Advances in Health Sciences Education
https://doi.org/10.1007/s10459-023-10259-2

RESEARCH

Moral injury and the hidden curriculum in medical school: comparing the experiences of students underrepresented in medicine (URMs) and non-URMs

Samuel Nemiroff[1,2] · Irene Blanco[3] · William Burton[4] · Ariel Fishman[5] · Pablo Joo[6] · Mimoza Meholli[7] · Alison Karasz[8]

Received: 29 November 2022 / Accepted: 18 June 2023

Abstract
Underrepresented students in medicine (URM) have more negative perceptions of the medical school learning environment (LE), a phenomenon that can contribute to higher rates of burnout and attrition in these populations. The hidden curriculum (HC)—defined as a set of values informally conveyed to learners through clinical role-modeling—is a LE socialization construct that has been critically examined for its role in shaping students' professional identities. Yet differences in how URMs and non-URMs experience the HC remain underexplored. The study used a pragmatic approach that drew on elements of grounded theory and employed both deductive and inductive reasoning. Investigators conducted qualitative, semi-structured interviews with a purposive sample of 13 URM and 21 non-URM participants at a Bronx, NY medical school. Interviews examined student experiences and reactions to the HC. Both cohorts witnessed patient disparagement and mistreatment. However, from these encounters, URM participants expressed more *moral injury*—the adverse emotional consequence of feeling pressured to accept ideologically incongruent values. URMs were also more likely to describe resisting the HC. Differences in group reactions appeared to arise from URMs' identity resonance with patients' lived experiences. Participants across cohorts emphasized increasing URM recruitment as one step toward mitigating these circumstances. URM participants experienced more distress and offered more resistance to the HC relative to non-URMs. The etiology of these differential reactions may stem from relative barriers in negotiating personal and professional identities. As such, URMs' perceptions of the LE may be adversely impacted given their more negative interactions with the HC.

Keywords Hidden curriculum · Learning environment · Moral injury · Professional identity formation · Underrepresented in medicine

Extended author information available on the last page of the article

Introduction

The medical school learning environment (LE) plays a critical, dual role in facilitating students' education, ideally promoting trainees' wellbeing while also fostering the development of skills they need to become successful clinicians (Dyrbye et al., 2020). Yet the LE affects underrepresented minority (URM) and non-URM medical students differently, with URM students perceiving the LE more negatively than non-URM students (Hardeman et al., 2016; Orom et al., 2013; Osseo-Asare et al., 2018). This is important because unsupportive, stressful LEs have been associated with medical student burnout and attrition (Dunham et al., 2017; Hewitt et al., 2020), phenomena that disproportionately impact URM students (Chisholm et al., 2021; O'Marr et al., 2022; Tekian, 1998).

One aspect of the LE in medical schools that has received considerable attention is that of professional identity formation (PIF) (Cruess et al., 2014; Sarraf-Yazdi et al., 2021). PIF is the process by which students transform their existing personal identities via iterative socialization experiences, leading to the negotiation of a professional identity (Cruess et al., 2015) (Fig. 1). URM students may have more to negotiate in this process compared to their non-URM counterparts (Chow et al., 2018; Wyatt et al., 2020). This may be in part due to unique socialization structures with which URM students must contend, including microaggressions, stereotype threat, and racial trauma (Bullock et al., 2020; Colon-Hidalgo & McElroy, 2021; Nadal et al., 2014). The hidden curriculum (HC), another frequently referenced socialization structure, remains underexplored for its impact specifically on URMs' PIF and their consequent perceptions of the LE (Weiss et al., 2021; Wyatt et al., 2021a, b).

The HC represents the set of values that are informally conveyed from faculty and house-staff to generations of learners, often through clinical role modeling or discourse surrounding patient care. Often, these values contradict the bioethical principles taught in the formal, "declared curriculum" (Hafferty & Franks, 1994). While the HC can technically be regarded as either a positive or negative influence on PIF (Gaufberg et al., 2010), it has been mostly investigated as a negative socialization process that reduces

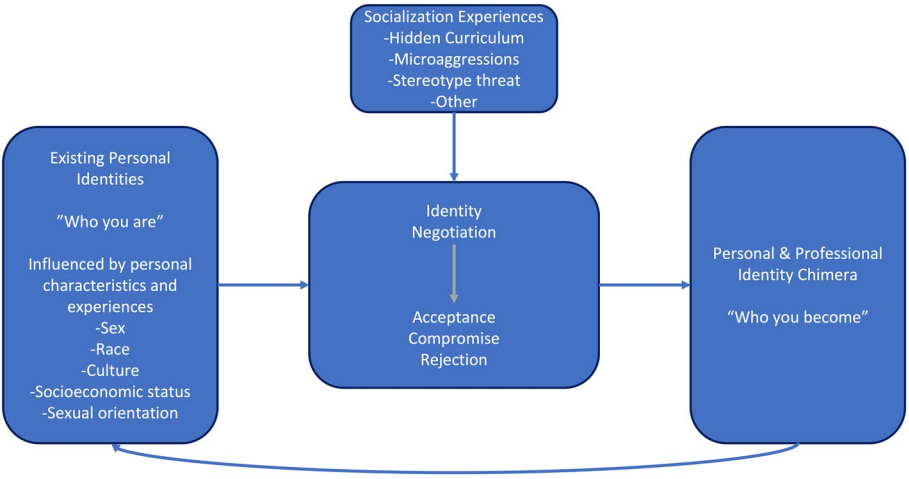

Fig. 1 Professional identity formation process in medical school adapted from Cruess et al. (2015)

empathy in students at large and ultimately obstructs the delivery of patient-centered care (Humphrey et al., 2007; White et al., 2009).

Evidence suggests that URM students may respond differently to the HC compared to non-URM students. In a study of 2016–2017 AAMC Graduation Questionnaire (GQ) responses, Weiss et al. found that URMs are more likely to perceive faculty as *negative* role models who are less respectful of diversity. The authors suggest that URMs may be more attuned to the values communicated by these faculty, and they recommended utilizing a qualitative approach to explore the impact of HC experiences on these students (Weiss et al., 2021). Such research could lead to the development of interventions that may mitigate adverse impacts on URM students and, potentially, reduce distress, burnout, and attrition.

The present study therefore aims to compare URM and non-URM experiences within the HC and explore how these experiences may impact their perceptions of the larger LE. We conducted a qualitative analysis of our institution's LE using semi-structured interviews of both URMs and non-URMs to better understand the context of students' reactions and responses to the HC and to work toward identifying targets for reform.

Methods

Setting, sample and recruitment

The study was conducted at the Albert Einstein College of Medicine in the Bronx, NY. The decision to focus on a single institution was made on pragmatic grounds: our study was a response to institutional leadership's request for data to inform ongoing LE reforms. A purposive sample of URM and non-URM participants was recruited for the study. Students were recruited via email list-servs maintained by the Office of Student Affairs and the Office of Diversity Enhancement. Interested students contacted the study team. We used students' self-identified ethnicities to assign prospective participants to one of two groups, URM or non-URM, utilizing the AAMC's definition of URM (Association of American Medical Colleges, 2004). Ultimately, this study recruited thirty-four participants, including thirteen URMs and twenty-one non-URMs. A detailed description of the sample is presented in Table 1. Participants engaged in an informed consent process. The Einstein Institutional Review Board approved the study (IRB #2019-9972).

Data collection

The senior author (AK) developed an interview guide influenced by a LE conceptual framework (Gruppen et al., 2019) and discussions with the larger research team. Questions were stratified by relevant domains of the LE, namely organizational, physical/virtual, social, and personal (Appendix). Semi-structured interviews, lasting between thirty minutes and an hour, were conducted via Zoom. Audio recordings from each session were professionally transcribed. Data was collected from Spring 2019 through Spring 2021. The senior author, an expert in qualitative research, trained all interviewers.

Table 1 Demographic description of the study sample (n = 34)

	Total (% of total)		
Gender			
Male	18 (52.9%)		
Female	15 (44.1%)		
Nonbinary	1 (2.9%)		
Mean (SD) age *in years*	26.8 (3.5)		
Race/Ethnicity (self-identifying)			
Non-URM (n = 21)			
White	15 (44.1%)		
East Asian	4 (11.8%)		
Middle Eastern	1 (2.9%)		
Multiracial (White & East Asian)	1 (2.9%)		
URM (n = 13)			
Hispanic/Latinx	6 (17.6%)		
Black	6 (17.6%)		
Multiracial (Black & Hispanic/Latinx)	1 (2.9%)		
Academic year	Total (% of total)	URM	Non-URM
MS1 & MS2 (preclinical/PC)	18 (53.0%)	7	11
MS3 & MS4 (clinical/C)	16 (47.0%)	6	10

Epistemological position

The epistemological position of our research team is best described as pragmatic (Maxcy, 2003; Tashakkori et al., 2020). We used some elements of a classic grounded theory approach: inductive reasoning to generate hypotheses regarding patterns in the data, along with systematic comparisons and a search for non-confirming cases. However, we also examined evidence for pre-existing hypotheses, based on our review of the literature and conversations among the research team.

Data analysis

In keeping with standard qualitative research approaches, data analysis began immediately, and questions were refined and incorporated into the interview guide as data collection proceeded. Transcripts were uploaded into NVivo (QSR International, Melbourne, Australia) to facilitate the coding and processing of thematic data. The senior author (AK) developed a preliminary code list. The initial code scheme, like other aspects of the analysis, included both themes derived from the literature as well as categories derived from preliminary readings of the data. The first and senior authors (SN and AK) applied codes to segments of the data, then subsequently revised the overall schema to accommodate new data segments and to eliminate codes that were capturing the same material. This iterative process continued until the coding scheme was deemed sufficiently comprehensive and parsimonious (Table 2) (Charmaz, 2008). Once a broad agreement on coding was established, the

Table 2 Codebook reference guide excerpt

Codes			Definitions	Examples
Social	Attitudes toward diversity		Refers to participant experiences with diversity in the LE	Lack of diverse role models, need to recruit more URM students
	Stereotyping & microaggressions		Refers to discourse, behaviors, mistreatment based on race/ethnicity, gender, sexual orientation	Academic disadvantages, isolation pressures
	Key relationships	Faculty-student	Refers to lecturers, clinical attendings, and administrative faculty and their interactions with students	Taking students' needs into account, receptive to feedback, availability, specific teaching styles, and unreasonable expectations
		House staff-student	Refers to interactions between directly supervising residents and medical students	Role modeling vs "passing on the bad energy"
		Student–student	Refers to interactions between medical students	Competition vs collaboration, transition to clinical years, insecurity
		Student-patient	Refers to interactions between students and patients	Respect, language barriers, empathy
		Faculty/house staff-patient	Refers to interactions between faculty or house staff and patients	Role modeling, burnout, mistreatment, assumptions
Personal	Detecting patient discourse/Treatment issues		Refers to instances where participants identify triggers to detecting HC and potential causes	Race, socioeconomic status as common triggers; perceived overwork, lack of respect/attention to patient contexts as causes
	Reacting to HC	Moral injury	Refers to instances where participants use language to describe pain, struggle with assimilating to HC norms	Betrayal, loss, guilt horror, etc. vs weird, uncomfortable
		Resistance	Refers to instances where participants refused to assimilate to HC norms	Try to address by providing extra care, reporting experiences, standing up to authority

first author (SN) coded the full data set. Coding decisions and data interpretations were discussed and reconciled in weekly meetings. Data collection continued until analysis suggested thematic saturation had been achieved (Sebele-Mpofu, 2020).

The analysis of coded data proceeded in two phases: a descriptive phase and a comparative phase. In the descriptive phase, the first and senior authors prepared a memo summarizing key themes that emerged from frequently applied codes across the whole sample, bringing focus to those that were most closely associated with the overall meaning and experience of the HC. In the comparative phase, we used the matrix function in NVivo to compare these salient HC themes between the two cohorts. From this process, we created a detailed account of group similarities and differences.

The first author (SN) then drafted the results from these analyses with guidance from AK. Other authors (IB, WB, AF, PJ, MM) engaged in critical readings and revisions to the manuscript. The full team engaged in reflexivity discussions of how their personal and professional identities might influence the interpretation of data, ensuring a diversity of perspectives would be considered. The first author (SN), as a recently graduated medical student, was familiar with the LE described in participant interviews, which shaped his perceptions and afforded the analysis a deepened understanding of the data. The senior author (AK) is a psychologist and qualitative research expert who has dedicated her professional career to evaluating programs and examining differences in cross-cultural dynamics. Her work has led her to focus on ways that culture and context shape experiences and prompted her to compare URM and non-URM perceptions of the medical school LE. Other authors (IB, PJ) previously experienced undergraduate medical learning environments through the lens of minority students in medicine, which shaped their interpretations of and reactions to emergent findings. Several authors (IB, WB, AF, PJ, MM) were able to afford the analysis insight through an administrative and educator-based lens, as they described their participation in ongoing efforts to address existing LE issues identified in the data.

Results

Analysis of participants' in-depth interview transcripts demonstrated that students across both cohorts witnessed inappropriate behaviors and discourse in delivering patient care. However, there were marked differences between URM and non-URM students' reactions to these experiences. While participants in both groups described their distress over witnessing instances of disparagement and mistreatment of patients, URM students appeared to be more viscerally affected and more likely to report efforts to resist the HC. Three core themes emerged from these insights: (1) Witnessing disparagement and mistreatment of patients; (2) Experiencing moral injury; and (3) Resisting the HC.

Witnessing disparagement and mistreatment of patients–"There was definitely a bias there"

The formal, declared curriculum emphasizes compassionate and egalitarian care for all patients (Lehmann et al., 2004). Yet participants from *both cohorts* described experiences in which patients and their communities were disparaged, lending to the development of more adversarial attitudes. One term that repeatedly arose was that of 'the Bronx special,' meaning "obese with hypertension, diabetes, and on welfare… There was occasionally some discussion, like, 'oh these people are such a drain on

the system…' There was definitely a bias there" (P3/C/non-URM). These stereotyping heuristics were one part of a larger pattern in which clinical supervisors ignored social determinants of health (SDH) that contributed to patients' frequent readmissions, whether it was "assuming that patients are (intentionally) not taking their medications when actually there's something else going on behind the scenes" (P5/C/non-URM) or "subtle fat-shaming, which [is unfair] because I've seen the kind of food desert we're in and how easily certain foods are available, especially when [patients] don't have the time, the energy, and the financial means to access good, healthy food" (P12/C/URM).

Not only did participants from both cohorts find assimilating these disparaging *attitudes* into their professional identities to be difficult, but they also struggled to accept scenarios of *mistreating* patients. For instance, one participant was shaken after seeing house staff yell at a pregnant patient who had not engaged in prenatal care: "How could you put your baby in danger [by] not taking your medications?" (P6/C/URM). Others noted that these confrontations extended beyond patients to their families, treating them as obstacles in care rather than stakeholders:

> The whole team rolled in. The resident started touching her baby – nobody said anything, nobody explained to her what was happening, and then she was like, "Hey, one person can do that and also say good morning to me, and treat me like a human, and tell me what you want to do to my fucking sick kid." Then, the attending just got super huffy and was like, "This is a teaching hospital, and if you want to be here, this is just how it is" (P7/C/Non-URM).

Participants were also disturbed when clinical decisions were seemingly biased by race during rounds, with one URM participant noting that, "some patients' pain was not taken seriously… people say that people of Black origin don't experience pain the same way or experience less pain… and that's a theme I've seen a lot for sickle-cell patients" (P6/C/URM).

Taken together, students from both cohorts noticed their superiors' dismissive attitudes and insulting behaviors toward specific patient populations. They were upset with several aspects, including how these attitudes impacted the professional socialization of their peers. For some, faculty seemed to "almost forget that we're still students there, and we're not necessarily their colleagues who share the same views" (P8/C/non-URM). Participants instead wanted their faculty to be more conscientious of student experiences and their vulnerability as learners, focusing not only on medical acumen but also on patient-centered approaches to practicing medicine:

> Professors have a lot of power in determining how students, especially those who come from very different backgrounds, begin to view their patients in the future... The knowledge we get from our textbooks and lectures doesn't give you any greater understanding of the people around you. [This knowledge] gives you an understanding of medicine, and that's it. Understanding communities comes with experience, insight, and cultural humility… so I wouldn't be surprised if I started to hear those types of comments from my peers (P2/PC/URM).

These accounts suggest that an adverse HC can make the process of PIF more painful. For students, as less powerful members of the medical education hierarchy, the perceived pressure to reconcile and accept these disrespectful encounters is problematic both for patient care and for professional development.

Experiencing moral injury–"It felt like a double-hit in the stomach"

Both non-URM and URM cohorts described distress related to their experiences with the HC. We conceptualize this distress as *moral injury*, defined as the emotional discomfort trainees experience as a result of the pressure to conform to ideologically incongruent values and behaviors that are demonstrated by superiors in a hierarchical system (Griffin et al., 2019). Yet we noted differences in expressed moral injury between the two groups. Most non-URM participants tended to use milder descriptors of their reactions to negative aspects of the HC, like feeling "uncomfortable" or "weird" when encountering such circumstances.

> If you have a fellow or attending saying these [inappropriate] things, you feel weird… it might [adversely] affect you at the end if you start bringing it up [to administrators and your preceptor finds out]. And that's why I was like, I don't know what I'm going to do right now but kind of ignore this (P9/C/Non-URM).

URM participants, on the other hand, were more likely to use visceral language to recount how these experiences impacted them, suggesting a greater level of distress (Borelli et al., 2018). They more typically used language such as "exhausted," "hit in the stomach," or "gross" when encountering such circumstances:

> I realized that something was seriously wrong with [the patient] when she was in so much pain she couldn't nurse her baby… [but] the attending said, "Well, all she's going to get is Tylenol, and that is it" and brushed me off… It felt like a double-hit in the stomach [when later I found the patient's condition had deteriorated] (P12/C/URM).

Studies of PIF suggest that identity repression and dissonance are inevitable features of the process of negotiating between personal and professional identities (Cruess et al., 2015). It follows that trainees of different racial, ethnic, cultural, and socioeconomic backgrounds may face different PIF pathways and pressures to assimilate their personal identities. As such, these identity-specific processes can lend to variable degrees of moral injury.

Participants noticed their classmates' different reactions to HC experiences. Some URM students perceived that "the majority of our classmates don't really pick up or even care about [when professors use inappropriate language to describe patients]" (P10/PC/URM), while several non-URM participants acknowledged that they were less likely to be personally impacted by experiences of the HC, compared to their peers of color:

> I'm from a privileged group… I think I've learned a lot more about different perspectives from other people because the student body is more diverse than my background is… I have classmates who have been very vocal about the disparities, both in education and in patient care as well (P13/C/non-URM).

Our URM participants described their personal connections to the communities served by the hospital, while none of our non-URM participants described such ties. For example, many URM participants grew up in the Bronx or in similar urban areas, and they compared the experiences of their family members and friends to those of their patients.

> [My clinical ward team informally] labeled one of my patients as 'crazy' because he was difficult… but this is somebody that, just by talking to him, I found out he used to work down the street from my elementary school. I found out about his sons, the story of his parents, [he showed me] his parents' pictures, and that it was

> his mother's birthday. Like, this is a human being… As somebody who is from the Bronx, I always think this could be my mother, my father, my grandmother (P12/C/URM).

Thus, deeper empathy with patients' lived experiences seemed to make encounters with the HC more painful for URM participants:

> I've felt certain comments that professors made [about patients] have made me feel uncomfortable, considering I lived in this environment for the majority of my life, and I have a strong understanding of the culture that exists in these neighborhoods that maybe [these] physicians could not acknowledge or understand (P2/PC/URM).

Resisting the HC–"I didn't want any patient to ever feel bad [again]"

URMs and non-URMs described differing approaches in how to respond to the HC. Among non-URMs, a common theme was the futility of trying to resist the HC, suggesting that "the more you go through third year, you see [patient marginalization] often enough that sometimes you feel as if you're questioning whether or not that was wrong or if that's how things have to be" (P13/C/non-URM). URM participants, on the other hand, more frequently described resisting HC messages, rejecting the integration of certain HC norms that would be too morally injurious to accept into one's professional identity. One form of this resistance included offering additional support to patients who had been mistreated by supervisors:

> She was a 40-year-old African-American woman. And [the clinical team] just "punched" her… in a sense borderline yelling at the patient. And you could see how she felt so, so, so much discomfort [during bedside rounds]… I [circled back to console her once the team left and] came to find out she was escaping a violent situation with her other three kids, was living out of some shelters before she made her way up to New York [from a Southern state] and didn't have money to afford medications (P6/C/URM).

Instead of assimilating to a professional culture where this abusive behavior was acceptable, this participant tried to effect change, bringing new information to the team that impacted the patient's care. This intervening experience was so positive that they vowed to take this approach "for every rotation afterwards. I didn't want any patient to ever feel bad [again]" (P6/C/URM).

Another URM student described how they sought to improve the care of patients by training and serving as an in-person Spanish interpreter, minimizing the degree of disconnect they had experienced in phone interpreter interactions and making sure patients' concerns were adequately considered:

> I was taught that one of the most important things is to interpret the tone of a person… how worried this person is, how distressed they are, or if they're very pleasant, and to have that come through. Because it's very easy when you don't understand a language… to write this person off as a voice on the phone. I become more protective of making sure that every single little problem gets addressed because they're not hearing that tone, they're not hearing what's more important to the patient (P12/C/URM).

This participant sought to prevent patients' concerns from being discounted in the interest of expediency, which can be a common phenomenon perpetuated by the HC (Khan & Martimianakis, 2019).

Participants from both cohorts made the case for the diversification of the medical student body and faculty.

> More students that are from underrepresented backgrounds in medicine [need to be] present. That needs to change in faculty as well – there needs to be a greater effort to recruit faculty members that look like, not only the students in the environment, [but also] represent the patients, because we can provide a greater perspective of what medicine is like for people of [diverse] backgrounds (P2/PC/URM).

Participants implied that increasing diverse voices could help the institution to weaken the influence of the adverse HC, resulting in more humane treatment for patients. While an important step, it is an incomplete solution to solely place the burden of LE improvement on those that are most negatively impacted. Additional targets must be considered in order to create a more hospitable LE for all.

Discussion

This investigation aimed to explore how URM and non-URM experiences with the HC may impact participants' perceptions of the larger LE. We found that students from both cohorts described painful experiences of observing patient disparagement and mistreatment, though these experiences impacted URM and non-URM participants differently. URM participants expressed greater moral injury from the racist and classist overtones that the HC enabled, and they were also more likely to describe efforts to resist these adverse messages.

We utilized Cruess' et al.'s PIF framework as a lens to interpret the potential etiology of participants' differential moral injury. Our data demonstrate several instances where URM participants' personal identities resonated with the lived experiences of patients under their care. Non-URM participants did not describe a similar identity resonance. We postulate that the moral injury URM participants describe could possibly arise from the degree of negotiation of personal and professional identity required among URMs (Fig. 1).

One reason it is critical to focus on reforming the medical school LE is that it is one of the earliest formative settings in the development of professional identity, where learners are introduced to the institution of medicine at the lowest level in the hierarchy of training (Vanstone & Grierson, 2022). While hierarchy can be important for maintaining patient safety, it also produces a power dynamic that pressures students to adopt adverse HC values into their professional identities (Vanstone & Grierson, 2022). Although Hafferty & Franks emphasized the HC's potent influence on students' abilities to act appropriately in scenarios of moral equipoise (Hafferty & Franks, 1994), these authors did not explore students' own perceptions of the HC or its differential impact across student populations.

Until recently, literature on US medical school LEs had largely investigated the HC and PIF aspects through an analytical lens skewed toward White, male perspectives (Volpe et al., 2019; Wyatt et al., 2021a, b), in line with the historical demographics of the medical profession (Choi et al., 2018; Lenz & Laband, 1989). Wyatt et al., by contrast, studied how aspects of the LE influence Black trainees, finding that they consistently view PIF through the lens of "racial uplift"—a phenomenon in which physicians feel unique responsibility

and connection to patients with whom they identify (Wyatt et al., 2020). While Wyatt et al. do not explicitly frame their findings in terms of the HC, their results suggest that URM students may experience and react to socialization messages differently than White students (Wyatt et al., 2020). Thus, the pressure to assimilate to the values of the HC (and of the in-group of the medical establishment) can make the process of PIF more difficult, as the constant negotiation of personal versus professional identity can exacerbate feelings of isolation, especially in the context of race/ethnicity (Osseo-Asare et al., 2018). These feelings, in turn, may serve as a barrier to entry for subsequent generations of URM trainees (Orom et al., 2013). The persistence of a LE that enables negative role modeling may further perpetuate underrepresentation in medicine, limiting the proportion of minority medical professionals that can participate in patient care.

To address the differential moral injury that URMs experience and to improve institutional culture, participants suggested two solutions: diversifying recruitment practices and targeting the HC by emphasizing empathic clinical interactions. Diversifying the student body and hospital workforce could bolster URM students' sense of support, mentorship, and belonging within the medical school community (Emery et al., 2018; Odom et al., 2007; Youmans & Suleiman, 2018), directly combatting feelings of isolation. However, it is unfair to expect that this type of intervention alone could address all systemic contributors to the adverse HC, including those that select for behaviors at the root of students' moral injury. Other organizational aspects–like workflow, time constraints, understaffing–and social aspects like lack of structural humility can affect the LE (Gruppen et al., 2019; Metzl & Hansen, 2014) and can promote HC values of efficiency over patient wellness (Kenison et al., 2017; Khan & Martimianakis, 2019). Attention should be paid toward these contributors separately on an institutional level.

Strengths and limitations

This exploratory study is the first to examine group differences in perceptions and experiences of the HC between URM and non-URM medical students using comparative, qualitative techniques. However, the sample of participants included in this investigation is not necessarily representative of our institution's student population. Students agreeing to participate were self-selecting and may have been more willing to share both stronger positive and negative insights, compared to students from the broader population. The purpose of our study, though, was to generate a richer, more nuanced understanding of student experiences than what is often possible to achieve through other methodologies such as survey analysis. To this end, the diverse experiences and perspectives within the research team also augmented our ability to interpret and understand the phenomena depicted in our data. Findings from this single institution remain to be validated in larger, multi-institution studies.

Conclusions

Both URM and non-URM students noted experiences of patient disparagement and mistreatment. URM students, in their process of PIF, may experience greater moral injury from adverse HC aspects, and they may be more motivated to respond. Efforts to diversify institutional recruits and to target other selective pressures that contribute to an adverse HC may serve as important first steps toward effectively reforming the LE.

Appendix: Interview guide

The ideal learning environment

The Learning Environment includes multiple contexts: the organizational context which refers to the timing, sequence, and organization of course material; the interpersonal context, which refers to interactions between faculty, students, and patients; the learning spaces context, which refers to both physical/geographic spaces where learning takes place as well as virtual spaces; and the personal context, which refers to building professional identity, developing autonomy, and setting professional goals.

Given this definition, what do you think makes a good (or healthy) learning environment?

Prompts:

Based on your assessment above, what aspects of Einstein's Learning Environment are working well? Not working well?

The learning environment at Einstein

Please describe your thoughts and experiences related to the overall organization of the pre-clinical curriculum.

Prompts:

- Does the sequence of courses make sense? Why or why not?
- Was there any material you felt did not receive enough attention? Why or Why not?
- Does the curriculum feel timely/outdated? Why or why not?

Now let's think about individual courses. Think about a course that you would rate very highly. What is it about that course that makes it stand out?

Prompts:

- How does it compare to a course that you would not rate highly?
- What could course directors learn from your experiences with your favorite course?

OK. Now I'd like to ask you about the clinical learning environment. What has been your experience of the learning environment on your clerkships?

- Which clerkships have the best learning environments? How/why?
- Which clerkships have the worst Learning Environments? Tell me about that.
- What makes an effective learning environment on clerkship?

How could Einstein' improve its clerkship learning environment?

Faculty interactions with students... What is your assessment overall of Faculty interactions with students?

Prompts:

- Availability, feedback and criticism, supportiveness, mentorship

- Can you tell me about one of the most positive interactions you've had with faculty?
- Negative interactions?

Student interactions with each other. What is your assessment of student interactions in general?

Prompts:

- Competitiveness—please give examples
- Mutual support—please give examples

Attitudes towards patients. Now I'd like to ask you for your assessment of attitudes and treatment of patients.

Prompts:

- To what degree do your teachers (faculty, attending and/or house staff) show appropriate respect and caring in presentations about patients? Please give examples.
- To what degree do your teachers (faculty, attending and/or house staff) show appropriate respect and caring in their interactions with patients? Please give examples.

Inappropriate language. Have you had the experience that faculty or students have made inappropriate or derogatory comments about other students, hospital staff, or patients?

- Please comment and give examples.

What the physical learning spaces that typically use?

For quiet study? Tell me about that

For group study? Tell me about that

What about lecture and classroom spaces? What are the strengths and weakness of these spaces? How would you improve them?

If you work at home, how conducive/suitable is your student housing for study? Tell me about that?

We know that students learn in different ways. In general, what is your preferred setting for learning (lectures, small groups etc.)? Why?

Tell me about how online lecture streaming first into your learning experience.

Prompts:

1. How often did you attend class in person? How did you decide which classes to attend?
   - What are the advantages of lecture streaming vs. attending in person? Is there a downside?

   Tell me
2. What about online resources? Can you comment on how helpful they were? Which ones did you use?

What are your thoughts on the physical learning environment at Einstein?

Prompts:

- Classrooms, library, and other learning spaces?

The experiences of URMs

Finally, I'd like to ask you to comment on whether you think the Learning Environment at Einstein, with its strengths and weaknesses, works equally well for all students?

We are particularly interested in understanding your thoughts on how the Learning Environment works for students from URM groups.

- Any suggestions for how the LE could be made healthier or hospitable for URM groups or other minority Groups?
- At Einstein? What could be improved?

Note: This interview guide will be reproduced in our manuscripts that will focus on other domains of the LE (i.e., organizational, physical).

Acknowledgements The authors would like to thank the participants for their openness and willingness to discuss these critical issues.

Author contributions SN drafted the main manuscript text with guidance from AK and prepared tables and figures. Other authors (IB, WB, AF, PJ, MM) engaged in critical readings and revisions to the manuscript.

Funding Support for this study was provided by the Office of Medical Education at the Albert Einstein College of Medicine (AECOM).

None of the authors have any relevant financial disclosures to report.

Declarations

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval This study received AECOM IRB approval on March 23, 2019, under ID#2019–9972.

References

Association of American Medical Colleges (2004). *Underrepresented in medicine definition*. Retrieved August 10, 2021, from https://www.aamc.org/what-we-do/equity-diversity-inclusion/underrepresented-in-medicine

Borelli, E., Crepaldi, D., Porro, C. A., & Cacciari, C. (2018). The psycholinguistic and affective structure of words conveying pain. *PLoS ONE, 13*(6), e0199658–e0199658. https://doi.org/10.1371/journal.pone.0199658

Bullock, J. L., Lockspeiser, T., del Pino-Jones, A., Richards, R., Teherani, A., & Hauer, K. E. (2020). They don't see a lot of people my color: A mixed methods study of racial/ethnic stereotype threat among medical students on core clerkships. *Academic Medicine, 95*(11S), S58–S66. https://doi.org/10.1097/acm.0000000000003628

Charmaz, K. (2008). Grounded theory as an emergent method. In S. N. Hesse-Biber & P. Leavy (Eds.), *Handbook of emergent methods* (pp. 155–172). Guilford Publications.

Chisholm, L. P., Jackson, K. R., Davidson, H. A., Churchwell, A. L., Fleming, A. E., & Drolet, B. C. (2021). Evaluation of racial microaggressions experienced during medical school training and the effect on medical student education and burnout: A validation study. *Journal of the National Medical Association, 113*(3), 310–314. https://doi.org/10.1016/j.jnma.2020.11.009

Choi, K. J., Tak, H. J., Bach, C., Trias, C., Warsi, H., Abraham, J., & Yoon, J. D. (2018). Characteristics of medical students with physician relatives: A national study. *MedEdPublish*. https://doi.org/10.15694/mep.2018.0000030.1

Chow, C. J., Byington, C. L., Olson, L. M., Ramirez, K. P. G., Zeng, S., & López, A. M. (2018). A conceptual model for understanding academic physicians' performances of identity: Findings from the University of Utah. *Academic Medicine, 93*(10), 1539–1549. https://doi.org/10.1097/acm.0000000000002298

Colon-Hidalgo, D., & McElroy, I. (2021). Racial trauma perpetuated by academic medicine to those in its ranks. *Annals of the American Thoracic Society, 18*(11), 1773–1775. https://doi.org/10.1513/AnnalsATS.202105-592IP

Cruess, R. L., Cruess, S. R., Boudreau, J. D., Snell, L., & Steinert, Y. (2014). Reframing medical education to support professional identity formation. *Academic Medicine, 89*(11), 1446–1451. https://doi.org/10.1097/acm.0000000000000427

Cruess, R. L., Cruess, S. R., Boudreau, J. D., Snell, L., & Steinert, Y. (2015). A schematic representation of the professional identity formation and socialization of medical students and residents: A guide for medical educators. *Academic Medicine, 90*(6), 718–725. https://doi.org/10.1097/acm.0000000000000700

Dunham, L., Dekhtyar, M., Gruener, G., Cichoski-Kelly, E., Deitz, J., Elliott, D., Stuber, M. L., & Skochelak, S. E. (2017). Medical student perceptions of the learning environment in medical school change as students transition to clinical training in undergraduate medical school. *Teaching and Learning in Medicine, 29*(4), 383–391. https://doi.org/10.1080/10401334.2017.1297712

Dyrbye, L. N., Lipscomb, W., & Thibault, G. (2020). Redesigning the learning environment to promote learner well-being and professional development. *Academic Medicine, 95*(5), 674–678. https://doi.org/10.1097/acm.0000000000003094

Emery, C. R., Boatright, D., & Culbreath, K. (2018). Stat! An action plan for replacing the broken system of recruitment and retention of underrepresented minorities in medicine. *NAM Perspectives*. https://doi.org/10.31478/201809a

Gaufberg, E. H., Batalden, M., Sands, R., & Bell, S. K. (2010). The hidden curriculum: What can we learn from third-year medical student narrative reflections? *Academic Medicine, 85*(11), 1709–1716. https://doi.org/10.1097/ACM.0b013e3181f57899

Griffin, B. J., Purcell, N., Burkman, K., Litz, B. T., Bryan, C. J., Schmitz, M., Villierme, C., Walsh, J., & Maguen, S. (2019). Moral injury: An integrative review. *Journal of Traumatic Stress, 32*(3), 350–362. https://doi.org/10.1002/jts.22362

Gruppen, L. D., Irby, D. M., Durning, S. J., & Maggio, L. A. (2019). Conceptualizing learning environments in the health professions. *Academic Medicine, 94*(7), 969–974. https://doi.org/10.1097/acm.0000000000002702

Hafferty, F. W., & Franks, R. (1994). The hidden curriculum, ethics teaching, and the structure of medical education. *Academic Medicine, 69*(11), 861–871. https://doi.org/10.1097/00001888-199411000-00001

Hardeman, R. R., Przedworski, J. M., Burke, S., Burgess, D. J., Perry, S., Phelan, S., Dovidio, J. F., & van Ryn, M. (2016). Association between perceived medical school diversity climate and change in depressive symptoms among medical students: A report from the medical student CHANGE Study. *Journal of the National Medical Association, 108*(4), 225–235. https://doi.org/10.1016/j.jnma.2016.08.005

Hewitt, D. B., Ellis, R. J., Hu, Y.-Y., Cheung, E. O., Moskowitz, J. T., Agarwal, G., & Bilimoria, K. Y. (2020). Evaluating the association of multiple burnout definitions and thresholds with prevalence and outcomes. *JAMA Surgery, 155*(11), 1043–1049. https://doi.org/10.1001/jamasurg.2020.3351

Humphrey, H. J., Smith, K., Reddy, S., Scott, D., Madara, J. L., & Arora, V. M. (2007). Promoting an environment of professionalism: The University of Chicago "Roadmap." *Academic Medicine, 82*(11), 1098–1107. https://doi.org/10.1097/01.ACM.0000285344.10311.a8

Kenison, T. C., Madu, A., Krupat, E., Ticona, L., Vargas, I. M., & Green, A. R. (2017). Through the veil of language: Exploring the hidden curriculum for the care of patients with limited english proficiency. *Academic Medicine, 92*(1), 92–100. https://doi.org/10.1097/acm.0000000000001211

Khan, R., & Martimianakis, M. A. (2019). Empathy, burnout, and the hidden curriculum in medical training. In A. E. Foster & Z. S. Yaseen (Eds.), *Teaching empathy in healthcare: Building a new core competency* (pp. 239–250). Springer. https://doi.org/10.1007/978-3-030-29876-0_15

Lehmann, L. S., Kasoff, W. S., Koch, P., & Federman, D. D. (2004). A survey of medical ethics education at US and Canadian medical schools. *Academic Medicine, 79*(7), 682–689. https://doi.org/10.1097/00001888-200407000-00015

Lenz, B., & Laband, D. (1989). Why so many children of doctors become doctors. *Journal of Human Resources, 24*(3), 396–413. https://doi.org/10.2307/145820

Maxcy, S. J. (2003). Pragmatic threads in mixed methods research in the social sciences: The search for multiple modes of inquiry and the end of the philosophy of formalism. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of mixed methods in social and behavioral research* (pp. 51–89). SAGE Publications.

Metzl, J. M., & Hansen, H. (2014). Structural competency: Theorizing a new medical engagement with stigma and inequality. *Social Science & Medicine, 103*, 126–133. https://doi.org/10.1016/j.socscimed.2013.06.032

Nadal, K., Wong, Y., Griffin, K., Davidoff, K., & Sriken, J. (2014). The adverse impact of racial microaggressions on college students' self-esteem. *Journal of College Student Development, 55*, 461–474. https://doi.org/10.1353/csd.2014.0051

O'Marr, J. M., Chan, S. M., Crawford, L., Wong, A. H., Samuels, E., & Boatright, D. (2022). Perceptions on burnout and the medical school learning environment of medical students who are underrepresented in medicine. *JAMA Network Open, 5*(2), e220115–e220115. https://doi.org/10.1001/jamanetworkopen.2022.0115

Odom, K. L., Roberts, L. M., Johnson, R. L., & Cooper, L. A. (2007). Exploring obstacles to and opportunities for professional success among ethnic minority medical students. *Academic Medicine, 82*(2), 146–153. https://doi.org/10.1097/ACM.0b013e31802d8f2c

Orom, H., Semalulu, T., & Underwood, W. I. (2013). The social and learning environments experienced by underrepresented minority medical students: A narrative review. *Academic Medicine, 88*(11), 1765–1777. https://doi.org/10.1097/ACM.0b013e3182a7a3af

Osseo-Asare, A., Balasuriya, L., Huot, S. J., Keene, D., Berg, D., Nunez-Smith, M., Genao, I., Latimore, D., & Boatright, D. (2018). Minority resident physicians' views on the role of race/ethnicity in their training experiences in the workplace. *JAMA Network Open, 1*(5), e182723–e182723. https://doi.org/10.1001/jamanetworkopen.2018.2723

Sarraf-Yazdi, S., Teo, Y. N., How, A. E. H., Teo, Y. H., Goh, S., Kow, C. S., Lam, W. Y., Wong, R. S. M., Ghazali, H. Z. B., & Lauw, S.-K. (2021). A scoping review of professional identity formation in undergraduate medical education. *Journal of General Internal Medicine, 36*(11), 3511–3521. https://doi.org/10.1007/s11606-021-07024-9

Sebele-Mpofu, F. Y. (2020). Saturation controversy in qualitative research: Complexities and underlying assumptions A literature review. *Cogent Social Sciences, 6*(1), 1838706. https://doi.org/10.1080/23311886.2020.1838706

Tashakkori, A., Johnson, R. B., & Teddlie, C. (2020). Philosophical foundations of mixed methods research. *Foundations of mixed methods research Integrating quantitative and qualitative approaches in the social and behavioral sciences* (2nd ed., pp. 57–80). Sage Publications.

Tekian, A. (1998). Attrition rates of underrepresented minority students at the University of Illinois at Chicago College of Medicine, 1993–1997. *Academic Medicine, 73*(3), 336–338. https://doi.org/10.1097/00001888-199803000-00024

Vanstone, M., & Grierson, L. (2022). Thinking about social power and hierarchy in medical education. *Medical Education, 56*(1), 91–97. https://doi.org/10.1111/medu.14659

Volpe, R. L., Hopkins, M., Haidet, P., Wolpaw, D. R., & Adams, N. E. (2019). Is research on professional identity formation biased? Early insights from a scoping review and metasynthesis. *Medical Education, 53*(2), 119–132. https://doi.org/10.1111/medu.13781

Weiss, J., Balasuriya, L., Cramer, L. D., Nunez-Smith, M., Genao, I., Gonzalez-Colaso, R., Wong, A. H., Samuels, E. A., Latimore, D., Boatright, D., & Sharifi, M. (2021). Medical students' demographic characteristics and their perceptions of faculty role modeling of respect for diversity. *JAMA Network Open, 4*(6), e2112795–e2112795. https://doi.org/10.1001/jamanetworkopen.2021.12795

White, C. B., Kumagai, A. K., Ross, P. T., & Fantone, J. C. (2009). A qualitative exploration of how the conflict between the formal and informal curriculum influences student values and behaviors. *Academic Medicine, 84*(5), 597–603. https://doi.org/10.1097/ACM.0b013e31819fba36

Wyatt, T. R., Balmer, D., Rockich-Winston, N., Chow, C. J., Richards, J., & Zaidi, Z. (2021a). 'Whispers and shadows': A critical review of the professional identity literature with respect to minority physicians. *Medical Education, 55*(2), 148–158. https://doi.org/10.1111/medu.14295

Wyatt, T. R., Rockich-Winston, N., Taylor, T. R., & White, D. (2020). What does context have to do with anything? A study of professional identity formation in physician-trainees considered underrepresented in medicine. *Academic Medicine, 95*(10), 1587–1593. https://doi.org/10.1097/acm.0000000000003192

Wyatt, T. R., Rockich-Winston, N., White, D., & Taylor, T. R. (2021). "Changing the narrative": A study on professional identity formation among Black/African American physicians in the US. *Advances in Health Sciences Education, 26*(1), 183–198. https://doi.org/10.1007/s10459-020-09978-7

Youmans, Q., & Suleiman, L. (2018). Finding focus: Recruiting and supporting underrepresented minority trainees starts with faculty. *Academic Medicine, 93*(4), 523. https://doi.org/10.1097/ACM.0000000000002134

Authors and Affiliations

Samuel Nemiroff[1,2] · Irene Blanco[3] · William Burton[4] · Ariel Fishman[5] · Pablo Joo[6] · Mimoza Meholli[7] · Alison Karasz[8]

✉ Samuel Nemiroff
samuel.nemiroff@gmail.com

1 Albert Einstein College of Medicine, New York City, NY, USA

2 Mount Sinai Morningside-West, New York City, USA

3 Medicine-Rheumatology, Clinical Research Ethics & Equity Consultative Service (CREEC), Northwestern University, Chicago, IL, USA

4 Assessment, Evaluation and Quality Improvement in the Office of Medical Education, Albert Einstein College of Medicine, Bronx, NY, USA

5 Department of Epidemiology & Population Health, Albert Einstein College of Medicine, Bronx, NY, USA

6 Department of Family Medicine, University of California, Riverside, CA, USA

7 Department of Medicine, Albert Einstein College of Medicine, Bronx, NY, USA

8 Department of Family Medicine and Community Health, Chan Medical School, University of Massachusetts, Worcester, MA, USA