

Outcomes of Global Public Health Training Program for US Minority Students: A Case Report



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Abstract

The numbers and success of minority students in science and the health fields remain relatively low. This study presents the outcomes of a research training program as an illustrative case study. The Short-Term Training Program for Minority Students (STPMS) recruits underrepresented minority undergraduate and graduate students for immersion in research training. A total of 69 students participated in the STPMS between 1995 and 2012, and 59 of these completed our survey to determine the perceived impact of the program on the students' motivations and professional development. Results indicated that motivations to participate in the STPMS were commonly related to long-term professional development, such as obtaining mentoring and guidance in career decision making, rather than gaining specific research skills or for economic reasons. Students reported that participation in short-term research training had the most significant effect on improving their attitudes toward biomedical research and promoted positive attitudes toward future careers in health research. A total of 85% of the program's alumni have since completed or are currently working toward a degree in higher education, and 79% are currently working in science research and health care fields. Overall, the short-term training program improved students' attitudes toward research and health science careers. Mentoring and career guidance were important in promoting academic development in students.

KEY WORDS graduate, health fields, internship, medicine, science, undergraduate, underrepresented.

INTRODUCTION

Lack of diversity in the sciences and health professions has been identified as an important perpetuator of health disparities and as a pressing challenge to the conduct of medicine.¹⁻⁴ At a time when the gap in health between the races has widened, the number of minority students in biomedical research and medicine continues to be small. Underrepresented minorities (URM) constitute 32% of the general population in the United States,⁵ yet in 2012 they made up only 11% of those who graduated from American medical schools.⁶ The Council on Gradu-

ate Medical Education determined that the United States would need to increase medical school enrollment by 15% to keep up with the public's need for physicians.⁶ With the country's changing demographics, this goal would be nearly impossible to achieve without the recruitment of minority students.^{3,7} Minority scientists are also urgently needed to conduct research and develop models to address health conditions.⁸⁻¹⁰ Yet in 2012, URM represented only 7.3% of those graduating with doctoral degrees in the natural sciences, and in 2013, 6.2% of full-time professors with science, engineering, or health doctorates in all American institutions.⁵

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Reasons for the lack of URM in science and health professions are complex. Among them are economic hardship, poor access to quality early education, lack of role models, feelings of isolation and discrimination, and inadequate support systems.^{8,11-15} Many URM come from disadvantaged high schools where they are not academically prepared.¹⁶ These disadvantages perpetuate over time, through medical and graduate education.^{14,15,17} Minority physicians are less likely to enter careers in academic medicine,¹⁸ where they would have the ability to contribute to the future of medical education, and minority scientists compete less successfully for NIH funding than their nonminority peers.¹⁹

It is essential to recognize the substantial benefits of increased diversity. Minority physicians tend to practice medicine in underserved communities²⁰ and do research on diseases that disproportionately affect underserved populations^{8,10,21} and are effective in recruiting minorities into research studies.^{10,22} Creating a diverse and culturally competent workforce may allow for development of effective interventions to treat all populations.^{2,3,23-25}

Well-designed programs can be effective in recruiting minority students and improving their rates of success in health-related fields. Exposure to research experiences, mentorship, peer integration, and financial assistance have all been proposed to enhance educational and professional attainment for minorities.²⁶⁻³⁰ In this paper we present an evaluation of the Short-Term Research Training Program for Minority Students (STPMS) at the Icahn School of Medicine at Mount Sinai, a program that provided 3 months of research training to 69 undergraduate and graduate URM students between the years 1995-2012.

SHORT-TERM TRAINING PROGRAM FOR MINORITY STUDENTS

Recruitment. Criteria for selection into the training program were (1) US citizens or permanent resident, (2) self-identified as URM, and (3) an undergraduate grade point average of 3.0 or above. The National Institutes of Health definition of URM includes American Indians or Alaska Natives, Blacks or African Americans, Hispanics or Latinos, and Native Hawaiians or Other Pacific Islanders. Students were selected on a competitive basis from a national pool of applicants.

Program Structure. Students were paired based on academic interests with a faculty mentor. Before the research period, students underwent an orientation during which they learned about institutional policies and completed

courses in the ethical conduct of research, including Health Insurance Portability and Accountability Act compliance, conflict of interest, and ethical use of human and animal subjects in research. During the research period, students participated in seminar series, weekly group meetings, monthly works-in-progress seminars, and a bimonthly journal club. Students were granted a stipend and benefits for the duration of their research training.

Training and Mentoring Strategies. Research training focused on environmental health and includes disciplines such as community-based participatory research, health disparities research, biostatistics, molecular biology, or other research methods. Students were required to complete a research paper. Each student had weekly sessions with their mentor and monthly career counseling sessions with the program director, who is a URM woman. After completion of their research training period, students became part of an alumni network linked through e-mail and social media groups. Alumni are regularly sent information regarding relevant scholarships and training positions and are encouraged to stay in touch with each other as well as with mentors and the program director regarding their future plans.

Program Evaluation. After testing with students who were not participants in this program, a questionnaire was developed using Survey Monkey. Individual e-mails were sent to alumni with an invitation to voluntarily complete survey. Questions included demographic information; educational attainment and degree; motivation for participation in the program; frequency of contact with mentor, director, and peers from the program; employment field and satisfaction with current work; impact of training program on professional and academic development; and overall impressions and recommendations for the program. All questions were voluntary and both multiple choice and open-answer questions were used.

Data Analysis. Data were compiled in 2013 and multiple choice and short-answer questions and answers were assembled into tables and graphs using Microsoft Excel. Percentage and other appropriate calculations were performed using the number of respondents in each question. Open-response answers were reviewed and categorized by content and used as a qualitative reference for discussion.

FINDINGS FROM PROGRAM EVALUATION

Participant Profile. A total of 69 alumni participated in the STPMS between the years 1995-2012. Seven students were lost to follow-up; 62

Table 1. Profile of Participants and Survey Respondents of Short-Term Training Program

	Original Participants	Survey Respondents
Total	69	59
Gender	Male = 15 (22%) Female = 54 (78%)	Male = 11 (19%) Female = 48 (81%)
Ethnicity	Latino = 31 (45%) African American = 31 (45%) Other* = 7 (10%)	Latino = 30 (51%) African American = 25 (42%) Other* = 4 (7%)

* Other refers to multiracial or other underrepresented groups as defined by the National Institutes of Health (2013).

students were sent the questionnaire via e-mail, and 95% (59) completed it. Table 1 presents the demographic profile of program participants and respondents. Almost all of the 53 respondents (96%) rated their program experience as positive (indicated as excellent, very good, or good), as opposed to fair or poor, and 92% (49) indicated that they would recommend the program to others.

Motivation for STPMS Participation. The motivations for student participation in the STPMS are presented in Figure 1. The highest ranked motivations included “to gain research experience” (100%); “to meet peers/experts in the field” (92%); “to work with a mentor” (91%); “to improve skills or knowledge in current field” (90%); and “to help make a decision on my career” (88%).

Effects of the STPMS. The degrees to which different attitudes and competencies of students were

influenced by the STPMS are presented in Figure 2. The attitudes most commonly indicated as significantly affected by the program included “increased awareness of environmental and occupational health issues” (66% a great deal, 23% moderately); “helped to better understand research” (63% a great deal, 31% moderately); “led me to a better understanding of my own career goals” (52% a great deal, 31% moderately); “increased interest in environmental and occupational health issues” (52% a great deal, 21% moderately); and “increased interest in pursuing advanced science degree” (45% a great deal, 23% moderately).

Mentorship Experience. Most respondents (95%; 54 of 57) rated their experience with their mentor as positive (indicated as very positive, positive, or somewhat positive) as opposed to somewhat or very negative; 77% of respondents (43 of 56) indicated that they

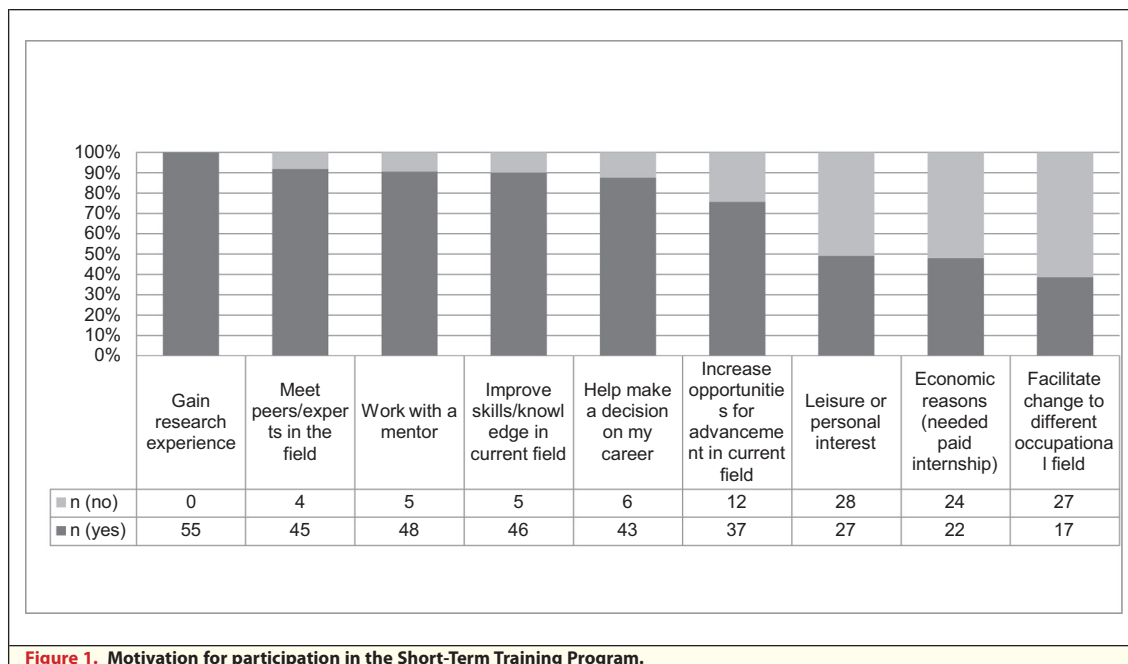
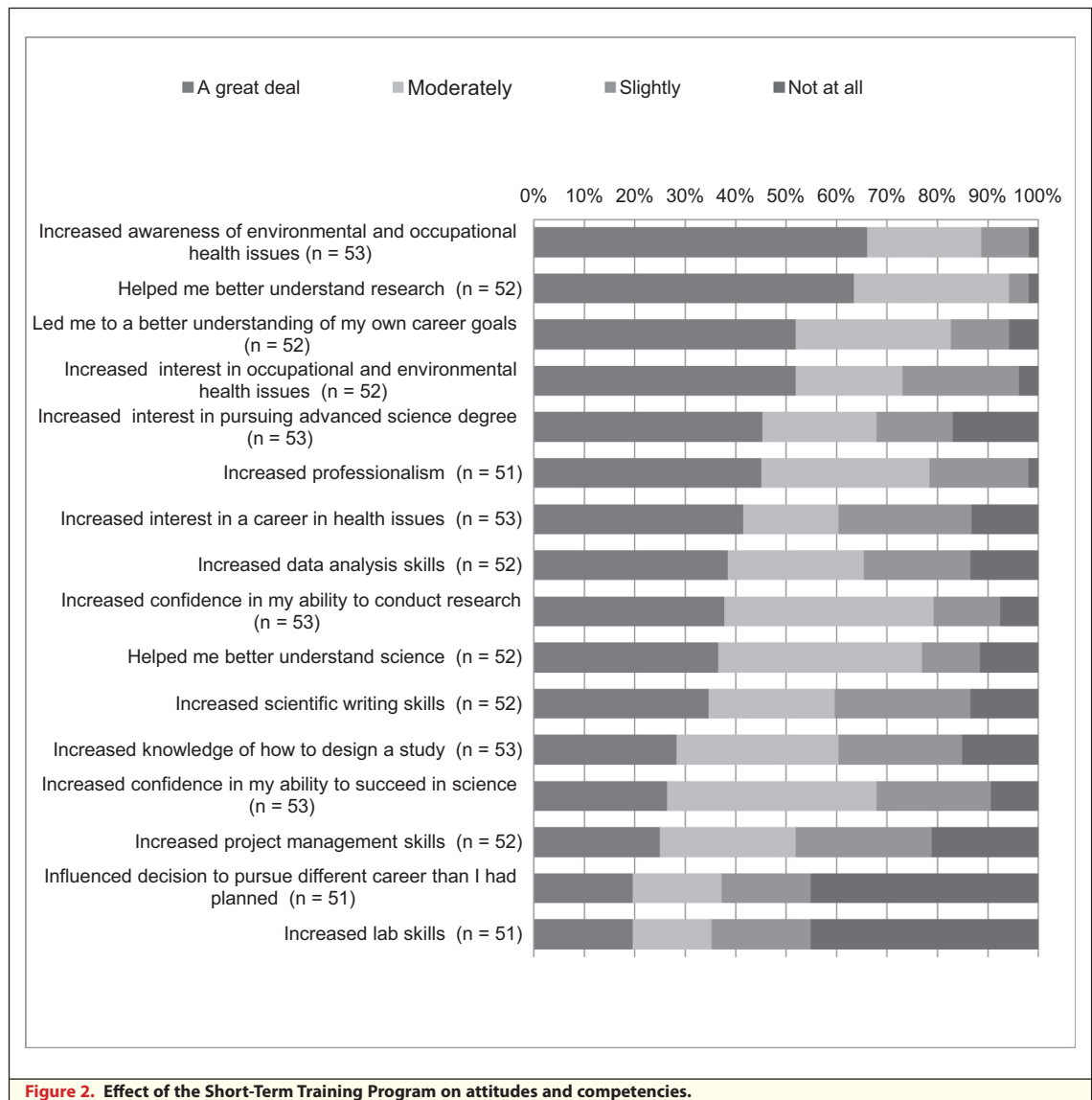


Figure 1. Motivation for participation in the Short-Term Training Program.



had been in contact with their mentor since the end of their internship, and 53% of respondents (29 of 55) indicated that they had been in contact with their peers or colleagues since end of their internship. About half of respondents, 51% (24 of 47), indicated that they contacted the program director or their mentor at least once per year after completion of the program.

Academic Achievement. The survey was conducted an average of 7 years after students participated in the program. By then, 13% of respondents (7 of 56) indicated that they had completed a bachelor's degree, 55% (31) had completed master's degrees, 30% (17) had completed doctoral degrees. Furthermore, 5 respondents indicated that they were enrolled in master's

programs, 3 in doctoral programs, and 4 in medical schools. Since their completion of the STPMS, 8 students had written grant proposals, 18 had published research papers, 18 had won academic awards, 24 had served as mentors to minority students, and 26 had made conference presentations.

Employment in Science and Health Fields. Of the 38 respondents who were working full-time, 79% (30) were working in a health care- or science research-related field, 4 of whom were conducting research at academic institutions. A total of 98% percent of respondents who were working indicated that they were somewhat or very satisfied with their current job, as opposed to dissatisfied or very dissatisfied.

LESSONS LEARNED AND IMPLICATIONS

The STPMS has been continuously funded by the NIH since 1995. Unlike institution-specific programs that tend to attract students from a specific discipline or interest, the STPMS selects from a national pool of applicants from different backgrounds. Students are integrated into ongoing research projects with mentors in a variety of fields. The program has enrolled an equal number of African-American and Hispanic students, students from other URM ethnicities. Only seven of 69 students were lost to follow-up over the past 17 years, indicating a high retention rate of contact, and only 3 of 62 students who were contacted did not respond to the survey. Such willingness to participate in the survey reflects the communal relationship that exists between former students and program organizers (the investigators of this study), which is encouraged through the STPMS's close mentoring relationships and through its organization of trainee and alumni networks. Such communal exchange and commitment to the program's network is a crucial element of the Tailored Panel Management approach, outlined by Estrada et al.,³¹ which has been reported to be helpful in the execution of longitudinal research studies. The program received overall positive feedback from alumni as almost all respondents rated their program experience as positive one and stated that they would recommend the program to others.

When asked about their motivations for participation in the STPMS, factors related to students' long-term goals were most common. These included goals such as gaining research experience, working with a mentor and other experts in their field, improving skills and knowledge in field, and helping to make a decision on their career. Less common motivators were those related to short-term gains, interests, or specific career goals such as increasing opportunities for advancement in current field, facilitating change into a different field, personal interest, or economic reasons. Students' prioritizing of long-term objectives may indicate that students who participate in the program are most interested in gaining exposure, guidance, and general knowledge about the health fields, as opposed to pursuing specific career objectives. The low proportion of students who were motivated by economic reasons may imply that unpaid programs may still attract and benefit URM students who wish to gain research experience. Other authors, however, have stressed the benefit of providing financial assistance in minority train-

ing programs, as many URM come from disadvantaged socioeconomic backgrounds and may otherwise not be able to participate.^{11,32,33}

Respondents listed attitudes toward research, the health fields, and future career directions as most significantly affected by the STPMS. Students were less significantly affected by more specific competencies, such as gaining particular skills. STPMS effects on students' attitude toward research is illustrated in responses such as "[The STPMS] showed me that research can be a powerful tool in helping the community" and "[The STPMS] helped me to see what life would be like as a scientific researcher." These outcomes also correlate with students' original motives for participation in which interest in exposure to the field was more significant to most than particular short-term gains. In similar programs, guided research experiences have also been found to be successful in increasing student interest in research and pursuing scientific careers.^{26,27} Such experiences may be especially relevant to first generation URM students who are less likely to have prior experiences in research or have someone in their family who has.³³

Many students found mentoring to be a helpful component of the STPMS: Nearly all respondents indicated that they had a positive experience with their mentor and most stayed in touch with theirs after program completion. Many students provided additional comments about their experience such as being "introduced to leaders in the field of medicine and public health" and gaining "the support and guidance of a life-long mentor," or pointed to the helpfulness of mentors' "constant support as well as skill improvement suggestions and knowledge sharing." The fact that many alumni went on to serve as mentors to other minority students implies that students may have recognized the role of mentorship in their own academic and professional development. One student stated that the program allowed him or her to be "confident enough to be able to serve others as a mentor, as my mentor did me." Another student recognized how her own success could benefit other minority students: "Being a Latina female from the Bronx, who was, at the time in graduate school was a great example for other young ladies to see and know that higher education and having goals and accomplishing them is not out of their reach."

Exposure to role models and mentors is a key factor that has been identified as important to the success of minorities in many professional fields.^{8,13,34} URM students often express one of the common barriers to academic development as lack of professional

mentoring and role models.^{13,26} Many programs for minorities have attributed their success largely to the strength of the mentoring component they offer.^{11,33,35,36} Studies have particularly pointed to the success of having minority mentors who can provide social, emotional, and academic support, while reinforcing important contributions of minority researchers and helping create professional networks for peer mentoring.³⁶⁻³⁹ Previous studies have also emphasized the benefit of peer-mentoring network in promoting the success of minority students in research and medicine and reducing feelings of isolation.^{11,38} In our study, more than half of respondents indicated that they stayed in touch with peers after completion of the program.

Most students who participated in the program continued graduate education. Currently more than half of respondents have or are pursuing a master's degree and almost a quarter completed or are pursuing doctorates in science or medicine. Many students also achieved other academic accomplishments, including submitting grant proposals, presenting research projects, and publishing peer-reviewed articles. Responses from students suggest that the skills earned through the program may have played a role in these achievements, such as the following illustrative response from a student: "research skills, confidence, [and] motivation to further my education." Another student stated, "[The STPMS] has helped me mature and provided me with the experience in research and medicine which I still use today."

Of the alumni who were employed, most worked in health care- or science-related positions and were satisfied with their careers, suggesting that many deem these positions professionally rewarding and appropriate. Some respondents explicitly stated that the STPMS influenced their career choice or helped prepare them for careers in health care; for example, "[The STPMS] has encouraged me to pursue a position in public health when I am done with medical school." Another wrote, "[The STPMS] helped me develop organizational and technical skills necessary for my present work position." One student mentioned the director of the program as being especially helpful to his or her own professional development: "Having one-on-one chats and group meetings with [Program Director] helped me to really define what I wanted to do in the future."

These outcomes affirm other studies that suggest that research opportunities, mentorship, and support for URM students at all academic levels may help attract minority students into scientific and medical careers, as well as help them succeed at advanced

stages of their careers.^{26-29,33} Programs to support minorities along their academic trajectory can thus play a significant role in increasing representation in the health professions over the long term, especially when combined with efforts to address early barriers and sociocultural factors that contribute to the achievement gap between ethnic groups in these fields.⁴⁰

There were several limitations to the present study, however. Although students participated in the training over the past 17 years, all students responded to the survey during the same time frame; thus, some respondents may have had a more distant memory of the program than more recent participants may. Recall bias may be an issue affecting all student responses. Student academic and professional accomplishments after the program are also dependent on the time that has passed since participation. All survey questions were optional, and thus results may be biased to the program experience of those who chose to respond to the questions. The small sample size is also an important limitation of this case report; thus, there is a question as to whether the results obtained can be generalized to other training programs. In spite of this, our confidence in the study results is strengthened by the fact that the respondent sample was not very different as a group from the total program alumni population.

CONCLUSIONS

In this paper, we have presented the Short-Term Training Program for Minority Students as a case study for programs that aim to increase minority representation in the health and science. The evaluation revealed that students at the undergraduate and early graduate stages were often most interested in seeking research experiences, career guidance, and mentoring and similarly benefited most from these aspects of the training program. Indeed, most alumni went on to pursue advanced degrees in science and medicine and to find employment in these fields. This suggests that minority students may benefit most from programs that focus on exposure to research and offer ongoing mentoring and advising.

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