

**article:2384****Encouraging Minority Undergraduates to Choose Science Careers: Career Paths Survey Results**

**Encouraging Minority Undergraduates to Choose Science Careers: Career Paths Survey Results** Merna Villarejo, Amy E.L. Barlow, Deborah Kogan, Brian D. Veazey, and Jennifer K. Sweeney

Despite significant efforts over the past 30 years by Federal government agencies and private organizations, there continues to be a significant underrepresentation of minority scientists engaged in research in the U.S. A wide array of intervention programs has attempted to redress this disparity; most focus on individual research experiences and financial support. The NIH assumption is that “when students are provided the opportunity to engage in state-of-the-art biomedical research ...their appetite will be whetted to enter a career in biomedical research” (National Institutes of Health, 2007). Although significant resources have been expended on such programs, few studies have rigorously investigated their efficacy.

Previous studies of undergraduate research experience fall into two groups. One approach, largely ethnographic and descriptive, shows that undergraduate research experience increases basic science inquiry skills and may lead to other cognitive or personal gains (Hunter, Laursen, & Seymour, 2006). More quantitative studies attempt to understand how participation in the research experience influences academic and career outcomes. A common weakness is that the direction of causality is undefined—it is not clear whether students who were already interested in research careers elected to participate in undergraduate research or whether the research experience influenced students to pursue research careers.

The goal of this study is to understand the manner and degree to which targeted undergraduate enrichment activities influence career choice. We surveyed high-achieving alumni of the Biology Undergraduate Scholars Program (BUSP), an undergraduate biology enrichment program for underrepresented minorities at the University of California, Davis (Villarejo and Barlow, 2007). At college entry, all of the participants were biology majors and three quarters were considering medical careers. They began BUSP in the freshman year with structured supplementary instruction in basic chemistry, biology and calculus, mandatory advising and the opportunity for early undergraduate research. Survey respondents were asked to describe their career paths and reflect on the influences that guided their career choices. We particularly probed for attitudes and experiences that influenced students to pursue a research career, as well as factors relevant to their choice between medicine (the dominant career choice) and basic science. This paper is based on a combination of quantitative and qualitative analyses of 201

survey responses.

Respondents were first asked to rate the impact of undergraduate enrichment experiences on academic success and persistence in a biology major. They strongly endorsed supplemental instruction as a mechanism for achieving excellence in basic science courses; many indicated that this early success gave them the confidence to continue in science. In fact, 71% persisted in biology majors to graduation, a high rate compared to the campus average of about 45%.

Undergraduate research was seen as broadening by many, including the 101 respondents who pursued clinical careers. However the undergraduate research experience was transformative for many of the 24 alumni who ultimately pursued biomedical PhDs. Although 13 of that group had considered research as a possible career choice at college entry, only 5 had identified research as their primary or only career interest at that time. They credit their undergraduate research experience with putting them on track toward a research career. Nonetheless, many individuals who pursued biomedical PhDs had serious misgivings about the practical disadvantages of their career choice, in terms of balancing work and family and the financial insecurity they see as endemic to a career as a science researcher. While they persevered despite these concerns, the same characteristics repelled others. These concerns may be related to the fact that our sample is 2/3 female and half are the first generation to attend college.

A policy implication of these results is that making undergraduate research opportunities widely available in the context of a structured educational enrichment program should increase the number of minority students who choose to pursue PhDs. Although our subjects were all biology majors, the same strategy may increase the number of minorities pursuing advanced training in engineering.

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## References

Hunter, A., Laursen, S. L., & Seymour, E. (2006). Becoming a scientist: The role of undergraduate research in students' cognitive, personal, and professional development. *Sci.*

Educ. 91, 36-74.

National Institutes of Health. (2007). Request for Applications (RFA) number: RFA-GM-08-005. Research on interventions that promote research careers. <http://grants.nih.gov/grants/guide/rfa-files/RFA-GM-08-005.html> (accessed June 2007).

Villarejo, M. & Barlow, A. E. L. (2007). Evolution and evaluation of a biology enrichment program for minorities. *J. Women Min. Sci. Engr.* 13(2), 119-144.

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