

**Examining the Barriers and Opportunities to
Black Students along the Pre-Med Track***

Olivia L. Quartey

Department of Sociology, Temple University

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ABSTRACT

For this project, I have engaged in research on one of the biggest impediments to diversifying medicine and eliminating health disparities: the pipeline problem. Black students in the medical professional pipeline face barriers and a lack of opportunities that prohibit their advancement to medical school. In my project, I focus my analysis on Black students' efforts to successfully matriculate into medical school and how undergraduate institutions play a pivotal role in the process of becoming a physician. To engage in this project, I draw upon several disciplines, because the "pre-med" experience is unique and multifaceted, spanning public health, medicine, sociology, and education. After I did a thorough and synthetic literature review, I conducted qualitative research through interviews with pre-med students to identify resources and constraints that impact attrition, and the extent to which it is racialized. I focus on the inconsistencies between what is said needs to be done to increase the number of Black students matriculating into medical school and whether there is something being done. I find that there are three main areas of barriers: inequalities in college advising, inequalities in access to resources, and pre-med social support inequalities. Based on my findings, I conclude the paper with a few research-informed policy recommendations to address the gaps in pipelines to becoming a physician for Black students in medicine.

INTRODUCTION

It has long been documented that there are inequalities that exist in the Black physician force in the United States. In 2019, only 2.6% of the U.S. physician force was Black, and further from 1980 to 2019, the number of Black applicants, matriculants, and graduates has not grown in comparison to other groups (AAMC, 2021). Currently, the United States population is around 13% African-American/Black, so the low percentage of Black physicians is indicative of a

representation inequality in the U.S. physician force. This poses an issue for the U.S. medical system because—based on demographic trends—the demand for physician services is projected to grow proportionately faster for minority populations (AAMC, 2021). Physicians of color are needed as soon as possible to serve these growing populations for a few reasons (Kenya, 2018). First, as research shows, Black physicians are more likely to serve the underserved (Saha et al., 2008). Second, Black physicians can lead to improved patient-doctor interactions with diverse populations as well as more respect for cultural sensitivity in the medical field (Gasman et al., 2017). And third, patients who have providers that look like them have better health outcomes (Kenya, 2018).

Despite an explicit need for more Black physicians to enter the medical field, there are barriers that discourage Black students from remaining on the path to medicine. These barriers can occur at each step of the pre-med pathway as described by Michalec & Hafferty (2022): coursework, extracurricular activity, shadowing, volunteering, the medical college admissions test (MCAT), and the process of applying to medical school. Michalec & Hafferty (2022) further discuss the theoretical framework of *discriminatory design* while taking into account the role of financial, social, cultural, and (extra)curricular capital for pre-med students; *discriminatory design* leaves the students that are underrepresented in medicine either racially, ethnically, and/or financially, vulnerable to the challenges that exist on the pre-med track. Challenges on the pre-med track can be attributed to a multitude of reasons, however, commonly cited are the inadequate education background and unsupportive academic environments (Gasman et al., 2017). While this body of scholarship has illuminated some of the central foreseeable barriers along the pipeline, there is little research that takes students' perspectives—particularly Black students' perspectives—into the equation.

The goal of the present study is to address the gaps in the literature by centering Black students' voices to see what barriers they are up against in their pursuit of matriculating into medical school. Thus, the research question that I am looking to answer is: what are the undergraduate level barriers and opportunities along the pre-med pathway that hinders Black students from getting to medical school? I find that the barriers discovered in the research are centered around inequalities in college advising, inequalities in access to resources, and pre-med social support inequalities. The findings from this research will be used to inform—and ideally improve—future programming to support Black pre-med students by making recommendations that universities can implement.

LITERATURE REVIEW

Within the body of research about pre-med students, there is work that focuses on preparedness, STEM coursework, exams, student culture, stress—and, thus, the different barriers to staying on the pre-med pathway that might arise along the way. For the present study, there are three central areas of focus: advising, resources, and social support. The bulk of the literature centers on how all pre-med students interact with these three domains and there is limited data on Black pre-med students' experiences.

College Advising along the Pre-Med Track

College advising is an integral part of pursuing medical school because at U.S. medical schools, there is no uniform requirement for classes and a pre-med student cannot declare a “pre-med” major (Lin et al. 2020). Without a standardized way for pre-med students to accomplish their course requirements, the onus is on the student to decide on a major that will allow them to complete the requirements while also completing their degree (or desired amount of credits) in their desired time frame. Once a student designates that they are pre-med to their

institution, they should be typically directed to the college's or university's pre-health advising (Grace, 2018). With that comes the importance of undergraduate advisors; research shows that early intervention, engagement, and utilization of advising by pre-med students increase their chance of matriculating into medical school (O'Mealia 2017). Additionally, having high-quality advising has been cited as one of the most important resources that aid pre-med students in their success (Barr et al., 2008). Moreover, at historically Black colleges and universities, having advisors with familiarity and knowledge of medical school provides applicants with what they need to prepare themselves for medical school (Atkinson et al., 1994).

Conversely, advising also has the capability to reinforce early negative experiences in their challenging coursework by advisors discouraging students from staying on the pre-med track (Barr et al. 2008). This capability presents an opportunity for college advising to discourage pre-med students and influence a premature decision for students to stop their pre-med journey. Not only that, but the combination of the stringent-spoken and sometimes unspoken- requirements of the pre-med pathway that are enforced by advisors can also discourage students who are underrepresented minority students (Michalec & Hafferty 2022). When advisors are giving advice that is to be strictly followed, it can dissuade students of marginalized and underprivileged backgrounds from continuing on the pre-med path because it is so challenging to complete all of the requirements, while simultaneously facing discrimination and prejudice on top of their academic obligations (Gasman et al. 2017). Pre-health advising professionals should be helping students to uncomplicate things early on in their pre-med experience to help them get where they need to so that students can apply for medical school (O'Mealia 2017). In terms of the pre-med pathway, advising can be conceptualized as a resource; however, there are other resources that also deserve attention.

Institutional Resources for Students

There are many resources necessary to be able to be and remain a pre-med; the pre-med track is notoriously expensive and that proves to be a barrier to students of low socioeconomic status backgrounds— as well as underrepresented minority students given the racialization of wealth in the U.S. (Michalec & Hafferty, 2022). Therefore, it is important to focus on economic resources. The consequences of such a costly career path lead to attrition among students who cannot afford it, deters students from being able to complete their necessary extracurricular activities like shadowing and gaining clinical experience, and impact other parts of their admission to medical school like when they are taking the MCAT and how many times they can take it (Michalec & Hafferty, 2022; Ruedas, 2016). For instance, sometimes students will have to make a decision between completing the requirements for pre-med or having enough money to be financially stable (Ruedas, 2016). Even though there are currently programs out there like the Fee Assistance Program (FAP) from the Association of American Medical Colleges (AAMC), it is not enough to substantially reduce the costs; especially because participating in programs like the Fee Assistance Program requires students to know they exist and/or successfully apply and receive the benefits from it (Michalec & Hafferty, 2022). This further reinforces the importance of advising where it takes good advising to guide students to the resources that will mitigate financial burden.

According to Kenya et al. (2019), creating opportunities for minority students like developing pathway programs and assigning the program planning to someone who is able to commit all of their time to a program is essential for the successful implementation of programs that increase the number of minority students in medicine. Additionally, providing stipends to students is another way that institutions can invest in their students for more minority retention

(Kenya et al. 2019). Institutions that attend to the needs of their students by providing them with services are the ones that are more likely to produce Black doctors. Specifically, historically Black colleges and universities (HBCUs) are well-known suppliers of Black physicians. Even though HBCUs only make up 3% of higher education institutions, 17% of the colleges that are supplying the U.S. physician force with the most doctors are HBCUs (Gasman et al., 2017). The reason that HBCUs are able to produce more Black doctors is that they are intentional with what they provide their pre-med students with. One way that HBCUs do this is by providing their pre-med students with a range of externally sponsored enrichment programs. These enrichment programs that are implemented serve as a mechanism to sharpen science core competencies so that they could be better positioned to excel in medical school. Xavier University (an HBCU) is deliberate in using a peer and instructor drill system and a peer-led student tutoring center so that there is always a means of access to support (Gasman et al, 2017). Thus, financial resources are important for Black pre-med students; however, in addition to advising, social support is also another component of the pathway.

Social Support Experiences within Pre-Med Culture

Finally, the pre-med culture and experiences with social support are the final dimension that is important for understanding the pre-med experience. The social aspect of the pre-med experience is an important part of the story when it comes to why students may not persist on the path to medical school, but also can be an indication of why they may stay. Notably, pre-med students that can look to older pre-med students are provided a safe space in terms of social support in an otherwise competitive environment (Grace, 2018). Through participation in organizations on campus where students can meet older pre-meds that are not necessarily at the same stage as younger ones; the atmosphere can be quite welcoming and improve a pre-med

student's construction of their perceived failures (Grace, 2018). In other words, when a student has an older pre-med mentor, they find solace in being able to confide in someone else who is ahead of them and have been through the same experience that they have.

Behind the amicable relationship between pre-meds can also lie the pre-med stereotype. The pre-med stereotype describes pre-meds as single-minded, competitive, and obsessed with grades (Lin et al. 2013). This stereotype has the potential to discourage some students from continuing because they do not feel comfortable in the pre-med environment due to its “cutthroat” nature (Lin et al. 2013). In one case in Lin et al.'s (2013) study, a student reported that they no longer talk to some of their pre-med friends because the track itself was all they were fixated on—getting into medical school. It is possible that the prospect of competition alone is enough to stop students from applying to medical school which, regrettably, leaves doctors who would have been capable of doing the work to pursue other careers in medicine. (Lin et al, 2013). Furthermore, the broader context in which we think about the social aspects of the pre-med track also deals with what dictates a successful medical school applicant as decided by the social norms set forth by peers on the pre-med track. Being surrounded by other people who are on the same track as you, forces students to always examine why they actually want to become doctors (Lin et al., 2013).

While the literature suggests that social support comes into play for everyone, there is reason to believe that it may be different for Black pre-meds, based on studies of higher education and STEM (Xie et al., 2015). In sum, advising, financial resources, and social support are the central areas that impact pre-med students as they advance along the pipeline, and research suggests that students of color are disproportionately impacted in these domains.

However, we do not yet know how Black students experience the pre-med pathway and evaluate these domains, and it is precisely this topic that will be addressed in the present study.

METHODS

To understand from an interdisciplinary standpoint the barriers and opportunities Black students face while on the pre-med track, I conducted open-ended interviews with Black students who expressed an intent to go to medical school. In particular, the data that is used for analysis are direct quotes from Black pre-med students that attend a predominantly white, public Northeastern university that I will be using the pseudonym North Atlantic University from here on out. Respondents were recruited via clubs on campus at North Atlantic University and through existing social networks.

Further, I asked respondents to fill out a pre-interview survey prior to the interview to confirm their background. I asked the respondents a range of questions pertaining to their general academic background, interest in medical school, medical school planning, undergraduate school environment, and their own evaluation of the pre-medical school experience. The respondents in this data set include 8 students who identify as Black and/or African-American who are pre-med within varying levels of the undergraduate experience.

After the interviews were conducted, I analyzed the audio and transcribed responses to questions. In reviewing the responses, I engaged in a thematic analysis of the data. Several themes emerged from students' responses, pointing to different sources of opportunities and constraints along the pre-med pathway, three of which are the focus of the present paper. In the results section that follows, all names are pseudonyms, in accordance with the Institutional Review Board protocol.

RESULTS

I have three main findings oriented around advising, resources, and social support. Similar to some of the literature on pre-med students, Black pre-med students had particular experiences with advising, access to resources, and social support. I will describe each and what Black students thought was unique to their experience relative to pre-med students' experiences at large. First, advising takes on good and bad forms, hinging on how knowledgeable advisors are, how critical they are of the student, and whether they are attuned to the experience of URM. Second, financial resources are not only necessary but students point out how unequal the different opportunities are for them relative to their peers not facing such constraints. And, third, social support differs depending on whether students are referring to classrooms or clubs.

Advising

When Black pre-med students talked about their advisors, one thing was made clear: there are good advisors and bad advisors. Good advisors were deemed knowledgeable about the pre-med pathway; bad advisors were not. Often bad advising took on the form of being rather thin on the actual advising, meaning that they were either supercritical or deemed unhelpful by students. Take for example Kylah, a Black pre-med student in her fourth year, who when asked about what her experiences were regarding advising, said:

With advisors, it's like you really have to know what you're talking about. And I feel like our relationship is so good because I know what I want and I plan it out. But it could be a struggle for people who don't know what they want.

Kylah was able to shed some light on what some Black pre-med students experience—particularly how much she had to do so much of the leg work. Perhaps this is built into the structure of the advising office because when I spoke to Mary, a second-year Black pre-med student, she

explained how “you get a new advisor each semester/year...they [advisors] don’t know your progress.” Lily, a fourth-year Black pre-med student also described her experience with feeling as though her advisors were not able to help them in a context wherein *they* did not know what to do in their next steps:

I’ve gone to advisors about things [programs for pre-meds] that people have told me about and I’m being told that there is no further information for me. And I really don’t like hearing that. I’m expecting to come here to get new information... that was kind of annoying.”

In an already long and arduous process of trying to get into medical school, Lily expressed her frustrations with having an advisor that was not able to give her information that she knows exists.

Conversely, at North Atlantic University, students articulated that they had much more positive experiences with an advisor who was specifically hired for working with underrepresented students interested in medicine. Brittany, a Black pre-med student in her fourth year, explained:

She has been that person who is understanding of students of color with their grades and finances, she understands. And I appreciate her understanding... She was always someone who has been in my corner.

The difference here between Brittany and the other students who discussed their advising experience with someone who is not trained for dealing with URM specifically is that Brittany feels supported by her advisor that can empathize with her undergrad experience. Moreover, Janet, a fourth-year Black pre-med student made this comparative point explicitly:

Other advising either leaned on being too easy on you and not giving you constructive criticism or giving you nothing but criticism.

Janet points out that what actually made the difference between advising was that the other advising that she experienced that was not from the advisor specifically for URM did not

actually help her improve; but rather, the advising just focused on the things that she was not doing well and was given no ways to improve. As research shows the discriminatory design of the pre-med pathway, this finding supports the idea that undergraduate advising can discourage minority students by enforcing stringent requirements of the pre-med requirements (Michalec & Hafferty 2022).

In sum, Black pre-med students report that when it comes to academic advising –whether it be for general class scheduling or for the pre-med requirements—they prefer to have advisors that are knowledgeable, and having an advisor that works with URM is helpful.

Access to Resources

Access to resources is important because having a holistic application for medical school—that is, having volunteer, clinical, and research experience—while also making money is important to my respondents because the costs to get into medical school are expensive. Brittany explained her financial situation in relation to her ability to get a clinical experience:

Clinical experience... I feel like there is a barrier. I do not have the money to be paying \$3,000 to become an EMT...MA (Medical Assistant, you need training for that, you need to pay for the courses. I don't have the money for that. Medical scribing, yes you can do it... for all the hospitals that you can go to [to medical scribe in the area], you need a car. I do not have a car. So [for] access to transportation, that would not work [for me]...For shadowing, I was working a lot of jobs trying to sustain myself. And even now, I am really, really involved, and it's hard to find time. And on the weekends, I study a lot or I sleep.

What Brittany is describing here are financial limitations to getting the clinical experience that she needs. And even further, because she does not have the money to get the certifications for the jobs that will pay her to do clinical experience, she finds herself without it. She has to work to be able to live so, it ends up being that even in her free time, she is doing schoolwork or being involved—which are both essential parts of the pre-med process. Moreover, students feeling this way established the ground for them to identify what resources they do need.

A common theme that emerged from students was that they need more resources from the institution itself. This sentiment was grounded in students feeling like the institution was not committed to students in their position, captured in Lily's statement that, "it doesn't always feel like diversity is of the utmost importance or equity isn't of the utmost importance [at university]." She elaborated further about the faculty that she has encountered, in particular, saying that:

It's the bare minimum... There is a lot more that professors and administration could do to make [the university] more welcoming.

The main concern for Lily, in particular, is that she feels unsupported by her institution because the professors and administrators are not doing enough. Especially when she points to the university about not being equitable as the school's utmost importance, she emphasizes the need for the institution to acknowledge systemic barriers that may exist for marginalized students. What she further discusses is how there are more things that the institution could do.

And some of her peers were able to name some of the things that the university has not been doing to support their students like saying things like Brittany, a fourth year Black pre-med student who said that, "They need more people who are catered to actually helping underrepresented students." Or, Sarah, a fourth-year Black pre-med student explained that "The amount of paid research opportunities can be improved."

These responses make it clear that students know what they need, however, they don't have it. It draws attention to how pre-meds do know what they need but how their undergraduate institution is not providing them with things like guidance from people who are trying to help marginalized students and with the chance to engage in research that will help them with their medical school application without having to volunteer their time

To conclude, Black pre-med students face financial limitations in getting clinical experience and also have expressed the need for more institutional resources.

Social Support

When it comes to the social environment that Black pre-meds experience, it can be anywhere from hostile to positive—depending on the students’ perspective. Lily is able to explain the feeling of what it’s like to be in pre-med where she says things like:

I feel like it is very cliquey. I don’t know if it is intentional...It feels like every man for himself...It is weird to see that... “I don’t want to work with you mentality.”... It feels ostracizing to be a [Black] STEM major.

But then she also goes on to talk about things like:

I’ve actually been really lucky to be able to find at least people that I’m in community with that are a part of STEM that look like me and we share at least some similar... culture things... that makes me feel comfortable, and I don’t necessarily think my classes reflect that same sentiment.

Essentially, Lily is able to address the pre-med culture as she perceives it from outside of her friend group, but at the same time when it comes to people within her own circles, she does not feel that same way. Ultimately, what Lily is pointing to is the importance of maintaining a strong Black pre-med student group, especially in light of a much less friendly broader pre-med culture. And Brandon, a second-year Black pre-med student further supported this same idea when he discussed pre-med culture when he was asked about what he thought about his pre-med peers by saying:

Pre-med culture is like a jungle. It feels like survival of the fittest basically...There is that toxicity of pre-med culture.

These comments are testaments to the hostility of the environment that Black pre-med students feel while they are trying to complete their undergraduate coursework. However, Brandon goes on to talk about his own experience within his organization where he says, “In my organization

[pre-med fraternity on campus], I feel like... I think it's friendly. You don't see that cutthroat competition that you see in classes." And another student, Janet, a fourth-year Black pre-med student, also found solace in her club:

I feel like within [club/organization] [pre-med culture] leans a lot more on the cooperative side.

Ultimately, it is rather relevant to consider how pre-meds are able to compartmentalize their pre-med peers based on how much interaction they have with them. When talking about their peers with whom they have classes, they are more inclined to give them a label that they are hostile. While on the flip side, when students are not within the organizations that they are a part of are not labeled with more positive attributes, but more so associated with the stereotypes that exist within a pre-med culture. Furthermore, Lily's comment captures the role of race in Black pre-med students' perception of their peers where it feels as though when she is amongst students who look like herself, she is able to feel more comfortable while pursuing her STEM coursework.

DISCUSSION

After taking stock of their experiences through these qualitative interviews, students were able to delineate what they are up against while on the pre-med track. There are three main domains by which Black pre-med students feel barriers along the pre-med pipeline: advising, their access to financial resources, and social support. First, respondents in my study noted a disparity in what academic support is offered to Black pre-meds, resulting in students feeling discouraged after receiving incorrect information about the pre-med path. This is especially poignant because the pre-med path requires knowing a vast amount of information, so any misstep or misguidance can be costly.

When students go to their advisors, they expect guidance and help along the way to becoming a physician because there is a general lack of understanding of what it means to apply to medical school early on in the process. And one of the things that is helpful for students is having a knowledgeable advisor. A knowledgeable advisor can be encouraging to students who want to pursue medicine. Having advisors that are not supportive and degrade their advisees are not advisors that can help students.

Another way that students can be limited on the pre-med journey is by not having enough resources, and having financial limitations to get clinical experiences. Some students do not have the ability to complete the essential parts of the medical school application that are obstructed by financial practicality. A student who needs to work to pay rent cannot work for free—a common occurrence with the opportunities to get clinical experience or be able to volunteer. However, to be considered a well-rounded medical school applicant, you need to have both of those things. Overall, the university does not provide enough resources for their students as well as financial constraints limit students from being the best medical school applicants. Because class and race are historically linked in the U.S., this disproportionately impacts students of color, like the Black pre-med students in my study.

The last theme that emerged from the data is that social support plays a role in how Black students perceive their pre-med experience. Students find their pre-med environment rather hostile when they are in their classrooms and in general, however, it is contradictory to how they perceive their pre-med peers when they are in a club or organization that has all pre-meds. Black pre-med students described a very harsh environment when it came to identifying the characteristics that their peers had. But at the same time, when they are within groups of other pre-meds they express how helpful that other pre-meds could be. It is also notable that Black

pre-meds—when amongst each other—felt more supported by being around people who look like them.

These findings are significant because when we refer back to the mechanism of discriminatory design that exists along the pre-med track as defined by Michalec and Hafferty (2022), discriminatory design, particularly, affects Black students. Something that is often neglected in the literature is focusing on a specific group that is affected because we know that generally, minority students do suffer from the discriminatory design but we are unable to specify exactly what Black students are facing in their journeys to medical school.

In the context of the pre-med track, so much of the responsibility is put on students to know exactly what to do and when to do certain steps that are essential to building a holistic medical school application. Institutions could pay more attention to this as there is no formal process to designate pre-med. The onus is put on the student to sign themselves up for that designation and to receive the important information that is necessary for them to be successful at their undergraduate institution. By institutions paying more attention to their Black students and their perspectives, the institution may be able to produce more Black doctors (Gasman et al., 2017).

LIMITATIONS

One limitation of this study is the bias that exists in the sample. The sample was a convenience sample collected from only one undergraduate institution and the majority of the interviewees were Black females. Additionally, given the total number of interviews conducted was 8, it limits the generalizability of this study as well. Another limitation is that the study does not have data on the K-12 education of respondents. Therefore, future research should investigate possible disparities in high school education and college preparation. A strong GPA is

an important factor of the pre-med track and so exploring what could be happening earlier on in students' academic careers may provide insight into what could be done to retain more Black students on the pre-med track. Another possibility for future research would be exploring how pipeline programs and other institutional programs strengthen the retention of Black pre-meds (and other URM). This would allow for the inquiry of what is being done right now to make sure that more Black physicians matriculate into and graduate from medical school.

Despite the limitations and areas for future research, these findings that surround the themes of advising, access to resources, and social support are worthy of exploration and should be considered in finding solutions to help more Black pre-med students get through the process. As for recommendations based on the findings of the present study, one thing that is clear from this study is that the students themselves have a lot of expertise. Thus, universities should gather and prioritize student input regarding the efficacy of advisors in advance of those advisor's contract renewal. That way, advisors who are genuinely looking out for students' best interests are kept and also provide feedback for advisors who may not be aware of their impact on students.

An additional proposal to change advising is to increase the number of advisors with proven track records regarding diversity, equity, and inclusion. This way, advisors are capable of coming up with realistic solutions to students' problems or, at least, more equipped to answer their questions about the process as Black pre-med students.

And to address the financial limitations for pre-med students to achieve their clinical experience goals that can make them better candidates for medical school, the university should subsidize students' participation in unpaid or low-wage work. Being funded can make it easier

for students to properly round out their application without having to sacrifice their well-being in case an opportunity arises that does not pay them what they need.

Finally, one recommendation to address hostile pre-med culture would be to facilitate conversations about the hostile pre-med culture across disciplines and stages of the pre-med track because opening up communication about how people feel makes room for more understanding. Especially with the contrasting data that describes pre-meds on different sides of the spectrum (as in being cooperative and helpful vs. cutthroat and cliques), beginning to have these conversations would allow us to see where exactly the disconnect is when it comes to perceptions of a hostile environment while being a pre-med.

CONCLUSION

The thematic analysis from the qualitative interviews that I conducted shows exactly what Black students are up against in trying to matriculate into medical school which involves advising, access to resources, and social support. Making institutional changes may strengthen the pipeline, increase the number of Black physicians in the workforce, and ultimately, diversify medicine to help reduce racial health disparities.

References

- AAMC. (2021). “The Complexities of Physician Supply and Demand: Projections from 2019 to 2034.” AAMC. Retrieved
<https://www.aamc.org/data-reports/workforce/data/complexities-physician-supply-and-demand-projections-2019-2034>).
- AAMC. (2021). *Diversity in Medicine: Facts and Figures 2019*. AAMC. Retrieved March 20, 2022, from
<https://www.aamc.org/data-reports/workforce/report/diversity-medicine-facts-and-figures-2019>
- Atkinson DD, Spratley E, Simpson CE (1994) Increasing the pool of qualified minority medical school applicants: premedical training at historically black colleges and universities. *Public Health Rep* 109: 77.
- Gasman, M., Smith, T., Ye, C., & Nguyen, T. H. (2017). HBCUs and the Production of Doctors. *AIMS public health*, 4(6), 579–589. <https://doi.org/10.3934/publichealth.2017.6.579>
- Grace, M. K. (2017). Subjective social status and premedical students' attitudes towards medical school. *Social Science & Medicine*, 184, 84-98.
- Kenya, S., Young, B., Vega, N., Bringuez-Sanchez, J., Reynolds, A., & Symes, S. (2019). Tips for Building a Pathway to Medicine for Underrepresented Minority Students. *Journal of Best Practices in Health Professions Diversity*, 12(2), 181–191. <https://www.jstor.org/stable/26954208>
- Lin, K. Y., Parnami, S., Fuhrel-Forbis, A., Anspach, R. R., Crawford, B., & De Vries, R. G. (2013). The undergraduate premedical experience in the United States: a

critical review. *International journal of medical education*, 4, 26–37.

<https://doi.org/10.5116/ijme.5103.a8d3>

Michalec, B., & Hafferty, F. W. (Accepted/In press). Examining the U.S. premed path as an example of discriminatory design & exploring the role(s) of capital. *Social Theory and Health*. <https://doi.org/10.1057/s41285-022-00175-7>

O'Mealia, M. M. (2017). *Cognitive and Non-Cognitive Influences on Pre-Health College Students' Advising Utilization* (Doctoral dissertation, Drexel University).

Ruedas, L. G. (2016). *The Minority Premedical Preparation Experience of UC Davis School of Medicine Postbaccalaureate Program Students*. University of California, Davis.