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August 8, 2017

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Re: Request for Information: Strategies to Enhance Physician-Scientist Training through the NIGMS Medical Scientist Training Program
NOT-GM-17-009

Dear Dr. Singh:

The Association of American Medical Colleges (AAMC) is pleased to have this opportunity to offer comments related to enhancing physician-scientist training through the NIGMS Medical Scientist Training Program (MSTP). Founded in 1876 and based in Washington, D.C., the AAMC is a not-for-profit association dedicated to transforming health care through innovative medical education, cutting-edge patient care, and groundbreaking medical research. Its members comprise all 147 accredited U.S. and 17 accredited Canadian medical schools; nearly 400 major teaching hospitals and health systems, including 51 Department of Veterans Affairs medical centers; and more than 80 academic societies. Through these institutions and organizations, the AAMC serves the leaders of America's medical schools and teaching hospitals and their nearly 167,000 full-time faculty members, 88,000 medical students, 124,000 resident physicians, and thousands of graduate students and postdoctoral trainees in the biomedical sciences. Our comments reflect input from many of these constituents, primarily collected through our Group on Graduate Research, Education, and Training (GREAT), Group on Research Advancement and Development (GRAND), and Council of Faculty and Academic Societies (CFAS)[1]. While the AAMC's comments here focus on general themes, we have encouraged our member institutions to respond as well.

[1] The GREAT Group is AAMC's professional development group for graduate school deans, MD-PhD program directors, and postdoctoral program directors who have responsibility for biomedical PhD, MD-PhD, and postdoctoral training occurring within medical schools and teaching hospitals. GRAND is a professional development group for research deans and deans of clinical and translational research at these same institutions. CFAS is AAMC's council comprising faculty representatives appointed by medical schools and academic societies, providing a voice for academic faculty within the AAMC's governance and leadership structures.

Physician scientists play an essential role in our nation's health by linking discoveries and translating research findings to clinical applications and improved care. As noted in the NIH Director's Advisory Committee Physician Scientist Working Group report, there is a great concern in the research community that the physician-scientist workforce is aging and too few new physician scientists are entering the workforce to replace them.

MD-PhD combined degree programs provide an important training pathway for those pursuing careers as physician scientists. The AAMC thanks the NIH for its leadership and support of MD-PhD combined degree programs through the MSTP, which has produced over 10,000 graduates since its inception in the 1960s. The AAMC, in collaboration with MD-PhD program offices across the nation, has undertaken a study of the career outcomes of MD-PhD combined degree trainees. The study examines the graduates from MSTP and other MD-PhD programs and analyzes their demographics, specialties, workplace choices, research effort, and types of research. A report is currently in the process of being published, and we will be happy to share the report with NIH leadership when available. We anticipate the report showing strong participation in careers consistent with the goals of their training, with the large majority obtaining positions in academia, industry, and federal agencies. In addition, the overwhelming majority of alumni would make the choice to enter an MD-PhD program again if they could start all over.

AAMC is pleased that NIH has reached out to the community for input and emphasizes that any changes that are made to the MSTP should be based on evidence-based principles. The following is a summary of AAMC's recommendations to NIGMS, described further below:

- Multiple "on-ramps" should be available for pursuing a career as a physician scientist and for entering MD-PhD programs;
- Individuals pursuing an MD-PhD program ideally should have prior research experience to ensure that they know a career as a physician scientist is right for them, although this may not always be possible, particularly for applicants from non-standard backgrounds;
- MSTPs should implement holistic review of applicants and maintain a strong commitment to increasing diversity of their applicant pool and trainees;
- Shifting training costs to the trainees has the potential to move them away from entering research careers;
- Programs should emphasize professional development, mentor engagement, individual development, and wellness; and
- Institutional infrastructure must create a robust environment for trainees.

Recruitment and Selection of Trainees

The AAMC supports providing multiple on-ramps for pursuing a career as a physician scientist and for entering MD-PhD programs. For some students, that pathway is entering MD-PhD programs from college after having meaningful research experiences. Other students may become aware of the physician-scientist career path or gain research exposure after entering medical school, and benefit from the opportunity to enter MD-PhD programs directly from medical school. Many MSTP institutions already accept students from the MD program, and

NIH should encourage MSTP institutions to remain flexible in order to provide such students the opportunity for entering the program at different stages of training. However, the AAMC believes that students entering from the MD program should not be the only pathway for entry and that the pathway of applying directly from college into MD-PhD programs should remain. While there are many shared attributes and skills of being a physician and scientist, MD programs and MD-PhD programs each emphasize the building of different skill sets.

In order to improve the likelihood of long term commitment to a career in research, it is a good practice that students have some research experience before entering a MD-PhD program. The AAMC applauds the NIH Postbaccalaureate Research Education Program (PREP), which was cited by numerous research training leaders as providing a deep research experience and encouraging individuals from underrepresented groups to enter research careers. Summer research programs, including those tailored specifically to those considering careers as physician scientists, also provide research experience opportunities.

There are also several existing mechanisms for those who wish to gain research experience during medical school. The HHMI Medical Research Fellows Program and the NIH Medical Research Scholars Program provide mechanisms for medical students to engage in a meaningful research experience during medical school. Some institutions, such as the University of Alabama at Birmingham School of Medicine, have opportunities for medical students to get research exposure through a MD-Master's program in translational and clinical research, and some medical schools now incorporate a research year (or more) into the standard curriculum (e.g. Duke, Vanderbilt, and the Cleveland Clinic Lerner School of Medicine).

MSTPs should be encouraged to undertake a holistic review of applicants, giving a balanced consideration to experiences, attributes, and academic metrics when considering candidates. Characteristics of applicants include research experience, passion and excitement for research, creativity, being open to receiving and giving feedback, grit, and leadership.

MSTPs should retain a strong commitment to increasing the diversity of their trainees. Informing a diverse set of individuals about MD-PhD programs is one method of potentially increasing the diversity of trainees. The AAMC GREAT Group Communications Committee has developed a website for those considering entering MD-PhD programs and hosts various local and national workshops to inform individuals of MD-PhD programs, how to prepare for entry, and physician-scientist careers. In addition, as noted above, the NIH PREP program and summer programs that focus on increasing the diversity of trainees have become a strong source of diverse trainees entering MSTPs.

Financing/Funding of MD-PhD Training Programs

The NIH investment in the MSTP leverages many more resources at institutions. Medical schools that choose to have MD-PhD programs do so knowing that they will make a substantial investment in supporting the programs, demonstrating that there is a strong institutional commitment to training the next generation of physician scientists by this pathway.

The AAMC is concerned that if trainees bear more of the training costs that they would shift away from entering research careers. Some students already enter the program with college loans or other debt, and this type of shift would increase such debt. The AAMC is also concerned about any unintended consequences from such a shift, such as negatively impacting diversity, especially those students who have financial challenges.

The AAMC strongly supports the continuation of the NIH Loan Repayment Programs whose goal is to retain health professionals in research careers. Some individuals may enter the MSTP with college or other debt, and those that enter the MSTP from medical school may have additional debt. Helping relieve this financial pressure on MSTP graduates is beneficial.

Enhancing MD-PhD Training

MSTPs have been implementing approaches to move toward more integration of basic medical education, research experiences, and clinical training. While trainees have medical exposure during the research-focused time periods by keeping engaged in clinical activities, many schools have reported that it is much more difficult to incorporate research exposure during the clinically focused years, especially during medical school years M3 and M4. In addition, AAMC members noted that much focus is currently on the transition of trainees from research-focused time back to medical education and clinical focused-time; however, it is important to also incorporate research exposure throughout the training. Several strategies have been employed. Some institutions noted that their students participate in research rotations during the summers prior to medical school years M1 and M2. Another integration strategy is to sustain journal clubs throughout the entire training period. Some programs encourage their trainees to finish research manuscripts during their clinical training-focused time periods. Another suggestion is connection of MSTP trainees with the Clinical and Translation Science Award during clinical years as a way to maintain research exposure.

The AAMC would like to call attention to knowledge and skills in several key areas which our member institutions have identified as essential for physician scientists to be successful. Just as we noted in the AAMC response to the NIGMS request for information on modernizing graduate education, it is also critical that MSTP students are trained in professional skills such as: communication (oral and written), teaching, management, leadership, and teamwork. Our member institutions noted that most of the professional skills training is now offered during the research training components of MD-PhD training but such skills should be themes throughout the training spectrum.

Quantitative skills and knowledge of biostatistics, informatics, and big data are essential for trainees. The ability to identify gaps in medical knowledge and to use communication skills in scientific and grant writing is also deemed important. Physician scientists should display professionalism, responsible conduct, and ethical reasoning. The ability to time manage was noted to be especially important for physician scientists, many of whom are balancing several roles in their careers.

Outside of the classroom, there are a number of cultural shifts which the AAMC believes are critical to trainee development. Student wellness is an important element for success throughout training and beyond. As AAMC has previously noted, the NIH intramural program is a good model in this area, and extramural training programs should utilize existing institutional resources to address stress and mental health.

Similar to what AAMC advised for PhD programs, the AAMC cautions against establishing new requirements and making all such skills mandatory for all trainees. Some trainees may come into a program already well-versed in these areas. Also, programs should have flexibility in deciding how to implement skills development and balancing this need with the length of training.

While NIH and program reviewers should expect that all MSTPs have strategies in place to help their students to reduce time to degree, time to degree as a metric for evaluating programs should be less emphasized; instead, more focus should be placed on completion rate, training quality (including knowledge, skills, and abilities acquired during training), and career outcomes. Strategies could include ensuring that an MD-PhD advisor serves on the thesis committee and the development of key milestones across stages of the program to help trainees ensure they are on track. However, the NIH should request programs to provide justification for those trainees who take more than 9 years to complete their training.

Strong mentoring, including career advising, is needed throughout the program. Such advising should be tailored to MD-PhD trainees, as they have different needs than MD-only or PhD students. Some institutions, such as Vanderbilt and University of Iowa have developed MD-PhD specific individual development plan templates to help facilitate career goal setting for trainees. NIH should recognize that career options outside of academia, such as research and research leadership careers in biotech, the pharmaceutical industry, and government agencies are all successful career outcomes.

As stated in previously submitted comments, AAMC also supports efforts to enhance mentorship, including through a “train-the-trainers” framework, or an increased focus at the institutional level of defining and recognizing the characteristics of a good mentor. We again applaud the National Research Mentoring Network and its emphasis on diversity and inclusivity, and additionally recommend that mentors are trained in recognizing unconscious bias as we work toward achieving equity in the research enterprise.

NIGMS Management of MSTP Grants

Since training time for physician scientists is already lengthy and even more time is required to achieve a first independent position, the evaluation of programs is a challenge. Some institutions suggested that the success of a MSTP be measured by the research productivity during training (the number of publications and citations as well as the research impact), success at obtaining residency positions that are conducive to careers as physician scientists, and continued engagement in research upon completion of the program. MSTPs should also be evaluated on their level of interaction with any postgraduate physician-scientist office or physician-scientist training program. In addition, the AAMC suggests that the NIH consider a central evaluation

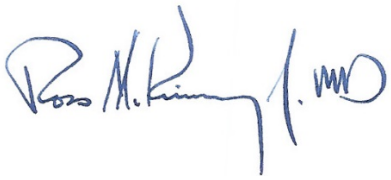
center for the programs so that all are evaluated in a similar way, similar to the evaluation center for the Broadening Experiences in Scientific Training (BEST) Program.

The AAMC believes that all MSTP institutions should have the institutional infrastructure to create a robust environment for trainees. The number of trainees within a program need not be set by fiat, but should vary based on the available infrastructure at each institution. The NIH should continue to emphasize to programs that they recruit diverse trainees from across the country, including persons underrepresented in research. The AAMC acknowledges that state-supported schools may have some limitations on the numbers of students that they can accept from outside of their state or region.

To encourage pursuit of research careers, trainees must perceive there is a productive and stable environment that allows for success in a research career. The NIH and research community must continue to partner to stabilize the biomedical workforce and provide pathways for new investigators to enter research careers. The AAMC appreciates the NIH's renewed focus on early-career investigators and its new emphasis on mid-career researchers through its Next Generation Researchers Initiative.

The AAMC appreciates the opportunity to comment on enhancing physician-scientist training through the NIGMS MSTP, and we look forward to working with the NIGMS on this issue. Please contact me or my colleague, Jodi Yellin, Ph.D., Director, Science Policy (jyellin@aamc.org) with any questions about these comments.

Sincerely,



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