Young Investigator Perspectives. Rethinking the biomedical postdoc: but first let’s get the data

Joseph F. Pierre
Department of Medicine, University of Chicago, Chicago, Illinois

Submitted 4 April 2016; accepted in final form 6 April 2016

Dr. Joseph F. Pierre PhD is a postdoctoral fellow at the University of Chicago, where he studies the interplay between nutrition, the microbiome, and the enteric immune and neuronal systems. His Young Investigator Perspective, “Rethinking The Biomedical Postdoc: But First Let’s Get The Data,” highlights the challenges faced by postdoctoral fellows in biomedical sciences and emphasizes the importance of obtaining detailed information about postdoctoral fellows and their career trajectories. This information should enable grant funding agencies and academic institutions to make informed decisions about how best to support postdoctoral fellows, who are the future of scientific research.

—Nigel W. Bunnett, Editor in Chief, American Journal of Physiology, Gastrointestinal and Liver Physiology

A STRONG AND EFFICIENT SCIENTIFIC workforce is critical to the health and future of the US economy and to overcome challenges presented by the 21st century. With the majority of scientists trained in academic institutions, the classical expectation of graduates to pursue academic career paths has prevailed. However, over the past 25 years the estimated number of graduate students and postdocs has roughly doubled, while US research budgets as a percentage of GDP have contracted, leading to a scientific workforce imbalance and atmosphere of hypercompetitiveness that endangers the general health and efficiency of the biomedical research enterprise. Clearly, this crisis extends far beyond postdocs, including fewer research dollars for greater numbers of grant applications, impaired grant peer-review processes, and skewed publishing incentives, but many also agree that too many biomedical postdocs are narrowly pursuing limited numbers of academic faculty jobs.

Postdocs were classically considered temporary and defined periods of focused mentored training aimed to enhance professional skills in research areas needed for independent research careers. These positions were once held for 1-2 years, but it is not uncommon for postdocs today to remain in these positions for up to 5+ years. Unfortunately, greater postdoc experience does not correlate with increased federal funding rates, and furthermore the percentage of postdocs eventually obtaining faculty jobs has decreased by 30% between 1993 and 2013, according to the 2016 National Science Foundations (NSF) Science and Engineering Indicators (Table 3-16 and Appendix Table 5-23 therein). So why are more people choosing to become postdocs? Strikingly, the 2014 NSF Science and Engineering Indicators report found “other employment not available” as the leading reason (Table 5-19). Similarly, other research suggests that as many as 40% of new PhDs are unaware of career options available following graduation (2). Has postdoc training has become a default option? Many institutions have reciprocally welcomed the highly capable and affordable labor, dependent only on having “soft money” and without the long-term commitment and fringe benefit requirements that permanent scientist positions demand. The resulting flood of academic biomedical postdocs, in contrast to limited academic tenure-track positions, has arguably led to a stagnation of capable scientific minds in prolonged postdoc appointments, often with little training in skills away from the bench. Paradoxically, the idea of a general STEM workforce shortage continues to be promoted, despite the fact that only 1 in 10 individuals with a science bachelor’s degree work in science-related fields and as few as 15% of PhDs will obtain academic faculty positions. Challenging the conventional training paradigm may be needed to improve the efficiency of well-trained scientists to move into all sectors of the scientific workforce.

Recently, the “postdoc crisis” has received greater attention and has been the focus of numerous workshops and national symposiums, including the Future of Research (FOR) series (futureofresearch.org). These sessions have led to outstanding ideas to help improve research in the US (4, 5). Notably, Science Careers named the collective FOR postdoc organizers their 2015 “person-of-the-year” for drawing national attention to these issues. The NIH also recognizes the significance of these challenges and is considering diverting more resources toward addressing postdoc and graduate training and career development, under the guidance of the inaugural Director of Biomedical Research Workforce, Dr. P. Kay Lund. However, a startling fact remains. Postdocs are in some regard, literally, an invisible population; no one, including the NIH or NSF, is sure how many postdocs even exist in the US. Literally, an invisible population; no one, including the NIH or NSF, is sure how many postdocs even exist in the US. Apart from being uncertain of about total numbers, little else is actually known about the postdoc workforce. If many agree there is a postdoc crisis, but we are unaware of numerous postdoc parameters, how can we make meaningful and informed policy suggestions to lawmakers and to institutions for improving conditions and efficiency within the scientific workforce?

In an attempt to help address these realities, we have recently launched a national postdoc survey (postdocsurvey.org), streamlined into 50 questions, designed to gather a range of postdoc population metrics, including but not limited to demographics, mentorship and training experience, training duration, and career aspirations. Several things make this survey useful to the scientific community. First, the sample size is expected to range in the thousands, meaning rare members of the postdoc population (e.g., persons with less common demographics) can be analyzed with appropriate statistical power.

Address for reprint requests and other correspondence: J. F. Pierre, 900 E. 57th St., KCBD 9th floor, Chicago, IL 60637 (e-mail: jpierre1@medicine.bsd.uchicago.edu).

http://www.ajpgi.org 0193-1857/16 Copyright © 2016 the American Physiological Society
Smaller single institutional surveys capture too few respondents to learn anything statistically useful about these individuals. The most recent large survey, with 7,600 respondents, was now performed over a decade ago (1). Secondly, the survey is being distributed nationally to all institutions. This allows regional and even city-specific comparisons in postdoc metrics, which can take into account cost of living and location-specific variables. Thirdly, the data will be analyzed by multivariate statistics, which will allow discovery-based and hypothesis-based analysis of survey responses. Finally, the survey is anonymous and IRB approved so the data can be made available to help improve postdoc conditions and shape policy decisions related to the scientific workforce. It should be noted that the NSF is performing an ongoing Early Career Doctorate survey, designed to collect information about individuals within 10 years of PhD completion, and these efforts are also invaluable for understanding early PhD metrics. In conclusion, although many agree major challenges surround the future of postdocs in the academic research enterprise, a prudent strategy is to begin collecting the data needed to make informed policy decisions aimed at improving postdoc conditions and strengthening the future of the US scientific workforce.

REFERENCES