significant differences on all academic variables: high school GPA, F(2)=14.2, p < .001, SAT Verbal, F(2)=8.2, p < .001, SAT Math, F(2)=11.1, p < .001, and combined SAT, F(2)=17.0, p < .001. Post hoc tests indicated that African American Meyerhoff students achieved statistically lower scores than the European American and Asian American students on high school GPA, SAT Math, and combined SAT, and statistically lower scores than European American students but not Asian American students on SAT Verbal. A chi-square analysis did not reveal ethnic group differences in gender, X^2 (2) =0.6, *ns*.

Similarly, analyses of variance for the 2001-2005 entering students indicated ethnic group differences for all academic variables: high school GPA, F(2)=13.4, p < .001, SAT Verbal, F(2)=6.4, p < .01, SAT Math, F(2)=40.5, p < .001, and combined SAT, F(2)=26.7, p < .001. Post hoc tests indicated that

African American Meyerhoff students achieved statistically lower scores than European American and Asian American students on high school GPA, SAT Math, and combined SAT, and statistically lower scores than European American students but not Asian American students on SAT Verbal. On the combined SAT, Asian American students scored significantly lower than European American students. A chi-square analysis again did not reveal ethnic group differences in gender, X^2 (2) =1.4, *ns*.

Experience in Program

The 1991-1995 entering African American Meyerhoff students did not achieve a mean score on any of the nine survey items equal to or higher than those of the 1996-2000 entering African American Meyerhoff students (Table 3). Averaging across the nine items, the 1991-1995 students had scores 0.4 lower (range 0.2 to 0.7). Although changes in the wording and scaling of items over the years preclude formal statistical testing, the findings suggest that a decline in the value of the program experience did not occur (if anything, it increased).

Of note, both sets of entering students perceived the value of their experiences in the program to be quite positive, with six of the nine items rated 4.0 or higher for the 1991-1995 students, and eight of the nine items for the 1996-2000 students (the scale range was 1 to 5, with 5 the most positive rating). Financial support was rated most highly by both groups of students (4.4 and 4.7, respectively). Academic interactions with peers (4.2, 4.5), being part of the larger Meyerhoff community (4.1, 4.6), the on-campus, 6-week summer bridge orientation program (4.0, 4.5), social interactions with peers (4.0, 4.4) and summer research opportunities (4.0, 4.2) also received ratings of 4.0 or higher from both sets of students. Study groups also were rated highly by both (3.9, 4.2). The largest discrepancy between groups was for the value of program staff academic advising (3.5, 4.2). Both sets of students viewed program cultural activities as providing moderate value (3.4, 3.6).

Among the 1996-2000 cohorts, an analysis of variance did not reveal a difference in overall perceptions (all items combined) among African American (4.3), European American (4.1), and Asian American (4.4) students, $F(2)=2.3$, *ns* . In terms of individual items, the three groups did not differ on seven of the nine items. There were significant differences on being part of the Meyerhoff community, $F(2) =3.0$, $p < .05$, and program staff academic advising, $F(2) =3.3$, $p < .05$. Post-hoc analyses revealed that European American students had marginally ($p < .06$) lower scores than African American students on the program community item, and significantly lower ($p < .05$) scores than the Asian American students on the academic advising item. The African American and Asian American students reported scores of 4.0 or higher on eight of nine items (only cultural activities was below 4.0), and the European American students reported scores of 4.0 or higher on six of nine items (staff advising, summer research, and cultural activities were each below 4.0).

Student Perspectives on the Opening of Admissions

Interview Findings: 1999-2001. Semi-structured interviews were conducted with a randomly selected subgroup of 40 African American Meyerhoff students in 1999, 2000, and 2001—three, four, and five years following the entrance of the first integrated class. The interview examined various aspects of the student's experience in the program. One question asked students to provide their thoughts and feelings about the racial integration of the program, and whether such an integration would allow the program to remain true to the goal of increasing the number of African American Ph.D. in the sciences. Students expressed positive, negative, and mixed feelings about the change. However, most students expressed a belief that despite this change the program would still be able to meet its overarching goal of increasing the number of African Americans receiving STEM Ph.D.'s. Representative responses are provided below.

Positive. Positive feelings primarily involved an appreciation for diversity in the program and the positive impact racial diversity would have on minority and non-minority students. Students reported feeling that the racial integration of the program would prepare them for racially integrated environments of graduate school and workplace, reduce biases and racial stereotypes held by both minority and non-minority students about the other, and make the program stronger by enhancing its credibility and legitimacy in the larger campus environment. The first three interview excerpts below are representative of the large number of students who viewed diversity in the program as providing African American students with a necessary "real world" experience--preparing them for the racially integrated environments of graduate school and the workforce.

"I think that it is a benefit. Only because, the work place and… graduate school--it's not going to be only African American. By making the program more diverse people are surrounded by an atmosphere that's going to be more similar to the atmosphere we're going to experience when we actually get into the work force." (1998 entering class; interviewed in 1999)

"*I think it's good that other racial groups have [been] included...When you get out in the real world there are a number of other people that you'll have to be able to work with, and you can't be biased or anything*." (1996 entering class; interviewed in 2000)

"*I think it's great to have people from different backgrounds interacting while they're going through the process of becoming scientists, so when they get to become scientists it won't be hard for them to interact with people who aren't like them."* (1997 entering class; interviewed in 2001)

The next three respondents focus on learning from others who come from a different ethnic background, and the reduction of biases.

"*I guess [the integration] can help us networking. Maybe some of the Caucasians in the program will talk to other Caucasians outside of the program which will then introduce them to other Meyerhoffs. . .It's helped the program become more diverse. It's helped people get a feel for different cultures outside of African American*." (1997 entering class; interviewed in 1999)

"*I think it is for the better to have the program for all races. For example, one guy…had not experienced intelligent people of color until he came here. So that definitely helps. Having things diverse is better*." (1998 entering class; interviewed in 1999)

"*I guess it's always good to have different types of people. We can really learn from each other."* (1998 entering class; interviewed in 2000)

A number of students reported feeling that racial diversity among applicants and students awarded the Meyerhoff scholarship added legitimacy and credibility to the program, in that it would less likely be viewed as an "affirmative action" program for blacks--but instead a program truly based on excellence in scholarship.

"*I think opening the program to everyone made it stronger. . . . It makes the comment that you only got the award because you're black irrelevant now. So now if you get in the program you can say, 'Well I'm just the best of the best that came to get this*." (1997 entering class; interviewed in 2000)

"*From what I've seen… it makes us a lot more open and it kind of destroys the biases that are there, especially in dealing with the campus at large. I'm sure people used to look at it and say, "Well, those black people really don't deserve it and why do they have all these privileges." But now seeing that it's open to everybody and the [way the] races interact with each other, now it's like the only bond isn't race. So everyone's looking at it like, "Wow, there's something really special here*." (1996 entering class, interviewed in 2001)

"*I think it makes the program better to see that you don't have to be a particular race or ethnic group to actually be successful.* (1997 entering class; interviewed in 2001)

Several students expressed a positive or accepting viewpoint concerning the legal rationale for the change in program admissions. The first excerpt below reflects a positive view and the second an accepting perspective along with comments on the likely continued achievement of program goals.

"*I think it was a very smart decision to integrate the program before it was forced to integrate*." (1996 entering class; interviewed in 1999)

"*I don't have any objections to including any other races besides African American. I do like the fact that the program is still focused on particularly African Americans but I understand where*

they're coming from, as far as on a legal level that they have to include other races. I don't see that as something bad and I definitely don't see that as a detriment to the program at all. . . . I believe the goal [of the program] is still…attainable and likely, with the inclusion of other students besides African Americans." (1996 entering class; interviewed in 2000)

Negative. Although a number of students discussed positive aspects of the integration, many others expressed negative feelings about the change in the program's racial demographics. Concerns focused around a fear that the goals of the program would change as a result of the demographic shift, a change in program cohesion as a result of the integration, and feelings of upset that resources initially designed for African Americans were being taken away. The first five responses focus on concerns about changing the program's goal of enhancing the number of African American Ph.Ds.

"*You know it's a shame because whenever black people get anything good someone always starts to take it away. My only worry is that the whole goal was to increase the numbers of blacks with Ph.D.s. By letting other students in that's taking away a spot for another black student who is deserving and otherwise may not have opportunities to get the Ph.D*." (1995 entering class; interviewed in 1999)

"*I don't think the inclusion [of students from different background] has helped, honestly. Just because you're not as focused on your main objective. Because my understanding of it is that they did this, integrated the program not because they thought it would be better for the program or they thought it would be better for the students they were targeting. They did it because it was mainly a political issue."* (1996 entering class; interviewed in 2000)

"*I think it's changed the dynamics of the program. I would say that due to the inclusion of non-minority students the goals of the program need to shift. . . . Because the goal was to get more minority students to get Ph.D.s. As more and more non-minority students are coming in those goals don't seem to be the same among those students*." (1997 entering class; interviewed in 2000)

"*Actually I think it weakened the program. . . . . It's basically diluting the program*." (1997 entering class; interviewed in 2000)

"*Whenever Summer Bridge comes in [6-week summer orientation session] there is always more white people. . . . It seems like [the program] is losing its goal as the years progress*." (1998 entering class; interviewed in 2000)

The next three students note a reduction in cohesion within and between cohorts of students. The fourth student expresses concern about a potential loss of an African American core of support.

"I've heard that the later [integrated] classes weren't as cohesive [and] that white Meyerhoffs stayed with themselves and black Meyerhoffs stayed with themselves. My [all black] class was pretty unique [because] when we got in we all pretty much became friends." (1995 entering class; interviewed in 2001)

"*I think diversity in general is good. But in terms of the program and how they're trying to promote a family atmosphere, it gets kind of hard sometimes. . . . the white people in my class sort of hung out together and with no one else. So [some] of the black students were saying, "You know when we go into a majority white atmosphere we're the ones that have to reach out and get to know people." They [see] the responsibility of the white students to reach out and get to know us because we were the majority in our class. So I think a lot of people didn't get to know each other because of that reason*." (1997 entering class; interviewed in 2001)

"*I think it put a division between the classes that weren't, and the classes that were, [integrated*]." (1997 entering class; interviewed in 1999)

"*I see the program as being majority black and becoming increasingly white. And I think the idea of the program is majority black…Being surrounded by blacks that were intellectual, well-rounded, and successful was really instrumental to my success and growth*." (1997 entering class; interviewed in 2001)

Mixed Responses: Transition Process and Post-Transition Future. Some responses concerning the change in program composition could not easily be categorized as positive or negative, but contained elements of each. The three student responses below each refer to initial distress or resistance to the change, but also comment positively on the transition process or the post-transition future.

"*I think [the integration] changed the Meyerhoff program. I still see the focus as the same . . . getting minorities in science. [But] at first I was taken aback. . . . African Americans can never have anything without someone coming in and changing it. . . . for the future I still hope the focus is mainly towards African Americans and most of the classes are still African American students because there's definitely more of a need*." (1994 entering class; interviewed in 1999)

"*When [the transition] initially happened I was the last class to have an all African American class and initially we were distraught about the situation...It's kind of hard to go from one way of life to another…But I think that they made a smooth transition because they made it as painless as possible*." (1995 entering class; interviewed in 1999)

"*I was the first class that was actually integrated. I know initially there was some resistance to opening up the program to everybody because people thought it defeated the purpose: trying to get more minorities into science and engineering. I think the transition has been smooth*." (1996 entering class; interviewed in 2000)

Exit Interview Findings: 2002-2005. As part of a larger exit interview conducted yearly with graduating seniors from the MARC U*Star program (primarily Meyerhoff scholars), students are asked whether or not they felt the presence of students from different racial and ethnic backgrounds has affected the program and the students in it**.** Almost all of the graduating seniors have indicated that the program's diversity did not negatively impact the students or the program but rather was an important, positive factor. Many commented that it allows non-minority students to interact with minority students and experience different cultures, and helps to change perceptions of students who may have never otherwise had an opportunity to interact with minorities. Also, many minority students felt that white students get a chance to see what it is like to not be in the majority group (while in the program). Others felt that the experience encouraged them to explore more about their own culture. Representative student comments, from African American Meyerhoff/MARC scholars, included the following: *"To see so many students, from all kind of backgrounds…to see them all on the same level does a lot for breaking apart any stigma you might have ever had, and that's just great." "I think it gives you good experience, it gives you good training…to have this interaction with people now…I mean you have to learn how to interact with people from different backgrounds, because otherwise you're going to be trying to make it alone in this world and you really can't" "I think it's really important that the program doesn't just focus on African Americans because people of other races need this too, they need to see that there are people that don't live like them that can succeed in this field as well." "I think, it's more realistic of what everyday is like…what being in the workforce is going to be like.*"

Post-College Outcomes

African American Meyerhoff students in the 1996-2000 cohorts achieved more positive post-college Ph.D. outcomes than those in the 1991-1995 cohorts, if differing academic background characteristics are not taken into account (Table 4). Specifically, 34.8% of the 1996-2000 students entered either a STEM Ph.D. (27.2%) or M.D./Ph.D. (7.6%) program, compared to 20.3% of the 1991-1995 students (14.3%, STEM Ph.D., and 6.0%, M.D./Ph.D.). Fewer of the 1996-2000 students entered STEM masters programs (13.3% versus 23.8%), medical school (9.5% versus 17.8%), or had no STEM

post-college (17.1% versus 33.2%). Conversely, more of the 1996-2000 students were still undergraduates (12.7% vs. 0.0%) or had an unknown graduate status to date (12.0% versus 4.0%). The chi-square analysis comparing the 1996-2000 and 1991-1995 groups on STEM Ph.D. (includes M.D./Ph.D.) versus all other categories (combined) was statistically significant, X^2 (1) =9.5, $p < .01$. However, when SAT Math, SAT Verbal, high school GPA, gender, and college major were statistically controlled in a logistic regression analysis, there was no longer a statistical difference between the groups, Wald (1)=1.2, *ns*.

Among the 1996-2000 entering cohorts, 34.8% of the African American students, 41.7% of the European American students, and 22.1% of the Asian American students to date have entered a STEM Ph.D. or M.D./Ph.D. program. The three groups entered STEM master's programs at comparable rates (13.3%, 16.7%, and 16.2%, respectively). Fewer African American (9.5%) and European American (2.8%) than Asian American (22.6%) students entered medical school, more European American (27.8%) than African American (17.1%) and Asian American (6.5%) students had not pursued graduate school after completing their undergraduate degree, and fewer European American (2.8%) than African American (12.7%) or Asian American (9.7%) students were still undergraduates. The graduate status of a substantial number of African American (12.0%), European American (8.3%) and Asian American (22.6%) students were unknown (many of these are recent graduates whose post-college information is currently being sought or confirmed). The chi-square analysis comparing the three ethnic groups on STEM Ph.D. (includes M.D./Ph.D.) versus all other categories (combined) was not significant, X^2 (1) =3.0, *ns.* Similarly, the logistic regression analysis with covariates controlled was not significant, Wald (1) =0.2, *ns*.

The 1991-1995 African American Meyerhoff, 1996-2000 African American Meyerhoff, and 1996-2000 European American Meyerhoff students each achieved greater post-college STEM Ph.D. outcomes than their respective Declined comparison samples. Specifically, 20.3% of the 1991-1995 African American Meyerhoff students entered either a STEM Ph.D. or M.D./Ph.D. program, compared to 4.7% of the 1991-1995 African American Declined students, X^2 (2)=11.2, $p < .001$. With covariates controlled, the difference remained significant, Wald (1) =6.6, $p < .01$. In turn, 34.8% of the 1996-2000 African American students entered either a STEM Ph.D. or M.D./Ph.D. program, compared to 4.5% of the 1996-2000 African American Declined students, X^2 (2)=34.2, $p < .001$. With covariates controlled, the difference remained significant, Wald (1) =14.6, $p < .001$. Among 1996-2000 Meyerhoff European American students, 41.7% entered either a STEM Ph.D. or M.D./Ph.D. program, compared to 3.8% of the 1996-2000 European American Declined students, X^2 (2)=9.0, $p < .01$. With covariates controlled, the difference remained significant, Wald (1) =6.9, $p < .01$. Among the 1996-2000 Asian American Meyerhoff students, 22.6% entered a STEM Ph.D. or M.D./Ph.D. program, compared to 16.7% of the 1996-2000 Asian American declined students, a difference that was not statistically significant X^2 (2)=0.3, *ns*. With covariates controlled, there also was not a significant difference, Wald (1) =0.0, *ns*.

Discussion

The Meyerhoff Scholars Program changed in fall, 1996 from a program that had exclusively served African American students to one that also admitted, in smaller numbers, students of other races who had an interest in the advancement of minorities in STEM fields. In the ten years since, there has been a 20% decline in the number of entering African American students (40.4 to 32.4), with slightly more than one-third (35.5%) of the admissions slots going to other students (mostly European American and Asian American students). Over the 10 year period, if the rate of 40.4 per year had been maintained and the program maintained as race-exclusive, there would have been an additional 80 African American students (8 per year). Assuming this number of qualified African American students were in the application pool and would have matriculated, the opening of admissions has led to lowered achievement of the initial program goal of enhancing the number of African American students entering STEM Ph.D. programs. However, this assumption may be questionable, since the smaller number of African Americans, according to program staff, was largely the result of reduced external scholarship funding availability in many of the years.

Of note, the opening of admissions has not led to a decline in the quality of entering students, their experience in the program, or their outcomes. Indeed, analyses indicated that the 324 African American students entering the program since the opening of admissions had higher high school GPA scores than those who preceded them, and were more likely to enter STEM Ph.D. programs. These trends may be due to various factors—for example, in part it may be due to a growing public recognition

over the years, in Maryland and nationwide, of the quality of the program and its success in producing large numbers of students who enter graduate and professional schools. As a result, it may have attracted applications from students with stronger high school records than in the program's earlier years, and those with greater interest in and commitment to matriculation in STEM graduate programs. In addition, the university and the program have continued to strengthen academic support initiatives (e.g., increased funding for tutoring and advising), and the peer support culture may be even stronger than in the early years.

African American students appear to have an experience in the program that is comparable (or perhaps better) to those in the program when only African Americans were participants, based on survey item responses. Their experience in the program is comparable to the European American and Asian American Meyerhoff scholars. Furthermore, although a number of African American students had very negative responses in the years following the change in admissions, a number of others did not, including those who were aware it would add credibility and legitimacy to the program in the primarily white campus environment. More recently, students have only had the experience of the program as integrated, and they consistently voice positive views about the racial diversity within the program. Most important, the 1996-2000 African American students have been entering STEM Ph.D. programs at a much greater rate than those who preceded them (when differing background characteristics and major are not taken into account), at a rate comparable to those of their European American and Asian American peers in the program, and at a rate greater than comparison sample students.

Changing from a race exclusive to an integrated program (with the majority African American), then, appears to have been on the whole a viable strategic response to an anti-affirmative action political climate. Admissions have been opened to students of all races, but the defined mission of the program helps to ensure an African American majority. Over the years, an increasing number of applications from European American and Asian American students has been received, but program staff report informally that it has been a challenge to find among these students those who meet the entire set of factors considered for admissions, including openness to taking advice, willingness to work with others in study groups and to take part in community service, and, directly related to the program mission, a strong interest in the advancement of underrepresented minorities in STEM fields. In fact, according to program staff, some of the European American students consider the staff's approach too strong-handed or "dictatorial", for example requiring students to attend regular program meetings.

It is possible that several additional factors have contributed to the maintenance of an African American majority in the program. These include the high number of high achieving African American students in Maryland who apply, and the relatively lower numbers of comparable Latino/a students in the state, the unwavering commitment of university administration and faculty to the program mission, the location in the Washington/Baltimore metropolitan area, the science and engineering strengths of the University, the University's racially and ethnically diverse student body, and the commitment of the University administration and faculty to the program mission.

This study has a number of limitations. The changes in the content and scaling of survey items over time greatly limit conclusions that can be drawn about change, or lack of change, in student experience over time. The interview findings are limited to small samples of students and do not reflect the perspectives of European American and Asian American students. The increasing quality of the high school records of Meyerhoff students over the years limit the meaningfulness of direct comparisons on STEM outcomes. Relatedly, possible self-selection differences between Meyerhoff and comparison students limit conclusions that can be drawn about these findings. Generalizability of findings may be limited—the Meyerhoff Program is relatively unique in its focus, its comprehensiveness, and the high levels of commitment of the university administration to its success. Also, the nature and quality of the program likely has changed over the years as faculty and staff have revised program strategies and components based on their experience with students. Also, the attitudes and perceptions of faculty and Meyerhoff staff regarding the opening of the program to students of other races were not assessed, and should be in future studies.

An additional limitation of the study was the absence of detailed information about the nature and quality of student relationships in the program. Anecdotal evidence indicates that, at least at times, the distinctive mission of the program combined with the mix of students has generated honest discussions about challenging issues such as the attitudes of faculty to different types of students, stereotypes students have about each other, reasons for the underrepresentativeness of minority groups in science, and what it means to be smart and black in America. In our experience, such discussions

tend not to happen often in public settings in higher education, or even in private among students from different races. Changes over time in the nature and impact of such interactions, and more generally about the nature and quality of student relationships with those different than themselves in both academic and social contexts were not systematically examined and should be a focus of future research.

The limitations notwithstanding, the current study remains one of the few systematic, empirical evaluations of the impact of changes in admissions policies in the anti-affirmative action context. Consistent with methods used in the current research, future studies of similar programs in this area will benefit from examining changes over time on multiple outcome measures, including the following: the number and percentage of entering minority students; academic preparation; program and university-level academic and social experience, including the nature and quality of cross-racial interactions and relationships; student attitudes, including interest in and commitment to the success of minority students and professionals; and post-college student outcomes, including pursuit of graduate degrees and, over the longer-term, career pathways (e.g., academic; industrial research; policy work) and community involvement. The inclusion of comparison samples for outcome analysis, the assessment of student experience both prior to and in the years following the change, and the inclusion of both minority and non-minority student samples, represent additional important features to be considered in future research in this area. In addition, the use of both quantitative and qualitative data—mixed methods designs—allows the strengths of each to be drawn upon and the limitations of each to be offset. Whenever possible, both process and outcome evaluation data should be gathered and analyzed in order to strengthen program effectiveness.

Ideally, evaluations will be conducted by social scientists who have expertise in evaluation research and who are knowledgeable about theory and practice related to minority student access, retention, and achievement in higher education. To allow state-of-the art evaluations, sufficient funding must be allocated. Furthermore, the evaluation research team ideally should be brought into the program planning process early on, prior to program implementation, to ensure that baseline information and appropriate comparison samples are included in the evaluation effort.

The future of access to higher education in this anti-affirmative action era represents one of the pressing issues of our times. Many approaches are being taken by universities and programs to address the issue. It is hoped that researchers will become involved increasingly in evaluating the outcomes, and the associated processes of these varied efforts, to ensure that decisions are made on the basic of solid data and not anecdotes. As noted in the recent report, “Rising Above the Gathering Storm”, because of the increasing globalization of the world economy and of competitiveness in science and technology, “for the first time in generations, the nation’s children could face poorer prospects than their parents and grandparents did” (National Academies, 2005, p. 10). It is imperative that we find ways to reduce both the broad academic achievement gap among the races and the disparities in science and engineering performance education, for only in tapping fully the talents of all our citizens can we as a nation remain competitive and meet successfully the challenges ahead.

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Appendix A
Meyerhoff vs. Declined Sample Differences on High School GPA,
SAT scores, and Gender

The 1991-1995 Meyerhoff students had a lower high school GPA (3.6) than Declined students (3.7), F (1) =7.8, $p < .01$ and lower SAT Verbal (555.3 vs. 574.0), F (1) =5.5, $p < .05$, and a greater percentage of males (51.5% vs. 25.6%), X^2 (1) =16.5, $p<.001$ (see Table A). The 1996-2000 African American Meyerhoff students had lower SAT Verbal (623.2) than 1996-2000 African American Declined students (638.0), $F(1)=4=3.9$, $p < .05$. The 1996-2000 European American Meyerhoff and Declined students did not differ on any of the academic characteristics, or gender. The 1996-2000 Asian American Meyerhoffs had lower SAT Verbal (629.0 vs. 666.3), F (1) =5.0, $p < .05$, and lower combined SAT (1315.8 vs. 1377.1), F (1) =6.1, $p < .05$.

Appendix: Table A

Meyerhoff and Declined Comparison Sample: High School GPA,

SAT Scores, and Gender by Year of Entry and Ethnicity

	Pre Cohorts: 1991-1995		Post Cohorts: 1996-2000	
	Meyerhoff	Declined	Meyerhoff	Declined
African American				
High School GPA	3.6 (0.3)	3.7 (0.3)	3.8 (0.3)	3.8 (0.3)
SAT Verbal	555.3 (58.8)	574.0 (68.6)	623.2(56.7)	638.0 (64.8)
SAT Math	644.5 (51.6)	635.1 (50.8)	657.3 (39.7)	657.6 (48.2)
SAT Total	1199.6 (80.8)	1209.1 (90.7)	1280.4 (68.9)	1295.6 (90.6)
% Male	51.5% (104/202)	25.6% (22/86)	45.6% (72/158)	44.5% (49/110)
European American				
High School GPA			4.0 (0.2)	3.9 (0.3)
SAT Verbal			665.8 (68.8)	639.2 (58.1)
SAT Math			688.6 (52.6)	689.2 (44.4)
SAT Total			1355.3(81.5)	1335.8 (87.3)
% Male			41.7% (15/36)	46.2% (12/26)
Asian American				
High School GPA			4.0 (0.3)	4.0 (0.3)
SAT Verbal			629.0 (41.9)	666.3 (79.8)
SAT Math			686.5 (54.4)	710.8 (50.8)
SAT Total			1315.8 (76.0)	1377.1 (107.6)
% Male			38.7% (12/31)	41.7% (10/24)

Table B-1

Number of Students Completing Process Evaluation Item*

by Survey and Entering Class

	1991	1992	1993	1994	1995	1991-1995 TOT	1996	1997	1998	1999	2000	1996-2000 TOT
Survey												
1992/ Freshmen	4	0	0	0	0	4						
1993/ Program Sample	5	5	0	0	0	10						
1994/ All	14	16	22	0	0	52						
1996/ Graduating Seniors	4	5	0	0	0	9						
1999-2001/ Undergraduate. Sample	0	0	0	0	0	3	12	16	48	45	0	121
1999-2001/ Graduate Sample	11	18	15	14	20	78	12	10	0	0	0	22
2005/ Graduating Seniors							0	0	0	0	6	6
TOTAL	38	44	37	14	23	156	24	26	48	45	6	149

* The numbers are for the summer bridge process evaluation item. For students who completed a survey on two or more occasions, the most recent survey was used (except in the case of the 1996 survey, due to the different response format.

Table B-2 Process Evaluation Surveys: Item Wording and Rating Scale Over Time (summer bridge as sample item)

Sample Survey Item	Rating Scale				
1992 and 1993 Surveys					
Rate the extent to which each item listed below is a source of academic or emotional support for you: 16. Summer Bridge Program.	Not at all supportive		Moderately supportive		Extremely Supportive
	1	2	3	4	5
1994 Survey					
20. To what extent did your experience during the summer bridge program positively impact on your academic success	Not at All		Moderate Extent		Large Extent
	1	2	3	4	5
1996 Survey**					
Please indicate the type of impact the following aspects of the Meyerhoff program had on your experience as a Meyerhoff student. c. Summer bridge program	Great Negative Impact	Some Negative Impact	No Impact	Some Positive impact	Great Positive impact
	1	2	3	4	5
1999, 2000, 2001, and 2005 Undergraduate Surveys					
Please indicate the degree to which the following aspects of the Meyerhoff Program were helpful in your experience as a student. 11. Summer bridge program	Not at all helpful	A little helpful	Somewhat helpful	Helpful	Very helpful
	1	2	3	4	5
1999, 2000, and 2001 Graduate Student Surveys					
Please indicate the degree to which the following aspects of the Meyerhoff Program were helpful in preparing you for your current experiences in graduate school: 11.Summer Bridge Program	Not at all helpful	A little helpful	Somewhat helpful	Helpful	Very helpful
	1	2	3	4	5

** To increase consistency with other survey scales, responses were recoded: 1, 2 or 3 as a 1, and 4 as a 3 (5 was retained as a 5).

Table 1

Number and Percent of Entering Students by Year of Entry and Ethnicity

	African American	European American	Asian American	Latino	TOTAL
Year of Entry					
Pre: Cohorts 3-7					
1991-1992	34 (100%)	0	0	0	34
1992-1993	44 (100%)	0	0	0	44
1993-1994	38 (100%)	0	0	0	38
1994-1995	39 (100%)	0	0	0	39
1995-1996	47 (100%)	0	0	0	47
SUBTOTAL	202 (100%)	0	0	0	202
MEAN40.	4 (5.1)	0	0	0	40.4(5.1)
Post: Cohorts 8-12					
1996-1997	28 (77.8%)	5 (13.9%)	3 (8.3%)	0	36
1997-1998	32 (71.1%)	6 (13.3%)	6 (13.3%)	1(2.2%)	45
1998-1999	32 (60.4%)	8 (15.1%)	11 (20.8%)	2 (3.8%)	53
1999-2000	29 (58.0%)	14 (28.0%)	6 (12.0%)	1 (2.0%)	50
2000-2001	37 (82.2%)	3 (6.7%)	5 (11.1%)	0	45
SUBTOTAL	158 (69.0%)	36 (15.7%)	31 (13.5%)	4 (1.7%)	229
MEAN	31.6 (3.5)	7.2 (4.2)	6.2 (2.9)	0.8 (0.8)	45.8(6.5)
Post: Cohorts 13-17					
2001-2002	36 (64.3%)	7 (12.5%)	12 (21.4%)	1 (1.8%)	56
2002-2003	25 (55.6%)	9 (20.0%)	8 (17.8%)	3 (6.7%)	45
2003-2004	36 (58.1%)	17 (27.4%)	8 (12.9%)	1 (1.6%)	62
2004-2005	41 (65.1%)	8 (12.7%)	12 (19.0%)	2 (3.2%)	63
2005-2006	28(60.9%)	11(23.9%)	6(13.0%)	1 (2.2%)	46
SUBTOTAL	166 (61.0%)	52(19.1%)	46(16.9%)	8(2.9%)	272
MEAN	33.2 (6.5)	10.4 (4.0)	9.2(2.7)	1.6 (0.9)	54.4(8.6)
Combined Post: Cohorts 8-17					
SUBTOTAL	324 (64.5%)	88 (17.6%)	77(15.4%)	12(2.4%)	501
MEAN	32.4 (5.0)	8.8 (4.2)	7.7(3.1)	1.2(0.9)	50.1(8.6)

Table 2

High School GPA, SAT Scores, and Gender by Year of Entry and Ethnicity

	African American	European American	Asian American	TOTAL
Year of Entry				
Pre: Cohorts 3-7				
GPA	3.6 (0.3)			3.6(0.3)
SAT Verbal	555.3 (58.8)			555.3 (58.8)
SAT Math	644.5 (51.6)			644.5 (51.6)
SAT Total	1199.6 (80.8)			1199.6 (80.8)
% Male (104/202)	51.5% (104/202)			51.5%
Post: Cohorts 8-12				
GPA	3.8 (0.3)	4.0 (0.2)	4.0 (0.3)	3.8(0.3)
SAT Verbal	623.6(56.7)	665.8 (68.8)	629.0 (41.9)	630.8 (58.9)
SAT Math	657.3 (39.7)	688.6 (52.6)	686.5 (54.4)	666.3 (46.1)
SAT Total	1280.4 (68.9)	1355.3(81.5)	1315.8 (75.9)	1297.3 (77.0)
% Male (99/225)	45.6% (72/158)	41.7% (15/36)	38.7% (12/31)	44.0%
Post: Cohorts 13-17				
GPA	3.9 (0.4)	4.0 (0.4)	4.1 (0.4)	3.9 (0.4)
SAT Verbal	620.4(62.6)	655.4 (53.1)	625.7 (67.7)	628.3 (63.0)
SAT Math	652.0 (41.9)	706.4 (53.3)	702.0 (48.9)	671.5 (52.0)
SAT Total	1272.1 (82.6)	1361.9 (72.0)	1324.8 (88.2)	1299.1 (89.3)
% Male (133/264)	47.9% (79/166)	55.8% (29/52)	54.3% (25/46)	50.4%
Total: Cohorts 3-17				
GPA	3.7 (0.4)	4.0 (0.3)	4.1 (0.4)	3.8 (0.4)
SAT Verbal	596.2(67.6)	659.7 (59.8)	627.0 (58.4)	607.7 (69.2)
SAT Math	650.7 (45.5)	699.1 (53.4)	695.7 (51.4)	662.0 (51.3)
SAT Total	1246.7 (86.4)	1359.2 (75.7)	1321.2 (83.1)	1269.4 (94.2)
% Male (336/691)	48.5% (255/526)	50.0% (44/88)	48.1% (37/77)	48.6%

Table 3

Program Components by Year of Entry and Ethnicity

	African American		European American		Asian American		Total	
Year of Entry								
Pre: 1991-1995								
Summer Bridge (1.1)		4.0 (1.1)						4.0
Part of Community Study Groups (1.2)	4.1 (1.1)	3.9 (1.2)					4.1 (1.1)	3.9
Staff Advising (1.3)		3.5 (1.3)						3.5
Summer Research (1.5)		4.0 (1.5)						4.0
Financial Support (1.1)		4.4 (1.1)						4.4
Peer Social (1.3)		4.0 (1.3)						4.0
Peer Academic (1.1)		4.2 (1.1)						4.2
Program Cultural (1.2)		3.4 (1.2)						3.4
Mean across items (0.7)		3.9 (0.7)						3.9
Post: 1996-2000								
Summer Bridge (0.8)		4.5 (0.8)		4.3 (0.8)		4.6 (0.7)		4.5
Part of Community Study Groups (1.1)	4.6 (0.8)	4.2 (1.2)	4.1 (1.3)	4.2 (1.2)	4.7 (0.6)	4.3 (1.1)	4.5 (0.9)	4.2
Staff Advising (1.0)		4.2 (0.9)		3.8 (1.3)		4.4 (0.8)		4.2
Summer Research (1.0)		4.2 (1.0)		3.9 (1.1)		4.1 (1.1)		4.1
Financial Support (0.7)		4.7 (0.7)		4.9 (0.5)		4.7 (0.9)		4.8
Peer Social (0.9)		4.4 (0.9)		4.4 (0.8)		4.5 (0.7)		4.4
Peer Academic (0.7)		4.5 (0.7)		4.4 (0.8)		4.4 (0.8)		4.5
Cultural Activities (1.0)		3.6 (1.1)		3.1 (1.0)		3.5 (0.9)		3.5

Mean Across Items	4.3 (0.5)	4.1 (0.7)	4.4 (0.4)	4.3 (0.5)

Table 4

Post-College Outcome by Year of Entry and Ethnicity for Meyerhoff and Comparison Students

	African American		European American		Asian American	
	Meyerhoff	Declined	Meyerhoff	Declined	Meyerhoff	Declined
Year of Entry						
Pre:						
Cohorts 3-7						
STEM Ph.D.	29(14.3%)	4 (4.7%)				
M.D./Ph.D.	12 (6.0%)	0 (0.0%)				
STEM M.S.	48(23.8%)	15(17.5%)				
M.D.	36(17.8%)	36(41.9%)				
Other Profess.	2 (1.0%)	5 (5.8%)				
No STEM Grad	67(33.2%)	19(22.1%)				
Still Undergr	0 (0.0%)	0 (0.0%)				
Unknown	8 (4.0%)	7 (8.1%)				
TOT	202	86				
Post:						
Cohorts 8-12						
STEM Ph.D.	43(27.2%)	5 (4.5%)	14(38.9%)	1 (3.8%)	6(19.4%)	1 (4.2%)
M.D./Ph.D.	12 (7.6%)	0 (0.0%)	1 (2.8%)	0 (0.0%)	1 (3.2%)	3(12.5%)
STEM M.S.	21(13.3%)	12 (11.0%)	6(16.7%)	2 (7.6%)	5(16.2%)	1 (4.2%)
M.D.	15(9.5%)	20(18.2%)	1 (2.8%)	2 (7.6%)	7(22.6%)	5(20.8%)
Other Profess.	1(.6)	3 (2.7%)	0 (0.0%)	1 (3.8%)	0 (0.0%)	0 (0.0%)
No STEM Grad	27(17.1%)	47(42.7%)	10(27.8%)	10(38.5%)	2 (6.5%)	9(37.5%)
Still Undergr	20(12.7%)	8 (7.3%)	1 (2.8%)	1 (3.8%)	3(9.7%)	0 (0.0%)
Unknown	19(12.0%)	15(13.6%)	3 (8.3 %)	9(34.6%)	7(22.6%)	5(20.8%)
TOT	158	110	36	26	31	24

APPENDIX IV

Draft 1/11/2008

MAP DATA COLLECTION (draft)

The types of data to be collected for each participant who has been supported will include background data and outcomes data. Suggestions are below.

A. BACKGROUND DATA TO BE COLLECTED

1. Name
2. Gender
3. Race/ethnicity
4. Major in college or graduate program department or field (for high school students, prospective college major)
5. Contact information for students – college e-mail (other electronic contacts – other e-mail, facebook page etc if relevant); permanent mailing address
6. Contact information for parents—phone number and e-mail.
7. Contact information for research mentor/primary advisor-phone number and e-mail.
8. Period of grant support (mo/yr – mo/yr)
9. Undergraduate Educational level at time of support [Proposed definitions below so that data from different sites are comparable.]
   Undergraduates in academic year programs
   Freshman, sophomore, junior, senior, super-senior (5th year or above)
   Undergraduates and high schoolers in summer programs
   Rising sophomore = summer at the end of freshman year
   Rising junior = summer at the end of sophomore year
   Rising senior = summer at the end of junior year
   Rising super senior = summer at the end of 4th year, UG education continuing into fifth year

10. Post-baccalaureate= summer or academic year immediately following graduation from college
11. For graduating students: college or graduate program/school plan to attend or have applied to if choice not known
12. Pre-doctoral students
    Date of receipt of bachelor's degree; scientific discipline, year of entry to graduate program
13. Post-doctoral scientist
    Date of PhD, scientific discipline, and years as a post-doc

14, Faculty
Date of PhD; scientific discipline, number of years as a faculty member; faculty rank

B. OUTCOME DATA TO BE COLLECTED

The outcomes should match the goals and milestones. We are looking at outcomes for each participant in the program and for the program as a whole. Types of data to be collected:

1. Current educational/employment status
    a. If pursuing educational goals (as appropriate): national test scores (SAT/GRE); type of degree; discipline; start and projected completion dates.
    b. If employed: type of employment (academia; biotech/industry); discipline; type of activity (research, teaching, administration); dates of employment

2. Complete citation of peer reviewed publications.
3. Applications/scholarships applied for: type of application (training/career development; research); funding organization; date applied.
4. Awards received: type of award (training/career development; research); funding organization; project period; total amount of award.

- For each participant, we want to know whether the goal(s) were met and what milestones were achieved. If the goal(s) have not been met, what strategies will you implement to achieve the goal(s)?

- For the program as a whole, indicate whether the goal(s) were met and what milestones were achieved. If the goal(s) have not been met, what strategies will you implement to achieve the goal(s)?

Summary Data for T32 Programs

Grant Number:

Reporting Period: From_____ To_____
PI Name:_____
Institution:_____

	Predocs		Postdocs	
	URMs	Non-URMS	URMs	Non-URMs
GRADUATE STUDENTS				
# Students participating in past academic year				
# trainee-authored peer review publications				
Average # years on T32				
# graduate students applying for graduate fellowships			N/A	N/A
# graduate students receiving graduate fellowship awards			N/A	N/A
Students who graduated			N/A	N/A
# with MS			N/A	N/A
# with PHD			N/A	N/A
# with MD/PHD			N/A	N/A
# Graduating students who obtained postdoc positions			N/A	N/A
Time to degree				
MS			N/A	N/A
PHD			N/A	N/A
MD/PHD			N/A	N/A
Average number of years to obtain Ph.D degree				
# Graduating students employed in academia			N/A	N/A
# Graduating students employed in industry			N/A	N/A
# Graduating students employed in other sectors			N/A	N/A
# Graduating students applying for postdoc fellowships			N/A	N/A
# Graduating students receiving postdoc fellowship awards			N/A	N/A
# Graduating students applying for career development or research grants			N/A	N/A
# Graduating students receiving career development awards or grants			N/A	N/A
POSTDOCTORAL FELLOWS				
# Postdocs participating in				

past academic year				
# trainee-authored peer review publications				
# New postdocs applying for fellowships	N/A	N/A		
# New postdocs receiving fellowship awards	N/A	N/A		
# Post docs who completed traineeship	N/A	N/A		
# Finishing post docs employed in academia	N/A	N/A		
# Finishing post docs employed in industry/biotech	N/A	N/A		
# Finishing post docs employed in other sectors	N/A	N/A		
# Finishing post docs applying for fellowships	N/A	N/A		
# Finishing post docs receiving fellowship awards	N/A	N/A		
# Finishing post docs applying for career development or research grants	N/A	N/A		
# Finishing post docs receiving career development awards or grants	N/A	N/A		

LIST PUBLICATIONS (Separate Predocs from Postdoc publications)

PREDOCTORAL

POSTDOCTORAL

Summary Data for Individual Post Docs on MAP Grants and Faculty Programs

Grant Number:
Reporting Period: From_____ To_____
PI Name:_____
Institution:_____

	Individual Post Docs on MAP Grants	Faculty
POSTDOCTORAL FELLOWS		
# Postdocs participating in past academic year		
# trainee-authored peer review publications		
# New postdocs applying for fellowships		N/A
# New postdocs receiving fellowship awards		N/A
# Post docs who completed traineeship		N/A
# Finishing post docs employed in academia		N/A
# Finishing post docs employed in industry/biotech		N/A
# Finishing post docs employed in other sectors		N/A
# Finishing post docs applying for fellowships		N/A
# Finishing post docs receiving fellowship awards		N/A
# Finishing post docs applying for career development or research grants		N/A
# Finishing post docs receiving career development awards or grants		N/A
FACULTY		
# Faculty participating in past academic year	N/A	
# trainee-authored peer review publications	N/A	
# Faculty members who completed the traineeship	N/A	
# Faculty applying for career development awards or research grants	N/A	
# Faculty receiving career development awards or research grants	N/A	
# Students from faculty's institution participating in research at host institution	N/A	

LIST PUBLICATIONS:

Summary Data for

Post Baccalaureate, Year Long Research Undergraduate, and Summer Undergraduate Programs

Grant Number:
Reporting Period: From_____ To_____
PI Name:_____
Institution:_____

	Post Baccalaureate Program	Year-Long Undergraduate Program	Summer Undergraduate Program
# Participating in past academic year			
# trainee-authored peer review publications			
# Graduating with a BS degree in STEM field	N/A		
GRADUATE SCHOOL (PHD or MD/PHD			
# Taking the GRE			
Participants' average score for GRE General Test			
Participants' average score for GRE Subject Test			
# Applying to graduate school (MS, PHD or MD/PHD)			
# Applying to graduate school in STEM field			
# Accepted into graduate school in STEM field			
# Applying for pre-doc fellowships			
# Receiving pre-doc fellowship awards			
# Receiving BS Degree in STEM field	NA		
# Receiving a MS Degree			
# Receiving a PHD			
# Receiving a MD/PHD			
Average number of years to receive Ph.D			
MEDICAL SCHOOL			
# Taking the MCAT			
Participants' average score for MCAT			
# Applying to medical school			
# Accepted into medical school			
# Graduating with MD degree			

LIST PUBLICATIONS

Summary Data for

High School Research Programs

Grant Number:
Reporting Period: From_____ To_____
PI Name:_____
Institution:_____

	High School Research Programs
# Participating in past academic year	
# trainee-authored peer review publications	
# Completed high school	
Participants' average GPA in STEM field	
# Participants who took the SAT	
Participants' average SAT score	
# Participants applying to college	
# Participants majoring in STEM fields	
# Participants applying for summer research experience post high school	
# Graduating with a BS degree in a STEM field	

LIST PUBLICATIONS

APPENDIX V

PROPOSED GOALS

FOR NHGRI RESEARCH TRAINING AND MAP PROGRAMS

Revised 12/21/07

BACKGROUND

In May 2001, the National Advisory Council for Human Genome Research approved the Plan for Increasing the Number of Underrepresented Minorities (URM) trained in Genomics and ELSI Research (http://www.genome.gov/10001707). The plan, later called the "Minority Action Plan," had one goal: "To increase the number of underrepresented minorities that are trained to pursue research in the fields of genomics and/or ELSI research. At the time, T32 institutional training grants and certain mechanism (Centers of Excellence in Genome Sciences (CEGS), large-scale sequencing and Centers of Excellence in ELSI Research (CEERS)) were mandated to develop activities to reach the NHGRI goals which were:

- **T32 Training Grants:** Achieve an average of 10 percent URM trainees within the next three years. Eventually, the percentage should rise to the percentage of minorities in the baccalaureate population.
- **Centers of Excellence in Genomic Sciences (CEGS):** The CEGS have two related training objectives. The first is the training of all Center-associated investigators, and the broader research community at the institution, in the development and use of genomics approaches to the study of biology and medicine. The second is the training of minorities who are underrepresented in genomics. For goal for the former is to have an average of 10 percent of the trainees be from underrepresented minority populations. The goal of the latter is to develop outreach activities, such as summer programs for undergraduates or a course for students or faculty from underrepresented groups by the second year of the grant.
- **Production Centers:** Encourage the careers of minorities working in production centers with such activities, such as establishing a scholarship program to enhance the careers so that they can pursue graduate degrees and developing and implementing other creative ideas for attracting and training minority individuals. Within two years, each center will be expected to have a program in place.
- **The Centers of Excellence in ELSI Research (CEERs):** The CEERs are required to develop detailed training plans to both train the next generation of ELSI researchers and increase the number of ELSI researchers from underrepresented minority populations. Activities to accomplish this can include providing research opportunities for undergraduates to encourage them to pursue careers in this field; pre-doctoral research experiences for students in the social sciences and humanities who are interested in ELSI training; postdoctoral training in ELSI research; recruiting and mentoring junior faculty in ELSI research careers; and outreach to established minority

scholars who are already engaged in research but who may not be aware of ELSI research opportunities.

In the implementation of the program, NHGRI staff also included databases, which were not in the original report. NHGRI gave laboratories the option of developing plans that took advantage of the strengths of their laboratories and encouraged grantees to capitalize on the resources and programs within their own institutions that had similar goals. To get the initiative started, grantees initially submitted request for supplemental funds that were added to ongoing programs. However, when these grants were seeking competitive renewals, the plan became an integral part of the application and did undergo peer review by experts in the field. The types of activities funded provided experiences fromK-12 to faculty. When the Centers of Excellence in ELSI Research was established, the goal was to training goals were limited to postdoctoral fellows. NHGRI also put in place a group of Advisors whose primary purpose was to give advice to the NHGRI regarding the implementation of this program. Annual meetings are held to provide grantees an opportunity to discuss their programs and for the Advisors to provide input to grantees and NHGRI staff.

The MAP was very clear that "All components of this initiative must have achievable goals, measurable outcomes and appropriate review and evaluation." Very few programs have procedures in place to evaluation outcomes. Although some are excellent models, the variety of data collected cannot be compared amongst programs. The Advisors have always stressed the importance of outcomes. Now that the program has been operations for several years, it is important that the outcomes of the various activities, summer research programs, graduate and postgraduate research training, etc, become harmonized. The purpose of this document is to put forth suggestions for goals, based on the activity and suggestions for measure for meeting those goals, the data to be collected and attempts to standardize the consent to participate form.

I. UPDATED GOALS, MILESTONES AND RELEVANT ACTIVITIES

A. Graduate Research Training

- A.1 T32 Research Training Programs.

  Goals: (1) appoint URMs to XX% (a minimum) of Council approved slots; (2) achieve retention rate similar or better than that for non-URMs; (3) provide additional temporary slots for URMs as needed; and (4) have URMs graduate with a Ph.D. in a scientific discipline relevant to genomics at the same percentage similar to or better than the non-URMs.

- A.2. Individual Graduates

  Goal: To have XX% of participants graduate in a scientific discipline relevant to genomics.

Milestones: choosing a major professor; choosing a research project; advancing to candidacy (passing qualifying exams), presenting research at scientific meetings, publishing, seeking independent pre/post-doctoral funding, completing the PhD in a biomedical discipline, securing the next

position (post-doc, academic research, industry, teaching, government, etc.); and identifying additional URMs beyond their recommended 25% participation.

Suggested Relevant Activities To Accomplish Milestones: completing academic courses; taking gap filling courses; pursuing career enhancement activities, such as writing, presentation and career development seminars, participating/leading journal clubs, etc.; recruiting URMs.

B Postdoctoral Fellowships

- B.1. T32 Research Training Programs

  Goals: (1) appoint URMs to XX% (a minimum) of Council approved slots; (2) achieve retention rate similar or better than that for non-URMs; (3) provide additional temporary slots for URMs as needed; (4) have URMs publish in quality peer-reviewed journals at a same or similar rate than the non-URMs; and (5) have URMs apply for/receive fellowships/first awards at a rate same or similar to that of non-URMs.

- B.2. Individual Postdoctoral Fellowships

  Goals: (1) have URMs publish in quality peer-reviewed journals at a same or similar rate than the non-URMs; and (2) have URMs apply for/receive fellowships/first awards at a rate same or similar to that of non-URMs.

Milestones: Choosing a major professor; choosing a research project; presenting research at scientific meetings, preparing manuscripts of research findings and submitting for publication in high quality journals; seeking independent post-doctoral funding/first grant awards; organizing national research meetings; going on recruitment trips, etc.

Suggested Relevant Activities To Accomplish Milestones: pursuing career enhancement activities, such as courses to improve writing and presentation skills and grant writing seminars; drafting fellowship or research applications; participating in mock peer review panels; discussing employment options with mentor and seeking employment opportunities/options, etc.

C. Post Postdoc/Faculty Programs.

Goal: to provide each participant with a research experience that will result in preliminary data for submission of a grant application that results in research being conducted at the home and/or host institution.

Milestones: presenting research at national scientific meetings; publishing; submitting a grant application within six months of completing the research experience; receiving a grant award; and providing opportunities for students at the home institution to participate in research at the host institution.

Suggested Relevant Activities To Accomplish Milestones: participating in a research project that can be continued at the home institution or at the host institution; participating in research seminars; writing and refining a draft of a research grant application; participating in career counseling; taking academic or other new courses to update knowledge and skills, if necessary; making presentations at scientific meetings; writing up research results for publication, etc.

D. Post Baccalaureate and Year Long Research Undergraduate Programs.

Goals: to have XX% of participants enrolled in and retained in a Ph.D. or MD/PhD in a biomedical research field.

Milestones: choosing a research lab, attending or presenting at scientific meetings, presenting research in departmental seminars; taking relevant core courses, graduating with a baccalaureate degree in a science, technology, engineering, mathematics (STEM) field (UG only), taking the GRE; applying to graduate or professional programs, enrolling in a graduate or professional program, seeking independent fellowship support; continuining in a STEM field.

Suggested Relevant Activities To Accomplish Milestones: taking GRE prep courses or courses required for admission to graduate school in of the STEM fields; participating in seminars to enhance writing, presentation and interviewing skills, conducting research ; writing manuscripts; participating in career counseling; involving the mentor in career counseling; acceptance into graduate, maintaining an excellent GPA in core science courses, etc.

E. Summer Undergraduate Research Programs.

Goal: to have XX% of students enroll in PhD or MD/PhD in biomedical research programs.

Milestones: taking advanced STEM courses, achieving a high GPA in STEM courses; attending or presenting at scientific meetings, graduating with a baccalaureate degree in a STEM field, taking the GRE, applying to graduate or professional programs, enrolling in a graduate or professional program, seeking independent fellowship support; continuining in scientific discipline.

Suggested Relevant Activities To Accomplish Milestones: taking GRE prep courses or courses required for admission to graduate school in of the STEM disciplines; participating in seminars to enhance writing, presentation and interviewing skills, conducting research ; writing manuscripts; participating in career counseling; involving the mentor in career counseling; acceptance into graduate, maintaining an excellent GPA in core science courses, etc.

F. Summer High School Research Programs:

Goal: to have XX% of the students enroll in college and major in a STEM field.

Milestones: completing high school science and math courses following summer research experience; taking the SAT, applying to college, enrolling in college with an emphasis on a STEM field, continuining as a science major through college, seeking summer research experiences.

Suggested Relevant Activities To Accomplish Milestones: taking SAT prep courses; achieving a high GPA in STEM courses; taking seminars to enhance writing, presentation and interviewing skills; selecting colleges to apply to, etc.

II. DATA COLLECTION (to not complete)

APPENDIX VI

NIGMS Post baccalaureate Research Education Program (R25)

Overall Goal: To encourage individuals from underrepresented groups who have recently obtained their baccalaureate degrees, to earn a PhD degree in biomedically relevant sciences, through well-designed academic enhancements and extensive research experience

Rationale of Program: The number of URMs completing Ph.D. degrees at highly selective institutions is small, thus in addition to increasing the number of URM Ph.D.s,(quantity) there is a need to increase the number of URM students at research intensive institutions (quality) who will finish Ph.D. degrees in biomedical sciences in order to support a diverse scientific workforce. The PREP was designed for URM baccalaureate graduates who may not have the proper academic background and research skills or may have acceptable academic training but did not have meaningful research experiences, and through individualized development plans, which includes proper coaching, mentoring, and training might become competitive. The institutional programs are expected to provide these students the academic credentials and research capabilities so they can undertake Ph.D. studies at highly selective institutions.

PREP Objectives: An identifiable pool of PREP participants may be the URM students who almost got admitted to high quality Ph.D. programs. Institutional PREPs will be able to obtain such information from their own admissions office or from other institutions and use this as the base for recruiting students into their institutional PREP. With the information, the applicant institutions will be able to determine what type of interventions might be suitable for the students and help them with application or re-application to their graduate programs as well as to other type 1 institutions. Since the targeted group is pre-identified as URM students interested in obtaining Ph.D. degrees, there is an expectation from the MORE Division that at least 90% of the PREP participants will apply to Ph.D. programs, with at least 75% of them gaining admission and enrolling in these programs after a one-year PREP internship. It is expected that after 7 years following PREP participation, at least 75% of the students would have obtained their Ph.D. degrees and at least 90% of them will have accepted postdoctoral positions 2 years after they finish their Ph.D. degrees.

Data Needed:

1. Institutional data on URMs and non-URM admission rate into graduate programs of participating departments before and after PREP
2. Institutional data on predoctoral URMs and non-URM students' graduation rate from participating departments before and after PREP
3. Number of predoctoral students (URMs and non-URMs) with predoctoral fellowships from participating departments before and after PREP
4. Number of URMs and non-URMs with competitive postdoctoral fellowships or positions from participating departments before and after PREP

Highlights from the Program Announcement: (PAR 07-432)

I. Eligibility Issues:

A. Institutions: must be a research institution that has a significant number of faculty mentors with NIH or other extramural research support in the biomedical and behavioral science fields; must have strong Ph.D. programs and demonstrated experience of training Ph.D. candidates. Supporting information about the institution's research

program, training experience, and funding of the faculty mentors must be provided at the time of application. Applicants may not submit, or have pending, more than one PREP grant application. Eligible institutions may hold only one PREP award.

B. PD/PI: should have the research and teaching experiences as well as leadership and administrative skills required to develop and implement the proposed research education program.

C. Participants: individuals underrepresented in the fields of biomedical or behavioral research and have graduated with a baccalaureate degree in a biomedically relevant science, from an accredited U.S. college or university, no more than 36 months prior to applying to a PREP, and are not currently enrolled in a degree program; must intend to apply for a Ph.D. program in the biomedical or behavioral sciences, immediately following completion of apprenticeship.

II. Research Plan: 25 pages, including tables, figures, diagrams, and charts.

1. Introduction-required only for resubmissions
2. Specific Aims-includes overall goals, specific measurable objectives, anticipated milestones
3. Background and Significance-includes institutional setting, graduate programs, institutional mission, academic components, evidence of institution's commitment to diversity, current academic programs (mentoring, tutoring, counseling), institutional data-number of graduate students, graduation rate, URM info). Student enrollment, graduation, career paths (includes % URMs), number of PhD students in participating departments-graduation rate, career track data for the last four years
4. Preliminary Studies/Progress Report-new applications, brief description and summary of any significant achievements within the last four years of any programs at the institution that have encouraged and helped retain underrepresented students, postdoctoral researchers, and faculty in the PREP-participating departments; for renewal applications: includes explicitly identified, detailed progress report; the original and specific measurable objectives, anticipated milestones, and outcomes.

(Provide information required in PREP competing renewal Sample Format Tables 1 and 2 http://www.nigms.nih.gov/Minority/Special/PREP/prepsampletables_competing.htm)

5. Research Design and Method- Includes the following:
    a) *Personnel*- PD/PI; Advisory Committee; Program faculty and staff
    b) *Proposed Research Education Program*-strategies for individual development plan (student IDP), program activities, outcome measures, monitoring student progress and career path (10 years post PREP); faculty mentors and staff contribution, mentoring, roles in student development, integration/interaction with other programs, enhancement of skills
    c) Responsible conduct of Research
    d) *Program participants*- pool; recruitment plans, eligibilities/qualification, selection
    e) Diversity Recruitment & retention Plan-
    f) *Evaluation plan* (survey instruments, questionnaires, full description may be included as appendix)

Institutional Commitment: Evidence of institutional commitment to the research educational program is strongly encouraged.

III. Allowable Costs

1. Personnel**:** Limited administrative and clerical salary costs, salary support for the PD/PI is up to 1.35 person months (i.e., 15% effort of a 9-month academic year) during the academic year and 0.45 person months (i.e., 15% of a 3-month summer term) in the

summer. Salary for a program coordinator may be requested and is limited to 50% time. Mentoring interactions will not be supported by grant funds.

2. Participant Costs: PREP participants will be paid a salary of $21,000/year but may not exceed the levels commensurate with the institution's policy for similar positions. The total compensation package: (includes fringe benefits and tuition and fees if applicable) must not exceed $30,000/year. PREP participants will be required to work as research apprentices at 75% of time, and the other 25% will be for further academic development. Travel support may be requested for students to present at national scientific meetings. Tuition Remission: for a course deemed necessary to enhance the preparedness of a PREP scholar for graduate studies; tuition remission must be specifically justified and may not exceed the in-state tuition cost at institutions that also have out-of-state tuition charges.

3. Other Program-Related Expenses: Consultant costs, equipment, supplies, travel for key persons, and other program-related expenses must be justified as specifically required by the proposed research education program and must not duplicate items generally available for educational programs at the applicant institution.

Unallowable costs: Housing, food, or recruitment expenses of any kind; support for faculty research; faculty mentors' time or effort compensation; cost of workshops or courses with a limited focus of preparation for a specific test (e.g., GRE, MCAT); foreign travel; alterations and renovations; consortium/contractual arrangements

IV. Evaluation: It is important to determine the efficacy of a given intervention by assessing program (1) implementation, (2) impact, and (3) outcomes. The impact of the program may be measured or described as benefits to the institution, faculty members in both participating and non-participating departments, non-PREP students, and PREP participants, as well as the rest of the community. Program outcomes are based on the specific measurable objectives set by the program. In order to assess the value of this program, an assessment component that includes specific goals and measurable objectives, indicators to measure successes, and measurement of the short- and long-term benefits and/or impacts of the PREP to the participants, faculty mentors, students within the institution, and the institution as a whole. In order to be maximally informative, an assessment plan must include baseline data and post-PREP follow up of participants. The main purpose of the assessment of the program is to provide useful information to the institutional program directors and the institutions for improving their PREPs. The resulting assessment should help inform the institutional leadership in deciding which elements of the PREP could be institutionalized. Applications must contain an evaluation or assessment plan. Applications submitted without these sections may be delayed in the review process or not reviewed. In addition, a mechanism to continue following the progress of the past participants (e.g., application to Ph.D. or enrollment/expected date to receive Ph.D.) should be described. Applications submitted without these sections will be considered noncompliant and will not be reviewed.