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July 24, 2020

Andrew Miklos, Ph.D.
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National Institute of General Medical Sciences
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Re: Request for Information: Soliciting Input on the NIGMS 2021-2025 Strategic Plan Framework (NOT-GM-20-034)

Dear Dr. Miklos:

The Association of American Medical Colleges (AAMC) appreciates the opportunity to comment on the NIGMS Strategic Plan Framework for 2021-2025. The AAMC (Association of American Medical Colleges) is a not-for-profit association dedicated to transforming health care through medical education, patient care, medical research, and community collaborations. Its members are all 155 accredited U.S. and 17 accredited Canadian medical schools; more than 400 teaching hospitals and health systems, including Department of Veterans Affairs medical centers; and more than 70 academic societies. Through these institutions and organizations, the AAMC serves the leaders of America's medical schools and teaching hospitals and their more than 179,000 full-time faculty members, 92,000 medical students, 115,000 resident physicians, and 60,000 graduate students and postdoctoral researchers in the biomedical sciences. Our comments reflect input from these constituents, primarily collected through our Group on Graduate Research, Education, and Training (GREAT) and Group on Research Advancement and Development (GRAND)[1]. While the AAMC's comments here focus on general themes, we have encouraged our member institutions to respond as well.

The AAMC supports the goals of the proposed 2021-2025 strategic plan framework, which take the right step towards investing in biomedical researchers from diverse backgrounds at every training and career stage, from K-12, to undergraduate students, to graduate student and postdoctoral researchers, to faculty, and to higher leadership positions at institutions. The United States and its biomedical research community are currently facing an unprecedented time of upheaval, being on the front lines of the coronavirus pandemic while also addressing racism facing African Americans and other communities of color. The AAMC encourages NIGMS to view this as an opportunity to create a strategic plan that is forward-thinking and embraces not incremental, but disruptive changes.

[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.

The following is a summary of AAMC's recommendations to NIGMS, described further below:

- Promote public-private partnerships to assist in covering the costs of research
- Expand efforts to support trainee-focused training environments beyond trainees funded through training grants
- Lead the way in identifying and deconstructing exclusionary institutional practices, policies, and procedures that affect trainees and faculty that come from vulnerable communities
- Collect and make available for analysis data on trainees funded by all types of funding mechanisms
- Continue investing in providing trainees with professional development to prepare them for a variety of careers in the biomedical workforce, as well as tracking their outcomes
- Engage with the public about science and provide them opportunities to participate in research
- Create a set of cross-cutting principles that apply to all strategic plan goals, including examining how NIGMS may be forward-thinking on ways to encourage diversity, equity, and inclusion
- Foster an institutional climate and culture that will positively impact a diverse biomedical workforce

The Suitability of the Goals and Objectives of the Framework Relative to the NIGMS Mission

Goal 1: Sustain Strong Support for Investigator-Initiated Research

The AAMC strongly supports the continuation of this goal. Investigator-initiated research plays a critical role in the advancement of discovery in combination with research supported through other mechanisms. Federal funding for Investigator-initiated research seldom covers the full cost of the research. The AAMC recommends that NIGMS promote public-private partnerships to assist investigators in covering the costs of research.

The training of graduate students and postdoctoral researchers is funded across many types of grants. The AAMC applauds the efforts NIGMS has made towards creating a training environment that is trainee-focused through its new T32 application and reporting requirements, and we suggest applying similar efforts for trainees funded through other mechanisms, such as R01 grants. NIGMS should collect and make available data on all trainees, in addition to those on training grants, in order to understand the entire trainee landscape. Additionally, NIGMS should consider how it can support a diverse, equitable, and inclusive environment at institutions for all trainees under all funding mechanisms.

Goal 2: Invest in the Development of a 21st Century Scientific Workforce

The AAMC appreciates NIGMS' intention to focus on the entire career "lifespan" of developing scientists, recognizing that PreK to grade 12 is a critical time to expose young people to science and potential career options in science. Along with outreach to this age group, NIGMS should continue to

invest in the professional development of PreK to grade 12 teachers, such as through the Science Education Partnership Award program, helping them develop innovative and creative ways to teach and inspire students about science and research. This investment should work to rectify inequities across school districts that affect teachers and funding for programs.

NIGMS should consider new strategies and systems-based solutions to lead the way in identifying and deconstructing exclusionary practices, policies, and procedures in NIGMS-supported institutions and funding to address significant institutional barriers for both trainees and faculty that come from vulnerable communities. NIGMS should hold its funded institutions accountable for such changes in their hiring, graduate admissions, promotion and advancement, and other policies, and for their effectiveness in achieving successful outcomes in their trainees' and faculty's careers.

Additionally, some suggested strategies to promote diversity and inclusion in biomedical science include increased community engagement through learning communities and partnerships between academic medicine centers and community schools to support student programs that attract young people into science careers.[2,3,4,5,6] These strategies could identify and support diverse pools of students during educational training long before traditional undergraduate training engagement.

We recommend, as an additional objective under Goal 2, that at both early and later stages of formal training, the NIGMS continue to support training and career development for a variety of careers in the scientific workforce beyond the academic environment.

Collecting and using data are critical in the development, assessment, and pursuit of research training outcomes, and the AAMC recommends that as NIGMS and its grantees develop metrics to measure the impact of training, it share these metrics with the research and research training community so that it can identify and utilize shared metrics across programs. We also support the use of electronic systems to facilitate data collection to assess program success across institutions.

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[2] Carpi, A., et al., "Cultivating minority scientists: Undergraduate research increases self-efficacy and career ambitions for underrepresented students in STEM," *Journal of Research in Science Teaching* 54(2) (2017).

[3] Carrino, S. S., Gerace, W. J., "Why STEM Learning Communities Work: The Development of Psychosocial Learning Factors Through Social Interaction," *Learning Communities Research and Practice* 4(1), Article 3 (2016).

[4] National Academies of Sciences, Engineering, and Medicine. 2017. Supporting Students' College Success: The Role of Assessment of Intrapersonal and Interpersonal Competencies. Washington, DC: The National Academies Press. https://doi.org/10.17226/24697.

[5] Rochat, Angela, "Fostering Empowerment: Supporting Student Success at Native American Serving, Non-Tribal Institutions," Center for Minority Serving Institutions, University of Pennsylvania (2015). https://cmsi.gse.rutgers.edu/sites/default/files/MSI_AIANrprt_R3.pdf

[6] Seuss, E. L., et al., "Transformative education pathways to improve health literacy, STEM learning, and youth outcomes," J. Barnes-Johnson, and J.M. Johnson (Eds.) Social justice across contexts in education (2018).

Goal 3: Enhance Research Capacity and Enable Access to Critical Research Resources

The AAMC agrees that the access and development of research resources and new technologies is critical, as funding for infrastructure has lagged behind the fast pace of technology development. Under Objective 3.1, we recommend an additional emphasis on sharing resources, including support of regional sharing and the removal of administrative burdens and other barriers that can hamper resource sharing. Objective 3.2 is also vital and could lead to the support of research in areas that traditionally underserved states, regions, and communities, have special expertise, for example, on heath disparities and other topics that have shown to be underfunded by NIH.[7]

Goal 4: Advance the Public's Understanding of the Critical Role Played by Fundamental Biomedical Research

While the AAMC agrees that advancing the public's understanding of fundamental biomedical research is essential and appreciates that NIGMS has devoted a goal to this point, we recommend adding additional recognition to the importance of community-based participatory research. A separate objective could address how NIGMS is looking to partner with the community, especially engaging with the public on projects by which they will be directly affected, such as research that involves gathering genomic data. We also suggest that science communication training be part of the professional development efforts of trainees as they enter a variety of fields in the scientific enterprise.

Goal 5: Maintain or Enhance Investments in the NIGMS Workforce to Better Enable Delivery of Mission

The AAMC applauds NIGMS' desire to continue to foster a proficient, effective, and diverse NIGMS workforce (including racial and ethnic minorities underrepresented in research, women, persons with disabilities, and first-generation college students as well as other individuals from disadvantaged backgrounds), as seen under Objective 5.1. As discussed further in the additional areas to consider section, we recommend that rather than including this overarching goal as a succinct objective under goal 5, that this aim should be highlighted as a cross-cutting principle woven into all of the strategic plan goals.

We also support NIGMS' intention to enhance the evaluation of its programs, and we suggest that the NIGMS be transparent about the metrics to be used for future evaluations. Institutions could use this information as guidance on how to implement similar metrics in their own programs. As metrics are considered for evaluation, we recommend that NIGMS stakeholders be invited to the conversation – perhaps by setting up a process by which they could suggest new metrics and evaluation procedures.

[7] Hoppe TA, Litovitz A, Willis KA, et al., "Topic choice contributes to the lower rate of NIH awards to African-American/black scientist," *Sci Adv* 5(10) (2019).

Objective 5.4 should be reframed to clarify the balance required when seeking both security and utility of information systems, technologies, and related infrastructure, as prioritizing one comes at a cost for the other.

When implementing any new systems in the future, the AAMC recommends ensuring they are user friendly, do not add undue administrative burden, and provide results that are used to assess programs. NIGMS should consider providing deidentified data sets for the research and research training community to use for their own research and analysis. We also suggest engaging with NIGMS stakeholders when designing and implementing new systems.

Goal 6: Evaluate and Iteratively Optimize NIGMS Programs and Portfolios

When considering the metrics that will be used to evaluate NIGMS programs and portfolios, the AAMC recommends defining what is meant by success, as there are many aspects of success beyond typical metrics, such as the number of R01 grantees produced. We also recommend that NIGMS be transparent on how it makes its funding decisions by, for example, providing the analytic methods used in the decision process.

Additional Areas that Should be Considered in the Plan's Framework

The AAMC supports the goals the NIGMS has presented in its strategic plan framework, and we recommend adding a guiding set of cross-cutting principles that should apply to all goals. The principles could expand on these ideas:

- Fostering a proficient, effective, and diverse NIGMS workforce
- Supporting trainees across all NIGMS funding mechanisms
- Recognizing the multiple career pathways into which trainees enter
- Identifying opportunities to engage the public in research

Additionally, while the AAMC endorses NIGMS' intention to enhance diversity of those entering the biomedical workforce, further emphasis also needs to be placed on career development and retention - during training, but especially for early stage faculty. Recent studies[8,9] have shown that while students from underrepresented groups are almost as likely as those from well-represented groups to matriculate into a doctoral program, receive a doctoral degree, and acquire a postdoctoral position, proportionally fewer transition to tenure-track faculty. The AAMC thanks the NIGMS and NIH for previously recognizing the need for additional strategies to foster faculty diversity in academic

[8] K. D. Gibbs et al., "Decoupling of the Minority Phd Talent Pool and Assistant Professor Hiring in Medical School Basic Science Departments in the Us," *Elife* 5 (2016).
[9] L. C. Meyers et al., "Survey of Checkpoints Along the Pathway to Diverse Biomedical Research Faculty," *PLoS One* 13, no. 1 (2018).

research positions, and we encourage NIGMS to continue highlighting this need in its strategic plan. NIGMS could add an objective under Goal 2 or 5 to provide support for trainees seeking to transition to independent research careers as well as consider funding programs to help institutions improve their recruitment and retention policies to attract a diverse workforce.

NIGMS should also consider creating an objective, possibly under Goal 2, to foster an institutional climate and culture that will positively impact a diverse biomedical workforce that allows them to thrive. The learning and workplace environments are critical elements for success, and many institutions need support and accountability in creating an environment that leads to a diverse biomedical workforce. NIGMS should promote conscious inclusion and equity advancing for its funded institutions, possibly by providing a vision for a diverse, equitable, and inclusive institution and monitoring and evaluating institutions on their progress towards this vision.

AAMC appreciates the opportunity to comment on the NIGMS 2021-2025 strategic plan, and we look forward to working with the NIGMS on its implementation. Please feel free to contact us or our colleague, Amanda Field, PhD, Senior Science Policy Specialist (afield@aamc.org) with any questions about these comments.

Sincerely,

Ross McKinney, Jr., MD
Chief Scientific Officer

David Acosta, MD
Chief Diversity and Inclusion Officer