

NIH ADVISORY COMMITTEE
TO THE DIRECTOR
WORKING GROUP ON
RE-ENVISIONING
NIH-SUPPORTED
POSTDOCTORAL TRAINING

December 15, 2023

Report to the NIH
Advisory Committee
to the Director
(ACD)

Pre-ACD Vote

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Acknowledgments

On behalf of the working group, the co-chairs thank all the individuals and organizations who contributed to preparation and development of the working group's (WG's) report both directly and indirectly. Without this crucial help, the report would not have been possible.

The working group is deeply grateful to every postdoctoral scholar, graduate student, investigator, and member of the biomedical community for valuable time and effort to engage with and share critical input, insights, and feedback with the working group.

The co-chairs offer special thanks to the working group members and executive secretaries, in particular, Laura Long and Brittany Chao, who were incredibly passionate, dedicated, and effective throughout the group's efforts. We also extend thanks to Lorjetta Schools for help with meeting support, notetaking, and drafting of the report.

To provide vital insight into the postdoctoral landscape, several individuals provided data that informed the WG's efforts, including Michael Yamaner and Kelly Kang of the National Science Foundation; David Payne of *Nature*; the team from the National Postdoctoral Association (NPA); and Dolan Ghosh and Deepshikha Roychowdhury of the NIH Office of Extramural Research.

We thank the team who worked on development, coding, and analysis of the request for information (RFI), particularly Jonathan Horsford, who led the analysis of the responses and development of the RFI report, and Matt Perkins, who was instrumental in technical support of coding and analysis. We thank the speakers who shared insights at the four listening sessions, in-person meeting, and other meetings (a full list is available in the report appendix). These listening sessions and meetings would not have been possible without the efforts of the NIH team, including from the NIH Office of Communications and Public Liaison (Amanda Fine, Renate Myles, Scott Prince, Emily Ritter, and Emma Wojtowicz) and our contractors and Events Management teams.

Additionally, we are grateful to the previous teams that have laid the groundwork for the recommendations described in this report, particularly the Advisory Committee to the Director (ACD) WG on Biomedical Workforce, the ACD Next Generation Researchers Initiative WG, and the ACD WG on Diversity.

Executive Summary

Science, technology, engineering, and mathematics (STEM) doctorate holders are critical to the health of the national and global scientific ecosystem. Within the U.S. research enterprise, postdoctoral scholars, predominantly based in academic research labs, are a bellwether of its sustainability. These labs train postdoctoral scholars, through an apprentice-based system, to pursue broad, intellectually curious questions, often underpinning innovation that precipitates new treatments or devices. However, the existing postdoctoral research system is not optimally supporting the current biomedical research ecosystem nor is it building the best foundation for a diverse, inclusive, productive, successful, and sustainable future. Among other issues, postdoctoral scholars often receive low compensation and benefits relative to their education and work experience; they confront job insecurity, insufficient support for professional development, and uncertain career prospects; they are subject to a power imbalance that favors the institutional establishment. Further, postdoctoral scholars from historically marginalized groups and international postdoctoral scholars face disproportionate structural and implicit barriers in academia, exacerbating the challenges experienced for these groups.

Inaction poses a significant risk to U.S. biomedical research progress and competitiveness. While NIH has made progress by implementing recommendations from previous Advisory Committee to the Director (ACD) Working Groups on these topics, NIH acknowledges that major changes are warranted to address challenges in the postdoctoral experience. This recognition of the need for a revitalized approach, bolstered by growing concerns, precipitated the establishment of a new Working Group on Re-envisioning NIH-Supported Postdoctoral Training to provide recommendations to address these and additional challenges for postdoctoral scholars as a particularly vulnerable group.

In this report, the Advisory Committee to the Director Working Group on Re-envisioning NIH-Supported Postdoctoral Training provides recommendations for improving the postdoctoral experience for both the postdoctoral scholar and the broader biomedical ecosystem. These recommendations, grounded by a [set of guiding principles](#), were developed by the working group to optimize the effectiveness of postdoctoral training and professional development to benefit engaged individuals and the scientific enterprise.

Recommendation 1: Increase pay and benefits for all NIH-supported postdoctoral scholars.

Recommendation 2: Create and expand mechanisms to support the full talent pool of postdoctoral scholars.

Recommendation 3: Facilitate the transition of postdoctoral scholars into their next career stage, including roles beyond academic faculty.

Recommendation 4: Promote training and professional development of postdoctoral scholars and their mentors.

Recommendation 5: Support safe and diverse perspectives and research environments within institutional research programs.

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Recommendation 6: Improve means to measure and share postdoctoral scholars' career progression.

The working group acknowledges that the challenges faced by postdoctoral scholars are symptoms of more pervasive issues across the biomedical enterprise that will require a holistic approach. The working group focused its discussion on ways to foster this important subset of researchers and NIH's role in supporting them. In doing so, it is resolved to boldly address systemic challenges to re-envision the enterprise to better benefit not just postdoctoral scholars but scientists at all levels of the academic system, and as a result, bolstering the scientific and economic competitiveness of the U.S.

While the working group recognizes that buy-in and substantial effort is also needed from other, non-federal organizations, particularly academic institutions, NIH is poised to serve as a catalyst for change and should pursue the implementation of these recommendations with the utmost urgency.

Preamble

A Note from the Working Group

On the heels of the Second World War, a bold blueprint for American scientific research laid the foundation for decades of innovation and U.S. leadership in science, technology, and healthcare. Sustained and robust federal investments in NIH led to effective therapies for many diseases that were once death sentences and, more recently, to the development in record time of COVID-19 vaccines. A thriving U.S. biomedical research enterprise also created robust industries in biotechnology and pharmaceuticals, millions of high-wage jobs, and continues to add tens of billions of dollars to the U.S. GDP each year.

However, continued success of American biomedical research, led by NIH, is now at risk. While it has served science and society with remarkable success, the U.S. biomedical enterprise has recently been struggling to adapt to the realities of a changing environment. Postdoctoral scholars, the engines of innovation and discovery, frequently find themselves caught in a research system that is failing them.

The compact between postdoctoral researchers and academia originated a century ago as an apprenticeship model. In this model, a temporary mentored research experience prepares early career scientists for independent academic research positions, and that transition initially occurred nearly 50% of the time. Unfortunately, this unwritten compact has morphed into a reality that disadvantages early career researchers - particularly postdoctoral scholars - who provide indispensable contributions at a cost that does not equate their expertise and value. Furthermore, today, postdoctoral experience is essentially required as preparation to achieve an academic faculty position. Now, as the system reaches a tipping point, there is a clear mandate to rectify compensation and to redefine the mentoring and career development framework serving postdoctoral scholars.

Today, more than half of the postdoctoral workforce is composed of foreign talent on temporary visas, while the remainder are U.S. citizens and permanent residents. New challenges, both shared and unique to these different populations, now yield unbalanced working environments characterized by career holding patterns with low compensation, missing benefits, job insecurity, nebulous expectations, and limited career prospects in academia, among other issues.

This unbalanced system threatens our nation's future biomedical research leaders, and threatens biomedical innovations that are driven by the postdoctoral labor force. Thus, the consequences of inaction are not only experienced by postdoctoral scholars but by all scientists at all career stages and society at large. These consequences are becoming increasingly clear as we observe a marked decline in the number of postdoctoral scientists nationally, threatening the full expanse of the American research enterprise.

In short, we argue that the system requires substantial change for renewed viability.

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The urgent challenge is to re-imagine and revitalize the postdoctoral career stage into one that rewards and honors the role of postdoctoral scholars as drivers of scientific progress. The scientific community must forge a new relationship between postdoctoral scientists and the broader enterprise, empowering the next generation of scientists and creating a more effective, inclusive, and sustainable system. To meet this challenge, our working group recommends bold action to stabilize the problem, and, most importantly, to improve the overall experience of early career scientists. We seek to address challenges that touch all individuals composing the postdoctoral workforce, and we advance shared solutions.

We believe that the scientific community, with NIH leadership, can enact this bold vision through deliberate, phased steps in coordination with research institutions and other key parties.

We acknowledge here that past working groups, task forces, and societies/organizations have raised many of the concerns outlined here and, at times, made similar recommendations. These reports, dating as far back as the turn of the century, have emerged from the NIH itself as well as the National Academies of Sciences, Engineering, and Medicine (NASEM), the National Postdoctoral Association (NPA), and others. While progress has been made, the persistence of many unimplemented past recommendations points to a systemic inertia favoring longstanding, normalized behaviors and incentive structures that do not foster a healthy research and mentoring culture.

This challenge in adopting past recommendations also highlights the difficulty of tackling systemic problems which cannot be *fully* addressed at one node of the system (the postdoctoral stage), nor *fully* addressed by one part of the system (the NIH). We are nevertheless encouraged by some targeted and bold NIH interventions that have shown good results, such as initiatives like the Pathway to Independence Awards to support early-stage investigators (ESIs) facing disproportionate challenges in securing research funding.

We believe that NIH, as the preeminent funder of biomedical research in the U.S., has a crucial role to address the challenges that face postdoctoral scholars today; given the recent progress with independent early career investigators, we believe that NIH can devise targeted interventions that improve the experience of postdoctoral scholars quickly and substantively. Action by NIH alters its own programs and, crucially, influences the practices of hundreds of institutions that host postdoctoral scholars.

We also assert that there are domains within which NIH cannot act alone and which require attention from other parts of government and from academia, research institutions, industry, nonprofit organizations, and other partners. Thus, we present in this report key recommendations for short-term actions NIH can implement, and important recommendations of a longer term and broader scope for NIH to coordinate with partners as we holistically re-envision the postdoctoral experience.

Working Group Charge, Activities, and Approach

Proposed in [November 2022](#)², the ACD WG on Re-envisioning NIH-Supported Postdoctoral Training was formally announced at an [ACD meeting on December 8, 2022](#)³. Members of the WG were carefully selected to represent relevant expertise and the groups impacted, including graduate students, postdoctoral scholars, ESIs, senior academic investigators, industry scientists, economists, and representatives of scientific and institutional organizations.

Building on the efforts already taken by NIH to improve the biomedical workforce, Dr. Lawrence Tabak, Senior Official Performing the Duties of NIH Director⁴, charged the WG to:

- Evaluate whether there is evidence to support the perceived decline and shortage in PhDs seeking U.S. postdoctoral training positions, and document trends in PhDs choosing nonacademic post-graduate employment
- Assess and consider the factors influencing the scope and persistence of the issue, including COVID-19, the economy and inflation, trends in academic job markets, time to publish, immigration policy, and the growing biotechnology and biopharmaceutical industries
- Review and compare the mechanisms, effects, and relevance of other approaches to postdoctoral training (e.g., in other countries, other systems)
- Consider ways to increase support and retention of postdoctoral trainees on key issues related to quality-of-life and work-life balance concerns
- Engage key parties, both internal and external to NIH, to understand and strengthen the U.S. postdoctoral training system

Community engagement has been pivotal in the WG's approach. The WG consulted with experts throughout the year, including researchers and reporters who furnished data providing an evidence base to the current postdoctoral perspective and demographics. These included guests from the National Science Foundation (NSF) and *Nature*, as well as researchers who have surveyed international postdoctoral scholars working in the U.S. In March 2023, the WG hosted [four public virtual listening sessions](#)⁵ to receive targeted feedback, with each session dedicated to a specific topic: Role, duration, structure, and value of the academic postdoc including impacts on underrepresented populations; International postdoc concerns; Compensation and benefits including child and dependent care; Job security, career prospects, and quality of life. Invited speakers, including at least one current postdoctoral scholar per session, offered comments on challenges faced by postdoctoral scholars and potential solutions. Participants across the 4 sessions—1585 registrants from more than 350 institutions and 31 countries — shared their thoughts in facilitated open discussion.

² <https://videocast.nih.gov/watch=46512>

³ <https://videocast.nih.gov/watch=48663>

⁴ At time of issuing the charge, Dr. Lawrence Tabak was serving as the Senior Official Performing the Duties of NIH Director. At the time of finalizing this report, he was serving as Principal Deputy Director.

⁵ <https://www.acd.od.nih.gov/working-groups/postdocs.html>

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To provide a broader opportunity to receive formal insights from the community on issues affecting postdoctoral scholars, NIH published a Request for Information (RFI): Re-envisioning U.S. Postdoctoral Research Training and Career Progression within the Biomedical Research Enterprise ([NOT-OD-23-084](#))⁶. Open from February 14 to April 14, 2023, NIH received 3,252 responses from individuals and organizations from academia, professional societies, non-profits and advocacy groups, industry, the federal government, and other interested groups. Summaries and synthesis of the themes from both the [listening sessions](#)⁷ and the [RFI](#)⁸ were published on the ACD website and reported during an update on the WG's progress, presented at an [ACD meeting on June 9, 2023](#)⁹. These reports are included as appendices to this report.

The WG met regularly from January to December 2023, including a two day in-person meeting in August. The WG updated the ACD in June on their progress, including the development of [seven guiding principles](#). The group then split into three smaller focused groups through September, each tasked to identify recommendations and actions to meet specific principles and share these with the overall group for consideration. From September through November, the group collaborated to refine these ideas into six final recommendations, which will be presented to the ACD along with this final report at a meeting on December 15, 2023.

Importantly, the WG has elected to use the term “postdoctoral scholar” throughout this report to reflect the high level of education of and respect for these scholars, especially in contrast to the commonly used term of “postdoctoral trainee”¹⁰. As reflected in the recommendations (Recommendation 1.3), the WG advises NIH to immediately adopt this term as standard practice and to encourage institutions to utilize this term.

⁶ <https://grants.nih.gov/grants/guide/notice-files/NOT-OD-23-084.html>

⁷ https://www.acd.od.nih.gov/documents/IMOD_Postdoc_Listening_Sessions_summary.pdf

⁸ https://www.acd.od.nih.gov/documents/RFI_Postdocs_Report_2023.pdf

⁹ <https://videocast.nih.gov/watch=49764>

¹⁰ One notable exception is in the WG charge, which is listed verbatim as it was issued in December 2022, before the WG addressed terminology.

Understanding the Need

Challenges affecting the postdoctoral scholar population are multifactorial and complex. They are wide-ranging and include concerns about low salaries, rising cost of living, insufficient benefits such as dependent care, work-life balance, limited academic career opportunities, lengthening time to publish, and expanding research expectations. Geopolitical factors, such as the emergence from the COVID-19 pandemic and shifts in immigration policies and patterns, also are at play. Many of these challenges are faced not just by postdoctoral scholars, but by all early career scientists and the broader academic workforce.

To evaluate evidence and document trends in the postdoctoral workforce, the working group engaged experts and reviewed available data from a wide variety of sources including NSF, NIH, *Nature*, NPA, and others. A brief review of selected data is included below.

Slowing Growth of the Postdoctoral Workforce

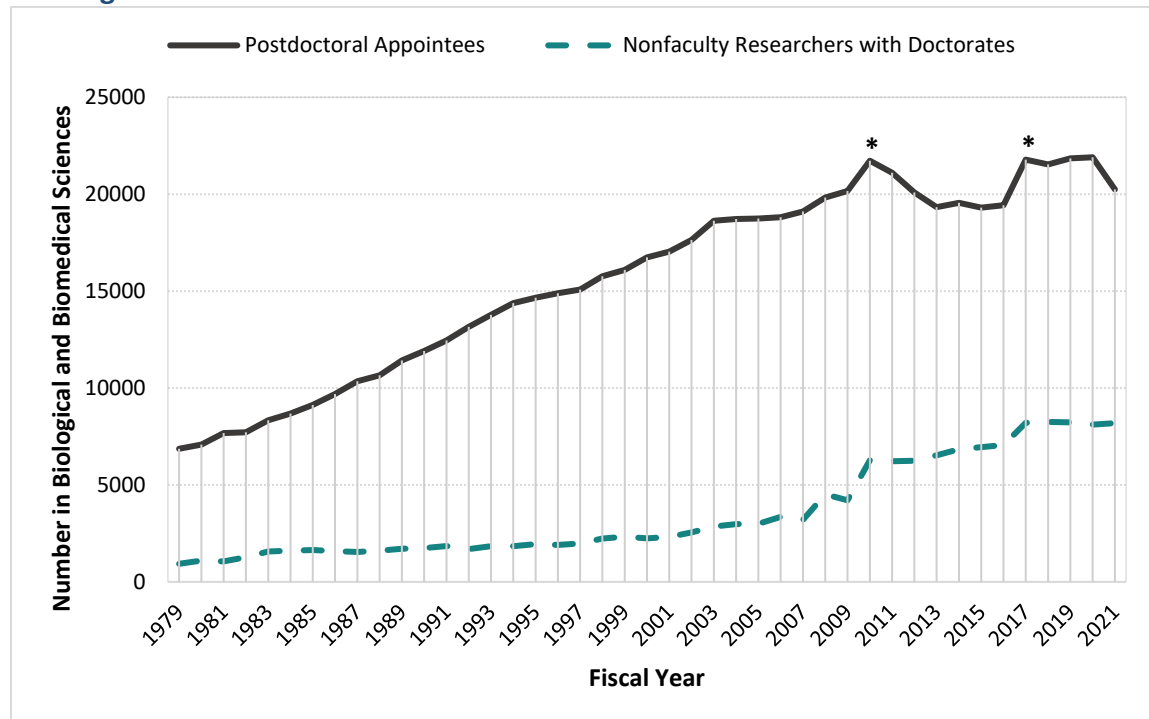


Figure 1. U.S. Researchers in Biological and Biomedical Sciences by Position, FY 1979 – 2021 (GSS)^{11,12}

Before fiscal year (FY) 2021, the number of measured postdoctoral scholars in biological and biomedical sciences had remained largely flat in recent years¹¹ (Figure 1), as shown by data from the [Survey of Graduate Students and Postdoctorates in Science and Engineering \(GSS\)](#)¹²

¹¹ Asterisks in the chart indicate changes in NSF's data collection and classification methods in FY 2010 and FY 2017. Thus, it is unclear how much of the changes before and after these specific years are from changes in postdocs and NFRs and how much are from changes in survey design. Details available at link in footnote 12.

¹² <https://ncses.nsf.gov/surveys/graduate-students-postdoctorates-s-e/>

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co-sponsored by the National Science Foundation (NSF) and NIH. Between FY 2020 and FY 2021, the number of postdoctoral scholars in biological and biomedical sciences decreased by 7.6%. In contrast, the number of non-faculty researchers with doctorates (doctorate-holding staff primarily involved in research who are neither postdoctoral scholars nor faculty) has remained flat.

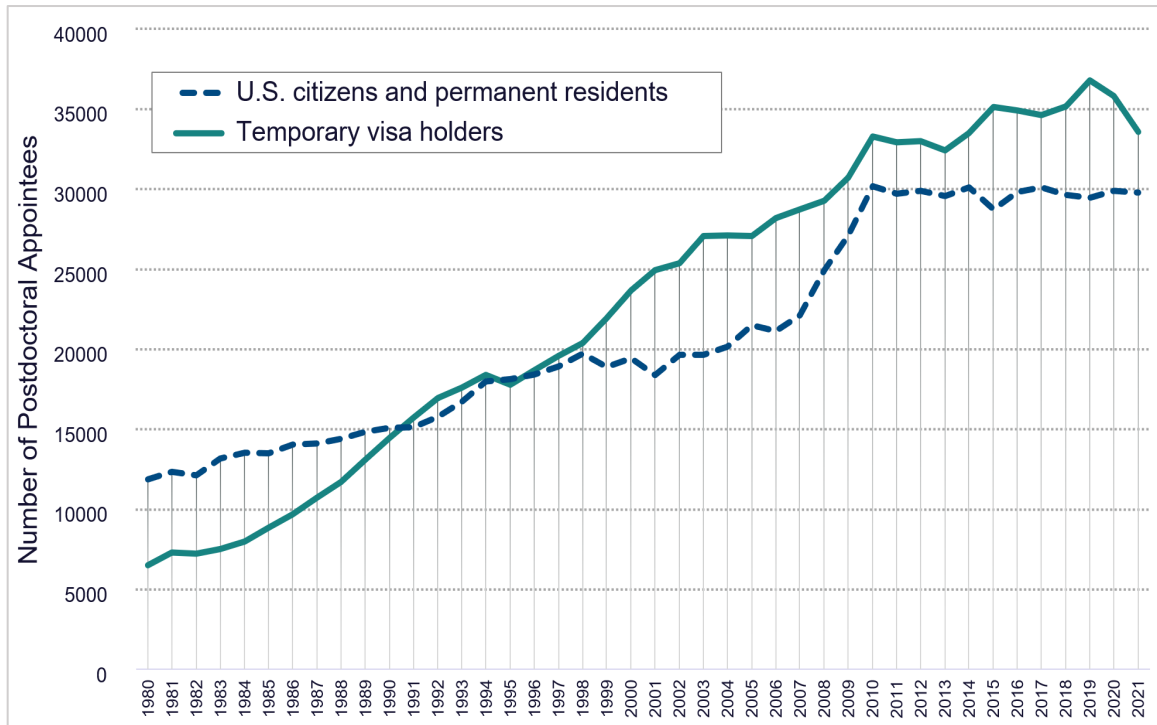


Figure 2. Citizenship of U.S. Postdoctoral Appointees in Science, Engineering, and Health, FY 1980-2021 (GSS)¹²

Since the 1990s, more than half of all postdoctoral appointees in science, engineering, and health in the U.S. have been temporary visa holders, underlining the critical importance to the success of U.S. science of postdoctoral scholars coming to the U.S. from abroad. In fact, in FY 2021, 53% of U.S. postdoctoral appointees were temporary visa holders (Figure 2). Most of the overall decline in all postdoctoral appointees is due to a decrease in international scholars, with a 6.2% decrease from FY 2020 to FY 2021.

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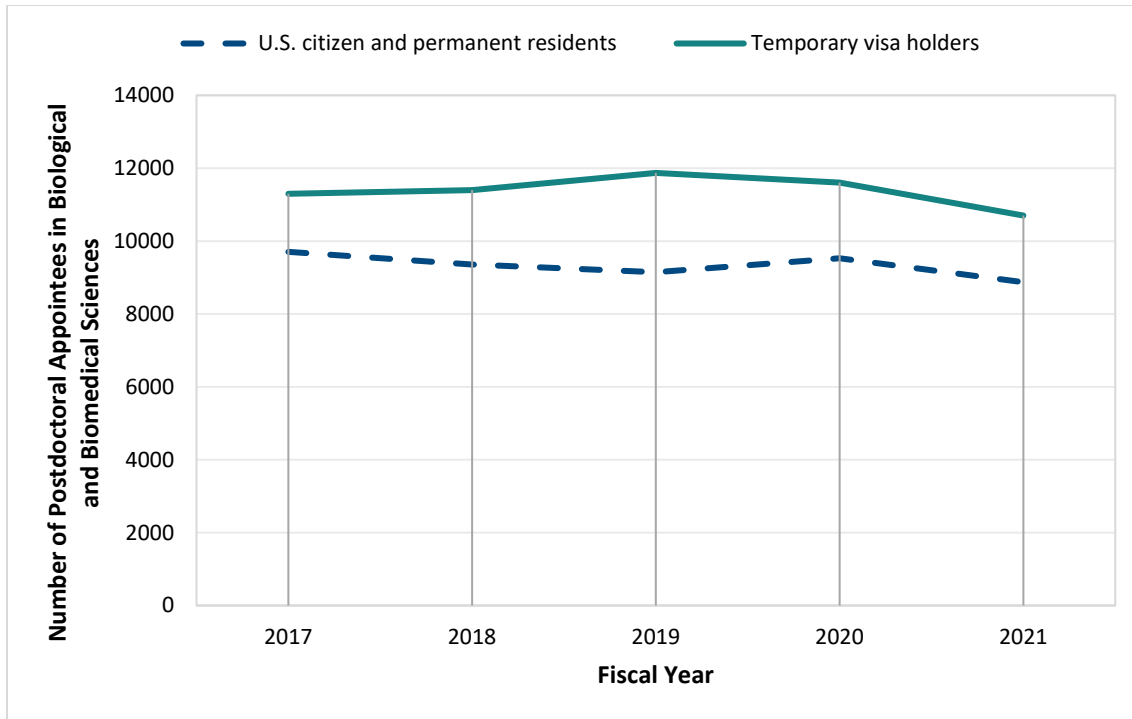


Figure 3. Citizenship of U.S. Postdoctoral Appointees in Biological and Biomedical Sciences, FY 2017-2021 (GSS)¹²

Breaking out postdoctoral appointees in biological and biomedical sciences, 54.7% were temporary visa holders in FY21 (Figure 3). Numbers of temporary visa holders and U.S. citizen and permanent residents both declined from FY20 to FY21, 7.8% and 6.9% respectively.

Decreases in international postdoctoral appointees correlate with data from an annual census of international students conducted by the Institute of International Education and sponsored by the U.S. Department of State. These data¹³ show a decline in the total number of international students enrolled in the U.S. starting in the 2020-2021 academic year. Enrollment trends show declines in new international student enrollment as early as the 2018-2019 academic year—*before* the pandemic—suggesting that, while the pandemic may have accelerated or exacerbated the problem, it was not the sole driver. However, new Open Doors data released in November 2023 show a rebound in both the total number of international students and enrollment in the 2021-2022 and 2022-2023 academic years. As data is not yet available for international postdoctoral scholars past FY 2021, it remains to be seen whether a similar rebound will occur.

¹³ <https://opendoorsdata.org/annual-release/international-students/>

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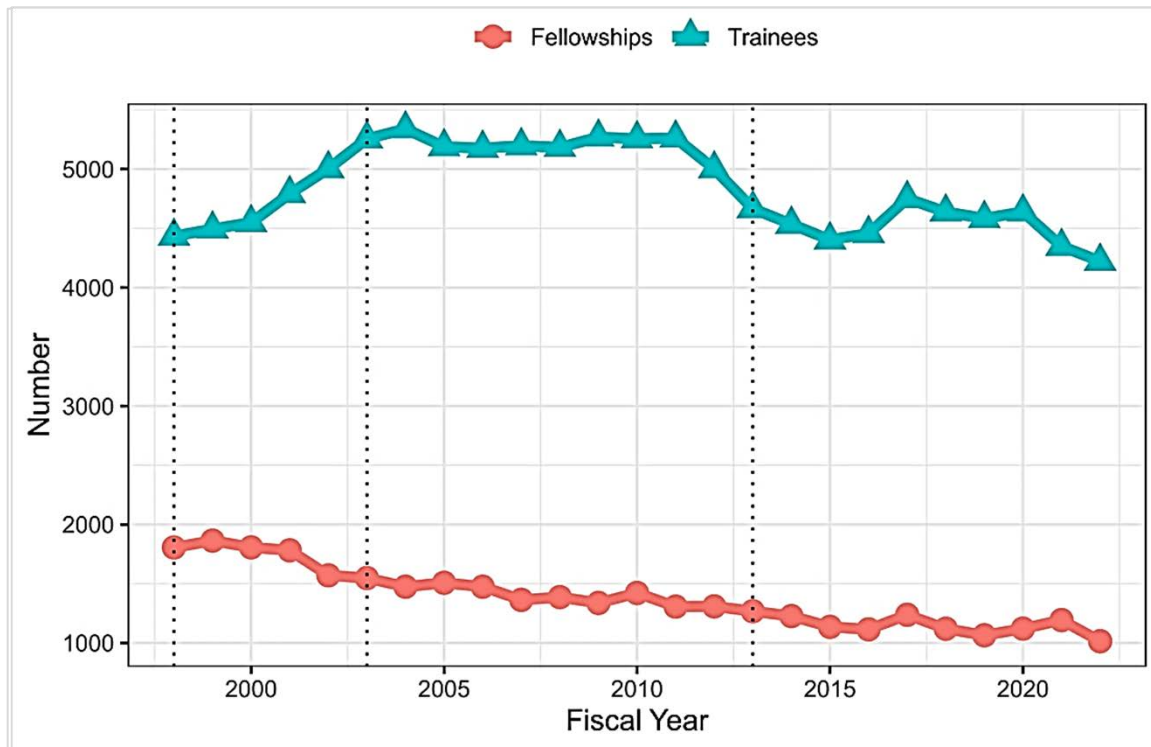


Figure 4. NIH NSRA-Supported Postdoctoral Scholars, 1998 – 2022 (OER)¹²

The decline in postdoctoral appointees in GSS data is mirrored by a decline in NIH-supported postdoctoral scholars supported by National Research Service Awards (NRSAs)¹⁴, though they are only a fraction of the pool of NIH-supported postdoctoral scholars (Figure 4).¹⁵ There has been a steady decline in both the number of postdoctoral scholars on NSRA training grants (T32s), which are awarded to institutions and support multiple postdoctoral positions, and the number of NSRA fellowships (F32s), which are awarded to fellows and support individuals.

¹⁴ NIH OER

¹⁵ NRSAs are awards to both individuals and institutions to provide research training, in contrast to Research Project Grants (RPGs), which are awards made to an institution/organization to support discrete, specified, circumscribed projects to be performed by named investigators in areas representing their specific interest and competencies, such as R01s. While NIH funding supports postdoctoral scholars through both NRSAs and RPGs and most NIH-supported postdoctoral scholars are supported through RPGs the NSRA is the most common mechanism NIH uses to fund postdoctoral scholars directly.

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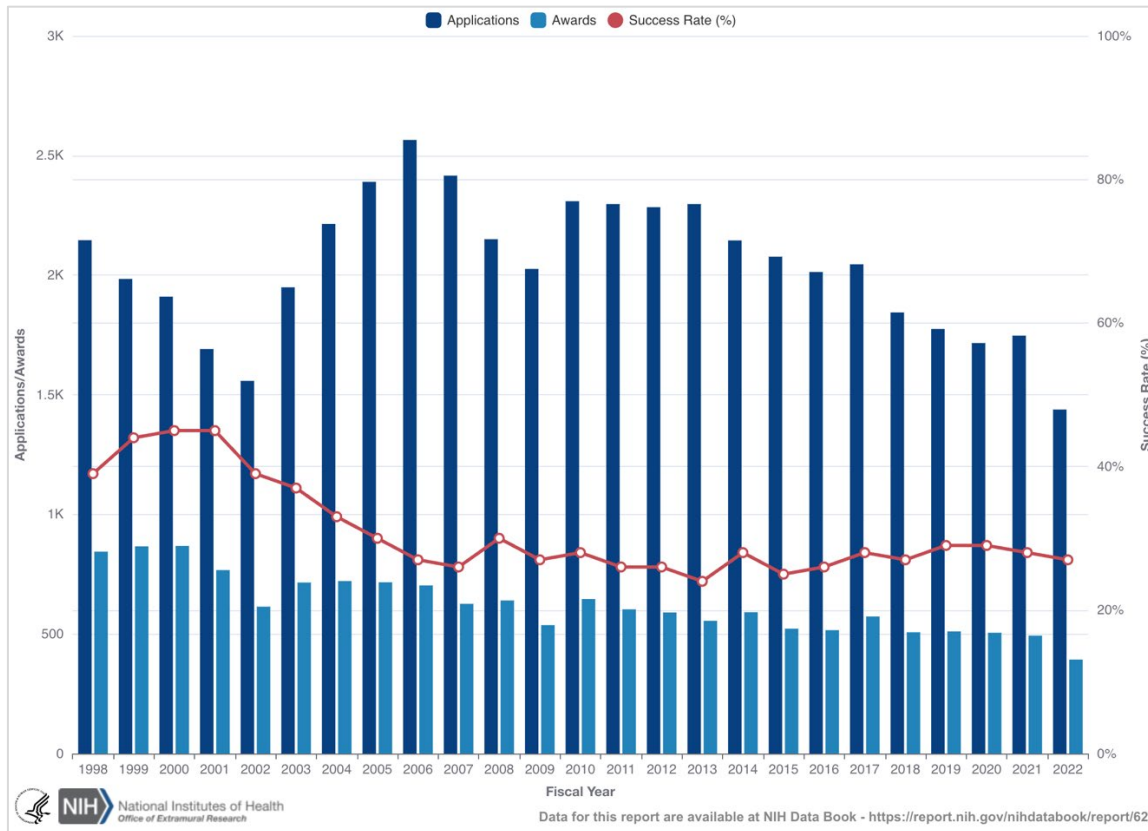


Figure 5. NIH NRSA F32 Applications, Awards, and Success Rates (NIH Data Book)¹⁶

Moreover, the decline in NRSA fellowships is not due to a decline in success rate, which has remained consistent and fairly high at just under 30%, but to a declining number of F32 applications over the last decade (Figure 5). Notably, a similar reduction in postdoctoral applications has been documented in other countries, including in the UK and EU¹⁷. Overall, these data support a growing perception in the public that the postdoctoral workforce is declining in size.

¹⁶ <https://report.nih.gov/nihdatabook/report/62>

¹⁷ <https://www.nature.com/articles/d41586-022-02781-x>

Doctorate Holders are Shifting Career Paths

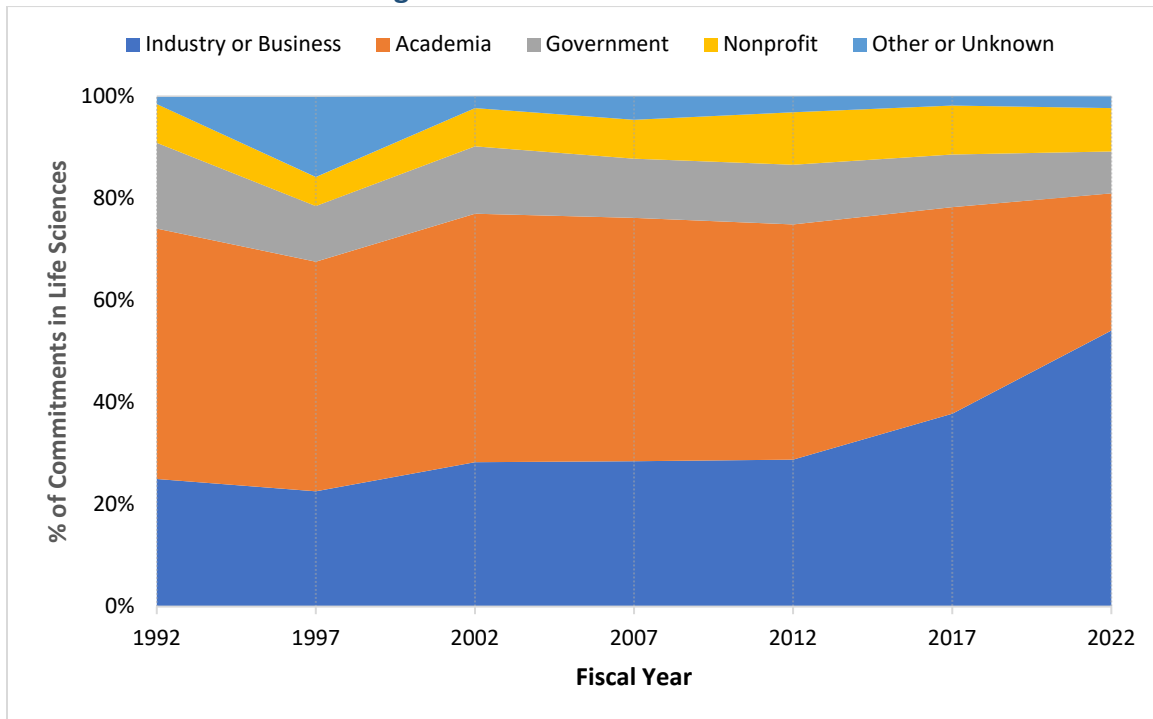


Figure 6. Employment Sector of Life Sciences Doctorate Recipients with Definite Postgraduation Commitments for U.S. Employment, FY 1992-2022 (SED)¹⁸

As documented by the NSF [Survey of Earned Doctorates \(SED\)](#)^{18,19}, an increasing percent of new U.S. life sciences²⁰ doctorate holders with definite postgraduate commitments plan to obtain a job and skip postdoctoral training, with 46.9% choosing a job in FY 2021 compared to 37.3% in FY 1992. By employment sector (Figure 6), U.S. doctorate recipients in life sciences are increasingly committing to positions in industry or business immediately after earning their doctorate, with a decreasing portion going into academia. In FY 2021, just 26.9% committed to academia, whereas more than double that amount (54.1%) committed to industry or business.

While the NIH NRSA stipend has been steadily growing and is \$56,484 for a first-year postdoctoral fellow in FY 2023, it has not kept pace with inflation and is much lower than corresponding industry salaries. The SED reports a median first-year salary of approximately \$90,000 for individuals in the biological, biomedical, and health sciences who committed to employment outside academia rather than to postdoctoral positions. Since the WG's inception, many research institutions have announced increases to their postdoctoral salary levels in reaction to growing calls for increases and collective bargaining efforts²¹.

¹⁸ <https://nces.nsf.gov/surveys/earned-doctorates/2022>

¹⁹ The SED is an annual census of research doctorate recipients from U.S. academic institutions that collects information on educational history, graduate funding source and educational debts, and postgraduation plans.

²⁰ Due to differences in how data is parsed for the GSS and SED, Figure 7 shows data for life sciences, which includes agricultural sciences and natural resources, biological and biomedical sciences, and health sciences.

²¹ <https://www.science.org/content/article/postdocs-need-raises-who-will-foot-bill>

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Postdoctoral Scholars are Growing Less Satisfied

In addition to declining numbers of postdoctoral scholars, concerns are increasing about their experience and satisfaction in the role. Several large-scale surveys of postdoctoral scholars were available during the WG's efforts, including two global surveys conducted by *Nature* in [2020²²](#) and [2023²³](#) and a [2023 Postdoctoral Barriers to Success survey conducted by NPA in fall 2022²⁴](#). Importantly, these global surveys demonstrate that other countries have similar challenges to the U.S. in supporting their postdoctoral scholar communities.

These surveys paint a picture of a community that is enthusiastic about their research but dismayed and concerned about their postdoctoral experience and their career prospects. In 2023, *Nature* reported that just 41% of postdoctoral scholars felt positive about their career prospects while 42% felt negatively; notably, despite the concerns, most scholars (65%) indicated they planned to pursue careers within academia. Just over half of postdoctoral scholars have considered leaving their scientific field due to mental health concerns, and 24% reported having experienced discrimination or harassment. Women, members of ethnic minority groups, and individuals with disabilities reported higher rates of both mental health concerns and harassment.

Further, the 2023 NPA survey of its postdoctoral membership found strong negative impacts on postdoctoral scholars' lives across all surveyed categories : low salary; lack of clarity about next position; unclear definition of their time as a postdoctoral scholar; low job security; decreased funding; lack of transparency around supervisor expectations; and lack of healthy workplace culture. The survey further showed that almost three-quarters of international postdoctoral scholars reported that vulnerabilities related to international status have a high-level negative impact on their lives.

Taken together and combined with anecdotal feedback the WG received from the RFI and listening sessions, these data support concerns that the postdoctoral system is not serving the needs of postdoctoral scholars individually or the biomedical system as a whole and demonstrate that change is urgently needed.

In particular, the extensive data revealed that the decline in PhD holders entering postdoctoral position extends beyond career decisions of recent PhDs, extending to multiple causes requiring action. The WG therefore looked deeper than the declining numbers to focus on factors negatively impacting the postdoctoral experience. This strategy led the WG to discuss tactical changes that NIH and partners could utilize to address fundamental shortcomings in the current postdoctoral experience. While the WG acknowledged past recommendations from NIH and other key institutions, the key focus areas were the most important actions NIH has authority to implement or to recommend, and linking these to specific sources of discontent and failings in the postdoctoral position today.

²² https://figshare.com/articles/dataset/Nature_Post-Doctoral_Survey/13207424

²³ https://figshare.com/articles/dataset/Nature_Post-Doctoral_Survey_2023/24236875

²⁴ https://cdn.ymaws.com/www.nationalpostdoc.org/resource/resmgr/docs/2023_Postdoctoral_Barriers_t.pdf

Past Efforts by NIH to Support Postdoctoral Scholars

Ensuring the future of U.S. competitiveness and innovation in biomedical research is of utmost importance to NIH. A key avenue for achieving this goal is to support a sustainable and diverse biomedical workforce, and this WG is far from NIH's first effort—or first Advisory Committee to the Director (ACD) WG—on the topic. Over the last several years, NIH has taken numerous steps to balance, strengthen, and stabilize the biomedical research workforce, including for postdoctoral scholars.

In 2012, NIH convened an [ACD WG on the Biomedical Workforce \(BWF\)](#)²⁵ to develop a model for a sustainable and diverse U.S. biomedical research workforce to inform decisions about training of the optimal number of people for the appropriate types of positions that will advance science and promote health. Postdoctoral scholars were a major component of the group's work, and they made recommendations including doubling the number of Pathway to Independence (K99/R00) awards supporting postdoctoral scholars' transition to independence, increasing stipends and benefits, and supporting training and mentorship. NIH also increased the awards for postdoctoral NRSA stipends to over \$50,000 annually following revisions to the Fair Labor Standards Act (FLSA) that increase the overtime pay threshold in 2016²⁶. Additionally, in 2013 and 2014, the NIH Common Fund issued Broadening Experiences in Scientific Training (BEST) awards to develop sustainable approaches to broaden graduate and postdoctoral training by creating programs that reflect a broad range of career options that scholars may ultimately pursue.

In 2017, NIH launched the Next Generation Researchers Initiative (NGRI)²⁷ to address longstanding challenges faced by researchers trying to embark upon and sustain independent research careers, and to take steps to promote the growth, stability, and diversity of the biomedical research workforce. In 2018, NIH convened an [ACD WG on the NGRI](#)²⁸ to engage individuals at every career stage, as well as research institutions and other key parties, to ensure that the policy would be effective in its goal of providing long-term stability and strength to the U.S. biomedical research enterprise. NGRI established new methods to support ESIs, which have led to record levels of NIH funding support for ESIs in FY 2023.

This current report, focused specifically on the postdoctoral experience within the greater research environment, builds upon the work of the previous WGs, with attention given to gaps and barriers to progress. A table is available in the appendix of this report comparing the recommendations of the BMW and NGRI WGs with this current report's recommendations and includes information about the implementation of past recommendations.

²⁵ <https://www.acd.od.nih.gov/working-groups/BWF.html>

²⁶ https://www.huffpost.com/entry/fair-pay-for-postdocs-why_b_10011066

²⁷ <https://grants.nih.gov/ngri.htm>

²⁸ <https://www.acd.od.nih.gov/working-groups/nextgen.html>

Goal and Guiding Principles

Following review of the data, engagement with the community, and discussions among the WG, the WG developed an overarching goal and a series of seven fundamental guiding principles to address the challenges and needs of postdoctoral scholars.

The WG enunciated its goal: to re-envision the postdoctoral experience to enhance sustainability and inclusivity and to better recognize and reward the value of postdoctoral scholars to the U.S. scientific enterprise.

The principles that guided the WG's discussion towards its goal and built the foundation for the recommendations are (not in order of priority):

Principle 1: All postdoctoral scholars should receive a wage with regular cost-of-living adjustments and employee-level benefits commensurate with their education and training regardless of NIH support mechanism or appointment.

Principle 2: All postdoctoral scholars should be ensured a safe, diverse, equitable, inclusive, accessible, and supportive work environment free from abuse, discrimination, and harassment.

Principle 3: The postdoctoral position should be clearly defined, standardized, and tracked within and across institutions, disciplines, and funding mechanisms. The duration of postdoctoral positions should be capped at a finite number of years.

Principle 4: New or expanded funding mechanisms and resources should be available to better support the postdoctoral experience and career paths.

Principle 5: International postdoctoral scholars play an important role in the biomedical research ecosystem and should have compensation and benefits that are equal to that of their counterparts who are U.S. citizens/U.S. permanent residents and access to more federal grant opportunities to support their research careers.

Principle 6: Professional and career development should be an integral, measured component of the postdoctoral experience that occupies a minimum percentage of the postdoctoral scholars' efforts.

Principle 7: Institutions, programs, and principal investigators should be held accountable for ensuring that postdoctoral scholars receive quality mentorship and professional development opportunities. Training in mentoring skills should be strongly promoted for those who serve in a mentor role to postdoctoral scholars or who work as leaders in postdoctoral offices, and for the postdoctoral scholars themselves.

Recommendations

By building consensus on these guiding principles, the group developed six primary recommendations and twelve accompanying sub-recommendations. A table is available in the appendix to this report, mapping each guiding principle to the related recommendations and sub-recommendations.

Critically, the WG seeks to emphasize that international postdoctoral scholars (those who are not U.S. citizens or permanent residents) are vital to the U.S. biomedical enterprise. Data show that foreign-born talent comprises more than half of the postdoctoral workforce and contributes disproportionately to innovation and entrepreneurship in the U.S.²⁹ A diverse workforce, including diversity of nationality, stimulates innovative solutions and strengthens the nation's competitiveness as a player in the global research landscape. Losing international talent would seriously reduce U.S. competitiveness and diminish the richness of ideas. Further—just like postdoctoral scholars who are U.S. citizens or permanent residents—international postdoctoral scholars deserve that their participation in the scientific enterprise should sustainably serve their personal and professional goals. Accordingly, the WG integrated across its recommendations the imperative to create policies and resources to support the unique challenges of international postdoctoral scholars.

Further, the WG assigned each recommendation or sub-recommendation an intended timeline and urges NIH to address “short term” recommendations as soon as feasibly possible and ideally within one to two fiscal years. “Long term” recommendations may be more complex and thus require a more extended time implementation window.

Recommendation 1: Increase pay and benefits for all NIH-supported postdoctoral scholars.

*Compensation was the top challenge reported in the WG's public engagement, reported to dissuade graduate students from pursuing postdoctoral positions and to prevent postdoctoral scholars from achieving personal and professional goals such as achieving financial security and starting families. The WG feels strongly that increasing compensation for postdoctoral scholars is the **top priority**, and that compensation and benefits should be improved and standardized for all NIH-supported postdoctoral scholars regardless of their citizenship, immigration status, discipline, or the mechanism through which they are funded.*

1.1. Increase compensation annually adjusted to inflation, with a minimum \$70,000 NRSA postdoctoral stipend in 2024.

Currently, postdoctoral scholars report financial burden as a top cause of stress, dissatisfaction, and departure from their academic careers. They feel undervalued and underpaid relative to their counterparts in other science-related industries, as postdoctoral pay levels have not kept pace with inflation or with increased opportunities in adjacent

²⁹ <https://www.nber.org/papers/w30797>

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sectors such as industry. While the WG acknowledges that academia cannot—and need not—directly compete with private industry, the current pay standards for academic postdoctoral scholars are not commensurate with their education and expertise and therefore are untenable. Moreover, pay levels for postdoctoral scholars are often inconsistent both within and across institutions, and many who are not funded by NRSAs report being paid far less than the NRSA minimum, resulting in widespread inequity and vulnerability.

The WG recommends that NIH increase the NRSA postdoctoral stipend to provide a minimum compensation of \$70,000 in 2024, with annual adjustments for inflation. This pay level is consistent with levels requested in public engagement, comparable with entry-level positions in other science-related industries, and similar to minimum levels recently announced by leading research institutions³⁰. The WG affirms that NIH should continue to provide an increase in the minimum stipend for each additional year of postdoctoral experience.

Additionally, the WG recommends NIH strongly encourage institutions to pay the NRSA level as minimum compensation for all NIH-supported postdoctoral scholars. This recommendation applies to all postdoctoral scholars regardless of funding mechanism or discipline and to both domestic and international postdoctoral scholars. NIH should explore collaboration with institutions and other government agencies to support this vital standardization to ensure postdoctoral scholars funded on mechanisms other than NRSAs are included.

The WG believes that a more professionally and personally satisfied postdoctoral population is in the best interests of both individual postdoctoral scholars and the national scientific enterprise and should take precedence over a focus on the number of scholars. The WG acknowledges that an expected consequence of increasing postdoctoral pay without a corresponding increase in NIH funding will be a likely reduction in the number of postdoctoral positions that NIH can support. The WG views this outcome as a means to enhance the quality and efficacy of postdoctoral training, streamlining the path to the next career stage and ensuring that those who embark on it are adequately compensated. After implementing this report's recommendations and reestablishing a more rewarding postdoctoral position, the WG expects the size of the postdoctoral workforce will likely re-equilibrate at a level needed to support a robust, appropriately compensated and supported postdoctoral population.

Lastly, the WG recommends NIH work with other organizations and federal agencies to simplify policies that impact postdoctoral income and provide greater clarity and understanding about these policies to postdoctoral scholars. In particular, scientists on fellowships often experience financial disadvantages through the tax code; for example, as

³⁰ <https://www.science.org/content/article/postdocs-need-raises-who-will-foot-bill>

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fellowship income is not usually considered “earned income”, fellows are often ineligible for certain tax credits. The WG encourages NIH to partner with other federal science funding agencies to engage with the Internal Revenue Service (IRS) to clarify postdoctoral scholars’ tax status and attempt to mitigate tax disadvantages. For example, this could include clarifying and raising awareness of tax implications and laws that impact postdoctoral scholars, such as provisions in the SECURE Act (P.L. 116-94), which allowed for fellowship stipends for graduate students and postdoctoral scholars to be classified as compensation for the purpose of contributing to individual retirement arrangement (IRA) accounts.

Timeline: Short-term

1.2. Provide full-time employee-level benefits for all NIH-supported postdoctoral scholars.

In addition to compensation, coverage of benefits is an integral component of compensation and is essential to postdoctoral scholars’ quality of life and financial security. Lack of access to sufficient health, vision, and dental coverage puts scholars and their families at both financial and physical risk. Lack of access to dependent care disproportionately impacts scholars who have children or other caretaking responsibilities. Lack of retirement benefits puts postdoctoral scholars financially further behind their peers in other sectors because one of the trade-offs of working in academic research is lower earning potential.

Further, there is currently wide variation between and within institutions on postdoctoral scholars’ employment status and access to benefits. In some cases, institutions apply different employment appointment mechanisms to postdoctoral scholars based on the funding mechanism providing their compensation. For example, many postdoctoral scholars who receive an individual fellowship are appointed as contractors, while those supported through a grant for their principal investigator’s work are often hired as employees. These differences lead to an unequal and often significant burden on postdoctoral scholars. Importantly, an NRSA does not prohibit institutions from hiring the recipient as an employee; NIH recently clarified this point to the community ([NOT-OD-23-111](https://grants.nih.gov/grants/guide/notice-files/NOT-OD-23-111.html))³¹.

Accordingly, the WG recommends that NIH require institutions to either employ all NIH-supported postdoctoral scholars directly (e.g., instead of as contractors) or to provide them with full-time employee-level benefits, including, at a minimum, health, vision, and dental insurance; dependent care coverage; and retirement savings plans. “Employee-level benefits” refer to benefits provided by the same institution to others in similar full-time employed positions with comparable experience and qualifications, such as postdoctoral scholars who are not on individual fellowships and are appointed as employees. As with

³¹ <https://grants.nih.gov/grants/guide/notice-files/NOT-OD-23-111.html>

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compensation, this should apply to all postdoctoral scholars regardless of funding mechanism, discipline, or citizenship or immigration status.

In addition to ensuring that NRSA recipients receive full benefits through their institutions, NIH should increase the benefits package the NRSA funding provides, including modifying NRSA childcare benefits to include all dependent care (e.g., child, spouse, or other dependent adult) and expand the benefits threshold to \$2,500 per dependent with a maximum of \$10,000 annually. To financially support this change, NIH should explore multiple avenues, including possible cost sharing with institutions, particularly for those that receive lower levels of NIH funding. For example, NIH could cover up to 50% of benefit costs for institutions receiving more than \$7M in RPGs and 100% for those receiving less than \$7M in RPGs.

NIH should further simplify and clarify policies impacting postdoctoral benefits, including examining payback requirements, deferral periods for student loan repayment programs, and expanding flexibility for these programs to include additional research-related career paths.

It is critical that NIH communicates clearly and seeks uniform implementation of these changes to ensure that institutions recognize and understand the revised policies without exploiting ambiguities or challenges in oversight and accountability.

Timeline: Short-term

1.3. Limit the total number of years a person can be supported by NIH funds in a postdoctoral position to no more than 5 years, including time spent in different host institutions.

The environment and experience of postdoctoral scholars has not been sufficiently defined or standardized; inconsistent titles, expectations, and position duration create institutional variability and inequitable treatment. Further, academic postdoctoral appointments have become excessively long, delaying career progression, and negatively impacting a time of life during which many people seek to assume important personal responsibilities, in particular, recognizing that not all postdoctoral scholars will enter a research or teaching position.

The WG recommends that NIH funding should not be used to support anyone as a postdoctoral scholar beyond five years. This five-year period should cover the total time spent as a postdoctoral scholar, including time spent in different host institutions and any changes in funding support. For example, if a scientist works as a postdoctoral scholar at one institution for three years funded by an R01, then moves to a new institution and is awarded an F32, the postdoctoral scholar would be able to accept only two years of

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funding, i.e. for a total of five years of NIH support. Beyond five years, postdoctoral scholars must transition to a new role and position (e.g., staff scientist; see Recommendation 3). While research project timelines differ across fields, the WG feels it is critical to set a uniform upper limit.

The WG recognizes that some postdoctoral scholars currently work for terms longer than five years, after which they are moved to another position, in title only, with no meaningful modification to their role, compensation, or benefits. Therefore, the WG further recommends that NIH develop and enforce a standard, firm definition of a postdoctoral scholar that limits this type of “gaming”. As mentioned previously, the WG recommends NIH adopt the term “postdoctoral scholar” as standard practice going forward and encourage institutions to do the same. The WG recommends the following definition: *An individual who has received a doctoral degree or equivalent working in a term-limited position of mentored research and professional development to prepare for an independent career usually in research and teaching.*

To ensure this limit encourages career progression without punishing scholars for events beyond their control, NIH should provide extensions for significant life events (e.g., childcare, health issues) and major setbacks (e.g., natural disasters). NIH may also consider extensions for scholars who were awarded their PhD outside of the U.S. and who may need additional time to acclimate after moving to a new country. To aid institutions in navigating the term-limit policy, NIH should also create a “best practice” document to support implementation and monitoring of this change.

NIH may also consider formally recognizing postdoctoral scholars who complete an NRSA fellowship as alumni of the program with a certificate or honorific and encouraging institutions to do the same when postdoctoral scholars transition to another role, position, or institution. Providing recognition of a postdoctoral position will help to formalize the relationship between the scholar and institution, elevate prestige, and provide a benchmark that the term of the position has been completed.

Additionally, the WG acknowledges that the current journal-based publication system, and the widespread practice of assessing researchers based on their performance in this journal system, can delay timely career progression. The current publishing culture requires graduate students and postdoctoral scholars spend significant time during final year(s), i.e. honing research for specific journals. While addressing this challenge will require concerted effort across all relevant parties in scholarly communications, NIH can encourage and reward researchers for sharing research output on journal-independent channels such as preprint servers and data repositories. For example, NIH can permit inclusion of preprints to grant applications at the pre-review 30-day update.

Timeline: Short-term

Recommendation 2: Create and expand mechanisms to support the full talent pool of postdoctoral scholars.

New approaches to funding are needed to revitalize the postdoctoral pathway and to increase and strengthen support for the broadest pool of scholars. Without these, the U.S.'s standing as a competitive player in the global research enterprise may erode. To create accessible and equitable pathways that can adequately recruit and retain talent, the WG urges NIH to expand existing programs to support postdoctoral scholars where possible and to create new mechanisms to fill existing gaps.

2.1. Develop new and expanded K mechanisms for both institutions and individuals.

New mechanisms to fund postdoctoral scholars are sorely needed to tap into large talent pools that are currently grossly underserved. These new mechanisms should ensure recruitment and retention of talented scholars from diverse and underprivileged populations as well as talented international scholars. A major current limitation for international postdoctoral scholars is that they are ineligible to apply for NRSAs (per U.S. statute). To support and attract this talent, K mechanisms should be made open to international postdoctoral scholars and should use cohort models wherever possible and appropriate. Cohorts allow groups of postdoctoral scholars to share their experiences in professional and career development through peer mentoring and networking, and they have proven extremely effective in programs such as in the Faculty Institutional Recruitment for Sustainable Transformation (FIRST)³² and Maximizing Opportunities for Scientific and Academic Independent Careers (MOSAIC)³³ programs.

Institutional Clinical Scientist Awards (K12s) are training and career development grants that are given to institutions and used to support candidates at the discretion of the institution. The WG recommends NIH develop new K12-like awards for institutions with the express goal of supporting cohorts of postdoctoral scholars who are currently underserved. Eligibility for these cohort positions should include candidates both internal and external to the institution, and those who are international. NIH should also promote the incorporation of cohort building into these awards.^{34,35} To complement the K12-like institutional awards, NIH should create K awards for individual postdoctoral applicants who do not attend a university with an institutional award. These awards could allow individuals to increase their competitive advantage.

Timeline: Long-term

³² <https://commonfund.nih.gov/FIRST>

³³ <https://www.nigms.nih.gov/training/careerdev/Pages/MOSAIC.aspx>

2.2. Revise the K99/R00 mechanism to focus on ideas and creativity over productivity.

The K99/R00 mechanism was designed to facilitate a timely transition for outstanding postdoctoral scholars from mentored research positions to independent, tenure-track, or equivalent faculty positions, and to provide independent NIH research support during the transition that will help these individuals launch competitive, independent research careers.

The WG recommends that NIH reconsider K99/R00 eligibility. To emphasize ideas and creativity rather than productivity, the K99/R00 eligibility window should be limited to the first 2 years of postdoctoral experience (with exceptions for notable life events, including childbirth). NIH should adapt award processes and policies, including creating targeted announcements for specific populations of interest and increasing the diversity of awardees in NOFOs (including in demographics, geography, and type of institution), to ensure this change does not negatively impact access to these awards by a wide range of scientists. To allow prospective applicants to plan for this change, it could take effect only for scholars who begin their postdoctoral positions in 2024 or beyond. Moreover, focusing the review of K99/R00 on ideas more than productivity also serves the interests of international scholars, scholars from underrepresented populations, scholars with dependent care responsibilities, and other individuals who may need additional time to establish their postdoctoral projects and demonstrate productivity.

To provide a new pathway with increased stability, NIH should pilot a new transition award mechanism, such as a F99/K00/R00, where the grantee receives 2 years of support as a graduate student, 3 years of support as a postdoctoral scholar, and 2 years of support as an independent researcher. This mechanism should provide a more rapid and stable path towards independence.

Timeline: Short and long-term

2.3. Create and expand support mechanisms for international postdoctoral scholars.

Studies show that international researchers contribute significant scientific talent, innovation, and entrepreneurship to the biomedical enterprise and the U.S. economy³⁶. To ensure the U.S. remains the leader in biomedical research and continues to achieve scientific breakthroughs to enhance human health, the U.S. must attract and retain highly skilled scientists, both from the U.S. and abroad. Therefore, NIH must commit to enhancing support for international postdoctoral scholars, who face unique challenges due to their international status. As addressed in Recommendation 2.1., these challenges include having limited funding opportunities because they are ineligible to apply for many NIH grant mechanisms and citizenship-related vulnerabilities such as restrictive visa requirements and processes. NIH should thus expand eligibility to include international postdoctoral scholars for all mechanisms where this is legally and programmatically possible or to develop targeted mechanisms to fund international postdoctoral scholars.

³⁶ <https://www.nber.org/papers/w30797>

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NIH should also provide international postdoctoral scholars support for immigration-related issues, which can be onerous and drain time from their research. In addition, the one-year contracts held by many postdoctoral scholars are disproportionately burdensome to international postdoctoral scholars, requiring them to engage in an annual cycle of renewing immigration paperwork which causes stress, financial strain, and job insecurity. The WG recommends that contracts for international postdoctoral scholars be extended from one to at least three years.

Timeline: Long-term

Recommendation 3: Facilitate the transition of postdoctoral scholars into their next career stage, including roles beyond academic faculty.

Postdoctoral scholars are increasingly pursuing a wider range of careers in science in addition to traditional tenure-track academic positions. Professional research careers in academia, as well as careers in industry, non-profits, and government, all contribute in unique and valuable ways to the overall biomedical research ecosystem. In addition to supporting scientists during their postdoctoral research, NIH should support and facilitate their transition to their next career step, inclusive of this wide variety. This includes both independent careers in academic research as outlined in Recommendation 2 and other career paths.

3.1. Increase support for a research professional career track, (e.g., staff scientist).

Fostering a robust research professional career track (e.g., staff scientist positions) would improve the sustainability and health of the biomedical system in several ways. It would expand the academic job pool and retain talented scientists in academic research, especially those who might be interested in a scientific career but not interested in the duties of a principal investigator. As a long-term presence in a laboratory or department, these scientists improve lab sustainability and efficiency by maintaining institutional knowledge and providing mentorship and support to others in the lab, thus reducing burden on principal investigators. Support for research professionals in academic core facilities can also build research enterprises and capacity.

The WG recommends that NIH support policy, infrastructure, funding mechanisms, and cultural change for a research professional career track to increase its presence, compensation, and professional standing. Such policy should also clearly differentiate this track from that of the postdoctoral scholar because a common criticism heard from many postdoctoral scholars is that the current distinction is blurry. Once this policy is established, it should be evaluated for efficacy.

NIH should engage with the community, with an emphasis on current postdoctoral scholars, staff scientists, research scientists, and others in similar long-term non-independent

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positions, to better understand the need for research professional roles. Based on that engagement, NIH should develop a definition of the research professional career track that establishes clear expectations for these roles. NIH should further encourage sharing successful models of these careers and models of institutional support for their career development.

To increase the cultural standing of these positions, NIH should set a minimum compensation range that is meaningfully higher than the range set for postdoctoral scholars, endorse that research professional positions can be supported on NIH grants, and emphasize that these positions are considered successful career outcomes for NIH-funded training programs.

Importantly, NIH should create and expand agency-wide support for research professional roles. Within a year of releasing this report, NIH should launch pilot funding programs and methods to support these career tracks. Methods could include expanding the current [National Cancer Institute \(NCI\) Research Specialist Award \(R50\)](#)³⁷ mechanism, or a similar mechanism, and allowing grant supplements to support these roles. NIH should provide support for scientists to transition into these roles both directly after completing a doctorate and from postdoctoral positions with appropriate increase in compensation, and for both staff scientists doing project-based work in laboratories and for scientific directors of shared and core facilities.

Timeline: Long-term; pilot programs within one year

3.2. Create engagement with sectors that hire biomedical doctorate-holders and postdoctoral scholars.

With an increasing number of doctorate-holders seeking employment outside of academic research, it is key that NIH engage other sectors and seek collaboration to support these members of the workforce. The Foundation for NIH (FNIH), an independent, not-for-profit 501(c)(3) charitable organization that convenes public and private partnerships between NIH, academia, life science companies, and patient advocacy groups, is an ideal partner for NIH in this endeavor. In collaboration with FNIH, NIH should engage life sciences companies, non-profits, professional organizations, and other key parties to create novel collaborative funding paths. This could include K99/I00 mechanisms supporting postdoctoral scholars moving into industry careers. Any proposed public-private partnerships should be as budget neutral for NIH as possible.

Engagement with other sectors should also include coordinating discussions on what training is most beneficial for postdoctoral scholars planning on careers in non-academic sectors. It is important for postdoctoral scholars to understand what opportunities are available to them and what skills and steps are beneficial in pursuit of these opportunities.

³⁷ <https://www.cancer.gov/grants-training/grants-funding/funding-opportunities/r50>

Timeline: Long-term

Recommendation 4: Promote training and professional development of postdoctoral scholars and their mentors.

Mentoring and professional development are critical aspects of the postdoctoral position and are defining elements of the academic science training. Training should be an integral component for both tenure and non-tenure professional positions. Mentoring should go beyond a scholar's direct PI to involve a network of mentors to ensure that postdoctoral scholars receive the full range of guidance needed for their individual career plans. Professional development training (including in leadership, teaching, communications, peer and career networking, etc.) standards are commonly established across a wide range of public and private sector jobs and disciplines. Similar standards should be adopted for postdoctoral scholars across the biomedical research enterprise.

4.1. Require institutions to ensure that career and professional development occupies a minimum average of 10% of a postdoctoral scholar's effort and create policies and resources to ensure equitable access to this training.

Career and professional development can include mentorship, grant writing, communication skills, lab management, conflict resolution, and other skills. These activities can be supported by the institution but should be directed by each individual postdoctoral scholar so that they have ownership over their training and can ensure it is aligned with their career goals. Completing normal professional duties not tailored to a scholar's individual aspirations does not constitute sufficient professional development to meet this requirement. For instance, although postdoctoral scholars will gain professional development skills as part of their primary research endeavor working with a principal investigator or supervisor, those experiences are not what is intended under this recommendation. Instead, a fundamental component of the professional development experience of a postdoctoral position is the ability of the scholar to direct the type of professional development best suited to achieve individual success. The professional development portion of a postdoctoral scholar's effort should be described in their Individual Development Plan (IDP), completed with their primary mentor.

Along with institutional support, NIH should support career and professional development opportunities for postdoctoral scholars by using existing or new mechanisms to expand regional or national infrastructures to disseminate evidence-based professional and career development resources and programs. NIH should consider whether it could also require all NIH grants that fund a postdoctoral scholar to pool financial resources at the institutional level to develop career and professional development programs. One example could be requiring that institutions with over a certain number of postdoctoral scholars have a postdoctoral support office.

Timeline: Long-term

4.2. Promote and ensure accountability for mentoring responsibilities.

As mentorship is a critical and defining part of the postdoctoral position, NIH should hold institutions and investigators accountable for providing high quality mentorship, including by requiring consistent reporting. At a minimum, these efforts should be reported as part of the Research Performance Progress Report (RPPR) using standardized, short questions to document mentor-mentee relationships for each postdoctoral scholar supported on the grant. Other possible mechanisms include requiring grant applicants to submit a mentorship plan for requested postdoctoral positions for all funding mechanisms; including mentorship training as part of the Responsible Conduct of Research training; finding ways to recognize and reward outstanding mentors; and requiring advisers to be reported on ScienCV.

Timeline: Long-term

Recommendation 5: Support safe and diverse perspectives and research environments within institutional research programs.

Abuse, harassment, mental health issues, and other impediments to success continue to hamper postdoctoral scholars. To promote the health of the biomedical enterprise, NIH must increase domestic talent that has been historically marginalized and retain diverse talent from across the globe. Scholars from these groups face increased structural and implicit barriers including lack of inclusion, reduced resources, implicit bias, language barriers, and loss of community, while often managing increased familial commitments and additional financial responsibilities. Examining and acting on these power imbalances is key to creating a more inclusive and safer environment.

5.1. Require institutions to provide safe research environments free of harassment.

Harassment and mistreatment of any person, scientist, and postdoctoral scholar cannot be tolerated. NIH currently requires institutions to have processes to identify and address inappropriate behavior, including requiring applications for extramural training grants to include a letter describing the institutional commitment to ensuring that proper policies, procedures, and oversight are in place to prevent discriminatory harassment and other discriminatory practices ([NOT-OD-19-029](https://grants.nih.gov/grants/guide/notice-files/NOT-OD-19-029.html)³⁸); requiring conference grant applications to ensure safe and inclusive environments ([NOT-OD-21-053](https://grants.nih.gov/grants/guide/notice-files/NOT-OD-21-053.html)³⁹); and affirming in the NIH Grants Policy Statement Section 4 that recipient institutions are expected to provide safe and

³⁸ <https://grants.nih.gov/grants/guide/notice-files/NOT-OD-19-029.html>

³⁹ <https://grants.nih.gov/grants/guide/notice-files/NOT-OD-22-074.html>

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healthful working conditions for their employees and foster work environments conducive to high-quality research ([NOT-22-129](#)⁴⁰).

The WG recommends NIH continue to build accountability for civil treatment of postdoctoral scholars. This should include fostering institutional support and implementation to empower postdoctoral scholars to change labs, if needed, without retaliation and with support to mitigate damage and delay to their wellbeing and careers.

Timeline: Short-term

5.2. Require institutions to support and foster diverse perspectives.

It is vital to ensure strong support for postdoctoral programs that increase diverse perspectives. Reductions in the number of NIH-supported postdoctoral scholars due to increased compensation (see Recommendation 1) could unintentionally lead to reductions in diversity without purposeful and careful action and monitoring. The WG applauds NIH's efforts to support and foster diverse perspectives, including expansion of relevant funding opportunities and agency-wide efforts such as UNITE. The WG recommends NIH continue its internal efforts in this space and require that extramural institutions support and foster diverse perspectives. One example is through the [Plan for Enhancing Diverse Perspectives \(PEDP\)](#)⁴¹, a new component in some NIH NOFOs that is considered as part of the scientific and technical merit of the proposed project during scientific peer review.

As noted in Sub-Recommendation 2.1., establishing cohorts has proven to be pivotal in supporting career growth and development; therefore, NIH could consider expanding programs that convene cohorts across grant mechanisms.

An important element of fostering diverse perspectives is addressing the unique needs of international postdoctoral scholars, ensuring they are supported and able to continue their scientific contributions. As a major obstacle for this population is difficulty navigating complex immigration policy, the WG recommends NIH create and widely disseminate a training module for immigration education, with resources on navigating immigration processes aimed at international postdoctoral scholars, their mentors, and postdoctoral affairs offices.

Timeline: Long-term

⁴⁰ <https://grants.nih.gov/grants/guide/notice-files/NOT-OD-22-129.html>

⁴¹ <https://braininitiative.nih.gov/vision/plan-enhancing-diverse-perspectives>

Recommendation 6: Improve means to measure and share postdoctoral scholars' career progression.

Postdoctoral scholars deserve access to and knowledge of policies, resources, and channels of communication that can enhance their experience and empower them to advocate for themselves. At present, data for and about postdoctoral scholars is limited and difficult to access. Enhanced data collection on postdoctoral experiences and outcomes will enable NIH to evaluate the success and results of implementation of the recommendations in this report and to identify best practices and areas for improvement. Transparent data-sharing will allow scientists interested in postdoctoral positions to assess potential positions and promote accountability by institutions. Enhanced communication with postdoctoral scholars and improved knowledge of postdoctoral experience and outcomes is critical to ensure accountability for and monitor progress of the improvements recommended in this report.

First, NIH should work to improve data collection by requiring institutions receiving funding to report accurate counts of postdoctoral researchers in biomedical fields to NIH (regardless of the source of funding for those postdoctoral scholars). In addition to the number of postdoctoral scholars, NIH could also require institutions to monitor and report career outcomes for graduate students and postdoctoral scholars and ensure these data are publicly available. While some organizations already collect and share this information (e.g., Coalition for Next Generation Life Science⁴²), it is incumbent on all organizations to do so.

Second, NIH should use administrative data (e.g., ScienCV & IMPAC II) to examine postdoctoral positions. This includes requiring all NIH-funded postdoctoral scholars to have an eRA Commons account independent of institution. Furthermore, NIH should collaborate with philanthropic organizations (e.g., Damon-Runyan, etc.) to track postdoctoral scholars who are funded by these entities.

Third, NIH should strengthen its existing partnerships with the NSF National Center for Science and Engineering Statistics (NCSES) and other organizations to enhance collection and analysis of postdoctoral data.

- NIH should request that NCSES field a new wave of the Early Career Doctorates Survey (ECDS) to collect retrospective data on postdoctorate length by field for scientists who have permanent employment. NIH should also request that NCSES include a retrospective postdoctoral position module similar to the module that was conducted in the 1995 and 2006 waves of the Survey of Doctorate Recipients (SDR)
- Concerns about the accuracy of the NCSES Survey of Graduate Students and Postdoctorates in Science and Engineering (GSS) have been raised. NIH should partner with NCSES and the Institute for Research on Innovation & Science (IRIS) at the University of Michigan to compare and validate the count of graduate students and postdoctoral scholars in the GSS to validate the accuracy of the data.

⁴² <https://nglscoalition.org/coalition-data/>

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- With the Census Bureau and FNIH, NCSES and NIH should collect and analyze data for postdoctoral scholars planning on careers in non-academic sectors, such as specific skills that are sought by these sectors when hiring postdoctoral scholars, and specific considerations for hiring of international postdoctoral scholars and doctorate-holders.

Communication between NIH, postdoctoral scholars, and institutions is critical, and NIH should continually seek ways to improve communication and engagement with postdoctoral scholars and institutions. For example, NIH should clarify federal policies and disseminate this information broadly to align expectations. Clarifications should include, but not be limited to:

- The NRSA stipend is not intended as a compensation cap.
- Recommended funding levels for NIH-supported postdoctoral scholars are intended to be minimums, not maximums.
- Institutions are permitted to supplement stipends for NIH-supported postdoctoral scholars with non-federal funding.
- Receiving an NRSA does not prohibit a scholar from being hired as an employee of their institution.
- Time as an NRSA-funded scholar does not disqualify the scholar from being eligible for the public services loan forgiveness program.
- For NRSA fellows classified as employees by their institution, grant funds may be used for relocation expenses. (Note this does not apply for students and contractors.)
- Eligibility and expectations around student loan repayment, such as clarifying that time on an NRSA fellowship is not disqualifying from the public services loan forgiveness program.
- TNIH re-integration program⁴³ to address the critical need to provide individuals who are adversely affected by unsafe or discriminatory environments resulting from intimidation or bullying to rapidly transition into new, safer, and more supportive research environments.
- NIH requires that every organization that receives NIH funds have policies and practices that foster an environment free from harassment⁴⁴.
- Individuals who have concerns that an NIH-funded project has been affected by harassment can notify the NIH⁴⁵.
- NIH should provide resources for postdoctoral scholars to better understand their tax status and navigate tax laws accordingly.

To foster direct communication between NIH and postdoctoral scholars and facilitate transparent and effective placement of postdoctoral scholars, the WG suggests NIH create a centralized portal that could serve as a “one stop shop” and provide:

- Access to resources and trainings for postdoctoral scholars

⁴³ <https://grants.nih.gov/grants/guide/notice-files/NOT-OD-23-170.html>

⁴⁴ <https://grants.nih.gov/grants/policy/harassment/policy-requirement.htm>

⁴⁵ <https://grants.nih.gov/grants/policy/harassment/notify.htm>

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- A job board for mandatory posting of postdoctoral positions funded by NIH to help ensure a broader reach of postdoctoral positions to potential candidates, including those from underrepresented communities⁴⁶
- A mechanism to collect data on postdoctoral scholars, such as how they are supported and whether they were trained in the U.S. or other countries
- A resource for other forms of communication including points of contact at NIH

NIH should work with organizations representing academic institutions to create and socialize this resource.

Timeline: Long term; clarification of policies and expectations within a year

⁴⁶ An example of this kind of job board is Job Openings for Economists: <https://www.aeaweb.org/joe/>

Conclusion

To enact positive change for postdoctoral scholars, an overall cultural shift is needed to make substantial and sustained progress. However, NIH cannot do this alone. It can and must partner with the institutions where these scholars work and collaborate to set standard expectations for institutions and individuals. In addition, NIH should work with other entities within the postdoctoral community, including nonprofit organizations, who share similar aims and expectations to improve the postdoctoral experience. In doing so, NIH must also enhance engagement, multidirectional feedback, and communication with postdoctoral scholars and institutions. NIH must very clearly and concisely distribute its policies and expectations for the treatment of postdoctoral scholars through multiple mechanisms and as broadly as feasible. Communication also fosters accountability. Thus, robust engagement between NIH and the scientific community can promote accountability for improvements to conditions for postdoctoral scholars, ultimately benefiting the entire academic enterprise.

The WG believes that the recommendations laid out in this report, along with expanded communication between and accountability for relevant groups, will result in large steps forward in ensuring U.S. postdoctoral positions become increasingly desirable, competitive, sustainable, and inclusive and that they better recognize and reward the value and wellbeing of postdoctoral scholars. In doing so, adoption of these recommendations will bolster the health, competitiveness, and sustainability of the entire U.S. scientific and research enterprise.

Appendices

Appendix A: Invited Speakers

The WG would like to thank the following invited speakers for sharing their expertise with the group at the listening sessions and WG meetings:

- Dr. Dawn Bonnell, University of Pennsylvania
- Dr. Andrew Campbell, Brown University
- Dr. Paola Cepeda, Washington University in St. Louis
- Dr. Natalie Chernets, Drexel University
- Stevie Eberle, Stanford University
- Dr. Lola Eniola-Adefeso, University of Michigan
- Dr. Julie Gerberding, Foundation for the National Institutes of Health (FNIH)
- Dr. Antentor Hinton, Vanderbilt University
- Dr. Shulamit Kahn, Boston University
- Dr. Bruce Mandt, University of Colorado Anschutz
- Dr. Megan MacGarvie, Boston University
- Dr. Krishna Mudumbi, Yale University
- Dr. Tori Osinski, University of Minnesota
- David Payne, Springer Nature
- Dr. Andrea Pereyra, East Carolina University
- Dr. André Porter, National Academies of Sciences, Engineering, and Medicine
- Dr. Neal Sweeney, University of California Santa Cruz & UAW Local 5810
- Dr. Esra Yalcin, Boston Children's Hospital & Boston Postdoctoral Association
- Michael Yamaner, National Science Foundation

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Appendix B: Table Demonstrating Relationship of Principles to Recommendations

Recommendation	Related Principles*						
	1	2	3	4	5	6	7
Recommendation 1: Increase pay and benefits for all NIH-supported postdoctoral scholars.	x		x		x		
1.1 Increase compensation annually adjusted to inflation, including a minimum \$70,000 NRSA postdoctoral stipend in 2024.	x		x		x		
1.2 Provide full-time employee-level benefits for all NIH-supported postdoctoral scholars.	x		x		x		
1.3 Limit the total number of years a person can be supported by NIH funds in a postdoctoral position to no more than 5 years, including time spent in different host institutions.			x				
Recommendation 2: Create and expand mechanisms to support the full talent pool of postdoctoral scholars.				x	x		
2.1. Develop new and expanded K mechanisms for both institutions and individuals.				x	x		
2.2. Revise the K99/R00 mechanism to focus on ideas and creativity over productivity.				x	x		
2.2. Create and expand funding mechanisms for international postdoctoral scholars.				x	x		
Recommendation 3: Facilitate the transition of postdoctoral scholars into their next career stage, including roles beyond academic faculty.				x			
3.1. Increase support for a research professional career track, (e.g., staff scientist).				x			
3.2. Create engagement with sectors that hire biomedical doctorate-holders and postdoctoral scholars.				x			
Recommendation 4. Promote training and professional development of postdoctoral scholars and their mentors.						x	x
4.1. Require institutions to prioritize career and professional development occupies a minimum average of 10% of a postdoctoral scholar’s effort and create policies and resources to ensure equitable access to this training.		x				x	x
4.2 Promote and ensure accountability for mentoring responsibilities.		x				x	x
Recommendation 5: Support safe and diverse perspectives and research environments within institutional research programs.		x					
5.1 Require institutions to provide safe research environments free of harassment.		x					
5.2 Require institutions to support and foster diverse perspectives.		x					
Recommendation 6: Improve means to measure and share postdoctoral scholars’ career progression.			x			x	x

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***Principle 1:** All postdoctoral scholars should receive a wage with regular cost-of-living adjustments and employee-level benefits commensurate with their education and training regardless of NIH support mechanism or appointment.

Principle 2: All postdoctoral scholars should be ensured a safe, diverse, equitable, inclusive, accessible, and supportive work environment free from abuse, discrimination, and harassment.

Principle 3: The postdoctoral position should be clearly defined, standardized, and tracked within and across institutions, disciplines, and funding mechanisms. The duration of postdoctoral positions should be capped at a finite number of years.

Principle 4: New or expanded funding mechanisms and resources should be available to better support the postdoctoral experience and career paths.

Principle 5: International postdoctoral scholars play an important role in the biomedical research ecosystem and should have compensation and benefits that are equal to that of their counterparts who are U.S. citizens/U.S. permanent residents and access to more federal grant opportunities to support their research careers.

Principle 6: Professional and career development should be an integral, measured component of the postdoctoral experience that occupies a minimum percentage of the postdoctoral scholars' efforts.

Principle 7: Institutions, programs, and principal investigators should be held accountable for ensuring that postdoctoral scholars receive quality mentorship and professional development opportunities. Training in mentoring skills should be strongly promoted for those who serve in a mentor role to postdoctoral scholars or who work as leaders in postdoctoral offices, and for the postdoctoral scholars themselves.

Appendix C: Comparison of ACD WG on Re-envisioning NIH-Supported Postdoctoral Training Recommendations and Recommendations from Previous ACD Reports

Postdoc WG Recommendation	Previous Report	Relevant Recommendation from Previous Report	Implementation Status of Recommendation
<p>1. Increase pay and benefits for all NIH-supported postdoctoral scholars.</p> <p>1.1. Increase compensation annually adjusted to inflation, with a minimum \$70,000 NRSA postdoctoral stipend in 2024.</p> <p>1.2. Provide full-time employee-level benefits for all NIH-supported postdoctoral scholars.</p> <p>1.3. Limit the total number of years a person can be supported by NIH funds in a postdoctoral position to no more than 5 years, including time spent in different host institutions.</p>	Biomedical Workforce ⁴⁷	<p>The current stipends for NIH-supported postdoctoral fellows need to be adjusted to levels that better reflect their years of training. The working group recommends that the NIH should adjust the starting stipend levels of the Ruth L. Kirschstein National Research Service Awards (NRSA) to \$42,000 and index the starting stipend according to the Consumer Price Index (CPI-U) thereafter. Stipend levels should increase with each year of experience in any postdoctoral position irrespective of their titles by 4% for the second and third years and 6% for years 4 through 7. The large jump between years 3 and 4 is meant to emphasize a transition from postdoctoral training to research production, and to incentivize PIs to move fellows to more permanent positions. This salary scale will apply to postdoctoral researchers supported by research project grants as well, and institutions should be encouraged to adopt this scale for all postdoctoral researchers, irrespective of the source of their support. NIH should evaluate this policy in the decade after implementation to determine whether the postdoctoral period has shortened. If it is not reduced, then perhaps NIH should experiment with a cap on the length of funding for postdoctoral researchers.</p>	<p>-In FY14, NRSA stipends were raised to \$42000 as recommended in year 0, but with 4% increase each year, not the 6% increase in years 4-7. (https://grants.nih.gov/grants/guide/notice-files/NOT-OD-14-046.html). The baseline stipend was increased disproportionately from 2016 to 2017 in response to the ACD NGRI WG and the NASEM NGRI reports.</p> <p>- As of FY23, there is a less than 1% increase in NRSA stipend each year from Y0-Y2. After Y2, the increase is between 3-4%. (https://grants.nih.gov/grants/guide/notice-files/NOT-OD-23-076.html)</p> <p>-Intramurally, in late FY23, a scheduled increase in postdoc stipends was implemented in all institutes and centers such that, by FY25, stipends will be in alignment with the DC-region cost-of-living index across all institutes and centers.</p>
	Biomedical Workforce	<p>NIH should require and adjust its own policies so that all NIH-supported postdoctoral researchers on any form of support (training grants, fellowships or research project grants) receive benefits that are comparable to other employees at the institution. Such benefits include paid time off, health insurance, retirement plans, maternity leave etc.</p>	<p>-In 2015, NIH released updates on a postdoctoral benefits survey. (https://nexus.od.nih.gov/all/2015/11/30/update-postdoctoral-benefit-survey/)</p> <p>-In FY21, childcare support of \$2,500 annually was announced for NRSAAs (https://grants.nih.gov/grants/guide/notice-files/NOT-OD-21-074.html).</p> <p>-In 2023, NIH issued a reminder that NRSA policies do not discourage institutions from hiring and providing benefits to recipients</p>

⁴⁷ https://www.acd.od.nih.gov/documents/reports/Biomedical_research_wgreport.pdf

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			(https://grants.nih.gov/grants/guide/notice-files/NOT-OD-23-111.html)
Biomedical Workforce	NIH should require and adjust its own policies so that all NIH-supported postdoctoral researchers on any form of support (training grants, fellowships or research project grants) receive benefits that are comparable to other employees at the institution. Such benefits include paid time off, health insurance, retirement plans, maternity leave etc.		-In 2015, NIH released updates on a postdoctoral benefits survey. (https://nexus.od.nih.gov/all/2015/11/30/update-postdoctoral-benefit-survey/) -In FY21, childcare support of \$2,500 annually was announced for NRSAs (https://grants.nih.gov/grants/guide/notice-files/NOT-OD-21-074.html). -In 2023, NIH issued a reminder that NRSA policies do not discourage institutions from hiring and providing benefits to recipients (https://grants.nih.gov/grants/guide/notice-files/NOT-OD-23-111.html)
Next Generation Researchers Initiative ⁴⁸	3.1 Increase gradient of post-doctoral support levels after 5 years		-As of FY23, there is a less than 1% increase in NRSA stipend each year from Y0-Y2. After Y2, the increase is between 3-4%. (https://grants.nih.gov/grants/guide/notice-files/NOT-OD-23-076.html) -In 2021, NIH provided extensions for fellowship awards for those adversely affected by the COVID-19 Pandemic (https://grants.nih.gov/grants/guide/notice-files/NOT-OD-21-052.html) - NIH considers requests for extensions of ESI eligibility from researchers who have lapses in their research or research training or have experienced periods of less than full-time effort (https://grants.nih.gov/policy/early-stage/extensions)
			-In FY20, the award cap for the NIH Loan Repayment Program was increased from \$35,000 to \$50,000 annually -The NIH Individual Fellowship page

⁴⁸ https://www.acd.od.nih.gov/documents/presentations/12132018NextGen_report.pdf

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			<p>(https://researchtraining.nih.gov/programs/fellows/hips/F31) was revised to help applicants to training grants find information on opportunities, policies, stipends, resources, and answers to frequently asked questions.</p> <p>-The NIH Research Training and Career Development Office includes information on types of awards for postdoctoral scholars and their purpose (https://researchtraining.nih.gov/career/postdoctoral-residency)</p> <p>-For NIH's Intramural Program, policies include guidelines for trainees and mentors (https://oir.nih.gov/sourcebook/mentoring-training)</p>
<p>2: Create and expand mechanisms to support the full talent pool of postdoctoral scholars.</p> <p>2.1. Develop new and expanded K mechanisms for both institutions and individuals.</p> <p>2.2. Revise the K99/R00 mechanism to focus on ideas and creativity over productivity.</p> <p>2.3. Create and expand support mechanisms for international postdoctoral scholars.</p>	Biomedical Workforce	To encourage larger numbers of PhD graduates to move rapidly into permanent research positions, NIH should double the number of Pathway to Independence (K99/R00) awards, and shorten the eligibility period for applying to this program from the 5 years to 3 years of postdoctoral experience.	<p>-In FY17, there were 437 K99 awards. The number of awards ramped up from FY18-FY22 and is 738 in FY23.</p> <p>-In FY23, eligibility is 4 years of postdoctoral experience.</p>
	Biomedical Workforce	NIH also should double the number of the NIH Director's Early Independence awards to facilitate the "skip-the-postdoc" career path for those who are ready immediately after graduate school.	In FY12, there were 27 DP5 awards, which increased to 85 by FY16. In FY23, it has leveled off at 56 awards. (RePORTER)
<p>3: Facilitate the transition of postdoctoral scholars into their next career stage, including roles beyond academic faculty.</p> <p>3.1. Increase support for a research professional</p>	Biomedical Workforce	The working group encourages NIH study sections to be receptive to grant applications that include staff scientists and urges institutions to create position categories that reflect the value and stature of these researchers.	In 2012, NIH issued modified instructions to reviewers on evaluating the Investigator(s) criterion: "In evaluating the Investigator(s) review criterion, reviewers are encouraged to focus on the qualifications and expertise of the members of the research team for the work proposed, including the Personal Statement in each Biosketch. Unless the

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<p>career track, (e.g., staff scientist). 3.2. Create engagement with sectors that hire biomedical doctorate-holders and postdoctoral scholars.</p>			<p>application is for a fellowship or career development award, remarks about career tracks, titles, or salaries should be reserved for the Additional Comments to the Applicant box, or the Budget section." -NCI has issued an R50 award program (https://www.cancer.gov/grants-training/grants-funding/funding-opportunities/r50)</p>
	<p>Biomedical Workforce</p>	<p>The working group felt that including multiple types of training (e.g. project management and business entrepreneurship skills needed in the pharmaceutical and biotechnology industries, or teaching experience needed for a successful faculty position in liberal arts colleges) would be particularly valuable for those who go on to conduct NIH-funded research as well as benefit those students who do not follow the academic research career track. For example:</p> <ul style="list-style-type: none"> o Approximately 30% of biomedical PhDs work in the biotech and pharmaceutical industries in research and non-research positions (Figure 19). Their transition would be more effective if their training was better aligned with the required skill-sets for these careers. NIH and the institutions should explore ways to involve relevant employers in the public and private sector in designing training paths for those students who seek employment in that sector. It is possible that the pharmaceutical and biotechnology sectors would be willing to partner in supporting such programs. Another option would be for institutions to develop pilot programs in partnership with private foundations and industry to prepare Ph.D. graduates for careers that involve translational research and development. Finally, NIH should encourage the SBIR/STTR awardees to provide internships for graduate students and postdoctoral researchers to enable increased hands-on training at small businesses. o Institutions also could be encouraged to develop other degree programs, such as master’s degrees designed for specific science-oriented career outcomes, such as industry or public policy. These could be developed as stand-alone programs or provide sound exit pathways for PhD students who decide not to continue on the 	<p>- NIH added new language to T32 NOFOs about multiple career paths, e.g., “The career outcomes of individuals supported by NRSA training programs are intended to include both research-intensive careers in academia and industry, and research-related careers in various sectors, e.g., academic institutions, government agencies, for-profit businesses, and private foundations. Training programs should make available structured, career development advising and learning opportunities (e.g., workshops, discussions, Individual Development Plans). Through such opportunities, trainees are expected to obtain a working knowledge of various career paths that would make strong use of the knowledge and skills gained during research training and the steps required to transition successfully to the next stage of their chosen career.” - NIH is currently working on developing an SBIR equivalent of the K99 award</p>

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		research career track. However, this would require a change in the definition of “success” in the evaluation of NIH training grants.”	
<p>4: Promote training and professional development of postdoctoral scholars and their mentors.</p> <p>4.1. Require institutions to ensure that career and professional development occupies a minimum average of 10% of a postdoctoral scholar’s effort and create policies and resources to ensure equitable access to this training.</p> <p>4.2. Promote and ensure accountability for mentoring responsibilities.</p>	Next Generation Researchers Initiative	3.3 Require institutions to provide professional development and training plans for mentors and trainees listed on research grants, including actionable feedback from trainees and detailed language in annual and renewal progress reports	In 2014, NIH strongly encouraged use of IDPs and required that progress reports include a section used to describe how IDPs promote career goals of grad students/postdocs (https://grants.nih.gov/grants/guide/notice-files/NOT-OD-14-113.html)
	Biomedical Workforce	NIH should require individual development plans (IDPs) for all NIH-supported postdoctoral researchers, whether on training grants, fellowships, or research project grants. Assessment of implementation of this requirement should be included in the review criteria of training grants.	In 2014, NIH strongly encouraged use of IDPs and required that progress reports include a section used to describe how IDPs promote career goals of grad students/postdocs (https://grants.nih.gov/grants/guide/notice-files/NOT-OD-14-113.html)
	Next Generation Researchers Initiative	4.3 Revise NIH project scoring criteria and funding decision criteria to emphasize the PI’s previous 7 years of service and mentorship contributions	- In the NIH Intramural program, both OITE and FAES offer "mentoring the mentor" courses and both faculty and postdocs are eligible to take those courses. - Trainees and training records are now included in scoring criteria for grants (https://grants.nih.gov/grants/peer/guidelines_general/Review_Criteria_at_a_glance.pdf)

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			training/resources/innovative-programs-to-enhance-research-training) to support creative and innovative research educational activities designed to complement and/or enhance the training of a workforce to meet the nation’s biomedical research needs..
<p>5: Support safe and diverse perspectives and research environments within institutional research programs.</p> <p>5.1. Require institutions to provide safe research environments free of harassment.</p> <p>5.2. Require institutions to support and foster diverse perspectives.</p>	Next Generation Researchers Initiative	3.9 Require grantee organizations to provide assurances that they have effective, fair, and up-to- date policies to preserve a harassment-free environment	<p>-In 2018, NIH required applications for extramural training grants must include a letter from a key institutional letter describing the institutional commitment to ensuring that proper policies, procedures, and oversight are in place to prevent discriminatory harassment and other discriminatory practices (NOT-OD-19-029).</p> <p>-NIH also requires conference grant applications to ensure safe and inclusive environments (NOT-OD-21-053)</p> <p>-Revised in 2022, NIH Grant Policy Statement outlines that NIH recipient institutions are expected to provide safe and healthful working conditions for their employees and foster work environments conducive to high-quality research, regardless of the recipient institution. Institutions are required to have behavioral codes of conduct (https://grants.nih.gov/grants/guide/notice-files/NOT-OD-23-045.html)</p>
	Next Generation Researchers Initiative	3.2 Ensure that all funding opportunity announcements for training, fellowship, and career awards reflect the requirement to promote diversity and inclusion in a sustainable way	<p>- The BRAIN Initiative includes a component in most NOFOs called the Plan for Enhancing Diverse Perspectives to foster DEIA in the research community (https://braininitiative.nih.gov/vision/plan-enhancing-diverse-perspectives). Many ICs now use the PEDP in their NOFOs.</p> <p>- in the NIH intramural program, all NIH Boards of Scientific Councilors and the NIH Central Tenure Committee consider the diversity of mentees and quality of mentoring in their reviews and decisions affecting NIH Principal Investigators.</p>

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	Next Generation Researchers Initiative	3.3 Require institutions to provide professional development and training plans for mentors and trainees listed on research grants, including actionable feedback from trainees and detailed language in annual and renewal progress reports	In 2014, NIH strongly encouraged use of IDPs and required that progress reports include a section used to describe how IDPs promote career goals of grad students/postdocs (https://grants.nih.gov/grants/guide/notice-files/NOT-OD-14-113.html)
	Next Generation Researchers Initiative	3.6 Expand access to the National Research Mentoring Network-type resources	In FY22, the NIH Common Fund's Faculty Institutional Recruitment for Sustainable Transformation (FIRST) program to create cultures of inclusive excellence. Hiring cohort of diverse faculty is likely to encourage and support recruitment of diverse cohorts of postdocs (https://commonfund.nih.gov/first)
			<p>-The NIH Individual Fellowship page (https://researchtraining.nih.gov/programs/fellows hips/F31) was revised to help applicants to training grants find information on opportunities, policies, stipends, resources, and answers to frequently asked questions.</p> <p>-The NIH F Kiosk (https://researchtraining.nih.gov/programs/fellows hips?CFID=44174854&CFTOKEN=8d94c4df72bf893f-8067F9C7-AE23-AB35-BBF1893EF0183E8B) serves as a resources for NIH fellowship parent announcements, instructions, stipend levels, and deadlines.</p> <p>-In the NIH Intramural Program, the NIH Office of Intramural Training and Education (OITE) empowers and equips postdocs to report and respond to such practices. In addition, the OITE Resilient Scientist webinar series is publicly available online and (for NIH postdocs) in-person. In response to reports and requests, OITE enables and facilitates changing labs for postdocs.</p>
6: Improve means to measure and share postdoctoral scholars' career progression.	Next Generation Researchers Initiative	5.1 Increase accessibility of NIH administrative data for both members of the biomedical research community and researchers investigating biomedical science	-Information on the NIH-funded workforce is provided on the NIH Data Book (https://report.nih.gov/nihdatabook/category/14). Some external researchers are using internal NIH

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			<p>administrative data to answer questions of interest (e.g., Elasticity of Science, AMERICAN ECONOMIC JOURNAL: APPLIED ECONOMICS, VOL. 12, NO. 4, OCTOBER 2020, pp. 103-34; PLOS article on NRSA fellowships, https://doi.org/10.1371/journal.pone.0272230)</p> <p>-NIH required use of xTRACT for RPPRs starting in FY2020. This significantly improved the ability to track trainees and reduced administrative burden on grantee institutions - https://grants.nih.gov/grants/guide/notice-files/NOT-OD-19-108.html</p>
Biomedical Workforce	<p>Institutions that receive NIH funding should collect information on the career outcomes of both their graduate students and postdoctoral researchers, and provide this information to prospective students/ postdoctoral researchers and the NIH. Such information should include completion rates, time to degree, career outcomes for PhD trainees, as well as time in training and career outcomes from postdoctoral researchers over a 15-year period. Outcome data should be displayed prominently on the institution's web site. This will require institutions to track the career paths of their students and postdoctoral researchers over the long-term. One way to do that would be to assign graduate students and incoming postdoctoral researchers an identifier that can be used to track them throughout their careers.</p>		<p>-In 2009, NIH required eRA commons User IDs for Individuals on a postdoctoral project role with measurable efforts on an NIH annual Progress Report (https://grants.nih.gov/grants/guide/notice-files/not-od-09-140.html).</p> <p>-- Starting in FY2020 NIH required all trainees and career awardees to get an ORCID account - https://grants.nih.gov/grants/guide/notice-files/NOT-OD-19-109)</p>
Biomedical Workforce	<p>NIH, working with other agencies in the Federal Government, should address the identified data gaps and collect information on the biomedical and scientific workforce on an ongoing basis.</p>		<p>-In 2013, NIH announced that an eRA Commons ID will be required in progress reports for all individuals in graduate and undergraduate student roles who participate in NIH-funded projects for at least one person month or more (NOT-OD-13-097).</p> <p>-NIH in partnership with other federal agencies developed an electronic system to support an online CV (Science Experts Network)(http://rbm.nih.gov/profile_project.htm)</p> <p>- Starting in FY2020 NIH required all trainees and career awardees to get an ORCID account - https://grants.nih.gov/grants/guide/notice-files/NOT-OD-19-109)</p>

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	Biomedical Workforce	NIH should create a permanent unit in the Office of the Director that works with the extramural research community, the National Science Foundation (NSF) and the NIH ICs to coordinate data collection activities and provide ongoing analysis of the workforce and evaluation of NIH policies so that they better align with the workforce needs.	<p>-In 2013, NIH established a new Division of Biomedical Research Workforce Programs (DBRWP), which resides in the Office of Extramural Programs, Office of Extramural Research, Office of the Director (OD), NIH. DBRWP will provide ongoing analysis of the biomedical research workforce and evaluation of NIH policies to enable NIH to sustain and grow the biomedical research workforce at all levels to assure the most productive biomedical research endeavors and most effective use of taxpayer dollars. The office will develop comprehensive long-term strategies in response to these analyses which address all components of the biomedical research enterprise including trainees, biomedical researchers in academia and industry, and scientists in research-related occupations.</p> <p>-In 2014, NIH established the position of the Chief Officer for Scientific Workforce Diversity (COSWD). The COSWD office leads NIH's efforts to diversify the biomedical research workforce by developing a vision and comprehensive strategy to expand recruitment and retention, and promote inclusiveness and equity throughout the biomedical research enterprise</p>
			<p>The NIH F Kiosk (https://researchtraining.nih.gov/programs/fellowships?CFID=44174854&CFTOKEN=8d94c4df72bf893f-8067F9C7-AE23-AB35-BBF1893EF0183E8B) serves as a resource for NIH fellowship parent announcements, instructions, stipend levels, and deadlines.</p>

Appendix C: Listening Session Materials

Four public virtual listening sessions were held in March 2023 to get input on the experiences, challenges, and opportunities for postdoctoral scholars from the extramural research community. The agendas are listed below. Recordings of the sessions can be found at <https://www.acd.od.nih.gov/working-groups/postdocs.html>, and a summary of the sessions at https://www.acd.od.nih.gov/documents/IMOD_Postdoc_Listening_Sessions_summary.pdf.

Virtual Listening Session: Role, Duration, Structure, and Value of the Academic Postdoc

Wednesday, March 8, 2023

12:30-1:30pm ET

Agenda

Welcome <i>Dr. Tara Schwetz, National Institutes of Health</i>	3 minutes
Brief Opening Remarks <i>Dr. Shelley Berger, University of Pennsylvania</i>	5 minutes
Remarks from Invited Speakers <i>Dr. Esra Yalcin, Boston Children's Hospital & Boston Postdoctoral Association</i> <i>Dr. Bruce Mandt, University of Colorado Anschutz</i> <i>Dr. Antentor Hinton, Vanderbilt University</i>	15 minutes
Facilitated Discussion <i>Facilitators:</i> <i>Dr. Shelley Berger, University of Pennsylvania</i> <i>Ms. Adriana Morales Gómez, Mayo Clinic</i> <i>Dr. Judith Kimble, University of Wisconsin-Madison</i> <i>Dr. Tara Schwetz, National Institutes of Health</i> <i>Discussants: All Attendees</i>	35 minutes
Closing <i>Dr. Tara Schwetz, National Institutes of Health</i>	2 minutes

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Virtual Listening Session: International Postdoctoral Trainee Concerns

Friday, March 10, 2023

1:30-2:30pm ET

Agenda

Welcome <i>Dr. Tara Schwetz, National Institutes of Health</i>	3 minutes
Brief Opening Remarks <i>Dr. Shelley Berger, University of Pennsylvania</i>	5 minutes
Remarks from Invited Speakers <i>Dr. Andrea Pereyra, East Carolina University</i> <i>Dr. Natalie Chernets, Drexel University</i> <i>Dr. André Porter, National Academies of Sciences, Engineering, and Medicine</i>	15 minutes
Facilitated Discussion <i>Facilitators:</i> <i>Dr. Shelley Berger, University of Pennsylvania</i> <i>Dr. Tara Schwetz, National Institutes of Health</i> <i>Dr. Jodi Yellin, Association of American Medical Colleges</i> <i>Dr. Tom Kimbis, National Postdoctoral Association</i> <i>Discussants: All Attendees</i>	35 minutes
Closing <i>Dr. Tara Schwetz, National Institutes of Health</i>	2 minutes

Pre-ACD Vote

Virtual Listening Session: Compensation and Benefits (Including Child and Dependent Care)

Friday, March 17, 2023

12:30-1:30pm ET

Agenda

Welcome <i>Dr. Tara Schwetz, National Institutes of Health</i>	3 minutes
Brief Opening Remarks <i>Dr. Shelley Berger, University of Pennsylvania</i>	5 minutes
Remarks from Invited Speakers <i>Dr. Krishna Mudumbi, Yale University</i> <i>Dr. Lola Eniola-Adefeso, University of Michigan</i> <i>Dr. Tori Osinski, University of Minnesota</i> <i>Dr. Andrew Campbell, Brown University</i>	15 minutes
Facilitated Discussion <i>Facilitators:</i> <i>Dr. Shelley Berger, University of Pennsylvania</i> <i>Tom Kimbis, Esq., National Postdoctoral Association</i> <i>Dr. Emily Miller, Association of American Universities</i> <i>Dr. Tara Schwetz, National Institutes of Health</i> <i>Discussants: All Attendees</i>	35 minutes
Closing <i>Dr. Tara Schwetz, National Institutes of Health</i>	2 minutes

Pre-ACD Vote

Virtual Listening Session: Job Security, Career Prospects, and Quality of Life

Monday, March 20, 2023

1:30-2:30pm ET

Agenda

Welcome <i>Dr. Tara Schwetz, National Institutes of Health</i>	3 minutes
Brief Opening Remarks <i>Dr. Shelley Berger, University of Pennsylvania</i>	5 minutes
Remarks from Invited Speakers <i>Dr. Neal Sweeney, University of California Santa Cruz & UAW Local 5810</i> <i>Stevie Eberle, Stanford University</i> <i>Dr. Dawn Bonnell, University of Pennsylvania</i>	15 minutes
Facilitated Discussion <i>Facilitators:</i> <i>Dr. Shelley Berger, University of Pennsylvania</i> <i>Dr. Donna Ginther, Kansas University</i> <i>Dr. Tara Schwetz, National Institutes of Health</i> <i>Dr. Chrystal Starbird, University of North Carolina at Chapel Hill</i> <i>Discussants: All Attendees</i>	35 minutes
Closing <i>Dr. Tara Schwetz, National Institutes of Health</i>	2 minutes

Appendix D: RFI Materials

Through a Request for Information (RFI), The NIH solicited feedback from the community on insights on issues affecting and possible solutions to the recent decline in postdoctoral trainees, which was open from February 14-April 14, 2023. The RFI language is copied below. A summary of the responses to the RFI can be found at:

[https://www.acd.od.nih.gov/documents/RFI Postdocs Report 2023.pdf](https://www.acd.od.nih.gov/documents/RFI_Postdocs_Report_2023.pdf), and the full responses will be posted shortly.

Request for Information (RFI): Re-envisioning U.S. Postdoctoral Research Training and Career Progression within the Biomedical Research Enterprise

Notice Number:

NOT-OD-23-084

Key Dates

Release Date:

February 14, 2023

Response Date:

April 14, 2023

Related Announcements

None

Issued by

Office of The Director, National Institutes of Health ([OD](#))

Purpose

The National Institutes of Health (NIH) seeks information from extramural research community members regarding the current state of postdoctoral research training and career progression within the biomedical research enterprise. NIH is particularly interested in understanding the perspective and experience of recent and current postdoctoral trainees, postdoctoral office leaders, as well as graduate students considering becoming postdoctoral trainees within the academic sector. This RFI will assist NIH in hearing the voices of postdoctoral trainees along with others impacted by this unique and skilled training position, and in exploring ways to address some of the fundamental challenges faced by the postdoctoral trainee community. This information will inform the development of recommendations by the NIH Advisory Committee to the Director ([ACD](#)), an advisory group that provides advice on matters pertinent to NIH mission responsibilities in the conduct and support of biomedical research, medical science, and biomedical communications.

Review of this entire RFI notice is encouraged to ensure your response is comprehensive and to have a full understanding of how it will be utilized.

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Background

NIH supports postdoctoral training through its [extramural](#) research programs and its own [intramural](#) training program. These efforts have supported the development of highly trained biomedical scientists who have the necessary knowledge and skills to pursue independent careers in the biomedical research workforce. Concerns about the postdoctoral training system and recruitment of qualified postdoctoral trainees have grown in recent years. [Data](#) published by the National Science Foundation suggest that the number of postdoctoral researchers may be declining, presenting an uncertain future for the overall U.S. biomedical research enterprise. These challenges have recently been severely compounded by the COVID-19 pandemic and the ensuing global economic environment. NIH seeks to evaluate the status of the postdoctoral training process, to understand fundamental issues affecting the postdoctoral trainee process, and to identify possible solutions to address these issues. Toward this end, an [ACD working group](#) has been established to explore the status of the postdoctoral training system, identify and understand critical factors and issues relating to the perceived decline in the number of postdoctoral trainees, and provide recommendations that address those factors to the NIH Director.

Information Requested

This RFI invites input on factors influencing postdoctoral training from the community. NIH is particularly interested in receiving input from trainees (e.g., graduate students, postdocs), as well as early-stage investigators, biomedical faculty, training directors, postdoctoral and graduate student office leaders, biotech/biopharma industry scientists, and research education program advocates. NIH is particularly interested in hearing about promising solutions to address current challenges affecting the postdoctoral trainee community. Input sought includes, but is not limited to, the following:

- Perspectives on the roles and responsibilities of the academic postdoc (e.g., what the postdoctoral position means to you, how you view it).
- Fundamental issues and challenges inhibiting recruitment, retention, and overall quality of life of postdoctoral trainees in academic research.
- Existing NIH [policies](#), [programs](#), or [resources](#) that could be modified, expanded, or improved to enhance the postdoctoral training ecosystem and academic research career pathways.
- Proven or promising external resources or approaches that could inform NIH's efforts to enhance the postdoctoral training ecosystem (e.g., improving postdoctoral recruitment, training, working environment, mentoring, job satisfaction).

How to Submit a Response

All comments must be submitted electronically on the [submission website](#).

Responses must be received by 11:59:59 pm (ET) on April 14, 2023.

Responses to this RFI are voluntary and may be submitted anonymously. Please do not include any personally identifiable information or any information that you do not wish to make public. Proprietary, classified, confidential, or sensitive information should not be included in your response. The Government will use the information submitted in response to this RFI at its discretion. **The Government reserves the right to use any submitted information on public websites, in reports, in summaries of the state of the science, in any possible resultant solicitation(s), grant(s), or cooperative agreement(s), or in the development of future funding opportunity announcements.** This RFI is for informational and planning purposes only and is not a solicitation for applications or an obligation on the part of the Government to provide support for any ideas identified in response to it. Please note that the Government will not pay for the preparation of any information submitted or for use of that information.

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We look forward to your input and hope that you will share this RFI opportunity with your colleagues.

Inquiries

Please direct all inquiries to:

Office of the Director, NIH

Email: ACDPostdocInquiries4RFI@nih.gov

Appendix F: Glossary of Abbreviations & Definitions

- Abbreviations
 - ACD – Advisory Committee to the Director
 - BMW – Advisory Committee to the Director Working Group on the Biomedical Workforce
 - ECDS – Early Career Doctorates Survey
 - ESI – early stage investigator
 - FIRST – Faculty Institutional Recruitment for Sustainable Transformation
 - FNIH – Foundation for the National Institutes of Health
 - FY – fiscal year
 - GDP – gross domestic product
 - GSS – Survey of Graduate Students and Postdoctorates in Science and Engineering
 - IDP – Individual Development Plan
 - IRS – Internal Revenue Service
 - MOSAIC – Maximizing Opportunities for Scientific and Academic Independent Careers
 - NASEM – National Academies of Sciences, Engineering, and Medicine
 - NCI – National Cancer Institute
 - NCSES - National Center for Science and Engineering Statistics
 - NGRI – Next Generation Researchers Initiative
 - NIH – National Institutes of Health
 - NPA – National Postdoctoral Association
 - NRSA – National Research Service Awards
 - NSF – National Science Foundation
 - OER – Office of Extramural Research
 - PEDP – Plan for Enhancing Diverse Perspectives
 - RFI – Request for Information
 - RPG – Research Project Grant
 - RPPR – Research Performance Progress Report
 - SDR – Survey of Doctorate Recipients
 - SED – Survey of Earned Doctorates
 - STEM – Science, Technology, Engineering, and Mathematics
 - U.S. – United States
 - WG – working group
- Definitions
 - International postdoctoral scholar – postdoctoral scholars who are temporary visa holders, i.e., not U.S. citizens or permanent residents
 - Postdoctoral scholar – An individual who has received a doctoral degree or equivalent working in a term-limited position of mentored research and professional development to prepare for an independent career usually in research and teaching
 - Short term / long term – “short term” recommendations should be addressed as soon as feasibly possible and ideally within one to two fiscal years. “Long term”

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recommendations may be more complex and require a more extended implementation window.

- Research professional career track – long-term, non-independent, non-tenure track scientist positions; many existing staff scientist or research scientist positions fit this description. The WG recommends NIH engage the public to better understand what they want from this career track before developing a formal definition.