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GRADUATE EDUCATION

Transforming training to reflect the workforce

THE PAST FEW YEARS HAVE PLACED SCIENTIFIC WORKFORCE PRESSURES IN THE limelight: National committees, academic thought-leaders, trainees, politicians, and the popular press have highlighted, in reports and essays, issues such as the increasing numbers of Ph.D.-trained scientists, the shrinking supply of physician-scientists, the disenchantment of early-career researchers, and the lack of diverse career-related training for scientists already in the pipeline (1–4). Funding agencies have begun to take notice (5, 6). In 2011, an advisory committee to the director of the U.S. National Institutes of Health (NIH) charged members of a newly formed biomedical research workforce working group to assess the status of the U.S. biomedical workforce and propose ways in which the NIH might help to sustain the biomedical research enterprise. The resulting report recommended that NIH create a program to encourage doctoral-granting institutions to “provide additional training and career-development experiences to equip students for various career options (7).” In response to this report, NIH released a new research funding opportunity announcement (FOA) called the Broadening Experiences in Scientific Training (BEST) grant to enhance career preparation for graduate pre- and postdoctoral biomedical research trainees (<http://grants.nih.gov/grants/guide/rfa-files/RFA-RM-12-022.html>).

The grant—awarded to 17 universities across the United States (8)—specified the goals of developing, testing, and integrating changes in the culture and practices of biomedical graduate and postdoctoral training. A successful program will educate trainees and mentors about the wide range of career pathways in the biomedical workforce and empower trainees to make informed training decisions to prepare for careers beyond those of the academic tenure track. Under the aegis of NIH, BEST awardees formed a consortium that meets regularly to share ideas and facilitate evaluation across the 17 institutions.

BEST PRACTICES

In the first annual face-to-face meeting of all 17 BEST institutions (October 2014), representatives assembled at NIH to exchange information on their newly developed strategies—an exercise that revealed seven fundamental BEST philosophies: (i) value the broad range of research-related careers open to early-career scientists; (ii) view these careers not only as legitimate, but also as essential to the scientific enterprise; (iii) strive to teach a strategic, skills-based approach to career planning in order to enable informed decision-making; (iv) complement and support individual mentoring and training already provided by university faculty members; (v) provide training that occurs simultaneously with graduate-student and postdoctoral research in a manner that benefits a trainee’s research as well as his or her career development; (vi) encourage active, time-efficient career development while maintaining high standards for research and not increasing the time it takes to receive a graduate degree or complete postdoctoral training; and (vii) rigorously test approaches (at the institutional and cross-institutional levels) to measure program outcomes and identify unintended consequences.

The consortium meeting also revealed that the majority of BEST programs emphasize trainee self-assessment; exposure to several different career pathways; career mentorship and planning with the use of “individual development plans” (www.lifescied.org/content/13/1/49.full); and building of communication, networking, and job-searching skills. Common approaches in this developing toolkit include workshops, courses, online resources, meetings of small groups of trainees with related career interests, and hands-on experiences, such as through short-term and long-term internships. In order to provide the education and experience most needed by biomedical trainees, BEST programs collaborate with or are directed by career-development professionals at their universities and build partnerships with offices of technology transfer, regulatory affairs, and communications or public affairs; local colleges and business schools; biotechnology and pharmaceutical companies; law firms; and policy, advocacy, and trade groups.

Although institutions share many programmatic goals and approaches, there are considerable differences in implementation and emphasis among programs. For example, the

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programs differ in the number of trainees they target and the extent to which participation is voluntary versus required, with some programs focusing on a small number of trainees who participate in an intense curriculum and others requiring a less-intense core curriculum for all trainees (9). The BEST programs have committed to the sharing of information and best practices to maximize programmatic success. Rigorous evaluation at the institutional level and across the consortium will assess both positive outcomes and unintended consequences that affect trainees and institutions.

These data will inform the development of these and future programs and will provide an understanding of what does and doesn't work in various types of educational environments. Patricia Labosky, NIH Office of the Director and Program Leader for the BEST awards, noted that "NIH is excited and encouraged by the approaches taken by BEST awardees to embrace and promote changes in biomedical research training. We are optimistic that successful new approaches will be shared and adopted by others across the entire training community and will result in a more robust and productive biomedical research enterprise."

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