



Future of Research Statement on the National Academies of Sciences, Engineering and Medicine Report, “The Next Generation of Biomedical and Behavioral Sciences Researchers: Breaking Through”

Future of Research endorses the recommendations in the National Academies of Sciences, Engineering and Medicine report, “[The Next Generation of Biomedical and Behavioral Sciences Researchers: Breaking Through](#),” released on April 12, 2018. This report addresses the factors influencing transitions of trainees in biomedical and behavioral sciences into independent research careers. It offers recommendations to reform systemic issues that reduce the efficiency of these transitions, and thus affect the productivity and scientific discoveries of researchers in the United States. This report, mandated by Congress under the 21st Century Cures Act, was envisioned by Senators [Tammy Baldwin \(D-WI\)](#) and [Susan Collins \(R-ME\)](#).

Though the issues that plague the biomedical research system have long been discussed within the scientific community, the key stakeholders (such as federal agencies, private funders, and universities) have frequently abdicated their responsibility for the system. The “Breaking Through” report addresses this issue head-on. The report argues that greater transparency, accountability and shared responsibility are needed to improve the biomedical enterprise.

Many of these suggestions have been made before, and while some changes and interventions have been made, others have not been heeded and have not resolved a key issue: that this enterprise depends on a large amount of cheap, and mostly foreign, labor in the guise of training. We recognize that no stakeholder seems willing to take responsibility for maintaining the sustainability of this system, nor does there seem to have been an appreciation of the shared responsibility and system-wide change required. The manner in which recent efforts have played out, such as the NIH proposal to cap the amount of funding to individual investigators through the [Grant Support Index](#), illustrates the likely opposition that has frustrated efforts to reform the system in the past by those who benefit from the status quo.

Though we support all recommendations in the report, we highlight in particular:

Recommendation 3.1 - Congress should establish a Biomedical Research Enterprise Council (BREC) to address ongoing challenges confronting the Next Generation of Biomedical Researchers.

NIH is limited in its power (delegated by Congress) to actually enact most of the NASEM's report, so either the Congress needs to be lobbied to increase NIH's power of oversight, or another committee is needed to oversee these changes, particularly when it comes to enforcement at institutes.

We therefore particularly endorse the creation of a body that oversees the biomedical enterprise, which can provide oversight for this system and push it towards greater sustainability, to the benefit of the entire biomedical community, and the nation. We urge action on this front at the Congressional level, due to the lack of action from individual stakeholders in taking responsibility to change the system or invest in it. This intervention is in the national interest to ensure that the investment the U.S. taxpayer is making in training scientists is of benefit to the nation and the science being produced, and not creating perverse incentives. The aim should not be to reward careerism and award grants and fellowships as prizes, but rather to focus on advancing knowledge and supporting researchers working on a diverse array of problems using diverse teams and approaches.

Recommendation 3.3 - Biomedical research institutions should collect, analyze, and disseminate comprehensive data on outcomes, demographics, and career aspirations of biomedical pre- and postdoctoral researchers

While NIH is the focus of much attention for reform, institutions have also benefited from the use of graduate students and postdocs to secure intellectual property and research funding. However, most institutions are not able to count their postdocs, provide equitable benefits or use job titles in a consistent manner. Indeed, [many have opposed moves such as raising salaries](#), long recommended for two reasons: 1) to prevent resilience to financial hardship from becoming a dominant selection factor for a career in academe, particularly for those trainees wishing to have children or who must support families; and 2) to reduce the use of trainees as temporary cheap labor. Institutions have claimed that tracking current and former trainees is an unfunded mandate, while simultaneously competing for funding using their labor. Institutions are able to collect such data on undergraduates, medical and law students to a high standard.

It is therefore encouraging to see a group of institutions, the [Coalition for Next Generation Sciences](#), leading the effort to make sure that data on graduate students and postdocs is gathered and reported, and we encourage other institutions to join this effort. Likewise we ask institutions to recognise that they must take greater responsibility for the welfare of graduate students and postdoctoral researchers. The formation of collective bargaining units and unionization efforts is a reaction to the relationship with trainees that institutions have largely abandoned, in the increasing prioritization of the university as a business rather than an educational institution.

Recommendation 4.2 - The NIH should expand existing awards or create new competitive awards to support postdoctoral researchers' advancement of their own independent research and to support professional development toward an independent research career.

As 80% of U.S.-trained biomedical PhDs undertake postdoctoral research, the postdoc has largely become a default for deferring career decisions (Sauermann and Roach 2016). These postdocs conduct much of the work of the biomedical enterprise, reducing pressures to develop a sustainable

academic workforce model. This uncontrolled growth in postdocs has been facilitated by the fact that 85% of postdocs - including nearly all of the international postdocs, who make up $\frac{2}{3}$ of the biomedical postdoctoral population - are supported from research project grants. Postdocs offer the cheapest source of labor available (Stephan). These grants do not assess or require any kind of training or professional development outcomes.

Concerns about a large number of trainees supported on research grants are not new. In 1974, President Richard Nixon was interested in removing training in biomedicine from the federal budget on the grounds that training was not being carried out sustainably (National Research Council 2000). In response, NIH created the National Research Service Awards to assuage concerns about training a sustainable workforce. Despite these efforts, the fraction of postdocs and graduate students supported on research grants continued to rise, despite repeated calls for a reversal of these trends (National Research Council 1994).

We urge the NIH to substantially shift the postdoc population from research project grants to fellowship training mechanisms. It is important that demonstrated biases in these awards (Heggeness et al. 2018) are addressed during this transition.

Despite existing disparities in award rates between populations, it is very beneficial to underrepresented groups to receive these awards. In particular, the NIH Diversity Working Group Report has highlighted that it is potentially harmful for underrepresented populations not to be supported on such mechanisms.

We further urge the NIH to take actionable steps to support international postdocs, noting that it is NIH, and not Congress, which prevents the participation of foreign postdocs on career development awards, or K mechanisms, beyond the K99/R00.

Recommendation 4.3 - *The NIH should phase in a cap (3 years suggested) on salary support for all postdoctoral researchers funded by NIH research project grants.*

In discussing the Breaking Through report in a [recent editorial in Science](#), the Chair of the National Postdoctoral Association, Dr. Tracy Costello, sums up the issue with training times for the postdoc in response to the recommendation that NIH pilot a study investigating the potential for limiting postdoctoral support on research project grants for 3 years:

“This recommendation poses a major challenge because pursuing a tenure track faculty appointment often requires high-impact publications, early career funding, and sufficient preliminary data for immediate RPG applications, which are historically difficult to achieve within 3 years.”

3 years used to be a perfectly reasonable postdoctoral tenure, when the postdoc was optional, as reflected in the first major report on the postdoc, [“The Invisible University,”](#) in 1969. What has changed is the overwhelming competition for faculty positions, and as Costello’s quote highlights, this is not determined by any need of the postdoc for training, but rather to accumulate credentials to compete against other postdocs. The postdoc therefore is not achieving a training aim, but rather providing cheap labor. Capping the time as a trainee and shifting instead to institutional support of postdocs as

permanent, experienced researchers would better reflect the work that is carried out by the postdoc. In calling for a pilot considering this recommendation, before implementation, the community is asked to consider whether the length of the postdoc is necessary to produce independent researchers, or simply a result of hypercompetition for tenure-track positions.

Concluding Thoughts

We believe that all stakeholders should be collaborating to address the sustainability of the research enterprise. In this hypercompetitive environment, we are forgetting the privilege of being given support by the nation to solve problems, instead increasingly fixating on securing careers and institutional finances.

We understand that, relative to the implementation of these recommendations, writing the report was the easy part. Much of the change that has occurred in the training landscape has been driven by trainees themselves. For example, the formation of the National Postdoctoral Association by a group of postdocs in 2003 resulted in the creation of many institutional postdoctoral offices, and greater recognition of the contributions of postdocs. Likewise, in 2016, postdoctoral unions were critical in ensuring that proposed changes to labor law included raises in postdoctoral salaries, in the face of institutional opposition. We therefore urge all graduate students and postdocs to recognize the role they have in shaping the biomedical enterprise for themselves, and for the generations to follow us, and we look forward to leading and supporting efforts with early career researchers to effect change.

Two of the NASEM report's authors are associated with Future of Research: President Dr. Jessica Polka and Executive Director Dr. Gary McDowell. This statement however represents the consensus opinion of the Board of Directors of Future of Research.

Bibliography

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