Addressing the Mental Health Crisis Among Predoctoral and Postdoctoral Researchers in STEM

Sophia Kaska

May 2022

The Day One Project Early Career Science Policy Accelerator is a joint initiative between the Federation of American Scientists & the National Science Policy Network.
Summary

The growing mental-health crisis among science, technology, engineering, and math (STEM) doctoral and postdoctoral researchers threatens the future and competitiveness of science and technology in the United States. The federal government should tackle this crisis through a four-part approach to (i) improve data collection on the underlying drivers of mental-health struggles in STEM, (ii) discourage behaviors and cultures that perpetuate stress, (iii) require Principal Investigators (PIs) to submit a statement of their mentoring philosophy as part of applications for federally supported research grants, and (iv) increase access to mental-health care for predoctoral and postdoctoral researchers.

Challenge and Opportunity

The prevalence of mental-health problems is higher among Ph.D. students than in the highly educated general population: fully half of Ph.D. students experience psychological distress. In a survey of postdoctoral researchers conducted by Nature, 51% of respondents reported considering leaving science due to work-related mental-health concerns. 65% of respondents reported experiencing power imbalances or bullying during their postdoctoral appointments, and 74% reported observing the same. Stress accumulation not only leads to the development of neuropsychiatric disorders among the developing STEM workforce — it also contributes to burnout. At a time when advancing U.S. competitiveness in science and technology is of utmost importance, the mental-health crisis is depleting our nation’s STEM pipeline when we should be expanding and diversifying it. This is a crisis that the federal government is well-positioned to and must solve.

Plan of Action

The federal government should counter the mental-health crisis for U.S. doctoral and postdoctoral researchers through a four-part approach to (i) improve data collection on the underlying drivers of mental-health struggles in STEM, (ii) discourage behaviors that perpetuate stress, (iii) require PIs to submit a statement of their mentoring philosophy as part of applications for federally supported research grants, and (iv) increase access to mental-health care for doctoral and postdoctoral researchers. Detailed recommendations associated with each of these steps are provided below.

Part 1. Improve data collection

Data drives public policy. Various organizations conduct surveys evaluating the mental health of doctoral and postdoctoral researchers in STEM, but survey designs, target audiences, and subsequent follow-up and monitoring are inconsistent. This fragmented information ecosystem makes it difficult to integrate and act on existing data on mental health in STEM. To provide a more comprehensive picture of the STEM mental-health landscape in the United States, the National Institutes of Health (NIH) and the National Science Foundation (NSF) should work together to conduct and publish biennial evaluations of the state of mental health of the STEM workforce. The
survey format could be modeled on the NSF’s Survey of Doctorate Recipients or the Survey of Earned Doctorates — and, like those surveys, resultant data could be maintained at NSF under the National Center for Science and Engineering Statistics. Once established, the data from the survey can be used to track effectiveness of programs that are implemented and direct the federal government to change or start new initiatives to modify the needs of doctoral and postdoctoral researchers. Additionally, the NSF and NIH could partner with physicians within HHS to define and establish what “healthy” means in terms of mental-health guidelines in order to establish new program guidelines and goals.

Part 2. Discourage problematic behaviors

The future of a doctoral or postdoctoral researcher depends considerably on the researcher’s professional relationship with their PI(s). Problems in the relationship — including bullying, harassment, and discrimination — can put a trainee in a difficult situation, as the trainee may worry that confronting the PI could compromise their career opportunities. The federal government can take three steps to discourage these problematic behaviors by requiring PIs to submit and implement training and mentorship plans for all grant-supported trainees.

First, the White House Office of Science and Technology Policy (OSTP) should assemble a committee of professionals in psychology, social sciences, and human resources to define what behaviors constitute bullying and harassment in academic work environments. The committee’s findings should be publicized via a web portal (similar to NSF’s website on Sexual Harassment), and included in all requests for grant applications issued by federal STEM-funding agencies (in order to raise awareness among PIs).

Second, federal STEM-funding agencies should require universities to submit annual reports of bullying to federal, grant-issuing agencies. NSF already requires institutions to report findings of sexual harassment and other forms of harassment and can revoke grants if a grantee is found culpable. NSF and other STEM-funding agencies should add clarity to this definition and broaden this reporting to include bullying and retaliation to include bullying and retaliation attempts by PIs, with similar consequences for repeated offenses. Reinstatement of privileges (e.g., reinstatement of eligibility for federal grant funding) would be considered on a case-by-case basis by the grant-issuing institution and could be made contingent on implementation of an adequate “re-entry” plan by the PI’s home institution. The NIH Office of Behavioral and Social Science Research should be consulted to help formulate such “re-entry” plans to benefit both researchers and PIs.

Third, STEM-funding agencies could work together to establish a mechanism whereby trainees can anonymously report problematic PI behaviors. NSF has a complaint form for those who wish to report incidents for incidents of sexual harassment or harassment. Thus, NSF could expand their system to accept broader incidents such as bullying and retaliation attempts and NIH could use this complaint form as a template for reporting as well. In conjunction with reporting misconduct, a “two-strike” accountability system should be imposed if a PI is found guilty of
harassment, bullying, or other behaviors that could contribute to the development of a neuropsychiatric disorder. After receiving a first strike (report of problematic behavior and a guilty verdict), the PI would be given a warning and be required to participate in relevant training workshops and counseling using a plan outlined by social science professionals at NIH. If a second strike is received, the PI would lose privileges to apply for federal grant funding and opportunities to serve on committees that are often favored for tenure and promotion, such as grant review committees. Again, reinstatement of privileges would be considered on a case-by-case basis by the grant-issuing institution and could be made contingent on implementation of an adequate “re-entry” plan.

Part 3. Require submission of mentoring philosophies

NIH F31 predoctoral and F32 postdoctoral award applications already require PIs to submit mentoring plans for their trainees to receive professional-development training. Federal STEM-funding agencies should build on this precedent by requiring PIs applying for federal grants to submit not just mentoring plans, but brief summaries of their mentoring philosophies. As the University of Colorado Boulder explains, a mentoring philosophy “...defines [a mentor’s] approach to engaging with students as [they] guide their personal growth and professional development, often explaining [the mentor’s] motivation to mentor with personal narratives while highlighting their goals for successful relationships and broader social impact. These statements may also be considered ‘living documents’ that are updated as [the mentor] refine[s] [their] approach and the context and goals of [their] work changes.”

Mentoring philosophies help guide development of and updates to individualized mentoring plans. Mentoring philosophies also promote equity and inclusion among mentees by providing a common starting point for communication and expectations. Requiring PIs to create mentoring philosophies will elevate mental health among doctoral and postdoctoral researchers in STEM by promoting effective top-down mentorship and discouraging unintended marginalization. And since a growing number of university faculty are already creating mentoring philosophies, this new requirement shouldn’t be seen as just another administrative burden; rather, it would serve as a means to quickly perpetuate a best practice that is already spreading. The federal government can support PIs in adhering to this new requirement by working with external partners to collect and broadly share resources related to preparing mentoring philosophies. The Center for the Improvement of Mentored Experiences in Research, for instance, has already assembled a suite of such resources on its web platform.

Part 4. Increase access to mental health care

Concurrent with reducing causes of mental health burdens, the federal government should work to expand doctoral and postdoctoral researchers’ access to adequate mental-health care. Current access may vary considerably depending on the level of insurance coverage offered by a researcher’s home institution. Inspired by legislation (S. 3048 - Stopping the Mental Health Pandemic Act, where funds can be used to
support and enhance mental health services) introduced in the 117th Congress, the Department of Health and Human Services (HHS) should partner with federal STEM-funding agencies to design and implement new pathways, programs, and opportunities to strengthen mental-health care among early-career STEM professionals. In particular, the federal government could create a library of model policies that federally funded public and private institutions could adopt to strengthen mental-health care for employed early-career researchers. Examples include allowing trainees to take time off during the workday to receive mental-health treatment without expectations to make up hours outside of business hours, providing a supplemental stipend for trainees to pay for therapy costs that are not covered by insurance, and addressing other sources of stress that can exacerbate stressful situations, such as increasing stipends to decrease financial stress.

Conclusion

The U.S. science and technology enterprise is only as strong as the workforce behind it. Failing to address the mental-health crisis that plagues early-career researchers will lead the United States to fall behind in global research and development due to talent attrition. President Biden's 2022 State of the Union address cited mental health as a priority area of concern. There is an especially clear need for a culture change around mental health in academia. The four actions detailed in this memo align with the President's policy agenda. By improving data collection on the mental-health status of STEM doctoral and postdoctoral researchers, discouraging behaviors and cultures that produce stress among this population, improving training and mentorship at universities, and expanding access to mental-health care among STEM doctoral and postdoctoral researchers, the federal government can ensure that success for early-career STEM professionals does not demand mental-health sacrifice.

Frequently Asked Questions

1. Why does this proposal focus on early-career professionals in STEM and not on other fields?

STEM fields are closely tied to the U.S. economy, supporting two-thirds of U.S. jobs and 69% of the U.S. Gross Domestic Product (GDP). Attrition of U.S. researchers from STEM fields due to mental-health challenges has disproportionally adverse effects on American society and undermines U.S. competitiveness. Policymakers should prioritize actions designed to combat the mental-health crisis in STEM.

2. Bullying and harassment are subjective behaviors. How can the federal government prevent false allegations from being submitted by doctoral and postdoctoral researchers?

NSF already requires that universities who receive federal research funding conduct internal investigations to validate claims of harassment and sexual harassment. Similar policies could be implemented regarding reported bullying and/or workplace
if an allegation is found to be false, it should be handled by university-
specific policies.

3. If bullying and harassment are causing serious issues in STEM training, why
should a PI be allowed “re-entry” to apply for federal funding to mentor students
and postdocs after workshops and therapy are completed?

The goal of requiring PIs to attend workshops on mentorship and therapy sessions is
to help them better themselves and improve their ability to mentor the next
generation of STEM professionals. Re-entry to mentoring trainees will be closely
monitored by leadership faculty who should conduct surveys of both mentors and
mentees to determine if the PI understands (a) their previous misconduct and (b) the
lasting mental health effects that their previous actions inflicted on their trainees.

4. NIH and NSF aren’t the only federal agencies that provide funding for training
early career researchers. What about the others?

NIH and NSF are arguably the two leading federal agencies when it comes to
providing federal funding for graduate students. That said, recommendations
presented in this memo could easily be extended to other STEM-funding agencies.
For instance, there is a timely opportunity to extend these recommendations to the
Department of Energy (DOE). DOE is currently working to manage the President's
major FY23 investment in clean energy and sustainability, including through
significant research-grant funding. Coupling these new grants with policies designed
to mitigate mental-health burdens among early-career researchers could help foster
a more resilient and productive clean-energy workforce and serve as a pilot group for
the NIH and NSF to follow.

5. Requiring the reporting of bullying or harassment by a PI is an administrative
burden. Why should universities take on increased responsibilities in this area?

The administrative responsibilities for reporting are minimal. NSF's Organizational
Notification of Harassment Form can — at a minimum — be used as a template for
NSF, NIH, and other agencies to notify the federal government of guilty verdicts from
universities. Alternatively, doctoral and postdoctoral researchers can submit incidents
for reporting by federal agencies similar to NSF's existing complaint form, which
would reduce the initial administrative burden of university employees but may
create additional hours of work once federal agencies conduct their investigations.

6. Some universities are offering free yoga and meditation classes for predoctoral
and postdoctoral researchers. Others are offering training courses on developing
resilience to stress. Aren't these opportunities sufficient for alleviating mental
health concerns?

While the strategies above teach researchers how to cope with stress, a long-term,
more supportive approach would be to reduce stress by going straight to the source.
Actions such as addressing harassment and bullying will benefit not only the
researcher themselves, but others in the work environment by fostering a responsible, low-stress culture.

7. How are mentoring philosophies different from mentoring plans?

The submission of mentoring plans by PIs are currently required for NIH pre- and post-doctoral fellowship applications. They are meant to supplement the training of a researcher by focusing on the logistics of skill building. However, mentorship of a researcher transcends knowledge and skill-building — it also encompasses the holistic development of a researcher, supporting and respecting their interests, values, and considerations of their individual situations. Thus, submission of a mentoring philosophy is meant to stimulate thoughts and conversations about how a PI wants to communicate openly and honestly with their trainee and how they can adapt to support the mentoring style that best fits their trainee.
About the Author

Sophia Kaska is the Manager of Science Initiatives and Outreach at Research!America. She oversees a program which supports science policy and communication initiatives led by early career scientists. She also coordinates activities for a group of science society CEOs who gather regularly to exchange timely information about policy issues and identity areas of collaboration across STEM disciplines. Sophia earned a dual-major Ph.D. in Pharmacology and Toxicology and Environmental Toxicology at Michigan State University and completed postdoctoral research in Pharmaceutical Sciences at the University of Kentucky. As a pharmacologist with expertise on opioids, opioid addiction, depression, and drug discovery, she remains active in the field by serving on the American Society for Pharmacology and Experimental Therapeutics (ASPET) Science Policy Committee.

About the Day One Project

The Federation of American Scientists' Day One Project is dedicated to democratizing the policymaking process by working with new and expert voices across the science and technology community, helping to develop actionable policies that can improve the lives of all Americans. For more about the Day One Project, visit dayoneproject.org.

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