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The Importance of Scientific Mentoring Programs for Underrepresented Youth

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INTRODUCTION

There are differences in disease burden that occur across some groups, including by gender, race/ethnicity, education, income, disability, geographic location, and sexual orientation (Healthy People, 2010). Some of the diseases that disproportionately afflict minority populations include diabetes, obesity, kidney, liver, urologic diseases, and cancers. These health disparities are correlated with lower socioeconomic status, less education, lower paying jobs, higher levels of unemployment, and less health care coverage found among rural residents. This often translates into less access to health care, lower rates of disease screening, and less access to accurate and current health information. Given the growing population of underrepresented minorities in the United States, there is great risk of increased health disparities (Cancer health disparities, 2016; CDCa; CDCb).

Boosting the number of underrepresented individuals in science and health-care is critical to meeting the needs of America's increasingly diverse society, reducing health disparities, and raising the cultural competence of all scientists and practitioners (Health Professions Partnership Initiative, 2004). Studies indicate that underrepresented minority scientists and health care providers are more likely than non-underrepresented providers to care for and understand diseases predominate within underrepresented populations (IOM, 2003, 2004). Studies have also suggested that the health and health care of underrepresented minorities are improved when providers of similar ethnic and racial backgrounds provide the care (Brown, DeCorse-Johnson et al. 2005; Smedley and Mittman, 2011).

However, the demand for underrepresented scientists outweighs the number of people interested in pursuing education or careers in science-related disciplines (National Science and Technology Council 2000). Individuals of color and from disadvantaged backgrounds are underrepresented in higher education, and in particular science education (Sanchez et al., 2015). African-American, Hispanic, and Native American youth graduate from high school and attend college at significantly lower rates than white and Asian youth. Minority youth who do attend college are more likely to attend two-year rather than four-year colleges, less likely to attend a

major University, less likely to graduate from college, less likely to obtain college degrees in science, and even less likely to pursue science-related careers, compared to white or Asian youth (Saguil & Kellerman, 2014; Barnett, 2011).

Lack of academic preparation is often deemed a major impediment to achieving parity in health and science professions (Patterson and Carline 2004; Winkleby, Ned et al. 2009). Therefore, providing opportunities for underrepresented groups of youth to enter the science and higher education pipelines will not only increase the number of youth from diverse backgrounds entering biomedical and health sciences, but will increase the number of diverse health care professions and scientists overall. Providing high school adolescents with opportunities for exposure to scientific environments and encouragement from scientist mentors are key factors in developing a passion for and sustained pursuit of education in the sciences. Such opportunities are especially critical in promoting science interest among youth of color.

The goal of the NIDDK Short-Term Education Program for Underrepresented Persons (STEP-UP) is to increase the number of youth who are committed to and well-positioned for careers in the sciences. The STEP-UP program provides opportunities for high school students to develop critical thinking and educational skills within a supportive environment in which they have sustained relationships with adults (often university faculty, medical and graduate students, and postdoctoral fellows) as well as peers in the program. Priority is given to recruiting and accepting students with interest in science from populations less represented in the biomedical and health sciences, including students of color, students from low socioeconomic backgrounds, and disabled students.

The STEP-UP program is developed on sound research showing that structured out-of-school science programs can stimulate science-specific interests of youth, positively influence academic achievement, and expand participants' sense of future science career options (Bell and Lewenstein, 2009). In addition to focusing on improved academic skills, STEP-UP strives to facilitate the development of positive attitudes toward science, scientific skills, positive relationships with peers and mentors, and positive attitudes toward NIDDK-mission areas. This focus is particularly important for minority students who often arrive at science programs with lower levels of confidence and comfort with math and science than do non-minority students.

The specific aims of STEP-UP and our coordinating center at Stanford University are to: 1) Recruit and retain 11th and 12th grade high school students less represented in the biomedical sciences, including individuals from underrepresented racial and ethnic groups, individuals from disadvantaged backgrounds, and individuals with disabilities. 2) Provide these students with a summer program that offers mentoring, opportunities for hands-on exposure to scientific research, and exposure to NIDDK-mission areas. 3) Help improve applications for successful college admission among youth who might otherwise have more limited educational choices. 4) Provide all mentors, including graduate and medical students, postdoctoral fellows, and faculty, with training in mentoring adolescents through formal training and didactic mentoring experiences, thus resulting in a cadre of mentors well trained to encourage adolescents to enter the sciences. Providing opportunities for underrepresented groups of youth to enter the science pipeline will not only increase the number of youth from diverse backgrounds entering biomedical and health sciences, but will increase the number of diverse scientists and health care professions. STEP-UP emphasizes partnerships and focuses on academic preparation, thereby playing a large role in creating the conditions for success and becoming crucial for solving the complex problem of underrepresentation in the science and health professions.

Bonnie Halpern-Felsher, Ph.D., FSAHM, has been the Principal Investigator/Program Director for the Stanford University coordinating center. She began with the program in 2007 while at the University of California, San Francisco, and then continued as PI/Program Director when she was recruited to Stanford University in 2014. Dr. Halpern-Felsher is a developmental psychologist whose research has focused on cognitive, psychosocial and environmental factors involved in adolescents' and young adults' health-related decision-making, perceptions of risk and vulnerability, health communication, and risk behavior. Sheila McLaughlin, MFA, has been the Project Coordinator since 2010. Ms. McLaughlin holds a firm commitment to assist youth during their high school years to achieve their educational and career goals.

Both Dr. Halpern-Felsher and Ms. McLaughlin are the first in their families to attend college, lending force to their individual commitment to the overall goal of the STEP-UP Program to increase the number of underrepresented minority and disadvantaged students "in the pipeline" who are committed to a career in biomedical, behavioral, clinical, or social science research.

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Keywords: Minority health; health disparities; mentoring; adolescent development; summer science programs

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