Title

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Journal

Open Forum Infectious Diseases, 7(10)

ISSN

2328-8957

Authors

Vijayan, Tara
Cortés-Penfield, Nicolás
Harris, Christina

Publication Date

2020-10-01

DOI

10.1093/ofid/ofaa458

Peer reviewed

Open Forum Infectious Diseases

PERSPECTIVES

Tuskegee as a History Lesson, Tuskegee as Metaphor: Addressing Discrimination as a Social Determinant of Health in the Classroom

Tara Vijayan,[1] Nicolás Cortés-Penfield,[2] and Christina Harris[3]

[1]Division of Infectious Diseases, David Geffen School of Medicine, University of California, Los Angeles, Los Angeles, California, USA, [2]Division of Infectious Diseases, Department of Internal Medicine, University of Nebraska Medical Center, Omaha, Nebraska, USA, and [3]Department of Internal Medicine, VA Greater Los Angeles Healthcare System, David Geffen School of Medicine, University of California, Los Angeles, Los Angeles, California, USA

While basic science and social medicine are fundamental to the practice of medicine, the former is often prioritized in preclinical medical education at the expense of the latter. In this perspective, we discuss ways to introduce the concept of interpersonal, institutional, and structural discrimination as social determinants of health (SDOH) into a preclinical microbiology and infectious diseases medical course. We offer 5 specific steps to creating a comprehensive curriculum on discrimination as a social determinant of health: define and use standardized terminology; integrate the concept of SDOH throughout the course; encourage critical appraisal of lay and medical resources; encourage student feedback; and provide faculty development supported by key faculty stakeholders that focuses on increasing comfort and facility with teaching such concepts. This approach offers a template for ongoing discussion in the setting of curricular reform.

Keywords. discrimination; social determinants of health; undergraduate medical education.

"TELL US MORE"

The topic was syphilis. The speaker briefly mentioned the Tuskegee experiments as the impetus for developing a procedure for informed consent, never using the words race, racism, or Black men. The remainder of the 50-minute lecture was spent covering the complex pathophysiology of spirochetes and one of the great masqueraders in medicine.

But our students made it clear that this discussion was insufficient. They wanted to learn more about the roles health inequity and racism played in the decades of the Tuskegee Syphilis Study, wherein penicillin was withheld from hundreds of Black men with syphilis. We responded by offering several modern and historical references regarding that notorious stain in our nation's and our profession's history. The students contributed to their own education by airing a PBS documentary on the subject. That was the easy part. What we found more difficult to communicate was how discrimination past and present affects patients today and how Tuskegee, as an exemplar of racism in modern medicine, continues to re-emerge as a concept time and time again.

An ideal infectious diseases curriculum should seamlessly involve discussions on how discrimination contributes to ongoing health inequities in patients with infections. African American men who have sex with men account for 42% of new HIV infections yearly [1], but only 10% of users of pre-exposure prophylaxis (PrEP) to prevent HIV [2]. Patients suffering from substance use disorders complicated by endocarditis face surgeons reluctant to operate and health care systems reluctant to address the social discord that underlies their disease, including cycles of poverty, abuse, discrimination, and stigma [3]. The severe acute respiratory syndrome coronavirus 2 pandemic has disproportionately affected African American, Hispanic, and indigenous men and women, who suffer mortality rates as much as twice those of other ethnic groups in the United States, laying bare disparities in who can afford to physically distance and who can access care [4].

Such patients live on the literal and figurative margins, isolated by geography, financial constraints, discrimination, and stigma. This is no more evident than in cities like Los Angeles, where neighborhoods, carved out by freeways, define the gap between the haves and the have nots [5]. Our patients' experiences with discrimination at all levels (interpersonal, institutional, and structural) impact their interactions with the medical community and limit their access to care. Tuskegee echoes in the day-to-day instances of discrimination that persist in modern health care [6].

Received 23 July 2020; editorial decision 17 September 2020; accepted 23 September 2020.

Correspondence: Tara Vijayan, MD, MPH, University of California, Los Angeles David Geffen School of Medicine, CHS 52-215, 10833 Le Conte Ave, Los Angeles, CA 90095 (tvijayan@mednet.ucla.edu).

Open Forum Infectious Diseases®

DOI: 10.1093/ofid/ofaa458

How do we discuss this in the classroom? In 2016, 15 years after the Institute of Medicine recognized the salience of health equity in improving the quality of health care, the American Association of Medical Colleges published their own treatise on ensuring that medical education addresses the social determinants of health (SDOH) [7]. The implementation of such a curriculum, specifically focusing on the impact of discrimination, has proven a formidable task. The Centers for Disease Control and Prevention outlines 5 key areas within SDOH: Economic Stability, Education, Social and Community Context, Health and Health Care, Neighborhood and Built Environment. While discrimination is specifically listed under "Social and Community Context," it transects each of these categories and functions as an effect modifier for many health outcomes (Table 1) [8].

We propose 5 simple but critical components to developing a preclinical microbiology and infectious diseases curriculum that address the impact of interpersonal, institutional, and structural discrimination on health inequities (Supplementary Table 1):

1. Define and use standardized terminology such as racism and homophobia.
2. Integrate the concept of discrimination as an SDOH throughout the course.
3. Encourage critical appraisal of lay and medical resources pertaining to discrimination as an SDOH.
4. Encourage student evaluation and assessment in curricular design.
5. Ensure ongoing faculty development, supported by key faculty stakeholders, in improving communication and comfort while teaching about discrimination and its impacts.

Our proposal stems in part from our informal adaptation of Kern's 6-step model for curriculum development [9]. We have engaged in an ongoing needs assessment, buoyed in part by the need for a greater curriculum redesign. We continue to develop educational strategies for implementation, soliciting learner and educator feedback throughout. While experts agree on quantity, content, and integration throughout undergraduate medical education, few have described a concrete approach [10].

USING AND STANDARDIZING DEFINED TERMS

Effectively teaching about the impact of discrimination on health requires a basic understanding of the relevant terms. We use the following definitions of intrapersonal, institutional, and structural discrimination proposed by the Applied Research Center for the American Civil Liberties Union [11]. In our rendering of these definitions, we have replaced the original term "bias" with "discrimination" because the latter centers on actions that create and propagate health inequities. We define social determinants of health as the social and material conditions in which people live that impact their health, noting that these conditions are often society-level consequences of marginalization and discrimination.

Interpersonal discrimination, including racism, occurs between individuals and includes overt prejudice (such as use of racial slurs) and microaggressions (indirect or subtle slights or snubs that communicate hostile or derogatory intent to a marginalized group). Stigmatization based on cultural norms (eg, discrimination based on body weight, professional appearance, or other aspects of normative beauty) also falls in this category.

Institutional discrimination includes intra and interinstitutional policies and practices that have inequitable impacts based on race, gender, sexuality, disability, and other forms of marginalization. Racial disparities in the United States prison system offer a clear example: In 2018, African Americans accounted for 32% of the prison population but only 13% of the general US population, with rates of incarceration nearly 7 times as high as White Americans [12]. This disparity is the direct result of racial discrimination in policing and sentencing, including differential rates of arrest for nonviolent crimes such as drug possession and racial disparities in rates of imprisonment and referral for drug treatment programs [13]. Disparities in incarceration rates remain an equally salient part of the ongoing racial disparities seen in coronavirus disease 2019 (COVID-19) [14].

Structural discrimination occurs across society and systematically privileges certain groups of people over others in ways that affect health outcomes. For example, in June 2020, the Supreme

Table 1. Key Areas of Social Determinants of Health and Discrimination as an Effect Modifier

Key Area of SDOH [25]	Example of Discrimination as an Effect Modifier
Economic stability	More Black and Hispanic men and women are in the service industry and rely on public transportation, increasing their risk for exposure to COVID-19 [4].
Education	Literacy impairs self-efficacy when it comes to access and utilization of health care, particularly with HIV [32].
Social and community context	Rates of incarceration are 7 times as high for Black Americans as for White Americans,, despite the fact that Blacks constitute 12% of the population [12]. Infections such as COVID-19 have disproportionally affected Black men who are imprisoned [14].
Health and health care	Black men who have sex with men constitute 10% of those prescribed pre-exposure prophylaxis to prevent HIV infection, but account for 42% of new diagnoses of HIV [2].
Neighborhood and built environment	Rates of chlamydia are higher in areas with higher rates of incarceration [33].

Abbreviations: COVID-19, coronavirus disease 2019; SDOH, social determinants of health.

Court voted in favor of acknowledging that the 1964 Civil Rights Act, which prevented job discrimination on the basis of sex, also applies to sexual orientation and gender identity. Prior to this, 18 states did not have any legislation offering protection. Transgender individuals, a population that is disproportionately affected by HIV and many adverse health outcomes [15], are 10 times more likely to have annual household incomes below $10 000 compared with cisgender individuals, and nearly 30% were living in poverty as of 2019, in part the result of longstanding lack of workplace discrimination protections and lack of a livable minimum wage in the United States [16].

INTEGRATING THE CONCEPT OF SDOH THROUGHOUT THE MICROBIOLOGY COURSE

Basic science and social medicine are fundamental to the clinical practice of medicine. These 2 disciplines are integral in developing a full understanding of our patients' health and disease but are often mistakenly siloed in the preclinical curriculum. We tacitly acknowledge racism and homophobia in sessions on bedside manner, when our students practice the interpersonal skills they need to fully embrace their roles as doctors, yet these words are rarely used in the medical literature or the lecture hall [17]. In teaching epidemiology, we pay much attention to calculating diagnostic parameters and little to the specific factors contributing to medicine's statistics. In recent months, we have been overwhelmed with data showing that Black, Hispanic, and indigenous Americans are disproportionately affected by the COVID-19 pandemic [4]. Yet few academic medical scholars publishing these numbers manage to connect them to the abundant historical factors that explain them (eg, redlining and segregation of housing, job discrimination, access to health care, lack of social mobility, multigenerational homes, food insecurity resulting in predisposing factors such as obesity and cardiovascular disease) [18]. This scholastic failure has left room for some individuals to push theories about genetic susceptibility and race-based science to explain disparities in the COVID-19 epidemic rather than confront the racism at their source [19].

Our goal in the microbiology and infectious disease portions of the preclinical curriculum is to ensure that our students have the fundamental knowledge and basic tools they need to enter clinical rotations. But it has become increasingly impossible to comprehensively teach our students medicine's expanding bodies of knowledge, and this is no more salient than it is in microbiology. As Carl Stevens wrote in 2018, "We have reached a point in curriculum reform when we must begin to take trade-offs seriously.... A broad range of stakeholders, including ourselves as the future patients of our current students, are counting on those who control the curriculum to choose wisely" [20].

We suggest that concepts and clinical reasoning skills be emphasized over minutiae such as specific culture media for the identification of select bacteria or which antibiotic inhibits the 30s or 50s subunit of the ribosome. We expect that the minutiae can be learned on one's own (and often are with memorization tools or even Google). We do note that certain tools, unless provided in financial aid packages, may exacerbate disparities among our learners. Teaching clinical reasoning skills, however, must include nuanced discussions on how SDOH inform epidemiology. Illness scripts are a valuable tool for facilitating trainees' clinical reasoning process and diagnostic cognitive development [21]. However, using race as an epidemiologic category within the illness script framework perpetuates medicine's vestigial non-evidenced-based race science and can result in inappropriate anchoring. Early education about both the necessity and the limitations of script formation is important to counter cognitive biases that contribute to discriminatory medical practice. A robust discussion of the epidemiology of infectious diseases must include an evidence-based appraisal of the local and national policies that have helped mediate the spread of infections (eg, differential access to health care, inability for certain marginalized groups to socially distance during the 2020 pandemic, the criminalization of HIV, reluctance to implement needle exchange programs and other harm reduction policies). Advocating for health care policy that is rooted in science rather than ideological motivations is an important way that our students can care for their communities.

Lastly, it is imperative to address the current challenges and limitations of our preclinical curriculum assessment methods (ie, multiple-choice questions) and their risk of re-enforcing race- and heteronormative-based illness scripts [22]. We suggest reviewing current lecture materials and test questions and removing those that promote pseudoscientific racialized medicine as an easy, important start. However, curriculum designers should also consider implementing methods that assess students' understanding of health inequity and ability to integrate this understanding into practice. One approach might be to shift a portion of exams to include open-ended questions [23], allowing a more granular assessment of how well students can identify patients whose disease processes have been impacted by discrimination and other social determinants of health and offer mitigation strategies. Another approach might be to develop standardized patient encounters that focus not only on the trainee's ability to communicate a clinical impression and plan, but their ability to navigate barriers to care based in SDOH such as low heath literacy and mistrust of the health care providers based on historical discrimination and/or prior negative personal medical experiences.

DEMONSTRATE CRITICAL APPRAISAL OF ALL LITERATURE SOURCES

We live in a time when information is in abundance and available instantly.

Effectively teaching concepts in SDOH requires an open dialogue and a critical appraisal of the sources we use to understand medicine and history. Narrative misunderstandings and incomplete and uncritically accepted histories exist in medical education. News headlines and social media influencers profile the challenges of recruiting Black participants in COVID-19 vaccine trials due to mistrust [24]. All students, whether they come from a minority or majority group, are at risk of absorbing harmful narratives that may encourage medical discrimination in their future practice. This is the reality that is well described in Ibram Kendi's *How to Be an Antiracist* [25]. In reaction, our curricula and our students should empathically explore the "whys," naming and explaining how real historical precedents of Black Americans' medical victimization, such as Tuskegee and the nonconsensual use of Henrietta Lack's bodily tissues for decades of medical research, inform many Black Americans' guarded attitudes toward medical research.

Similarly, medical hypotheses that skim or avoid altogether the complexities of SDOH, particularly those perpetuating unscientific conceptions of biological race, are as deserving of critique in evidence-based medicine curricula as intense dissections of statistical validity [19]. Research that fails to recognize and address the many already well-known disparities contributing to these groups' vulnerability (ie, poverty, poorer access to and discrimination while receiving health care, higher rates of employment in high-risk "essential personnel" roles with limited access to personal protective equipment) deserves to appear in the preclinical curricula solely as objects of critique.

In this era of propagandized sound bites and quickly retracted research articles, it is more imperative than ever that as educators we ensure that all our sources, lay and medical, are transparent and verified, that we critically appraise the medical and lay literature, and that we demonstrate the process of critical appraisal as we teach that material to our students.

INCORPORATE STUDENT INPUT IN CURRICULAR DESIGN

Students from all backgrounds increasingly recognize the social inequities faced by various marginalized communities. The ubiquity of social media and smartphones has created a generation that continues to bear witness to the ongoing inequalities that permeate our society. They hear recordings of individuals at the highest levels of power making racist statements. They watch videos of unarmed Black men killed by police officers while other officers stand by and watch. As a result, our students are outpacing us in ways many might have never imagined: They are demanding to hear more complete narratives early in their education, narratives that many of them own on a deeply personal level. Watching the Tuskegee documentary has become an important part of our curricular design. At a screening of a documentary on the Tuskegee Syphilis Study, one student poignantly remarked that listening to one of the victims was like watching her grandfather speak. We must not blind ourselves to the experiences of our students and allow them to engage us in a process of critical thinking, just as we engage them.

Finally, curriculum coordinators should find ways to remunerate medical students for the time and effort they invest in reforming the curricula for future classes. Just as diverting responsibility for relatively undervalued diversity efforts to minority junior faculty members effectively imposes a "minority tax" that may hinder their development [26], medical educators should not be willing to sacrifice the success of their marginalized students to develop more critical and self-reflective coursework. Appropriate compensation might include elective credit, a work-study position, an institutional award for service to the school, direct mentorship and letters of recommendation describing the student's contribution, or other incentives.

ENSURE FACULTY DEVELOPMENT

The critical roles of clinician educators in undergraduate medical education have resulted in an emerging need for continuous faculty development in a variety subject areas, specifically SDOH. While many faculty understand the impact of discrimination on health equity, few feel empowered to teach such concepts formally as evidenced by our example above. Consequently, faculty development to ensure a consistent use of the definitions and an understanding of how to appraise the medical and lay literature is of utmost importance. One-off or even annual seminars are insufficient; rather, there should be ongoing dialogue and a process of structured feedback that will enable our faculty to succeed in the best way possible. Considering a majority tax, as suggested by Dr. Michael Mensah, would force those who are privileged by a long history of White supremacy to learn "the science debunking race-based medicine in order to diagnose racism in [their] own practice" [26].

Faculty development in this area remains a fairly novel concept in medical education, but groups such as the Beyond Flexner Alliance and the Group on Diversity and Inclusion within the American Association of Medical Colleges are developing resources and lecture series in this area [27, 28].

Finally, faculty committed to creating a preclinical infectious disease curriculum that teaches medical students to recognize and overcome discrimination long baked into our society's institutions of power should not be surprised to face opposition from their colleagues. Additionally, these reforms swim against educational currents that separate the social and "hard" sciences. Any equation of social and medical ills may be cast

as "ideologically motivated" and hence have no place within the medical school lecture hall [29]. Making and sustaining meaningful curricular reform requires support from leadership and ideally a senior and well-liked faculty "champion" or champions who can promote acceptance of and support for these changes.

CONCLUSIONS

As Stephen Woolf once eloquently wrote, "Poverty matters as much as proteomics in understanding disease" [30]. Understanding social determinants of health is critical to providing competent care to marginalized patients, and a formal curriculum on the impact of discrimination on health equity should not be compartmentalized from traditional systems-based topics in the preclinical curriculum.

At the David Geffen School of Medicine, we have already begun auditing our existing preclinical curriculum with the help of select students, highlighting specific gaps in each of our systems-based courses. Each course chair has been given a list of concepts that should be integrated into their own curriculum. While this is currently recognized as a leadership role for the participating students, we are continuing to explore how to support them in this role in other ways. Furthermore, our institution has created a funded antiracism and health equity thread chair faculty position to systematically implement and integrate a curriculum that is not limited to lecture but to active participation with accountability. This chair will also be responsible for ongoing faculty development in this area.

It is imperative that each of us, as educators, use specific terms, such as racism and homophobia, to begin to open the dialogue about how these difficult-to-measure factors play an integral role in the health of our patients. We should promote ongoing research and critical appraisal of the literature on how these social determinants impact access to care and health outcomes. When tackling SDOH in medical education, our colleagues from other countries have noted that "awareness is not the same as action" [31]. Our curriculum must not render these upstream factors immutable, lest we condone inaction, codifying the injustices we witness as outside the purview of the physician's duties. We must ensure that our students master the art of medicine, reflecting on their own biases, and continue to advocate for their patients inside and outside the clinic and hospital settings.

While the path to bridging inequities in medicine is formidable, in many ways we, and particularly our students, are already primed for this task. Many of us are drawn to this profession because we are curious, and with curiosity comes empathy and the potential to bridge the equity gap. As educators, scientists, and physicians, we are united in our common goal to learn about and understand our patients and, most important, to give voice to their hidden stories, the Tuskegees of the here and the now.

Supplementary Data

Supplementary materials are available at *Open Forum Infectious Diseases* online. Consisting of data provided by the authors to benefit the reader, the posted materials are not copyedited and are the sole responsibility of the authors, so questions or comments should be addressed to the corresponding author.

Acknowledgments

Author contributions. The authors listed have contributed sufficiently to the project to be included as authors, and all those who are qualified to be authors are listed in the author byline.

Financial support. This work received support from the University of California, Los Angeles (UCLA), Department of Medicine Office of Equity, Diversity, and Inclusion.

Potential conflicts of interest. To the best of our knowledge, no conflicts of interest, financial or other, exist. All authors: no reported conflicts of interest. All authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Conflicts that the editors consider relevant to the content of the manuscript have been disclosed.

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