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Physician-Scientists Want to Address Social Determinants in Their Work – Are There Opportunities for Them to Train?

EDITORIAL

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ABSTRACT

In this Scholarly Perspectives Essay, a group of physician-scientist trainee leaders—all serving in the American Physician Scientists Association—describe our experiences in identifying and pursuing training in the social determinants of health (SDOH). Our experiences were variable, but can reliably be traced by beginning at our pre-medical institutions. Further, we describe the limited information for potential trainees about available opportunities in the United States. Finally, we describe a series of actionable steps that governmental and non-governmental leadership should take to improve the process for cultivating SDOH-minded physician-scientists of tomorrow.

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INTRODUCTION

Evaluation of social determinants of health (SDOH), the variance of health outcomes by social conditions such as healthcare access, environment, and socioeconomic status, is a predominant emphasis in the Healthy People 2030 objectives for the United States Department of Health & Human Services [1]. SDOH-related disparities not only adversely affect one's opportunity for health and prosperity, but also unjustly result in excess healthcare delivery costs [2]. Healthcare research institutes and governance, such as the U.S. National Institutes of Health (NIH), have emphasized understanding and researching SDOH in recent statements [3]. While physician-scientists, who have both medical and additional scientific training, have important expertise to contribute in addressing SDOH, it is unclear how future physician-scientists are being trained to consider and address these complex topics.

In this essay, we articulate our own experiences as dual MD-PhD students in identifying training pathways for advancing SDOH research for physician-scientists in various disciplines within the social and biomedical sciences. This is accomplished through Medical Scientist Training Programs (MSTPs) and other dual-degree training funding mechanisms. We describe our experiences in identifying training environments conducive to becoming competent investigators for SDOH-informed science. We combine six narratives into three composite representations.

We identified three themes from this narrative collection: (1) passion for training in addressing SDOH, (2) regional barriers to pursuing those passions, and (3) national perception that career stability is unclear for those focused on eliminating health disparities as physician-scientists. Our hope is to highlight the complexities and disparities of identifying training and funding opportunities for addressing SDOH. We aim to expand the focus of health scholarship toward mindfulness of SDOH across every discipline.

(1) THERE IS SUBSTANTIAL PASSION FOR ADDRESSING SOCIAL DETERMINANTS OF HEALTH AMONG CURRENT TRAINEES

Among the authors represented, there is an enduring passion for addressing SDOH within multiple disciplines, from cell biology to population health sciences. It is important to note that, while SDOH may be addressed at each stage from bench to bedside, they may be most recognizable in clinical investigations from disciplines within the humanities and social sciences. Early exposure to the concepts of SDOH can inspire continued or future SDOH research. One student author attributes courses in the humanities and social sciences for laying the foundation for this interest and helping to outline the limits of basic science methods and analysis in conceptualizing and addressing the uneven distribution of disease and its treatment.

> *As a pre-medical student, I studied biomedical engineering and took on a minor in women, gender, and sexuality studies. I also took some courses on medical humanities. I noticed that my science and engineering courses conflicted with my humanities courses; the former portrayed science as neutral and omnibenevolent while the latter taught me about how researchers ignored the AIDS epidemic and precipitated disparate care for black women. It helped me recognize the limitations of biomedical sciences in addressing the root causes of health disparities and sparked a passion for keeping my work today SDOH-formed.*

Several of the authors chose the dual training pathway as a way to incorporate the contextual social, political, and experiential aspects of disease. For example, a cellular biology trainee stated:

> *As an undergraduate researcher studying HIV and AIDS-defining illness, I realized that learning disease pathology alone would not give me a full appreciation for the experience of those affected by the disease. This led me to pursue a second degree, focusing on social determinants of health and cultural perspectives on illness. When choosing an MD/PhD program, one of the primary things I sought out was a curricular emphasis on social determinants of health and the opportunity to serve marginalized communities and increase healthcare accessibility… I eventually [selected my*

program] largely due to the curricular focus on SDOH and the pride in serving our local safety-net hospital. Now, starting my PhD in cancer immunology, I am continuing to look for ways to incorporate the impact of social determinants of health, such as chronic stress, in my study of this disease pathogenesis.

These are just a few examples of the passion that our physician-scientist trainees espouse as they exit undergraduate medical education. Next, we consider how these opportunities for SDOH engagement are born out across dual degree programs.

(2) OPPORTUNITIES AND EXPOSURES TO SOCIAL DETERMINANTS RESEARCH VARY BY INSTITUTION AND REGION

Trainees incorporated their interests in SDOH into research interests within disciplines ranging from anthropology to population health to wet lab research with translational implications for socioeconomically disadvantaged populations. When prompted to consider the perceived opportunities to study SDOH-related research during our university-level and MD-PhD training, we noticed that our experiences were tied to institutional characteristics. However, we also perceived that opportunities were distributed sparsely. One student who trained in the Mid-Atlantic region of the United States had exposure to SDOH through his pre-medical and undergraduate medical institutions.

[My] undergraduate pre-medical education was unique in that we received a lot of exposure to the history of [our affiliated hospital], which has been associated with some of the greatest and most controversial medical events in modern history… As such, social determinants of health concepts were circulated through the campus quite regularly. However, as a science-focused pre-medical student, we did not get much exposure to the intricacies of performing SDOH studies, including funding mechanisms and study design. That being said, [our institution] strongly supported us in applying for an early admission program at [a medical school in the Northeast] that allowed many students in our undergraduate institution to dive deeper into SDOH-relevant fields, such as anthropology and sociology, and to publish in these fields prior to medical school. My current medical school [Northeastern Medical school with an early admission program], conversely, strongly emphasizes SDOH research through student-led clinics for underserved immigrants and innovation programs that foster healthcare diversity and technology development that promotes health equity. Geography seemed to play a big role in the culture surrounding the promotion of SDOH research.

By contrast, another student noted that it was difficult to find opportunities to learn about and pursue advanced training in medical humanities.

While I loved the sciences, I knew I really loved the people for whom we use the science more than the science itself. When I stumbled across a Medical Humanities graduate program nearby, I realized that there were more possibilities for a career in medicine than just traditional clinical training. I realize in hindsight that I had no clue where to find opportunities like this on a national scale, nor did I have the chance to be mentored in this type of work during pre-medical studies – in fact, I didn't know anyone doing this type of work. My MD-PhD program was the only one I had applied to, and it wasn't until I was on campus that I understood the breadth of opportunities for SDOH research nationally.

A third trainee lamented the sparsity of opportunity available for discipline-specific training:

I estimate there were about 20 schools that reported willingness to consider an MD-PhD applicant in Anthropology; however, many had never accepted an applicant in Anthropology before, and even more only accepted one new trainee in Anthropology every 3–4 years.

The contrast between these experiences highlights the importance of institutional disparities in shaping access to research careers on SDOH. It potentially results in disparities in opportunities to

meaningfully participate in research at the pre-medical level, which would ultimately influence one's competitiveness for training programs. As programs and departments nationwide reckon with economic barriers, funding for these important disciplines may cease to be available. This has left some authors with a feeling of insecurity in finding further training, and ultimately faculty positions, addressing SDOH.

(3) FUNDING SECURITY FOR PHYSICIAN-SCIENTIST TRAINING HEAVILY FAVORS BIOMEDICAL SCIENCE, AND SDOH-FOCUSED POST-DOCTORAL OPPORTUNITIES ARE CHALLENGING TO FIND

The authors also noted challenges and perceived burden of self-identifying funding for not only their graduate training, but also for their future as young investigators. Of note, the NIH funds MSTPs specifically for training in disciplines within the biomedical sciences, not for social sciences or the humanities. Institutions therefore must fund trainees in non-biomedical fields themselves. Trainees interested in anthropology, public health, or the humanities often must identify institutions/faculty with other funding mechanisms. They may also need to pursue a self-driven fellowship-grant pathway.

One trainee at an institution that focuses on SDOH research as a principal output noted that, nevertheless, students were left to their own devices to negotiate training pathways.

> *While there was support for moving toward the dual degree pathway during [pre-medical education], the reality is that very few dual degree programs are open to and able to support PhD research in the social sciences. MSTP institutions tend to prioritize their T32-funded spots for 'pure' biomedical research. SDOH research opportunities were largely self-structured [at their institution]. Most research in that area was self-initiated; there were very few formal SDOH research programs, groups, or projects that allowed undergraduate involvement.*

Similarly, another undergraduate trainee noted that these limitations had forced them to consider another path:

> *However, upon learning about the limited number of funded MSTPs that exist for social sciences disciplines, I decided that it may be more realistic to pursue an MPH in addition to an MD degree… I am still hoping to apply to MSTP programs in the future to pursue a PhD in epidemiology one day.*

Finally, from a population health scientist now entering residency:

> *While I focused on adverse events in cardiovascular care for historically marginalized groups for my dissertation, which is generally regarded as important work by my peers, I still have no idea how my research is going to be funded moving forward. There was substantial pressure to find external funding even as a graduate assistant. Further, it is going to be very challenging to maintain work like this while completing residency and fellowship training. I don't know of any specific training grants that support SDOH research in cardiovascular spaces. I also have to hope my future Department Chair sees the value in my work and supports a prolonged effort to obtain external funding, which seems to be the norm.*

While there is a great deal of basic science that might meaningfully contribute to eliminating some SDOH—e.g., studying genetic diseases that disproportionately affect racial/ethnic groups that have been marginalized—the much of this work is done in the social sciences and humanities. When funding and opportunity are scarce, it is difficult to estimate the number of potential investigators who elect to pursue other paths. However, it is reasonable to suspect that those who do not complete this path may be more likely to be socioeconomically disadvantaged than their counterparts, given the lack of funding opportunities. A 2024 study [4] of Association of American Medical Colleges (AAMC) data suggests MD-PhD trainees were less likely first-generation college graduates ($OR = 0.70$, $p < 0.001$) despite having equivalent interests in pursuing that training.

DISCUSSION AND CONCLUDING REMARKS

While experiences vary, the social unrest of the last decade has imbued many with aspirations to use their love of science—whether biomedical or social—to make healthcare more equitable. However, the opportunities to pursue this work may depend on early exposure to research aimed at describing or improving SDOH. This, in turn, is likely dependent on one's pre-medical institution, their mentor's funding, and their future graduate medical training. We call attention to a connection between the uneven terrains of trainee contexts and opportunities to understand and address SDOH, which functions to keep marginalized applicants out of dual training programs at the same time as it makes research on SDOH more difficult.

As members of the American Physician Scientists Association, the national physician-scientist trainee organization, we aim to address these barriers and disparities through policy and practical initiatives. For example, the Social Sciences and Humanities Committee is working to compile a repository of program data for non-biomedical disciplines. However, early exposure and continued access to be involved in SDOH research cannot fall upon trainees alone. Thus, we call upon institutional leaders to examine their metrics of success as they relate to both individual trainees and institutional goals. **What makes for a strong applicant, trainee, and career as a medical scholar? What metrics define program success? What frameworks guide perspectives on valuable research contribution? How and by whom is the daily work of medical science done, and how does that work reflect equity?** We suggest that these questions be answered among a group inclusive of, but *not limited to*, institutional leaders.

Governing bodies such as the AAMC can publish data on the number and location of training positions focused specifically on SDOH. Basic science programs with strong opportunities to augment training with SDOH-informed methods should be recognized by governing bodies such as AAMC and advertised broadly. We also call for systematic, diverse, and sustained federal, state and local governmental funding for new scholarship in fields ranging from Epidemiology to the Medical Humanities, where describing SDOH and presenting solutions often takes primary focus. This aspirational goal need not wait for representative descriptions of training pipeline deficits to begin.

While the narratives presented are not comprehensive, they nonetheless may serve as the starting inquiry that paves the way for eliminating inequitable SDOH in the U.S.

DISCLOSURES

JWD, RAS, JLD, ADS, and BB are part of the Policy Committee, JWD, RP, JD are part of the Social Sciences and Humanities Ad-Hoc Committee, and BB serves as an Institutional Representative at the American Physician Scientists Association.

COMPETING INTERESTS

The authors have no competing interests to declare.

AUTHOR CONTRIBUTIONS

Brianna Brammer, BS, Jessica L. Ding, BA, Ross Perfetti, MSc, Randal A. Serafini, PhD and Ammar D. Siddiqi, BA. These authors contributed perspectives equally and are listed alphabetically.

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