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Prioritizing mental health support for physician-scientist trainees

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Physician-scientist trainees' dual commitment to advancing medicine and undertaking research predisposes them to mental health challenges. Here, we outline the critical gaps in mental health support structures available to this unique trainee population and provide recommendations to reduce the concerns discussed.

Mental health support is a critical part of healthcare, not only for patients but also for the providers who care for them. This is particularly true for physician-scientist trainees, who aim to obtain both a medical degree (Doctor of Medicine (MD) or Doctor of Osteopathic Medicine (DO)) and scientific credentials (often a Doctor of Philosophy (PhD)) for the purpose of integrating research and medicine. These trainees face unique and significant mental health stressors, as they must balance rigorous academic demands with patient care, directing complex research projects, and often coping with substantial financial burdens due to the prolonged training period. Mental health challenges in physician-scientist trainees are often overshadowed by the demanding nature of their dual careers, yet their well-being is central to their professional and personal success. Many physician-scientist trainees at different levels report high levels of stress and burnout due to immense workloads, long hours, high-performance expectations, financial insecurity, and inconsistent or incomplete institutional support[1–4]. These pressures can have dramatic effects on trainees by significantly elevating their risk of medical errors or self-harm[1,5]. Without addressing these gaps, poor mental health will continue to have a negative impact on physician-scientist trainee well-being, professional effectiveness, and ultimately patient care. In this Comment, we highlight the physician-scientist training pathway's detrimental impact on mental health and propose solutions at multiple institutional levels to maintain well-being during the training process.

Global context and U.S. parallels

While this Comment largely focuses on trainees in U.S. physician-scientist programs, several challenges are pervasive across global physician-scientist training pathways and provide valuable context for the universal need to address physician-scientist trainee mental health. Many countries lack national support for physician-scientist careers, leading to prolonged training time, difficulty balancing research and clinical responsibilities, funding uncertainty, and a lack of structured pathways for protected research time.

In some countries, national support for physician-scientist training is minimal or nonexistent, which contributes to trainee mental health challenges. In Australia there are no nationally sponsored programs for physician-scientists; MD/PhD and MBBS/PhD programs exist but are limited in number, leaving many trainees without dedicated institutional support, contributing to increased stress and attrition[6]. Canada once offered the Canadian Institutes of Health Research MD/PhD Studentship, a program equivalent to the U.S. Medical Scientist Training Program (MSTP), but it was discontinued in 2016. As such, trainees interested in the physician-scientist career now must navigate prolonged and often disjointed training pathways on their own[7]. Japan presents even greater challenges, as opportunities for research after obtaining both MD and PhD degrees are extremely limited[8,9]. Without a mentor to sponsor them, many physician-scientists abandon research entirely and focus solely on clinical practice unless they seek additional training in Europe or North America. For those who remain in academia, demanding work expectations, including late nights and weekend hours, contribute to high levels of burnout[10].

By contrast, some countries have more structured pathways that offer dedicated support, though trainee mental health shortcomings remain. In the United Kingdom (UK), some medical schools have dedicated MD/PhD training programs, but these come with extra fees that may deter potential trainees. Protected research programs via the National Health Service (NHS) such as the Academic Foundation Programme, Academic Clinical Fellowship, and Clinical Lecturer pathways provide further gateways to combine clinical and research training. Even so, retention of UK physician scientists is low, especially given the demands of NHS clinical practice and the competitiveness of obtaining independent funding[7,11]. Germany attempts to offset similar financial stressors by offering a more integrated approach in their MD/PhD training and reducing medical school debt[12]. Additionally, its Clinician-Scientist Program provides medical residents with three years of protected time to engage in research after their second year of residency, ensuring a more streamlined career trajectory[13]. These German programs are analogous to the U.S. MSTPs for medical students and Physician Scientist Training Programs (PSTP) for resident physicians. While these structured programs alleviate some burdens, particularly navigating fragmented training phases, they do not eliminate all challenges. Issues such as financial strain, research expectations, and institutional culture continue to impact mental health and career retention among physician-scientists. These international parallels suggest that physician-scientist trainees worldwide share many of the same mental health struggles. This highlights the need for globally adaptable interventions that address these obstacles across different training systems.

Mental health challenges facing the U.S. trainees

The highly structured nature of MD/DO-PhD programs in the U.S. presents unique opportunities for targeted mental health interventions that could be adapted globally. While these programs offer substantial but highly competitive funding opportunities, they also introduce significant challenges,

including prolonged training, financial insecurity, and the difficulty of balancing clinical and research responsibilities.

For U.S. physician-scientist trainees, financial insecurity is a compounding factor that affects both long-term personal goals and short-term career progression. While most U.S. physician-scientist training programs provide a salary and waive the medical school tuition, trainees face longer periods of lower income compared to their peers studying solely medicine or research. The prolonged training timeline delays financial stability, limiting their ability to save, invest, and afford milestones such as homeownership or starting a family, which have lasting financial and personal implications. Furthermore, applying for trainee funding mechanisms, such as the F30/31/31D in the U.S. and other external fellowships, are highly competitive and may facilitate students' success obtaining future funding[14]. Thus, applying for grants can add considerable stress given the amount of preparation necessary for submission. There are also time pressures due to the abridged training schedule for physician-scientist trainees, which generally shortens the PhD phase to four years as opposed to six or seven years, while still retaining expectations of quality research outputs and publications. A lack of adequate mentorship and institutional support throughout the grant application process can lead to worsened mental health outcomes for trainees. As such, ensuring MD/DO-PhD trainees have robust mentorship and training programs structured around these grant mechanisms are important to help trainees attain early funding and confidence in their research capabilities[15].

Finally, preparing physician-scientist trainees both mentally and professionally for the long pathway to independence in their research and clinical careers is essential. MD/DO-PhD trainees are often taught that they may not receive their first R01 grant, the most common grant funding mechanism for independent research from the U.S. National Institutes of Health (NIH), until their mid-forties, when they are finally deemed "young" investigators[16]. Faculty positions are similarly out of reach, often taking a decade to secure after medical school[16]. This extended period of uncertainty contributes to stress and undermines confidence in the long-term viability and practicality of the physician-scientist career. Recent cuts to NIH funding have heightened concerns about the viability of independent research careers, further discouraging trainees from pursuing this path. This prolonged period of professional instability underscores the importance of robust institutional and national-level interventions to support physician-scientist trainees' mental health, ensuring they remain engaged and confident in their chosen career path.

Given these challenges, structured mentorship and institutional support are essential. Mentorship networks, such as those provided by the Association of American Physicians (AAP), the American Society for Clinical Investigation (ASCI), and the American Physician Scientists

Box 1 | Proposed changes to improve the experience and well-being of physician-scientist trainees

Actions for MD/DO-PhD Training Programs, Hospitals, and Research Institutions:

1. Reduce mandatory wellness programs and instead set policies that give faculty and trainees greater flexibility (reasonable work hours and protected time off), autonomy (ability to choose time off), and financial protections (applications for financial waivers, scholarships with clear and succinct requirements).
2. Provide free, confidential, on-campus (or online) counselors and mental health services.
3. Provide opportunities for peer support groups and/or mentorship programs for physician-scientist trainees.
4. Foster a diversity pipeline that includes targeted outreach efforts, a holistic application process, extended and representative mentorship, and equitable training methods[21].
5. Develop MD/DO-PhD wellness committees with student representatives and newer faculty who recently finished training to facilitate continued improvement and accountability for changes.
6. Provide flexible time off for trainees in the MD/DO and PhD portions of training protected by their programs.
7. Educate trainees on various available training paths and information on nontraditional MD/DO-PhD careers.
8. Design flexible curricula to allow for some portions of the medical and/or graduate requirements to be done ahead of time to free up time during the PhD and/or clinical years.
9. Establish open communication channels, precise expectations, and predictable opportunities for feedback at the beginning of training and at regular intervals to ensure trainees have a clear understanding of program expectations, milestones, and available resources to reduce uncertainty and stress.

Actions for Government and Community Organizations:

1. Create or bolster policies that support mental health initiatives for medical and scientific trainees.
2. Develop and invest in cross-institutional networks to facilitate research spearheaded by physician scientists.
3. Establish meaningful mentorship and support networks whereby trainees can receive guidance from experienced physician-scientists and receive professional or personal support without institutional retaliation or stigma.

Actions for Professional Societies:

1. Increase travel grants for trainees with accommodations for childcare, disabilities, etc.
2. Establish committees for various MD/DO-PhD programs, residencies, medical schools, and graduate programs to support trainee wellness.
3. Organize with other professional organizations to advocate for the common good of trainees, practitioners, and researchers.

Actions for Trainees:

1. Use available resources and actively provide feedback on them.
2. Use student organizations/councils to provide timely feedback to medical schools and graduate programs.
3. Identify non-advisor mentors who can advocate for them throughout their training.

Association (APSA), offer valuable career guidance, funding strategies, and mental health resources. These resources help bolster trainees' morale, confidence, career readiness, and sense of purpose. Expanding these mentorship structures and integrating comprehensive support systems within physician-scientist training programs will be critical in sustaining trainee well-being and ensuring long-term career retention.

Other important stressors in MD/DO-PhD dual degree training that impact trainee mental health are "imposter syndrome" and social isolation. The small size and competitiveness of physician-scientist training programs often make trainees question whether they truly belong or deserve their place in the program. Some MD/DO-PhD trainees experience imposter syndrome because they think their minority status might have led to preferential acceptance into their program. They can feel alienated when others voice similar comments[17]. Imposter syndrome has also been associated with difficulties and stress during the transitions between the MD/DO and PhD programs, as the degrees are typically completed consecutively, not concurrently[17]. These phase transitions often lack sufficient programmatic support, leaving medical students to integrate themselves into an unfamiliar graduate school environment or for people who have just acquired PhDs to reorient themselves from lab work to the demands of the classroom and clinic. Social isolation is amplified by the hyper-competitive nature of many physician-scientist programs, where trainees are often isolated from their peers due to rigorous academic and research commitments. This isolation, coupled with imposter syndrome, can cause significant emotional strain, making it harder for trainees to seek help and ultimately hindering both personal and academic development. When compounded by poor social integration, imposter syndrome throughout the training period may exacerbate trainees' feelings of isolation, negatively impacting mental health and potentially hindering academic and professional success.

Despite having national training infrastructure in place that reduces some stress burden on trainees, U.S. institutions have much to gain by prioritizing physician-scientist trainee mental health. Interestingly, because physician-scientist training programs require extensive financial investments, many countries have hesitated to implement such programs[18]. For the past eight decades, the U.S. has heavily invested in its physician-scientist training infrastructure, particularly through the NIH MSTP and PSTP initiatives for MD/DO-PhD training[19]. Nevertheless, over 15% of U.S. trainees do not complete one or both degrees or do not continue toward a traditional physician-scientist career as principal investigators of original biomedical research[16]. The most common reasons for this attrition include social isolation, financial insecurity, and limited institutional and programmatic support[20]. By prioritizing support and mental health interventions at each step in MD/DO-PhD training, institutions can improve retention and create more sustainable training programs. Additionally, trainees will develop greater confidence in their training programs and perceive the pathway as more appealing, achievable, and rewarding. This will allow them to focus more effectively on producing quality research and delivering excellent patient care.

Proposed next steps

In Box 1, we propose institutional, governmental, and physician-scientist-led interventions that could substantially improve the experiences and well-being of the fields' trainees.

Given the profound implications of mental health on both trainees and the healthcare system, it is imperative that institutions, governments, and professional societies come together to enact comprehensive reforms. Addressing the unique challenges that trainees face, such as clinical and research demands and financial insecurity, is essential for trainees to be able to achieve optimal well-being and professional success. Training programs that prioritize mental health will not only foster a more positive and resilient culture but also enhance the overall quality of patient care and research productivity. By implementing flexible time-off policies, providing accessible mental health resources, and fostering a supportive, diverse environment, institutions can cultivate a thriving workforce. Ultimately, prioritizing the mental health of physician-scientists will lead to stronger, more effective healthcare systems that benefit both trainees and their communities.

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The authors declare no competing interests.

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