MEDICAL SOCIALIZATION & ITS DISCONTENTS:
Heteronormativity in US Medical Schools & Its Impact on Student Psychological Distress

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1. Background

INTRODUCTION

In 2018, over twenty thousand individuals matriculated in one of 143 allopathic medical schools in the United States.[1] They all shared the same goal of becoming medical doctors, members of one the most prestigious, influential, and potentially lucrative professions in North America. However, in order to be recognized as legitimate members of the profession, future medical doctors must undergo intense training over the course of four years of medical school and three to five years of residency training.

Medical school has long been recognized as a stressful time in the lives of future medical professionals. Medical students experience high rates of depression and anxiety,[2,3] often in excess of distress levels reported by their peers in the general population.[4,5] Psychological distress, such as burnout and depression, can have negative professional and personal repercussions for medical students, including impaired academic performance and higher risk of dropping out of medical school, as well as increased risk of substance use and suicidal ideation.[6–9] Psychological distress can also lead to lower empathy, less altruistic professional values, and unprofessional conduct, impacting the quality and patient-centeredness of care provided by these future physicians.[6]

Recognizing the significant implications of psychological distress, both for medical professionals themselves and for their effective practice of medicine, medical schools have sought to transform their educational programs. Unfortunately, these efforts have been hampered by medical schools' unwillingness to confront the continued

marginalization of students who do not fit the normative "mold" of what it means to be a medical doctor.

Specifically, as part of their medical training, non-medical novices undergo a process of medical socialization, i.e., the assimilation of professional attitudes, beliefs, values, and norms. However, what has often remained without adequate critique is the standard to which medical students are being socialized: what exactly is the culture of medicine that socialization seeks to reproduce? Indeed, it could be argued that the pressure to produce a uniform "kind" of physician has increased in recent years as a result of growing professional hand-wringing about medical practice variability, and an increasing focus on care standardization.[10,11] These discourses of standardization strive for homogeneity and fundamental sameness, conveying a message that there is only "a single uniform way of being a competent, professional physician."[11]

Problematically, much like medicine itself, the standard to which medical students are being socialized has been interpreted as neutral, devoid of culture, "dispassionate, abstract, and objective."[12,13] However, social institutions, including those of medical education, do not manifest an objective reality, but are instead socially constructed, and therefore possess a history and a culture.[14] Thus, the professed neutrality of medicine renders invisible and ignorable the white, male, heterosexual, and upper/middle class cultural standards that underlie medical education.[15–17]

The critical corollary of socialization to the standards of the dominant social groups is that non-normative group membership is construed as antithetical to the medical profession. As a result, medical socialization demands that members of formerly excluded groups, those who do not fit the "mold" of a normative physician, conform to

"standards and norms that are supposedly neutral and universal, but in fact are socially and culturally specific."[13] As a result, medical schools inadvertently (and sometimes intentionally) reproduce broader social power hierarchies and social stratification. This leads to the marginalization of students on the basis of their identities, experiences, characteristics, and other categories of difference.[17–22]

While a number of scholars have acknowledged and problematized the normative standards that are pervasive throughout medical education,[18,20,23,24] much of the cultural reproduction implicit within medical socialization has yet to be uncovered and destabilized. However, unlike the overt pathologizing and criminalization of non-heterosexual identities and behaviors of the past century, modern medical institutions re(produce) heteronormativity through more covert social processes. Therefore, in this dissertation, I set out to uncover and critically evaluate medical socialization's reproduction of heteronormativity, a dominant cultural standard that privileges those who conform to the heterosexual norm, while marginalizing those who depart from it by virtue of their identities, behaviors, or characteristics.

Given the lack of studies evaluating the prevalence of heteronormativity within medical socialization, it is unsurprising that there is a corresponding dearth of studies that have examined the consequences of heteronormative marginalization on the health and well-being of medical students, particularly those whose identity, behaviors, and/or relationships differ from normative heterosexuality. While this is unsurprising of work conducted in decades past when the medical profession was highly homogeneous,[13] the medical field has undergone a dramatic demographic shift and is no longer the profession of white, (outwardly) straight men. To wit, half of students currently enrolled in US

medical school are women, a third are people of color, and one in twenty identify as a sexual minority.[25,26] The continued scarcity of research on the unique medical school experiences of diverse students is therefore glaring.

STRUCTURE OF THE DISSERTATION

In this dissertation I seek to fill these gaps in current knowledge by uncovering the heteronormative cultural standard embedded within medical socialization and by evaluating its impact on students' psychological distress. I accomplish this, I first engage with over six decades of scholarly work on medical socialization, discuss the strengths and limitations of its dominant conceptualizations, and arrive at a definition that establishes conceptual space within which it becomes possible to center the experiences and voices of those on the margins. I then draw on education theory to provide a framework through which I operationalize the medical socialization processes and apply it to the empirical literature to identify specific medical socialization factors that result in the marginalization of medical students.

I then briefly review the literature on the mental health of medical students overall, sexual minority people in the general population, and sexual minority medical students in particular. I draw on minority stress theory, as developed by Meyer and expanded upon by Hatzenbuehler,[27,28] as a potential mechanism through which the particular socializing processes of medical education may lead to psychological distress among medical students.

Next, I present the findings of three studies that I conducted to empirically evaluate my arguments that heteronormativity is pervasive within medical socialization,

that it marginalizes sexual minority medical students, and that it has negative repercussions on students' psychological well-being. The first is a previously published study[26] that evaluated the psychological distress of sexual minority medical students relative to their heterosexual peers as they commenced medical education. The second study examines the prevalence of heteronormative socialization as reported by the largest longitudinal cohort of medical students to date, and evaluates the impact of these exposures on students' psychological distress. In the third study I triangulate quantitative and qualitative methods to conduct an in-depth investigation of the extent of heteronormativity within medical education by centering the voices of sexual minority students themselves.

KEY TERMS

Sexual minority and the alphabet soup of sexual minority identities

Like all socially constructed categories of difference, groups differentiated on the basis of sexual orientation seem at once both obvious and complex. Sexual orientation is not a unidimensional personal characteristic, but a multidimensional construct that encompasses an individual's sexual identity, sexual behaviors, sexual attractions, romantic relationships, and/or social identities. While related, these dimensions are not equivalent and may not align in predictable patterns.[29,30]

While all individuals who depart from dominant heterosexual norms in identity, behavior, or attraction can be described as sexual minority people, in this dissertation, I focus on sexual minority people defined along the axis of a single dimension: sexual identity. Specifically, I use the term *sexual minority* to designate individuals who

describe themselves as anything other than heterosexual. The most widely acknowledged sexual identity categories in the United States are lesbian and gay (sometimes grouped together as homosexual, though this term has increasingly been abandoned as a chosen identity within the queer community, in light of its problematic history), bisexual, and heterosexual/straight. Whereas gay is often used as a gender-neutral term (e.g., "gay men and women"), lesbian is primarily used by/applied to women. Often, sexual minority identities are abbreviated as LGB. While these terms appear to be characterized by permanence and universality, it is important to remember that sexual identity constructs are dynamic, historically and culturally specific, and, to a varying degree, can change throughout an individual's life course.

Heteronormativity

In the United States, the dominant cultural narrative has shifted gradually, but significantly, over the past four decades around minority sexual orientations (and to a lesser degree around minority gender identities and expressions). Americans' perception of same-gender relations as morally acceptable crossed the symbolic 50% threshold in 2010. On the other hand, a third of Americans continue to believe that homosexuality should be discouraged, 40% said they would be upset if their child was gay or lesbian, and nearly half believe that same-sex sexual behavior is a sin.[31] As of 2017, a majority of states do not have laws that protect sexual minority individuals from discrimination in schools, workplaces, housing, or public spaces,[32] highlighting pervasive structural discrimination. The social power hierarchies, whether manifested structurally or interpersonally, either as homophobia or heterosexism, derive from a particular social norm, heteronormativity.

In its simplest definition, *heteronormativity* is the privileging of a normative heterosexual sexual orientation, as well as its implication of a biologically determined gender binary. The word means "quite simply, that heterosexuality *is* the norm, [emphasizing] the extent to which everyone, straight or queer, will be judged, measured, probed, and evaluated from the perspective of the heterosexual norm."[33] It is the "myriad ways in which heterosexuality is produced as a natural, unproblematic, taken-for-granted, ordinary phenomenon."[34] Kitzinger further elaborates that heteronormativity includes:

> *the presumptions that there are only two sexes; that it is "normal" or "natural" for people of different sexes to be attracted to one another; that these attractions may be publicly displayed and celebrated; that social institutions such as marriage and the family are appropriately organized around different-sex pairings.*[34]

Lauren Berlant and Michael Werner define heteronormativity similarly as:

> *the institutions, structures of understanding, and practical orientations that make heterosexuality seem not only coherent – that is, organized as a sexuality – but also privileged. Its coherence is always provisional, and its privilege can take several (sometimes contradictory) forms: unmarked, as the basic idiom of the personal and the social; or marked as a natural state; or projected as an ideal or moral accomplishment.*[35]

Heteronormativity is so fundamental to the conceptualization of the world that heteronormative assumptions are often completely unacknowledged. "In spite of its prevalence, heteronormativity remains largely invisible and elusive to most people […] creating the conditions for the oppression, suffering, annihilation, and erasure of individuals who do not conform to […] the heterosexual mandate."[36] In other words, heteronormativity is the norm that justifies or makes invisible the power hierarchy that privileges some and oppresses others on the basis of their sexuality.

Marginalized minority people

A large number of terms circulate throughout the various health, sociological, and pedagogical literatures to describe individuals and populations who face social disadvantage and injustice – minority, oppressed, disadvantaged, marginalized, underrepresented, vulnerable, underserved, disenfranchised, disempowered, to name a few – though often without definition. In this dissertation, I have chosen to use two of these: *minority* as a group descriptor and *marginalization* as a social process. Regarding the former, I use the adjective *minority* to describe individuals who, as part of a group defined along socially constructed categories of difference, possess less social power relative to the majority group. Under this usage, minority status does not require an absolute numerical minority.

With regard to marginalization, I draw on the concept analysis conducted by Vasas, who advances a tripartite understanding of marginalization.[37] First, marginalization is a dynamic *process* of othering, subordinating, and socially excluding groups of people on the basis of their identities, associations, experiences, and environments, resulting in social inequity, power hierarchies, and oppression. Second, it is the *experience* of being marginalized, including the feelings, reflections, perceptions, actions, and responses of individuals and communities who are the targets of marginalization. Third, marginalization carries *consequences* for people's health, wellbeing, and life courses. The process of marginalization occurs through the (re)production of conditions that determine social outcomes; conditions arising from the dynamic interplay between social structures and individual agency.

MEDICAL SOCIALIZATION AND ITS DISCONTENTS

The institution of medicine has long been an object of inquiry, and indeed is the leading model for conceptualizing the professions and their power.[16,38] A profession is characterized by its autonomy to self-regulate, its monopoly over certain societal functions, and its high degree of solidarity.[38–40] Key to the perpetuation of a profession is the "standardized and centralized production of professional producers."[38] Within medicine, this task is primarily conducted by medical schools (and to a somewhat lesser degree residency programs) through the process of medical socialization.

Two sociological studies can be credited as laying the foundations for subsequent inquiry into the socialization of medical professionals: *The Student Physician: Introductory Studies in the Sociology of Medical Education* by Merton, Reader, and Kendall, published in the late 1950s;[41] and *Boys in White: Student Culture in Medical School* by Becker, Geer, Hughes, and Strauss, which was published a few years later.[42] Not only did these two works establish medical socialization as a legitimate topic of inquiry, they also set the stage for a number of debates that would characterize the field for decades to come.

Merton and the Student Physician

For Merton and colleagues, who approached their subject from the then-dominant functionalist perspective, medical socialization was the "acquisition of attitudes and values, of skills and behavior patterns making up social roles established in the social structure."[41] Their structural-functionalist perspective was grounded in the work of Parsons[43] and traces its roots back to Durkheim, who viewed education as a fully

beneficial social institution tasked with developing in an individual "a certain number of physical, intellectual, and moral states which are demanded of him [sic] by both the political society as a whole and the special milieu for which he [sic] is specifically destined."[44] Merton, et al. viewed the function of medical education not simply as the transmission of technical knowledge and skills, but as the instillation of the "culture of medicine" in those hoping to gain entry into the profession; resulting in graduates who "think, act, and feel like a physician" (p.7).[41] In this primarily qualitative study, the authors sought to examine exactly how the culture of medicine was transferred, and how socialization might differ among the student body they studied at three medical schools (Cornell University, University of Pennsylvania, and Western Reserve). Through interviews, questionnaires, and diaries, the authors examined students' motivations in enrolling in medical school, their perceptions about the meaning and role of physicians, and most relevantly, the processes of attitudinal learning.

Among their findings, the authors consistently found that medical schools act as the "guardian" of professional norms, defining the "technically and morally allowable patterns of behavior, indicating what is prescribed, preferred, permitted, or proscribed" (p.71).[41] *The Student Physician* remains a source of keen insight into the structure of medical socialization, and, quite presciently, considered the impact of student difference on the experience of medical school: "medical students of the same measured degree of intelligence and aptitude vary with respect to their status and social relations with others in the school, and as a result, in the extent to which they acquire the attitudes and values, the skills and knowledge of medicine" (p.63).[41] However, the level of gender, racial, and sexual orientation diversity present in modern day medical schools was likely

unimaginable to Merton and his colleagues, given the monolithically white, male, and (outwardly) straight subjects of their study.

Becker and the Boys in White

The work of Merton et al. is often contrasted with that of Becker and colleagues who drew on social interactionism, locating their research in the behaviors and the culture generated by the medical students themselves. *Boys in White* is a thorough and insightful ethnographic study of the lives of the (overwhelmingly male and white) students enrolled at the University of Kansas medical school. In their own words, Becker, et al. sought to understand the "process in which the [medical student] shapes and controls his [sic] conduct by taking into account […] the expectations of others with whom he [sic] interacts."[42] They were mostly concerned with students' negotiations of medical school demands, particularly through the construction of a student culture. Their primary argument was that over the course of medical education, students make deliberate situational adjustments to their perspectives and behaviors which enable them to persist and succeed in the institution – as opposed to being passively "molded" into physicians.[45,46]

Also unlike the authors of *The Student Physician*, Becker and colleagues focused their study on those aspects of medical socialization that were common to all medical students, since "the students were so homogeneous with respect to the problems [the authors were] studying, a focus on variations between them would have yielded little" (p.22).[42] Indeed, this focus on the common – or from a more critical perspective, normative – experience of medical socialization came to characterize much of the subsequent research into this area, particularly in fields outside of sociology and

anthropology. The authors of *Boys in White* placed heavy emphasis on the homogenizing effect of the medical school context on students' social positionality: "Because [medical students] all occupy the same institutional position, they tend to face the same kinds of problems, and these are problems which arise out of the characteristics of the position" (p.46).[42]

Becker, et al. were also mindful of the potential difficulty arising from a misalignment of the constructed (as well as transient and school-specific) student culture and the general public's assumptions about what a doctor should look like ("male, white, and upper middle class" (p.157)). That being said, the fundamental assumption of Becker et al. is that the shared experiences in and pressures of medical school result in a homogeneous student culture that is more predictive of student behavior than either medical or lay culture. In fact, the authors insist that "social characteristics such as gender, race, culture, social class, sexual orientation, and religion have little or no impact on medical student experiences."[21]

Modern conceptualizations

Viewed side-by-side, *The Student Physician* and *Boys in White*, published four years apart, appear as yet another chapter in the agency versus structure debate. Indeed, such a characterization of these two works has been put forth by a number of scholars, including Clouder, Conrad, Baszanger, and Weidman.[23,45–47] The accuracy of such an oppositional categorization notwithstanding, many modern interpretations of medical socialization advance a more integrated view of the process. For example, Conrad, in his review of first person accounts of the medical school experience, argues, "Both the structure of medical training and the students' subcultural adaptions may contribute to the

experience and outcome of medical education."[47] In this vein, some modern socialization theorists have attempted to fit agency within structure by drawing on Bourdieusian tools,[48,49] although the most common research approach has been to focus on students' own perceptions of medical school socialization.[21,46,50] These studies have drawn attention to the complexity of the interaction of structure and agency in the process of professional socialization.

Clearly, making room for the interplay between the structure of medical education and students' agency allows for a more complex understanding of medical socialization and creates space for resistance and change within an increasingly diverse medical field.[51] However, what needs further exploration is – to borrow a phrase from Cockerham – "the relative contributions of agency and structure" in the process of medical socialization.[52] This question is particularly wrought given my focus on minority students. Too often, structural approaches to the analysis of social phenomena render invisible/ignorable the resistance-as-agency of minority groups, and thus are themselves implicated in creating and maintaining social margins. Borrowing from postmodernist epistemology – which takes as its subject the margins, and as its method the deconstruction of centers of power and authority[53] – it is crucial to valorize the voices, experiences, and truths of those who have been rendered invisible under the sweeping generalizations of grand narratives.

At the same time, it is imperative to recognize that agency and resistance occur within the context of asymmetrical power relations and social stratification, which always favor the dominant and the privileged.[54] Social norms, including those implicated in medical education, strongly influence the lives, choices, and actions of all individuals,

and particularly those on the margins, impacting "the way people communicate, negotiate interpersonal power, and apply the norms of society."[37] As noted by Hill Collins, an analytical focus on agency at the margins without a corresponding structural critique is not only inadequate, but also potentially oppressive.[55] Thus, while I believe it is important to make space for resistance, I recognize the power of the institution "to manage contestation, reproduce hierarchy, and resist change."[56]

Consequently, in an effort to acknowledge – and make analytical space for – both the role of structure and the presence of agency, I have chosen to conceptualize medical socialization as a dynamic process versus an outcome; one that takes as its point of reference the experiences of those on the margins. By focusing on the how the socialization process impacts the lives of minority medical students, it is possible to undertake a structural critique without the definitional implication of a deterministically socialized medical doctor as an outcome, a point I will expand upon shortly. To put it another way, the question I wish to answer is not "why aren't minority students socialized successfully?" but rather "how does the socialization process marginalize minority medical students?"

Socialization as internalization

Medical socialization, as commonly defined, entails an assimilation of institutional attitudes, beliefs, values, and norms, resulting in the transformation of non-medical novices into medical professionals. This definition rests on a central assumption: medical socialization requires the internalization of these attitudes, values, beliefs, and norms – i.e., the acquisition of the culture of the profession – by medical students. Wentworth refers to this assumption as the socialization-as-internalization model,[57] while

Antony calls it the assimilation orientation.[58] Reinharz describes this as a teleological approach that posits "fixed identity definition as the culmination of the socialization process."[59] Crucially, both institutional-level and individual-level approaches to professional socialization rely on this assumption. In fact, as argued by Tierney, the seemingly different definitions of socialization employed in the contemporary literature "are more similar than dissimilar."[60] An illustrative example of this is revealed by the strikingly parallel language used by Stein and Weidman to describe the institutional-level, Mertonian approach (i.e., "a process through which students acquire the […] professional culture"), and the individual-level approach, espoused by Becker et al. (i.e., "a process through which people acquire a professional identity").[61]

The socialization-as-internalization assumption, though, has not gone unchallenged in the literature, with the most expansive critique put forth by Wentworth.[57] A number of other scholars have also taken this assumption to task. Long and Hadden, as well as Haas and Shaffir, have challenged it from a social interactionist perspective, with the latter arguing that entry into a profession is a function of a "cloak of competence" that medical students adopt in order to convince legitimating audiences of their worthiness.[62,63] Similarly, Reinharz, in describing her own socialization into a social scientist, argues against the ritualism view of socialization as the "mastery of what is given" and its overly socialized conception of students.[59] Tierney critiqued the assimilation assumption from a postmodern stance for endorsing "a rational view of the world in which reality is fixed and understandable, culture is discovered, and the individual holds an immutable identity that awaits organizational imprinting."[60] Clouder, drawing on a social constructionist perspective, advanced a view of socialization as a

"continuous dialectic," and suggested a distinction between compliance and true conformity.[46] Writing from academic medicine, Hafferty argues that as a result of the assimilation assumption, research has tended "to stress product over process, thus narrowing our understanding – and appreciation – of the social dynamics that underscore this particular form of social learning."[64]

None of this is to say that medical students remain unchanged throughout their medical education. It would be conceptually and empirically unjustifiable to claim that students do not, in fact, internalize professional culture; or that they categorically fail to identify as doctors upon graduating from medical school. The literature is replete with evidence to the contrary.[13,47] However, the internalization assumption grounding many conceptualizations of professional socialization leads to three untenable corollaries. First, that the principal object of socialization is its outcome, not its process.[57] Second, that it occurs fundamentally on the individual – as opposed to structural – level. Third, that the objective of medical socialization is to impart a neutral – or even beneficial – medical culture. Taken together, a view of socialization-as-internalization has rendered ignorable the cultural reproduction and social stratification inherent to medical education. It has also resulted in a preponderance of research that has disregarded student plurality and diversity, as well as student agency and resistance. Given the limitations of relying on this internalization assumption to ground definitions of medical socialization, I follow a conceptualization that relocates socialization from an outcome of assimilating professional culture on an individual level, to a process of reproducing professional culture on the structural level.

To summarize, in this section, I have argued that the dominant approaches to examining medical socialization are inadequate to enable an understanding of the experiences of minority medical students, including sexual minority students. I have therefore conceptualized medical socialization as a process undertaken by the medical profession to reproduce a specific culture, with the goal of producing standardized physician members. The dominant standards, including that of heteronormativity, which underlies this process results in the marginalization of minority medical students on the basis of their identities, experiences, characteristics, and other categories of difference.

The question then arises: what are the specific factors characteristic of medical socialization that result in the marginalization of minority medical students? In the next two sections, I present a framework that aids in the operationalization of medical socialization, and then apply it to the empirical literature on the socialization experiences of students from minority social groups, in order to identify a range of marginalizing factors.

THE FORMAL, INFORMAL, AND HIDDEN CURRICULA OF MEDICAL SOCIALIZATION

While a number of socializing factors have been identified in medical education – including formal coursework, clinical training, role modeling, mentorship, anatomy labs, cadaver stories, interpersonal contact with faculty, and peer culture – systematic frameworks for operationalizing the process of medical socialization are sparse. One useful framework, borrowed from education theories and advanced by Hafferty, is one that deconstructs medical socialization into the formal, informal, and hidden curriculum.[65]

Within the context of medical education, the *formal curriculum* is comprised of all official, often written, educational activities undertaken by the institution. This includes courses, lab work, evaluations, and syllabi, and any planned and intentional activities occurring in an educational setting, from lecture halls and seminar rooms to labs and clinics [66]. On its face, the formal curriculum conveys the knowledge and skills considered necessary for the practice of medicine, or the so-called "science of medicine." The *informal curriculum,* on the other hand, is seen as being integral to learning the "art of medicine,"[67] It encompasses teaching that occurs during the unscripted, idiosyncratic, and opportunistic interpersonal interactions, often outside formal educational settings (e.g. at a patient's bedside, in the elevator, in the on-call room). The informal curriculum is of particular relevance within medical education, as much of the training takes on an apprenticeship format, with students learning in an ad hoc manner from those with more seniority and experience in the context of daily work, as well as from other students. The lessons of the informal curriculum are perceived to be "the mechanism by which the wisdom of clinical practice is imparted and a trainee's abstract knowledge and skills are commuted to practical clinical functionality" [68].

The *hidden curriculum* describes structural aspects of medical education that convey the implicit values and norms of the profession. Contemporary scholars locate the hidden curriculum in the latent meanings and rules, the unstated tenets and beliefs that are transmitted to students; embedded in the structures, routines, and social relations of the educational institution.[10,54,56,66] Another way to understand the hidden curriculum is as the learning environment (or climate) of the medical school.[65] The concept of the hidden curriculum is rooted in the education literature, and was first applied to medical

socialization in 1994, in an influential paper on ethics teaching by Hafferty and Franks.[65] A hidden curriculum can be made visible by asking: "What are the fundamental values and messages [i.e., norms] being created and transmitted within" various structures of medical training institutions, such as evaluation practices, resource allocation, policies, and institutional language.[69]

The relevance of the formal, informal, and hidden curriculum framework to understanding student marginalization within the medical socialization process is readily apparent. As a conceptual framework, it enables a critical interrogation of both the explicit and implicit normative functions of all elements of medical education: its practices, procedures, rules, policies, relationships, structures and physical characteristics.[70] Significantly, central to the framework is the (re)production of social stratification and the privileging of dominant groups, ideas, and interests,[71] therefore bridging the concepts of socialization and marginalization. The framework also centers the analysis on the processes employed, both deliberately and inadvertently, by the institution for the purpose of socializing future members of the profession, therefore enabling a structural critique without precluding student agency. Further, it does not presume that all medical students experience these curricula in the same manner, thus avoiding the conceptually and empirically untenable assumption of identically socialized medical professionals.[56] Finally, the framework aids in operationalizing the process of socialization, not only integrating numerous structural, cultural, and interpersonal elements of socialization identified in the literature, but also pointing toward socializing elements that may have been overlooked.

Despite the evident utility of the framework of the formal, informal, and hidden curriculum to operationalizing professional socialization, I was unable to identify any studies that applied it to the particular experiences of minority students – a fact that is perhaps unsurprising given the inattention to the experiences of these students in general. Therefore, in the following section, I retrospectively apply the formal, informal, and hidden curriculum framework to extant studies to systematically evaluate the evidence of student marginalization within medical socialization.

IDENTIFYING THE MARGINALIZING FACTORS IN MEDICAL SOCIALIZATION

What follows in an investigation of the myriad ways in which medical socialization marginalizes students through the overt and covert espousal of normative professional standards, using the formal, informal, and hidden curricula framework. My goal in this section is twofold: first, to present empirical evidence that medical and professional socialization results in the marginalization of minority students, including sexual minority students; and second, to identify the specific marginalizing factors that have been documented in the literature. Given that the literature on minority students' experiences with medical socialization is scarce, I supplement this section with research on graduate socialization.

Marginalizing factors in the formal curriculum

The idea that the contents of officially sanctioned coursework may overtly espouse white supremacy, patriarchy, heteronormativity, and other systems of social power may at first appear improbable, given that the formal curriculum is seen primarily as a means of conveying "unbiased" medical knowledge. This does not mean, however,

that it is devoid of marginalization. The more egregious examples of marginalization are often discussed as relics of the past. For instance, racist and ableist eugenic theories were once taught widely throughout medical schools in the United States, influencing the socialization and work of innumerable medical doctors.[72] However, marginalization in the formal curriculum continues to this day. For example, the formal curricular teaching of many medical schools and psychiatry residency programs includes lessons on the psychological diagnosis of gender identity disorder (recently renamed gender dysphoria). The diagnosis has been vigorously criticized for pathologizing and stigmatizing individuals with gender minority identities and perpetuating discrimination against trans*[1] people, while upholding heteronormative assumptions, i.e., that biologically deterministic binary gender categories are the only "normal" gender identities.[73,74] As another example, Risdon, Cook, and Willms find evidence of heteronormative contents of the formal curriculum, quoting a medical student: "Whenever a health care problem has a gay person it has to do with AIDS or adolescent sexuality. There aren't any heart attack victims or diabetics who happen to be gay."[75] Through these formal curricula, "in myriad subtle (and not so subtle) ways, students were reminded of the negative connotations of their group membership," resulting in their social isolation and marginalization.[76] Importantly, apart from the marginalizing effect these narratives have on minority students themselves, equally problematic is their normative message that sanctions dominant students' privilege, as well as affirms any negative beliefs about and attitudes

[1] I use trans* as an umbrella term for individuals whose gender identities transcend biologically deterministic binary gender categories, including people who identify as trans men, trans women, gender nonconforming, gender queer, androgynous, and two spirit. In other words, trans* captures all people who are not cisgender (cisgender describes people whose sex assigned at birth and gender identity align according to normative gender/sex binary).

towards their minority peers, perpetuating oppressive power dynamics and interpersonal marginalization.

The formal curriculum can also convey additional normative information about what the profession considers important and valuable through the amount of time dedicated to a particular topic, whether the topic is included as part of required or elective coursework, and whether competency on the topic is evaluated; even the absence of a particular topic from the formal curriculum conveys to students their relative worth.[20,65,69,77] A number of studies have identified the *absence* of particular topics or perspectives (also referred to as the *null curriculum*) as a marginalizing factor in students' experiences of medical and graduate socialization.[18,20] For example, researchers examining clinical case studies presented to medical students found that nearly all of the almost one thousand cases reviewed failed to specify patient sexual orientation (though race and gender were commonly included).[78] The authors argue that when no mention is made of sexuality, students will make the heteronormative assumption that the patient is heterosexual, not only reinforcing the normalcy of a specific sexual orientation, but also rendering non-heterosexual persons invisible, and therefore ignorable.[78]

Marginalizing factors in the informal curriculum

Researchers have also examined marginalization resulting from the interpersonal interactions of the *informal curriculum*. Interactions with medical school faculty, attendings, residents and other students have been identified as key to the socialization process.[23,46,49,58,61,79,80] Unsurprisingly, there is a corresponding literature that finds that the informal curriculum can marginalize students who do not fit the normative "mold" of medical and graduate education. One of the most common marginalizing aspects of

interpersonal interactions examined in the literature is faculty and physician discrimination towards patients, other physicians and healthcare staff, or students themselves.[20,21,75,76] Beagan finds evidence of numerous examples of "everyday" racism, sexism, heterosexism, and classism (i.e., microaggressions) in her study of medical students and faculty, and argues "Well beyond blatant forms of discrimination […] more covert and more subtle forms of marginalization maintain and reproduce an institutional climate that is more welcoming to some participants than others."[21] This particular 2001 study used a comprehensive mixed method design to examine the experiences of 72 diverse medical students and 23 faculty members at a Canadian medical school. Beagan's use of the concept of microaggressions as a framework for analysis was a valuable decision, as it allowed the author to capture discriminatory experiences (such as hearing racist jokes stereotyping) that study participants were hesitant to label as, for example, racist: "In interviews, both faculty and students generally indicated that 'race' and racism really are not issues in medical school. Nonetheless, many students then went on to describe racist incidents."[21]

Ludmerer argues that such exposure to oppressive events is characteristic of medical schools in general, which have failed to create a welcoming, supportive atmosphere for minority students.[77] Indeed, as demonstrated by Risdon, Cook, and Willms (2000), gay and lesbian physicians in training reported "a lot of covert homophobia", resulting in feelings of isolation and not belonging.[75] Specifically, through interviews and focus groups with medical students and residents at four medical training programs across Canada, the authors learn that gay and lesbian medical students and residents not only contend with "hateful jokes and remarks targeting gay and lesbian

patients," but often with the fear that peer and faculty evaluations will be negatively impacted if they become aware of a student's minority sexual orientation. Apart from the demonstrable negative impact that exposure to discriminatory events, such as disparaging comments or unfair grading, can have on minority students themselves, they affirm privileged students' explicit and implicit biases, reproducing the very social conditions that give rise to discriminatory events.

Marginalizing factors in the hidden curriculum

While it may be obvious that interpersonal discrimination and microaggressions marginalize students who do not fit the normative mold of a medical professional, there is an additional *hidden curriculum* within the policies and structures of medical school that shapes basic assumptions about what the medical profession considers acceptable behaviors. Specifically, the strict hierarchy of medicine, the lack of policies requiring formal institutional recourse, and individual inaction in response to problematic behaviors all combine to convey a message to students that discriminatory events are acceptable, and indeed "it is folly to question or contradict" them.[80] Thus, along with students' reports of experiencing or witnessing discrimination are findings that these same students often feel powerless to respond to these events. For one, it can be awkward, difficult, even risky for students to challenge those who are in a position of power over their grades or academic progress.[21,75] Meanwhile, students learn to accept certain discriminatory behaviors as normal based on others' reactions to them. An illustrative example of this is the experience of a medical student in one study who witnessed another student making a racist joke about a patient.[21] Not only was the offending student not reprimanded by the witnessing attending, but the joke was also

announced loudly and without fear of negative repercussions, sending a message that those who might find this behavior problematic must simply learn "how to deal with it."[21] The lack of reaction to problematic behaviors also serves to enforce a norm that requires minority people to see their experiences of oppression and discrimination "as particularistic rather than linked to larger cultural and societal forces."[20]

These marginalizing characteristics of interpersonal interactions, as well as the hidden curriculum of their acceptability within the medical profession, are compounded by the lack of diversity among faculty and physician-teachers. While 12.6% of the US population identifies as black or African American, black or African American people represent only 6.3% of physicians and 2.7% of medical school faculty (AAMC 2010, 2013). The skewed demographics are similarly striking for Hispanic and Latino medical professionals, with only 5.5% of physicians and 3.7% of medical school faculty identifying as such, compared to 16.3% of the general population (AAMC 2010, 2013). Similarly, nearly twice as many male faculty teach at US medical schools as female faculty (AAMC 2013). The underrepresentation of certain groups in medicine represents a structural hidden curriculum that conveys a message that medical professionals "look" a particular way. A bisexual female engineering student described the impact of the white straight male standard within her profession thus: "To not fit these criteria, to be somewhat abnormal, somewhat strange, is a problem."[19] Griffith and Delgado spoke of the impact of this lack of diversity as early as 1979, when they argued that a lack of black attending physicians forces black psychiatry residents to wonder whether they belong in the program or whether their presence is merely being tolerated.[22] The lack of diversity also makes it more difficult for minority students to identify role models or establish

relationships with mentors at their institution. For example, minority students in one study saw the presence of minority faculty as critical to their ability to succeed in their doctoral programs.[20] This was further reflected in the findings of a recent study of sexual minority medical trainees and faculty, where "having a mentor of the same sexual orientation […] was described as critical to successful mentorship."[81] Nevertheless, only 40% of sexual minority respondents in the study sample worked with an LGBT-identified mentor in the previous year. Similarly, findings of an older survey of members of the (no longer extant) Gay, Lesbian, and Bisexual People in Medicine student committee, revealed that a third did not know of a single gay male faculty member and half did not know of a single lesbian female faculty member at their school.[82]

Other aspects of the structure of medical education contain a hidden curriculum that can result in the marginalization of minority students. For one, medical schools and residency programs are *reinventive institutions*, a modern update of Goffman's repressively coercive total institution.[83] As such, the socialization process of medical education is exclusive and demands complete commitment from medical students, with an expectation that new recruits will "weaken existing ties with other social groups and give the organization their undivided loyalty."[83] In medical education, a number of symbolic boundaries isolate students from their non-medical communities, including the extreme demands placed on students' time, changes in language, and shifts in self-identity.[13,84,85] This isolation from non-medical communities reduces the opportunities for students to benefit from the emotional support, companionship, as well as access to resources, assistance, and information offered by these non-medical social networks,[86] and has been found to be particularly important to members of minority groups.[87,88] One

study showed that while medical students, and in particular gay and lesbian students, reported that maintaining connections with outside communities was important, they struggled to maintain these relationships once in medical school.[13]

Further, minority students may feel like they do not belong to the normative social category of medical students due to sheer numerical underrepresentation, and therefore may struggle to establish group membership with their medical peers. To quote a lesbian medical student: "While I realize that there aren't exactly a lot of thirty-year-old lesbian mothers attending medical school in Ohio, it would be nice not to be the only one."[89] According to Hafferty, "persistent evidence of medicine's failure to recruit and train non-majority students" conveys a message that medical schools are dysfunctional and problematic learning environments.[64] Numerous studies have indeed found that minority students experience feelings of social loneliness, alienation and isolation, of being "uninvited guests in a strange land."[13,20,77,90] Fewer connections with medical peers can lead to lower rates of supportive collaboration, and can have detrimental effects on students' wellbeing and their resilience to stressors and psychological distress.[86]

Institutional recognition, resource allocation, and even the built environment also transmit a hidden curriculum about the "nature of things."[12,69] Promotions, tenure, and awards convey both explicit and implicit messages about what is considered valuable and important within the institution. For example, Antony describes the case of a white faculty member whose research was described as racially problematic by black students, but who was nonetheless held up as a "great scholar" by white faculty of the department.[76] Ludmerer comments on the sexist promotion patterns of medical schools,

noting that in the mid-1990s, only 10% of full professors and 4% of department chairs were women (a pattern that has not improved much in subsequent decades).[77]

In terms of resource allocation, the clearest, though often unexamined, marginalizing aspect of medical education is its cost. The class of 2015 will pay over a quarter million dollars for medical school, incurring a median debt of $180,000 (AAMC, 2014). This presents an obvious barrier to students from poor and working class families, resulting in a student body that is overwhelmingly upper middle and upper class. For poor students who nonetheless decide to pursue a medical education, the existing class hegemony can result in social isolation, as well as difficulty constructing a professional appearance and identity.[21]

Finally, as an example of a marginalizing hidden curriculum of the build environment, Beagan quotes a faculty member who describes the structural sexism within the material environment of the surgical suite, where everything is designed to match the image of a surgeon as "a tall, big man": the operating tables may be too tall and the surgical instruments too large for smaller students, who often are women.[21] This structural sexism is reinforced by the surgical attendings, who view a woman's difficulty in surgery as demonstrative of her limitations (i.e., "because she cannot take the clamp off the surgeons are screaming at her") as opposed to a symptom of a gendered structural climate. These combine to send a message to women students that they do not belong in a surgical specialty.

In summary, minority medical students, including sexual minority students, are marginalized through medical socialization factors across all three curricula: the formal, the informal, and the hidden. However, within the context of this dissertation, this is only

half the picture. How do marginalizing medical school factors affect the mental health of medical students? In the following section, I provide a brief overview of the literature on the epidemiology of mental health among medical students and sexual minority populations.

EPIDEMIOLOGY OF MENTAL HEALTH

Very few studies have examined the mental health of sexual minority medical students or their experiences as they progress through medical training. While I review this sparse literature here, I begin this section with a review of research on the mental health of medical students in general, followed by a brief review of the evidence on the mental health of sexual minority populations in general, and sexual minority medical students in particular.

Medical students & psychological distress

The mental health of medical students has long been of concern to healthcare researchers, medical educators, and policy makers,[91,92] with a decades-long body of research finding that medical students experience significant psychological distress, including depression, anxiety, fatigue, burnout, and suicidal ideation,[4,6,100,8,93–99] often in excess of the general population. For example, in one of the earlier empirical studies of medical student depression from 1988, Clark[8] found that as much as 25% of students had depressive symptoms as assessed by the Beck Depression Inventory (BDI). Though the structure of medical school and the characteristics of the medical student population have changed since Clark's study, more recent studies have similarly found a high prevalence psychological distress among medical students.

Dyrbye et al.,[94] in a large seven-institution study of 2,248 medical students (response rate: 52.4%) conducted in 2007 found startlingly high levels of distress in their sample, with 82% of medical students experiencing at least one of six distress domains (burnout, depression, mental quality of life, physical quality of life, fatigue, and stress). The authors found that the most common patterning of distress was a pentad of burnout, fatigue, high stress, low mental quality of life, and depression, experienced by 11% of respondents. In another large study, Goebert et al.[4] assessed depression and suicidal ideation in 1,343 medical students enrolled in six medical schools in 2003-2004 (response rate: 95%). Using the Center for Epidemiologic Studies-Depression scale (CES-D), the authors classified 25% of medical students as having probable depression, with 6.6% of students reporting suicidal ideation.

A number of studies have examined medical student distress at single medical schools. In one such study conducted in 2009 (n=505, response rate: 65.7%), Schwenk et al.[98] found that 14.3% of students who completed the Patient Health Questionnaire (PHQ-9) scored in the moderate to severe depression range. Tjia, Givens, and Shea,[99] in another single-institution survey conducted during the 2001-2002 academic year (n=322, response rate: 71.6%), report a prevalence of depression in their sample as 15.2%, as measured by the BDI. Two of these authors (Givens and Tjia), in an earlier single-institution study from 1994 (n=194, response rate: 93%), found BDI-assessed depression prevalence of 24%.[100] In one of the most recent studies of medical student distress, conducted in 2010 by Chang, Eddins-Folensbee, and Coverdale,[96] the authors found that of 336 students at a single institution (response rate: 69.3%), approximately 55% reported burnout, and 60% were classified as having depressive symptoms as assessed by the

Primary Care Evaluation of Mental Disorders (PRIME-MD) tool. Though less research has examined medical student anxiety,[2] Ghodasara et al.,[101] in a survey of 301 students at a single medical school (response rate: 91.2%), found that approximately 40% of women and 20% of men had clinically significant state anxiety.

A number of studies have also directly compared the prevalence of psychological distress among medical students to distress among other populations. A few older studies found that medical students did not have higher distress than nonmedical student samples.[102,103] More recent evidence, however, suggests that medical students experience more psychological distress than the general population. As one notable example, Dyrbye et al.[5] conducted a large, national study in 2012 of medical students (n=4,402, response rate: 35.2%) in which they compared the prevalence of psychological distress of medical students to population-derived control subjects (college graduates ages 22-32). The authors found that medical students were significantly more likely to exhibit depression (58.0% versus 47.5%) and burnout (49.6% versus 35.7%) than the nonmedical college graduate sample, as well as had worse mean scores for fatigue.

Empirical evidence also suggests that psychological distress levels fluctuate over the course of medical school. In a 2003 study of medical students at 16 medical schools (response rate: 83%), Compton, Cerrera, and Frank[95] assessed stress and depressive symptoms of the cohort at three time points: during first year orientation, during the transition from classroom training to clinical rotations (between the second and third years), and in their fourth year. The authors found that distress was highest during transition to rotations and was lowest during students' fourth year. In another study, Chang, Eddins-Folensbee, and Coverdale,[96] assessed stress, depression, and burnout

among 150 first year (response rate: 82.0%), 118 second year (response rate: 68.2%), and 98 third year (response rate: 57.7%) medical students enrolled at a single institution in 2010. The authors found no significant difference in depression between classes, but reported significant differences in burnout and stress. Specifically, third year students scored highest on the depersonalization subscale of the burnout measure, while second year students scored highest on the lack of personal achievement subscale, with first year students having the lowest scores for both. Similarly, first year medical students reported the lowest perceived stress, while third year students had the highest.

While it is possible that medical students represent an intrinsically distressed group that self-selects into medical school, empirical evidence suggest that the psychological distress is due, at least in part, to the conditions and processes of medical training. Brazeau et al.[104] compared the psychological distress of 582 students matriculating in six medical schools in 2012 (response rate: 62%) to that of age-similar college graduates. The authors found that medical students begin medical training with significantly lower burnout (odds ratio (OR): 0.62) and depression (OR: 0.39), and higher quality of life (parameter estimate: 0.85), than nonmedical controls. In another study, Dyrbye and coauthors[105] directly investigated the association between the medical school learning environment, personal life events, and distress among 1,701 medical students (response rate: 55%) enrolled at six institutions in 2006. They assessed the medical school's learning environment using a 15-item, author-developed questionnaire (items included: "How satisfied or dissatisfied are you with the overall learning environment at your medical school?", "My school promotes a collaborative rather than competitive environment for students", and "One of my current supervising residents or interns is

cynical"). The authors found that all fifteen learning environment items were significantly associated with increased odds of burnout among medical students, while negative personal life events such as divorce or illness were not.

In summary, medical students experience significant psychological distress, attributable, at least partially, to the structure, process, and/or other aspects of medical training itself. However, gaps in knowledge persist. In particular, inadequate attention has been committed to exploring how medical education is "experienced differently by students who are significantly different from one another upon entry to medical school"[15] and how the mental health of medical students may differ across social categories of difference.

While an extensive literature has documented racial, ethnic, gender, and sexual orientation disparities in mental health in the general population, few researchers have examined whether these disparities also exist among medical students. Dyrbye and coauthors[106] found similar levels of depression and lower burnout among racial minority medical students when compared to white students. Goebert, et al.[4] found no differences in depression by race or ethnicity, but higher suicidal ideation among students of color. In terms of the mental health of women and men in medical school, both Goebert et al. and Dyrbye et al. found higher rates of depression among women students compared with men, but no differences by gender in suicidal ideation.[4,5] In one of the largest studies of medical student mental health to date, Hardeman, et al.[107] found that African American students were more likely to experience depressive symptoms and anxiety than white students. Hardeman and colleagues also found significantly higher levels of depression and anxiety among women medical students than among men medical students.

Sexual minority populations and psychological distress

Prior to 1973, "homosexuality" was seen, in and of itself, as a mental disorder (specifically, as a sexual deviancy, along with pedophilia and voyeurism), a pathology so profound it was seen to affect the total personality. The observed disproportionate prevalence of mental disorders among sexual minority populations was seen as a corollary of, or even intrinsic to, "homosexuality."[87] As a result, until "homosexuality" was demedicalized and removed from the Diagnostic and Statistical Manual, little attention and research was committed to understanding the causes of the mental health disparities observed between sexual minority and non-minority populations. Post-demedicalization, this was followed by a period of general neglect of mental health issues among sexual minority populations, which at best was a misguided effort to remove stigma from this population,[87] and at worst the consequence of stigma and discrimination directed toward those researchers who sought to study the mental health of sexual minorities. In more recent decades, however, many researchers and practitioners have returned to the issue of the mental health of sexual minority people. This research has revealed that sexual minority populations experience more mental distress and disorders than heterosexual populations.[108–113]

Researchers have found that the majority of sexual minority people, in general, report no mental health problems. However, there is accumulating evidence of mental health disparities between sexual minority and heterosexual populations.[108,109,111–117] Studies have found these disparities emerge in adolescence and early adulthood, and persist through the life course into older adulthood.[118,119]

King et al.[108], in a 2008 meta-analysis of mental disorders among sexual minority adults, found that gay, lesbian, and bisexual adults had at least 1.5 times the risk of depression and anxiety when compared to heterosexual adults. Marshal et al.,[115] similarly found a significantly greater risk of depressive symptoms among sexual minority adolescents when compared to heterosexual adolescents.

There is also emerging evidence of disparities within sexual minority populations. For example, a number of studies have found that bisexual individuals, particularly bisexual women, had a higher risk of depression and anxiety than both heterosexual and gay individuals.[111,119–122] Studies have also identified a difference in the risk of mental disorders by gender[119,123] and race or ethnicity[110] among sexual minority people.

Overall, depression and anxiety symptoms in the general population decrease during the transition from adolescence to young adulthood to adulthood.[124,125] When stratifying by sexual orientation, sexual minority and heterosexual populations appear to experience a parallel decrease in mental illness as they age from young adulthood to adulthood.[119,126] Marshal, et al.,[119] in a 2013 study, found significant disparities between heterosexual, gay/lesbian, and bisexual adolescents (approximately 16 years old), which then remained stable during throughout young adulthood (until an approximate age of 28). Similarly, Needham[126] found that sexual minority status was not associated with the rate of change in depression symptoms or suicidality during the transition from adolescence to adulthood, although sexual minority youth had a consistently higher prevalence of poor mental health over time when compared to their heterosexual counterparts.

Sexual orientation and psychological distress among medical students

Though limited, a small literature is emerging documenting the mental health status of sexual minority medical students. Lapinski, Yost, Sexton, and LaBaere (2016)[127] conducted a web-based survey of 1294 osteopathic medical students (response rate 19.3%) to evaluate modifiers of student burnout, including sexual orientation. The authors found that 62.5% of sexual minority students experienced burnout, compared to 38.9% of heterosexual students (OR=2.6; 95 % CI, 1.61–4.29). In an earlier study by Lapinski and Sexton (2014)[128] of 1334 osteopathic medical students (32.4% response rate), the authors found students who identified as gay, lesbian, bisexual, and mostly heterosexual had 2.2 times greater odds of meeting the clinical criteria for depression (as assessed using the Major Depression Inventory) as compared to students who identified as completely heterosexual students. Finally, according to a 2013 pilot study conducted by the Association of American Medical Colleges (n=3,466, response rate: 18%),[129] sexual minority students had higher levels of stress compared to heterosexual students (point estimates were not provided in the study report). Unfortunately, these three studies were cross-sectional, had low response rates, or were not nationally representative in their medical school sampling.

SUMMARY

The stated vision of medical schools is to prepare diverse and culturally competent physicians who meet the evolving health needs of all.[130] However, as I've argued, their ability to produce medical doctors who are not only diverse themselves, but who are able to care for diverse patient populations, is undercut by a heteronormative medical socialization process. Exposure to heteronormative socialization factors within

the formal, informal, and hidden curricula during the four years of medical education not only leads to the marginalization of sexual minority students, but may additionally reproduce and reinforce the biases and discriminatory behavior of heterosexual students.[131–133] Furthermore, the marginalization experienced by sexual minority students may, in turn, lead to more psychological distress, with implications for their willingness to be out,[134] their academic performance,[7,8] and even their retention in medical school.[9]

In the following chapters I present three studies designed to empirically evaluate my argument that heteronormative socialization pervades US medical education, marginalizes sexual minority students, and leads to increased psychological distress. The specific research objective of each study are as follows:

Study 1: *Comparison of the mental health and wellbeing of sexual minority and heterosexual first-year medical students.*

In this previously published study,[26] I, along with my coauthors, compared the risk of depression, anxiety, and low self-rated health in sexual minority and heterosexual students as they were commencing medical school. We additionally evaluated students' exposure to non-medical school specific social stressors (experiences of discrimination and social loneliness). The results of this study set the stage for the following two studies.

Study 2: *Pervasiveness of heteronormative medical socialization in US medical schools and its negative consequences on students' psychological distress.*

The study was designed to answer two overarching research questions: what is students' level of exposure to three heteronormative medical socialization factors – perceived school safety for LGBT students, heterosexist faculty role modeling, and witnessing

heterosexist microaggressions towards other students – and does the magnitude of exposure predict higher depression and anxiety scores? Not only is this the first study to empirically investigate these questions in a nationally representative sample of medical students, but its longitudinal design made it possible to evaluate whether any observed differences in psychological distress were the result of medical school exposures or an exogenous phenomenon.

Study 3: *"It complicated my medical school experience" – an examination of sexual minority students' exposure to heteronormative medical socialization.*

The final study centers the voices and experiences of sexual minority medical students. To do this, I conducted a survey of self-identified gay, lesbian, and bisexual fourth-year medical students. Not only was my goal to quantify students' exposure to a range of heteronormative socialization factors, but to provide a space for students to share, in their own words, the challenges and tribulations as sexual minority students within a heteronormative social institution. The mixed methods study design allows for both quantitative breadth and qualitative depth of findings.

2. Comparison of the Mental Health and Wellbeing of Sexual Minority and Heterosexual First-Year Medical Students: A report from the Medical Student CHANGE Study

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***Available at**: www.ncbi.nlm.nih.gov/pmc/articles/PMC4414698*

BACKGROUND

According to a 2011 Institute of Medicine report, lesbian, gay, and bisexual (LGB) adults experience more mood and anxiety disorders than heterosexual individuals.[135] While there has been increasing research on the mental health and well-being of LGB patients, few studies have examined the mental health and well-being of LGB medical students and health care providers in the United States.[136]

Medical students, in general, experience high rates of psychological distress, including depression and anxiety.[4,9,98] However, compared with heterosexual students, students who identify as a sexual minority may face a higher risk of poor health due to minority stress—the additive and chronic stress resulting from the stigma and discrimination these individuals experience due to their marginalized social status.[87] The social stressors that comprise minority stress include overt acts of discrimination, such as violence, harassment, and name-calling; institutionalized heterosexism, such as marriage inequality and employment discrimination; and more implicit microaggressions, or everyday forms of unintended discrimination, such as social exclusion, tokenizing, and heteronormativity. Together, these stressors contribute to the health disparities experienced by sexual minorities.[28]

Poor mental health among sexual minority medical students may lead to greater burnout and attrition from medical school,[6] which in turn may diminish the diversity of the physician workforce. Both the American Medical Association (AMA) and the Association of American Medical Colleges (AAMC) have articulated the importance of diversity--including sexual orientation diversity--among physicians to the provision of accessible, quality care.[25,137,138]

In the present study, we hypothesized that sexual minority students entering medical school would be at greater risk of depression, anxiety, and low self-rated health when compared with heterosexual medical students, and that these disparities in risk would differ by gender. We also hypothesized that sexual minority medical students would be more likely than their heterosexual counterparts to report having experienced social stressors, and that exposure to these social stressors would attenuate the association between sexual identity and health.

METHODS

Data source

This study used baseline data collected as part of the Medical Student Cognitive Habits and Growth Evaluation Study (CHANGES), a national longitudinal study of individuals who matriculated at U.S. medical schools in fall 2010.[139] Briefly, we sampled medical students using a stratified multistage sampling design. In the first stage, we stratified medical schools by geographic region and public/private status. From these strata, we sampled 50 medical schools from the total of 131 MD-granting U.S. schools using a proportional to (first-year class) size sampling methodology.[140] One of the 50

schools sampled for our study was a military school that had highly unique features, including acceptance policies, curriculum structure, timing, and student characteristics. Due to concerns about the generalizability of our study findings, we excluded this school (n = 169 first-year students) from the analysis.

In the second stage, we recruited first-year students from the 49 selected schools, using three strategies to obtain their contact information because no complete list of students was available. First, we obtained e-mail addresses of students who indicated interest in participating in the study via a question included as part of the 2010 AAMC Matriculating Student Questionnaire, a voluntary annual survey sent to all students entering medical school. Second, we purchased an incomplete list of first-year medical students from an AMA-licensed vendor. Third, we used referral (i.e., snowball) sampling through recruited survey respondents. Ascertained students were invited to participate in the CHANGES survey via e-mail and/or postal mail. Those who consented to study participation completed an extensive online questionnaire and were randomized to complete various Implicit Association Tests (IATs; e.g., race, sexuality, obesity). The University of Minnesota and Mayo Clinic internal review boards approved the study. All students who completed the survey received a $50 incentive for participation.

Study sample

Between October 2010 and January 2011, 4,732 first-year medical students completed the baseline survey, representing 81% of the 5,823 students invited to participate in the study and 55% of the 8,594 first-year students enrolled at the 49 sampled schools (for participant recruitment flowchart, see Appendix A). Our overall response rate was comparable to other published studies of medical students.[9,105]

Study measures

Sexual identity

We assessed sexual identity, the main independent variable in this study, by asking all students in our sample, "What is your sexual orientation: heterosexual, bisexual, homosexual, or other?" We combined students who selected homosexual, bisexual, or other into a larger category of sexual minority (non-heterosexual) students. We did this for two reasons. First, although sexual minority individuals are not a monolithic group, they nonetheless share a common marginalized social status relative to society's heterosexual cultural norm.[135] Second, due to limited sample sizes, there was not sufficient power to distinguish among these three sexual minority groups.

Depression, anxiety, and self-rated health.

We assessed depression using the Patient Reported Outcomes Measurement Information System (PROMIS) Emotional Distress–Depression Short Form 8b, a validated 8-item instrument that evaluates negative mood, decrease in positive affect, negative views of self, and negative social cognition.[141] As per the PROMIS scoring manual, we standardized raw scores so that a score of 50 represents the average score of the general population of the United States, with 10 as the standard deviation.[142] We analyzed the depression score as a continuous dependent variable. We also sought to assess the risk of a clinically meaningful depressive symptomology by dichotomizing the depression score, whereby those students who scored one standard deviation above the general population mean (i.e., a score of 60) were categorized as exhibiting depressive

symptoms. This represents a score that exceeds the minimally important difference from the mean as suggested by Yost et al.[143]

We assessed anxiety using the PROMIS Emotional Distress–Anxiety Short Form 7a, a validated 7-item instrument that measures self-reported fear, anxious misery, and hyperarousal.[141] We standardized the raw scores so that a score of 50 represents the general population mean, with 10 as the standard deviation.[142] Similar to the depression measure, we considered anxiety both as a continuous outcome and a dichotomized outcome. For the dichotomized anxiety variable, students who scored two standard deviations above the mean (i.e., a score of 70) were classified as having clinically meaningful anxiety. We chose this higher cut-off in order to increase the likelihood of capturing a meaningful difference between anxious and non-anxious medical students. (In a comparison analysis using a cut-off of one standard deviation [results not shown], we found a statistically significant, though smaller, effect size).

We assessed students' self-rated health by asking, "In general, would you say your health is: excellent, very good, good, fair, or poor?" We categorized students who indicated their health was fair or poor as having low self-rated health, and students who indicated all other categories as having good self-rated health.[144]

Social stressors

We evaluated the differences in social stressors reported by sexual minority and heterosexual first-year medical students using two items from the Everyday Discrimination Scale (called names or insulted at least a few times a year, and harassed or threatened at least a few times a year)[145] and three items from the UCLA Loneliness

Scale (whether they felt they lack companionship, felt left out, and felt isolated from others at least some of the time).[146]

Other variables

We used standard demographic questions to measure student age, gender, race and ethnicity, and relationship status. We asked students to provide their parents' highest level of education to assess family socioeconomic status. Additionally, to assess social desirability response bias, we administered an abridged version of the Marlowe-Crowne Social Desirability Scale.[147]

Apart from the sexual identity question, none of the measures included in the study were specific to sexual identity. Further, some questions may have assessed exposures prior to medical school matriculation (e.g., stressors in the past year). Finally, for all multi-item scales, scores were computed only for respondents who completed at least half of the scale's items.

Analysis

We used descriptive summary statistics of demographic characteristics to characterize sexual minority and heterosexual students. We calculated the prevalence of all measures included in the study for sexual minority and heterosexual students, and we used Pearson chi-squared tests to determine whether there were significant differences between sexual minority and heterosexual students.

To estimate the association between sexual identity and depression, anxiety, and self-rated health, we fit three models to our data. In model 1, we conducted separate bivariate analyses to estimate the association between sexual identity and depression,

anxiety, and self-rated health. For the two continuous main outcome measures (depression score and anxiety score), we fit simple linear regressions to estimate association coefficients; for the three dichotomous main outcome measures (depressive symptoms, anxiety symptoms, and self-rated health), we fit generalized linear models (GLMs) with a binomial distribution and a log link function to estimate relative risks. In model 2, we conducted multivariate analyses that included as covariates gender, age, race and ethnicity, relationship status, parental education, and social desirability bias, as well as the number of days the student had spent in medical school at the time of survey completion to account for differences in exposure to the medical school environment. In model 3, we examined the multivariate association between sexual identity and depression, anxiety, and self-rated health, while controlling for all the covariates included in Model 2 as well as the social stressors included in this study. For one of the dichotomous outcomes (depressive symptoms), model 3 did not converge (which is known to occur with this GLM approach), and therefore we employed a GLM with a Poisson distribution and a robust variance estimator, an alternative analytic approach that has been demonstrated to reliably estimate relative risks for binary outcomes. [148,149]

Acknowledging the consistently documented gender differences in mental health and self-rated health,[150–156] we also conducted a gender-stratified analysis in which we modeled the associations between sexual orientation and the outcomes considered in the study separately for men and women.

All analyses took into account the sampling probability, stratification, and clustering in the two-stage design of Medical Student CHANGES. We obtained 95% confidence intervals (CIs) and *P* values for the model-estimated associations between

each outcome and the independent variable. We set the statistical significance threshold a priori at alpha equal to .05. We conducted all analyses in Stata version 12 (StataCorp LP, College Station, Texas).

RESULTS

The demographic characteristics of the first-year students in the CHANGE sample were similar to the demographics of all students who matriculated at U.S. medical schools in 2010, as reported by the AAMC (see Appendix B). Sexual orientation data were available for 4,673 (98.8%) of the 4,732 students in the CHANGES sample. Overall, 5.0% (n = 232) of our analytic sample selected a category other than heterosexual; when broken down by response option, 123 (2.6%) of respondents identified as homosexual, 93 (2.0%) as bisexual, 16 (0.3%) as other, and 4,441 (95.0%) as heterosexual. Fifty-nine respondents (1.2%) left the question blank. Eleven of the 16 students who selected "other" wrote in an answer: "don't know" (n=1), "equal opportunity employer" (n=1), "questioning" (n=2), "abstinate [sic]" (n=1), "do not disclose – military" (n=1), "pansexual" (n=2), and "queer" (n=3).

Characteristics of the SM and heterosexual students in our sample are presented in Table 2.1. Compared with heterosexual students, SM students had a higher mean age, were more likely to be men, and were less likely to be in a relationship or to have a parent with a graduate degree.

***Table 2.1**: Characteristics of first-year medical students; CHANGES (2010)*

Characteristic	Sexual minority students (n=232) % (n)	Heterosexual students (n=4,441) % (n)	p-value
Gender			
Female	42.7 (99)	50.3 (2,235)	.02
Male	57.3 (133)	49.7 (2,206)	
Race/ethnicity			
Black	8.9 (20)	6.4 (279)	
Hispanic/Latino	7.6 (11)	5.7 (250)	
East Asian	12.0 (27)	14.0 (609)	.22
South Asian	7.6 (17)	10.5 (460)	
White	64.0 (144)	63.4 (2,765)	
Relationship status			
Not in a relationship	53.0 (123)	46.0 (2,043)	
In a non-cohabiting relationship	34.1 (79)	36.9 (1,639)	.09
Engaged	1.3 (3)	3.4 (149)	
Married or living together	11.6 (27)	13.7 (608)	
Parental education			
Graduate degree	50.9 (118)	63.4 (2,808)	<.001
Bachelor's degree	22.0 (51)	21.9 (969)	
Less than bachelor's degree	27.2 (63)	14.8 (654)	
Age			
Mean [SD]	24.8 [3.1]	23.8 [2.6]	<.001

Note that percentages may not add to 100 due to rounding.

As shown in Table 2.2, SM students were more likely than heterosexual students to report depressive symptoms (20.7% vs. 12.7%, p<.001) and anxiety symptoms (46.1% vs. 36.1%, p=.002). Not shown are the mean depression scores, which were higher among SM than among heterosexual students (52.9 vs. 50.4); mean anxiety scores were also higher (59.3 vs. 57.4).

SM students also experienced more social stressors than their heterosexual peers. SM students were more likely than heterosexual students to report being called names or insulted at least a few times a year (34.9% vs. 26.6%, p=.01) and were more likely to report being harassed or threatened at least a few times a year (22.7% vs. 12.7%, p<.001). In addition, SM students were more likely than heterosexual students to report feeling a

lack of companionship (53.0% vs. 42.1%, p=.001), left out (50.7% vs. 42.1%, p=.01), and isolated (53.7% vs. 42.8%, p=.001).

***Table 2.2**: Prevalence of depression, anxiety, and social stressor; CHANGES 2010*

	Sexual minority students	Heterosexual students	*p*-value
Health measures			
Depressive symptoms	20.7%	12.7%	<0.001
Anxiety symptoms	46.1%	36.1%	0.002
Low self-rated health	10.1%	6.4%	0.03
Social stressors			
Called names/insulted at least a few times a year	34.9%	26.6%	0.01
Harassed or threatened at least a few times a year	22.7%	12.7%	<0.001
Felt lacked companionship some/most/all of the time	53.0%	42.1%	0.001
Felt left out some/most/all the time	50.7%	42.1%	0.01
Felt isolated some/most/all the time	53.7%	42.8%	0.001

Note that percentages may not add to 100 due to rounding.

Results of the unadjusted and adjusted analyses are presented in Table 2.3. In both models 1 and 2 (unadjusted and adjusted analyses, respectively), we found that SM medical students had greater odds of depression and anxiety, as well as low self-rated health, than their heterosexual peers.

After adjusting for relevant covariates (model 2), we found that SM students had a mean depression score 2.54 points higher (95% CI = 1.38 to 3.71) and had a greater risk of being classified as having depressive symptoms (adjusted relative risk [ARR] = 1.61, 95% CI = 1.25 to 2.06) than heterosexual students. For anxiety, SM students scored 1.77 points higher (95% CI = 0.74 to 2.80) and had a greater risk of being classified as having anxiety symptoms (ARR = 1.26; 95% CI = 1.09 to 1.46) compared with heterosexual students. Finally, sexual minority students had a significantly greater risk of reporting low self-rated health (ARR = 1.77, 95% CI = 1.15 to 2.60) than heterosexual students.

In the gender-stratified multivariate analysis (model 2), we found that sexual minority men had approximately twice the risk of reporting depressive symptoms (ARR = 2.00, 95% CI = 1.45 to 2.77) compared with heterosexual men, but these two groups did not differ significantly in terms of reporting anxiety symptoms or low self-rated health. Sexual minority women were twice as likely as heterosexual women to report low self-rated health (ARR = 2.04, 95% CI = 1.14 to 3.64), but these two groups were not significantly different in terms of reporting depressive symptoms or anxiety symptoms.

Table 2.3*: Association of sexual minority status with depression, anxiety, and self-rated health; CHANGES 2010*

Continuous outcomes	Model 1: Bivariate		Model 2: Model 1 + covariates		Model 3: Model 2 + social stressors	
	β	*95% CI*	*β*	*95% CI*	*β*	*95% CI*
Depression score	2.82***	1.6.9 to 3.96	2.45***	1.26 to 3.64	1.62**	0.59 to 2.64
Women	2.08*	0.47 to 3.68	1.55	-0.11 to 3.21	0.99	-0.36 to 2.34
Men	3.64***	2.13 to 5.15	3.10***	1.57 to 4.62	2.07**	0.69 to 3.46
Anxiety score	1.79***	0.80 to 2.77	1.67*	0.62 to 2.73	1.10*	0.14 to 2.06
Women	1.39	-0.05 to 2.84	1.24	-0.31 to 2.79	0.68	-0.49 to 2.23
Men	2.41***	1.11 to 3.71	1.98**	0.65 to 3.32	1.29*	0.07 to 2.52
Dichotomous outcomes	**Model 1: Bivariate**		**Model 2: Model 1 + covariates**		**Model 3: Model 2 + social stressors**	
	RR	*95% CI*	*ARR*	*95% CI*	*ARR*	*95% CI*
Depressive symptoms	1.67***	1.32 to 2.12	1.59***	1.24 to 2.04	1.37**	1.09 to 1.72
Women	1.27	0.85 to 1.91	1.20	0.80 to 1.80	1.11	0.76 to 1.62
Men	2.16***	1.59 to 2.93	2.00***	1.45 to 2.77	1.54*	1.09 to 2.15
Anxiety symptoms	1.62*	1.09 to 2.40	1.64*	1.08 to 2.49	1.47	0.99 to 2.19
Women	1.43	0.87 to 2.36	1.46	0.87 to 2.45	1.31	0.81 to 2.13
Men	2.02*	1.17 to 3.47	1.78	0.97 to 3.27	1.56	0.85 to 2.85
Low self-rated health	1.85**	1.21 to 2.82	1.77*	1.15 to 2.60	1.64*	1.07 to 2.51
Women	2.05*	1.15 to 3.68	2.04*	1.14 to 3.64	1.78*	1.02 to 3.11
Men	1.67	0.95 to 2.97	1.55	0.84 to 2.86	1.51	0.83 to 2.73

*RR, relative risk; ARR, adjusted relative risk; CI, confidence interval. *p<0 .05, **p<0.01, ***p<0.001. Estimates were weighted to account for probability of selection, stratification, and clustering. Model 2 covariates: gender, age, race, ethnicity, relationship status, parental education, and social desirability bias.*

When we controlled for social stressors (model 3), we found that the associations remained significant between minority sexual identity and depression score, depressive symptoms, anxiety score, and low overall health, although the magnitude of the associations decreased. The association between minority sexual identity and anxiety symptoms was no longer significant.

DISCUSSION

In this national cross-sectional study of individuals entering U.S. medical schools, we found that 5% of students identified as a sexual minority, a proportion higher than general population estimates (2.4% - 3.8%).[157–159] We found that SM men in medical school were at significantly greater risk of depression and anxiety compared with their heterosexual peers. Our findings are consistent with an established body of research that reports higher rates of depression and anxiety among SM individuals compared with heterosexual individuals in the general population,[108–113,115] and emerging evidence of such disparities among medical students.[127,128]

These disparities in mental health status have been attributed primarily to the stigma and discrimination faced by LGB individuals as a marginalized minority group in the United States.[87,135] Indeed, we found that SM medical students were significantly more likely than their heterosexual peers to report experiencing harassment, insults, and social isolation during the previous year. When we adjusted for these social stressors in our analysis, we found that SM men's exposure to stressors appeared to attenuate the observed association between sexual identity and depression and anxiety. Our findings contribute to a growing body of evidence about the significant detrimental impact of minority stress on the health of SM individuals.

Prior studies suggest that SM medical students experience discrimination and other social stressors throughout their medical training.[128,160–162] In a survey conducted by the AAMC, 17% of LGB medical students described the social, personal, and learning environments at their institutions as hostile toward SM students.[163] In a survey of LGB physicians, 15% reported experiencing harassment and 22% reported social ostracizing by professional colleagues.[164] Fear of discrimination may decrease LGB students' comfort and willingness to disclose their sexual orientation, which has been identified as an important issue for these students.[165]

We found that male sexual minority students were significantly more likely than their heterosexual counterparts to report depressive symptoms, but we did not observe a corresponding difference between sexual minority and heterosexual female students. The greater risk of depression among male sexual minority students may be a consequence of sexual minority men's greater exposure to discrimination and stigma, as reported in the literature.[42,43] On the other hand, female sexual minority students had a significantly greater risk of reporting low self-rated health than their heterosexual counterparts, a finding that was not observed for male students. More research is necessary to understand the source of this health disparity among women by sexual orientation. Studies of mental health in the general population have documented sexual orientation disparities in psychological distress among women,[108,109,115,120,166,167] though these findings are not consistent across the literature.[113,168]

The additional social stress experienced by SM students may exacerbate the stress experienced by medical students overall. Numerous studies have demonstrated that medical students, in general, experience higher rates of mental distress, including

depression and anxiety, than the general population of young adults.[4,98,100,169–172] The mental health burden among medical students has implications for their academic performance and retention. Several studies have found a link between mental health distress, academic difficulties, and dropping out of medical school.[25,173] Another potential consequence of psychological distress is burnout, which is a syndrome of emotional exhaustion, depersonalization, and reduced sense of personal accomplishment.[174] SM medical students and physicians may experience more burnout than their heterosexual colleagues as a result of stigma, concealment of their sexual orientation, and discrimination.

Our findings, along with previous research, suggest that SM students may face greater difficulties in medical school due to psychological distress when compared with their heterosexual counterparts. This, in turn, may lead to the underrepresentation of LGB providers, undermining AAMC and AMA calls to increase sexual orientation diversity among future physicians.[25,138] Furthermore, findings from a number of studies demonstrate that greater contact with SM individuals is strongly correlated with more positive attitudes of heterosexual individuals toward SM groups.[175–178] Underrepresentation of SM individuals among medical students and providers may limit opportunities for contact, which may, in turn, limit heterosexual physicians' opportunities to increase their comfort and competence in interacting with LGB patients. Taken together, the underrepresentation of LGB providers and heterosexual providers' discomfort in caring for LGB people may exacerbate sexual minority patients' experiences of discrimination and receipt of poor quality health care.[179–182]

Increasing attention and resources have been committed to reducing psychological distress and improving well-being among U.S. medical students.[6,183,184] Although sexual minority students are likely to benefit from these general interventions, it is doubtful that these programs will effectively address the mental health disparities we observed between heterosexual and sexual minority students. Our finding that sexual minority students are beginning their medical education facing a greater mental health burden than their heterosexual peers demonstrates a need for early, targeted interventions.

Medical schools can play a key role in promoting students' well-being and academic success by implementing evidence-based interventions that protect and improve students' mental health[61–65] and by creating an environment that is inclusive of all students, including sexual and gender minorities.[66] For example, medical education programs should implement policies that promote the equal treatment of lesbian, gay, bisexual, and transgender (LGBT) medical students, such as adopting non-discrimination policies that include sexual orientation and gender identity/expression as protected classes, offering school-sponsored health insurance to students' same-sex and different-sex partners on an equal basis, and including coverage of gender affirmation health care services in school-sponsored health plans.[67,68185,186] Given that bias against lesbian and gay individuals persists among heterosexual medical students despite shifts in public opinion over the past decade,[54] medical schools can also promote respectful interactions among students by implementing diversity programs and adopting a zero-tolerance policy toward discrimination and harassment. In addition, medical schools can increase the visibility of sexual and gender minority people by hiring openly LGBT faculty and staff, creating LGBT resource centers, and including instruction on the health of LGBT people

as part of the general curriculum. More information on strategies to enhance medical school experiences for LGBT students is available in a GLMA: Health Professionals Advancing LGBT Equality 2013 white paper.[67]

This study has several limitations. First, the cross-sectional nature of the data limits our ability to examine causal and mediational relationships between sexual identity, mental health outcomes, and social stressors. While we consider the role that social stressors may play in attenuating the association between sexual identity and health, we cannot determine empirically whether the stressors do, in fact, mediate this relationship. It is possible that students who experience more psychological distress are also more likely to feel socially isolated or stigmatized.

Second, although the mental health and well-being of sexual minority individuals are shaped by a common experience of discrimination, combining all non-heterosexual students into one larger category may have obscured differences between them. Similarly, we believe that more research on the health and wellness of transgender medical students is necessary. Although we underscore that sexual orientation and gender identity are not equivalent constructs, transgender and gender nonconforming people share LGB people's historically marginalized social status as a result of their departure from dominant gender norms.[135] It is therefore likely that transgender students similarly experience a greater mental health burden than their cisgender (i.e., nontransgender) peers, and more research in this population is needed.

A third limitation may stem from our inability to ascertain and invite participation of all medical students entering the sampled schools in 2010, creating potential selection bias. Despite a robust response rate (81% of the students invited to participate and 55% of

all first-year medical students at the 49 schools), it is possible that our results do not generalize to the students who did not participate. Nevertheless, the demographic characteristics of the CHANGES sample are similar to those of all students matriculating in U.S. medical schools in 2010, as reported by the AAMC,[31] suggesting that our findings are likely generalizable to medical students overall.

Using baseline data from a national survey of students matriculating at 49U.S. medical schools in 2010, we found disparities in depression, anxiety, and self-rated health between sexual minority students and heterosexual students. As articulated in an AAMC report, "diversity is an essential component for promoting excellence in medical education and accessible, quality health care."[25] Ensuring the mental health and well-being of sexual minority medical students is crucial to attracting, retaining, and graduating a diverse population of future physicians. Our findings suggest that medical schools should implement tailored programs aimed at improving the mental health and well-being of sexual minority students.

3. Pervasiveness of Heteronormative Medical Socialization in US Medical Schools and Its Negative Consequences on Students' Psychological Distress

BACKGROUND

Medical socialization is the transformation of non-medical novices into medical professionals through the assimilation of professional attitudes, beliefs, values, and norms. What often remains without adequate critique is the standard to which medical students are being socialized, i.e., the culture that medical socialization reproduces. This standard, much like medicine itself, is often interpreted as neutral, devoid of culture, "dispassionate, abstract, and objective."[12,13] However, social institutions, including that of medicine, do not manifest an objective reality, but are instead socially constructed, and therefore possessing of a history and a culture.[14] Thus, the professed neutrality of medicine renders invisible and ignorable the white, male, heterosexual, and upper/middle class cultural standards that underlie medical education.[15–17] A number of scholars have acknowledged this normative standard as pervasive throughout medicine.[18,20,23,24]

The critical corollary of socialization to the standards of the dominant social groups is that non-normative group membership is implicitly construed as antithetical to the medical profession. As a result, medical socialization demands that members of formerly excluded groups, those who do not fit the "mold" of a typical physician, conform to "standards and norms that are supposedly neutral and universal, but in fact are socially and culturally specific."[13] This leads to the marginalization of students on the basis of their identities, experiences, characteristics, and other categories of difference.[17–22]

One such standard that medical socialization reproduces is heteronormativity. In its simplest definition, *heteronormativity* is the privileging of a heterosexual sexual orientation, along with its definitional implication of a biologically determined gender binary. It is the "myriad ways in which heterosexuality is produced as a natural, unproblematic, taken-for-granted, ordinary phenomenon."[34] In other words, heteronormativity is the norm that justifies or makes invisible the power hierarchy that privileges some and oppresses others. Heteronormativity has been largely unexplored and unchallenged in numerous institutions, including medicine. This is of particular concern, as "health […] care provision is based on the concepts and assumptions of heterosexuality."[187] Clearly, medical education is not uniform, and not all medical schools are the same. Nonetheless, heteronormativity is a cultural standard that, to varying degrees, permeates these social institutions, leading to the marginalization of students who depart from the heterosexual norm. However, to date, no studies have explored and quantified students' exposure to heteronormativity in a nationally representative sample of medical schools.

Some might ask why it matters whether medical schools socialize future medical professionals to a heteronormative cultural standard. First and foremost, both overt heterosexism and more covert heteronormativity that is embedded in medical education can marginalize sexual minority students – i.e., those whose identity, behaviors, and/or relationships differ from those concordant with normative heterosexuality – within the medical profession. Marginalization is a dynamic *process* of othering, subordinating, and socially excluding groups of people on the basis of their identities, associations, experiences, and environments, resulting in social inequity, power hierarchies, and

oppression.[37] It is also the *experience* of being marginalized – the resulting feelings, reflections, perceptions, actions, and responses of individuals and communities who are the foci of marginalization.

Secondly, physicians who are socialized to a particular dominant cultural standard – whether that be heteronormativity, white supremacy, or patriarchy, among others – have been found to internalize these standards,[131–133] and as a result, will struggle to provide culturally appropriate care to patients from marginalized groups.[188,189] Medical education that reifies, however unintentionally, the normative presumptions that "there are only two sexes; that it is 'normal' or 'natural' for people of different sexes to be attracted to one another; that these attractions may be publicly displayed and celebrated; [and] that social institutions such as marriage and the family are appropriately organized around different-sex pairings"[34] will result in medical professionals who will then reproduce these presumptions in their practice. Indeed, as stated by the former Secretary of US Health and Human Services in 2011: "The lack of culturally competent providers is a significant barrier to quality health care for many LGBT people."[190]

Third, marginalization carries real and meaningful *consequences* for people's health, well-being, and life courses. One possible consequence of students' exposure to heteronormative medical socialization is greater psychological distress. The mental health of medical students in general has long been of concern to healthcare researchers, medical educators, and policy makers,[91,92] with an extensive body of research finding that medical students experience significant psychological distress, including depression, anxiety, fatigue, burnout, and suicidal ideation,[4,6,100,8,93–99] often in excess of the general population.[5,104] Emerging evidence further suggests that this psychological distress is due,

at least in part, to the conditions and processes of medical training. Dyrbye and coauthors[105] directly investigated the association between the medical school learning environment, personal life events, and distress among 1,701 medical students (response rate: 55%) enrolled at six institutions in 2006. The authors found that students' perceptions of their medical school's learning environment was predictive of greater burnout among medical students, while negative personal life events, such as divorce or illness, were not.

Within the stressful and marginalizing context of medical schools, it is also important to acknowledge that there is an extensive body of research documenting mental health disparities – i.e., a higher burden of mental illness resulting from social marginalization – between sexual minority and heterosexual populations.[108,109,111–117] Sexual minority people begin experiencing greater psychological distress in adolescence and early adulthood, which then persists through the life course into older adulthood.[118,119] In current scholarship, the increased risk of mental distress and disorders among sexual minority populations is widely understood as a consequence of *minority stress*,[28,191–194] an elaboration of the social stress theory.[27] The social stress theory suggests that conditions of the social environment may act as stressors that affect mental and physical health.[195] In addition to being socially based, minority stress occurs above and beyond the general social stressors that are experienced by all people; it is also chronic, in that it is linked to relatively stable social hierarchies and structures.[87]

Therefore, sexual minority medical students may be at particular risk of psychological distress and its negative ramifications given their exposure to heteronormative socialization in medical school. Though limited, a small literature is

emerging that indeed is documenting a higher burden of psychological distress among sexual minority medical students. Lapinski, Yost, Sexton, and LaBaere (2016)[127] conducted a web-based survey of 1,294 osteopathic medical students (response rate 19.3%) to evaluate modifiers of student burnout, including sexual orientation. The authors found that 62.5% of sexual minority students experienced burnout, compared to 38.9% of heterosexual students (OR=2.6; 95 % CI, 1.61–4.29). In an earlier study by Lapinski and Sexton (2014)[128] of 1,334 osteopathic medical students (32.4% response rate), the authors found that students who identified as gay, lesbian, bisexual, and mostly heterosexual had 2.2 times greater odds of meeting the clinical criteria for depression (as assessed using the Major Depression Inventory) that students who identified as completely heterosexual. Similarly, according to a 2013 pilot study conducted by the Association of American Medical Colleges[129] (n=3,466, response rate: 18%), sexual minority students had higher levels of stress when compared to heterosexual students (point estimates were not provided in the study report). Finally, Przedworski, et al. (2015)[26] examined differences in depression and anxiety symptoms among 4,732 first-year medical students (response rate 81.3%), and found that sexual minority medical students had a 59% higher risk of depressive symptoms and a 64% higher risk of anxiety symptoms (as assessed using the PROMIS Depression and PROMIS Anxiety measures) when compared to their heterosexual peers.

However, it is unclear whether the emerging research documenting mental health disparities by sexual orientation among medical students[127–129] is capturing the effect of medical school on mental health or an exogenous trend. Put differently, the question is: *Are medical schools psychologically unhealthy for sexual minority medical students?*

Extant studies have been unable to explore this question due to limitations of their design. First, all studies published to date have evaluated the association between psychological distress and sexual minority status cross-sectionally, making it impossible to distinguish whether the observed differences were the result of their specific exposure to heteronormative medical socialization or general social marginalization. Second, most studies to date have had poor response rates (less than 35%, excluding the Przedworski, et al. study), limiting the generalizability of the findings. Third, no studies to date have directly evaluated the relationship between heteronormative medical school exposures and psychological distress.

In this paper, I sought to fill the current gaps in knowledge by conducting the first study of medical students' exposure to heteronormative medical socialization and its consequences on student psychological distress. The specific research questions I sought to answer were:

1. ***Are medical students in the United States exposed to heteronormative medical socialization, and does the magnitude of reported exposure vary by sexual minority status?***

   My first aim was to examine the prevalence of reported exposures to heteronormative medical socialization. Further, by additionally stratifying this analysis by sexual minority status, my aim was to evaluate whether LGB medical students are more likely than heterosexual students to report exposure to heteronormative socialization.

2. ***Does exposure to a heteronormative socialization climate in medical school predict higher depression and anxiety scores during the fourth year of medical school, and does this association differ between LGB and heterosexual students?***

My second aim was to evaluate the consequences of heteronormative medical socialization on students' psychological distress. My expectation was that while heteronormative socialization would be detrimental to the mental health of all students, it would be particularly deleterious for LGB students. Unlike other studies, the longitudinal design of this study makes it possible to evaluate whether differences in psychological distress are exogenously derived or the result of medical training itself.

METHODS

Data source

The Medical Student Cognitive Habits and Growth Evaluation Study (hereafter: CHANGES) was designed to examine changes in medical students' well-being, experiences, and attitudes during medical school. CHANGES employed a stratified multistage sampling design. In the first stage, medical schools were stratified by geographical region and public/private status into 11 strata, and a probability sample of schools was selected. Roughly the same proportion (43%) of schools was sampled from each stratum resulting in a target sample size of 50 schools.

In the second stage, the study attempted to recruit all first-year students enrolled in the selected schools (for a participant recruitment flowchart, see Appendix A). There were no publicly available complete and accurate lists of incoming medical students from which to sample. Thus, we recruited participants using a combination of three strategies:

1) The Association of American Medical Colleges (AAMC) administers the Matriculating Student Questionnaire (MSQ) in late spring/early summer to all students who will be entering medical school that year. In the 2010 MSQ, the

AAMC included a question allowing respondents to provide an email address if they were interested in participating in CHANGES.

2) A list of first-year medical students (incomplete) purchased from an AMA-licensed vendor.
3) Students contacted us as a result of a referral (snowball) sampling strategy. When students completed the survey they were asked to let other students in their first-year class know about the study. Students who learned of the study through a classmate referral contacted study staff directly. After we confirmed eligibility and non-duplication, they were sent an invitation to participate in the study.

Students completed a baseline questionnaire during the fall and winter of their first year of medical school (2010), and a follow-up questionnaire during the spring of their fourth year of medical school (2014). The University of Minnesota and Mayo Clinic Institutional Review Boards approved the study. Students received a $50 incentive for participation in the baseline questionnaire and $75 incentive for completing the follow-up questionnaire.

Response rate

In total, there were 8,763 students who enrolled in one of the 50 sampled medical schools in 2010. One of the 50 schools sampled for our study was a military school that had highly unique features, including different acceptance policies, curriculum structure, timing, and student characteristics. Because of concerns about the generalizability of study findings, this school was excluded from the analysis (n = 169 first-year students). The resulting total universe of potential respondents was 8,594. Through the combination of the three recruitment strategies outlined above, we were able to contact 5,823 of the

potential respondents, of whom 4,732 completed the baseline survey, yielding a response rate of 81.3% (55.1% of all first year medical students enrolled at the 49 sampled schools). The overall response rate was comparable to or exceeded other published studies of medical students.[9,105]

In the spring of 2014 (i.e., during the spring semester of the cohort's fourth and final year in medical school) all 4,732 baseline study participants were sent an email inviting them to participate in the follow-up survey, along with a link to the questionnaire. We received completed surveys from 3,959 students. Students who reported that at the time of completing the survey they were not in their 3rd or 4th year of medical school for any reason (usually due to delaying attendance for a life event or pursuing another degree, such as a PhD, simultaneously) were excluded (n=203), leaving longitudinal data for 3,756 students (79.4% retention rate).

Measures

Sexual minority status

Sexual identity was assessed at baseline (year 1) and again at follow-up (year 4). At baseline sexual identity was assessed by asking students "What is your sexual orientation: heterosexual, bisexual, homosexual, or other?" Students who selected homosexual were re-categorized as gay/lesbian to better represent current linguistic conventions within the LGBTQ community. At follow-up, sexual identity was assessed by asking respondents: "Do you think of yourself as: heterosexual or straight, gay or lesbian, bisexual, don't know, something else." I generated a ***sexual minority status*** variable that categorized students who identified as gay, lesbian, or bisexual at both time

points as LGB, while students who identified as heterosexual at both time points were the reference group.

Respondents who selected “other” at baseline (n=9) or “something else” at follow-up (n=10) were excluded from the analytic sample, because there were too few of these students to consider as a separate study group, and it would be incorrect to include them as part of either the LGB or heterosexual group. Students who selected “don’t know” (n=28) were also excluded from the sample, due to the fact that two types of respondents have been shown to select this item: those who are in the process of figuring out their sexual identity, as well as those who do not understand the wording of the question.[196]

Students whose sexual minority status changed between baseline and follow-up (n=79, 2.2%) were also dropped from the analyses. This was done to reduce the possibility of introducing a spurious correlation between sexual identity change and psychological distress, given that sexual identity change itself has been found to be associated with an increase in depressive symptoms independent of the heteronormativity/heterosexism of the social context.[197] This also ensured that only those LGB and heterosexual students who had continuous and consistent levels of exposure to their school’s heteronormative socialization climate were included in the sample.

Depression and anxiety at year 4 of medical school

There were two psychological distress outcomes in this study: depression and anxiety, both assessed at year 4 of medical school (i.e., follow-up) using the Patient Reported Outcomes Measurement Information System (PROMIS) Short Forms. The 6-

item PROMIS-Depression Short Form evaluates negative mood, positive affect, negative views of self, and negative social cognition;[198] while the 4-item PROMIS-Anxiety Short Form evaluates fear, anxious misery, and hyperarousal.[199] Specifically, respondents were asked "How often have each of the statements below been true for you?" in the past 7 days. The six depression items were: "I felt 1) worthless 2) helpless, 3) like a failure, 4) depressed, 5) unhappy, and 6) hopeless." For anxiety the 4 items were: "I felt: 1) anxious, 2) worried, 3) nervous, and 4) uneasy." Response options were on a five-point scale from never to very often.

Items were summed and standardized using the PROMIS online scoring application to generate T-scores.[200] These scores are standardized to a mean of 50, representing the US general population mean, with 10 as the standard deviation.[142] A higher score indicates poorer mental health, e.g., a respondent with a depression score of 62 has more depression symptoms than a respondent with a depression score of 45. Importantly, the standard deviation of 10 does not represent a clinically meaningful difference. Instead, researchers have reported severity thresholds for PROMIS Depression and Anxiety that are much closer to the mean.[201] For example, depression scores that are 2.5 points higher than the mean (i.e., 52.5) have been found to be indicative of mild depressive symptoms.

Both PROMIS measurement tools have been rigorously validated. In a study comparing PROMIS-Depression against the Center for Epidemiological Studies-Depression scale (CES-D) and the Patient Health Questionnaire-9 (PHQ-9), PROMIS-Depression had strong convergent validity with both comparison instruments.[202] Similarly, PROMIS-Anxiety showed a good interscale correlation with the Mood and

Anxiety Symptom Questionnaire (MASQ), the Generalized Anxiety Disorder-7 scale (GAD-7) and the Positive Affect and Negative Affect Schedule (PANAS).[203] Table 3.1 links the PROMIS Depression and Anxiety scores to the corresponding most commonly used legacy instrument (PHQ-9 and GAD-7, respectively).[204]

Table 3.1*: Linking PROMIS Depression to PHQ-9 and PROMIS Anxiety to GAD-7*

DEPRESSION	PHQ-9	PHQ-9 cut points	Corresponding PROMIS T score
	No symptoms	< 5	< 52.5
	Mild symptoms	5 – 9	52.5 – 59.8
	Moderate to severe symptoms	≥ 10	≥ 59.9
ANXIETY	GAD-7	GAD-7 cut points	Corresponding PROMIS T score
	No symptoms	< 5	< 54.6
	Mild symptoms	5 – 9	54.6 – 62.2
	Moderate to severe symptoms	≥ 10	≥ 62.3

Finally, while depression and anxiety scores at year 4 (i.e., follow-up scores) were the main outcome variables, given the longitudinal design of CHANGES, I also had information about students' depression and anxiety scores at year 1, as they were commencing medical school (i.e., baseline scores). Including this information in relevant analyses allowed for an evaluation of *changes* in students' psychological distress over the course of medical school. This is important, as previous research suggests that sexual minority students begin medical school with more depression and anxiety than their heterosexual peers.[205]

Heteronormative socialization factors

The first heteronormative factor examined in this study was how safe students perceived their medical school to be for LGBT students, assessed by asking respondents to rate how strongly they agree with the statement "My medical school is a safe place for

gay, lesbian, bisexual, and transgender students" on a 7-point Likert scale: strongly disagree, moderately disagree, somewhat disagree, neither agree nor disagree, somewhat agree, moderately agree, strongly agree. I collapsed somewhat/moderately agree into a single category, and somewhat/moderately/strongly disagree into a single category, resulting in a 4-category variable, ***unsafe for LGBT students***: very safe, somewhat safe, neither safe nor unsafe, unsafe.

The second heteronormative factor was ***heterosexist faculty role modeling***, which was derived from two items: 1) faculty making negative comments about "lesbian, gay, or bisexual patients," and 2) faculty discriminating against an "LGBT patient." While the latter item included transgender patients as targets of discriminatory treatment, it is consistent with heteronormative role modeling. These two items were correlated and had a Cronbach's alpha of 0.69. The first item asked students to report the frequency (5-point scale: never, rarely, sometimes, often, very often) with which they "heard/witnessed professors, instructors, attendings and/or residents make negative comments, disparaging remarks, or jokes about gay, lesbian, or bisexual patients" while in medical school. The second item asked students to report the frequency (on the same scale) with which they "witnessed discriminatory treatment of an LGBT patient" while in medical school. I calculated the mean of the two items for each student and then categorized respondents into three ordinal categories of exposure to heterosexist faculty role modeling: never, rarely, and sometimes/often/very often to avoid cells with fewer than 20 respondents.

The third heteronormative factor was ***witnessed heterosexist microaggressions toward other students***. Respondents were first asked "During your years in medical school, how often did you witness or hear about another student(s) having each of the

following experiences and either believe or wonder if it might be because of their race, ethnicity, gender, sexual orientation, obesity, poverty level, and/or disability?" The specific microaggressions included in this measure were: 1) received lower evaluation or grades for unfair or unjust reasons – rather than performance; 2) treated in an unfriendly way, as if they were not welcome; 3) subjected to offensive remarks/names; 4) treated with less respect than other medical students; 5) publicly humiliated; and 6) ignored by residents or attending physicians. For each of the six items, respondents could indicate whether they witnessed these microaggressions never, once, occasionally, often, or very often. Those who selected anything other than "never" in response to a specific microaggression item then received the following prompt: "You stated that you witnessed [specific microaggression, e.g., another student being publicly humiliated]. How likely is it that any of the following factors contributed?" Respondents could indicate the likelihood that the witnessed microaggression was due to the student's race/ethnicity, gender, sexual orientation, or body size on a 5-point likelihood scale (not at all likely, a little likely, somewhat likely, very likely, extremely likely). The Cronbach's alpha of the six microaggression items was 0.98. For this study, I first created six dichotomous variables, where 1 indicated that a respondent witnessed a particular microaggression and thought it was at least a little likely that it was due to the target's sexual orientation, and 0 indicated that a respondent had never witnessed a particular microaggression, or if they had they felt it was not due to the target's sexual orientation. Next I generated a categorical variable with three categories: did not witness heterosexist microaggressions, witnessed 1-3 types of heterosexist microaggressions, and witnessed four or more types

of heterosexist microaggressions. The cut points were selected to avoid cells with fewer than 20 respondents.

The three factors were weakly, thought significantly correlated (correlation coefficients ranged from 0.18 to 0.37) , suggesting that while related, these factors captured distinct aspects of a heteronormative socialization climate.

Finally, I generated a ***heteronormative socialization climate*** score that summed student responses across the three factors. The minimum score was 0, indicating that a student reported no heteronormative socialization, while the maximum score was 7, indicating that a student reported the maximum possible level of exposure to all three socialization factors. To ease interpretation, I standardized the climate scores to a mean of 0 and a standard deviation of 1.

Demographic covariates

All demographic covariates listed below have been shown in the literature to be associated with mental health. While it is unlikely that these variables are true confounders (i.e., they are not causally related to both the predictor and the outcome), they nonetheless may play a role in the relationship between sexual identity and mental health, as they are associated with both the independent variable and the outcome variables.[206] These include *age*,[207–209] assessed at baseline only and included as a continuous measure; *gender*,[150–156,210,211] which is a binary variable (male/female) assessed at baseline (students who selected "other" (n=3, all heterosexual) were dropped from the analysis); *racial minority status* (person of color or white person),[107,211,220,212–219] assessed at baseline; *relationship status* (not in a relationship, non-cohabiting relationship, engaged, married or living together),[221–226] as assessed at follow-up and

dichotomized into *single* and *in a relationship*; and *family income when in high school* ("What was the annual household income for your family during the time period you attended high school?" 1) less than $49,000, 2) $50,000 to $74,999, 3) $75,000 to $99,999, 4) $100,000 to $249,999, 5) $250,000 or more), as assessed at follow-up, dichotomized into $100,000 or more and less than $100,000.[227–231].

Missingness

Missingness was low across included variables, with no variable missing more than 3% of data. Complete data on *all* variables was available for 96.1% (n=3,395) of cases in the analytic sample. An examination of missing data did not reveal any systematic patterns. Cases with missing data were listwise deleted from analyses.

Analysis

The study inclusion criteria were: students who participated in both the baseline and follow-up surveys, answered the sexual identity question at both time points, and whose sexual minority status (SMS) did not change during medical school, resulting in an analytic sample of n=3,533. The statistical significance threshold was set a priori at $p<.05$. All analyses were conducted in Stata 15.[232]

Sample characteristics

I used descriptive statistics to characterize the demographics and psychological distress of LGB and heterosexual students, and performed appropriate tests (t-tests or tests of proportions) to examine the statistical significance of differences between the two groups.

Question 1: *What is prevalence of reported exposure to heteronormative medical socialization by sexual minority status?*

I first calculated the prevalence of reported exposure to the three heteronormative socialization factors (i.e., unsafe school for LGBT students, heterosexist faculty role modeling, and witnessed heterosexist microaggressions towards other students) in the overall sample and stratified by sexual minority status. I also calculated proportions of LGB and heterosexual students reporting exposure to the two items comprising heterosexist role modeling and the six witnessed heterosexist microaggression items. Finally, I calculated the mean heteronormative socialization climate score for heterosexual and LGB students.

I fit multilevel models to separately examine the association between SMS and the three heteronormative socialization factors, controlling for gender, age, racial minority status, family income, and relationship status. These models included a random component for the school, allowing school intercepts to vary while holding the slopes constant. This was done to account for the structure of the sample: students were nested within schools, which could have led to intraclass correlation (i.e., students within a school are more similar than students across schools). Then I obtained the predicted means for both LGB and heterosexual students, and plotted these estimates, along with their confidence intervals. Finally, I tested the association between sexual minority status and heteronormative socialization climate scores (standardized), adjusting for demographic characteristics (gender, age, racial minority status, family income, and relationship status).

***Question 2**: What is the association between the heteronormative socialization climate and psychological distress, and does it vary by sexual minority status?*

I used multilevel models to estimate the association between heteronormative climate scores (standardized) and follow-up depression/anxiety in the overall sample (i.e., regardless of students' SMS). Model 0 did included only SM status as a covariates, model 1 additionally included baseline depression/anxiety scores, and model 2 further included the demographic covariates (age, gender, racial minority status, family income, and relationship status). To evaluate whether there was an interaction between the heteronormative socialization climate and SMS in predicting psychological distress, I fit an interaction model, i.e., model 2 that included an interaction term (climate score*SMS).

RESULTS

Sample characteristics

Of the 3,533 students in the sample, 3.7% (n=130) identified as LGB and 96.3% (n=3,406) identified as heterosexual at both baseline and follow-up.

Demographic characteristics and psychological distress in the sample are presented in Table 3.2. Compared to heterosexual students who were equally split between male and female students, LGB students were more likely to be male (60.8%, p=0.013). LGB students were also, on average, 1.1 (p<0.001) years older than heterosexual students.

In terms of psychological distress, LGB students had higher depression scores than heterosexual students at both baseline (51.7 vs 50.0, p=0.030) and follow-up (51.0 vs. 48.8, p=0.007). Students' anxiety scores did not differ by sexual minority status. For

reference, a score of 52.5 is the cutoff for mild depression, and a score of 54.6 is the cutoff for mild anxiety.

Table 3.1*: Demographics and distress in the total sample and stratified by sexual minority status, CHANGES 2010-2014*

		Total	Heterosexual	LGB	
		n=3,533	*n=3,403*	*n=130*	*p*
Demographics	Gender				
	Male	50.1%	49.7%	60.8%	*0.013*
	Female	49.9%	50.3%	39.2%	
	Racial minority status				
	Person of color	37.1%	37.3%	32.6%	*0.274*
	White	62.9%	62.7%	67.4%	
	Relationship status				
	In a relationship	68.4%	68.6%	62.3%	*0.127*
	Single	31.6%	31.4%	37.7%	
	Family income in high school				
	$100,000 or more	55.7%	55.8%	53.1%	*0.557*
	less than $100,000	44.3%	44.2%	46.9%	
	Age at baseline (mean)	23.8	23.8	24.9	*<0.001*
Distress	Depression scores (mean)				
	Baseline	50.2	50.0	51.7	*0.030*
	Follow-up	49.1	48.8	51.0	*0.007*
	Anxiety scores (mean)				
	Baseline	57.9	57.8	58.3	*0.512*
	Follow-up	56.7	56.5	57.5	*0.197*

Two sample test of proportions used to evaluate the significance of differences for gender, racial minority status, relationship status, and income; two-sample ttest used for age.

In the overall sample, depression scores decreased by 1.1 points (from 50.2 to 49.1 points, $p<0.001$) and anxiety scores decreased by 1.2 points (from 57.9 to 56.7, $p<0.001$) (data not shown). When stratified by SMS, heterosexual students' depression and anxiety scores decreased by 1.2 points ($p<0.001$) and 1.3 points ($p<0.001$), respectively from baseline to follow-up, while LGB students did not see an equivalent decrease in either depression (-0.7 points, $p=0.364$) or anxiety scores (-0.7, $p=0.374$).

Question 1 results

The proportions of students reporting exposure to the three heteronormative socialization factors (i.e., unsafe school for LGBT students, heterosexist faculty role modeling, and witnessed heterosexist microaggressions towards other students), overall and stratified by SMS, are presented in Table 3.2. Compared to 3.8% of heterosexual students, 18.8% ($p<0.001$) of LGB students reported that their medical school was unsafe. A higher proportion of LGB students also reported witnessing frequent heterosexist role modeling (24.4% vs. 5.4%, $p<0.001$). LGB students were also more likely than heterosexual students to report witnessing between one and three (21.9 vs. 15.4, $p=0.048$), as well as four or more (28.9% vs. 11.2%, $p<0.001$) heterosexist microaggressions towards other students.

Table 3.2*: Student exposure to three heteronormative socialization factors, overall and stratified by sexual minority status, CHANGES 2010-2014*

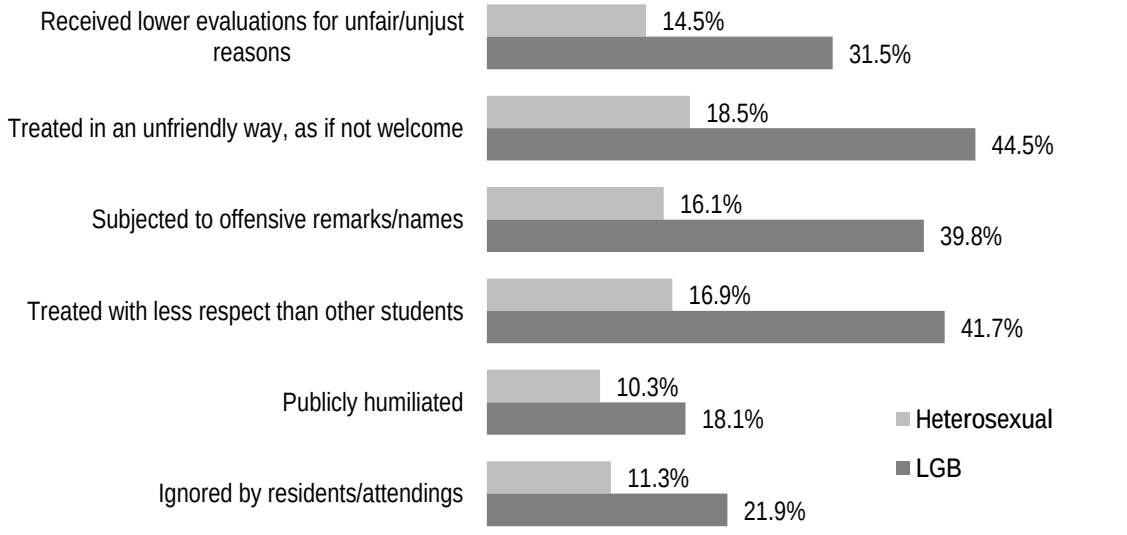
	Total (n=3,533) %	Heterosexual (n=3,403) %	LGB (n=130) %	*p-value*
School safety for LGBT students				
Very safe	46.6	46.8	39.8	0.120
Somewhat safe	39.9	40.0	36.7	0.460
Neither safe nor unsafe	9.3	9.4	4.7	0.069
Unsafe	4.3	3.8	18.8	<0.001
Heterosexist role modeling *(2 items)*				
Never	47.0	47.9	22.8	<0.001
Rarely/Sometimes	46.9	46.7	52.8	0.178
Often/Very often	6.1	5.4	24.4	<0.001
# of witnessed microaggressions (*6 items*)				
None	72.3	73.2	49.2	<0.001
One to three	15.7	15.4	21.9	0.048
Four or more	12.1	11.4	28.9	<0.001

Significance calculated using two-sample tests of proportions. Heterosexist role modeling items: 1) derogatory comments about LGB patient and 2) discriminatory treatment of LGBT patient. Heterosexist microaggression items: 1) lower grades, 2) unfriendly treatment, 3) offensive remarks/names, 4) disrespect, 5) public humiliation, and 6) ignored by residents or attending physicians.

In terms of the two constituent items of heterosexist role modeling (data not shown), LGB students were more likely than heterosexual students to report witnessing professors, instructors, attendings and/or residents make negative comments, disparaging remarks, or jokes about LGB patients both occasionally (61.4 vs. 46.9, p=0.001) and frequently (13.4% vs. 3.2%, p<0.001). Similarly, LGB students were more likely than heterosexual students to report witnessing discriminatory treatment of an LGBT patient both occasionally (40.9% vs. 21.1%, p<0.001) and frequently (6.3% vs. 1.0%, p<0.001).

LGB students were more likely than heterosexual students to report witnessing each of the six types of microaggressions perpetrated against another student due (at least in part) to that student's sexual orientation (Figure 3.1, all significantly different from heterosexual at p<0.001).

Figure 3.1*: Proportion of students who witnessed each of the six types of heterosexist microaggressions, by sexual minority status; CHANGES 2010-2014*



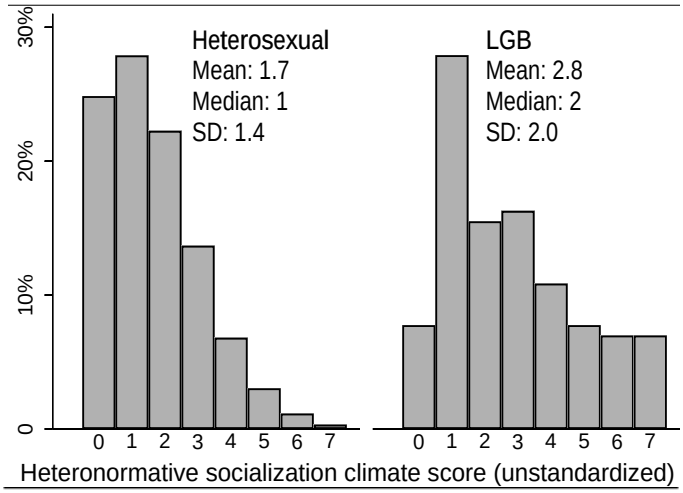
Unadjusted prevalence. Differences between LGB and heterosexual students evaluated using two-sample tests of proportions. All differences significant at p<0.001

The most commonly reported types of heterosexist microaggressions among both LGB and heterosexual students were witnessing another student being: 1) treated in

unfriendly way (44.5% vs. 18.5%), 2) disrespected (41.7% vs. 16.9%), and 3) subjected to offensive remarks/names (39.8% vs. 16.1%). The least common type of heterosexist microaggression was public humiliation, which was reported by 18.1% of LGB students and 10.3% of heterosexual students.

The distributions of heteronormative socialization climate scores by sexual minority status are presented in Figure 3.2. Overall, 76.1% of heterosexual students and 92.3% of LGB students ($p<0.001$) reported any level of exposure to a heteronormative socialization climate in medical school. Heterosexual students had a mean score of 1.7 (median=1, SD=1.4), whereas LGB students had a mean score of 2.8 (median=2, SD=2.0, $p<0.001$).

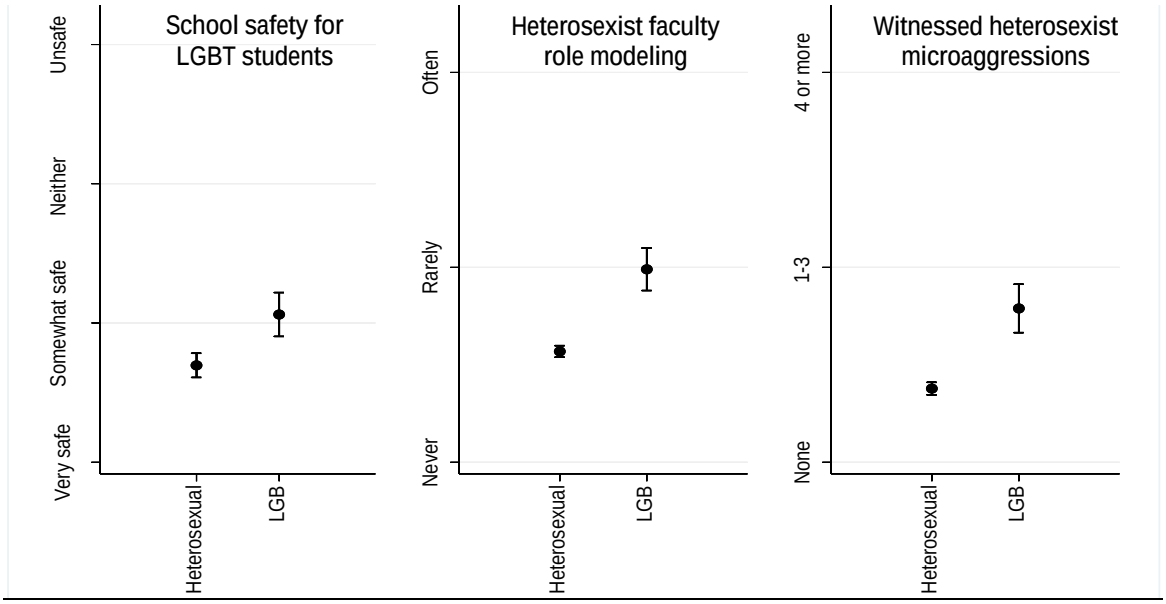
Figure 3.2*: Distribution of climate scores by SMS*



Climate scores are the sum of three heteronormative socialization factors; higher score = more reported exposure

Predicted means of the three heteronormative socialization factors by sexual minority status, adjusted for demographic characteristics, are presented in Figure 3.3. LGB students had higher predicted means for all three factors, paralleling unadjusted results. In terms of school safety, LGB students had a predicted mean of 1.1 ([0.9 – 1.2], $p<0.001$), which was higher than that of heterosexual students (0.7 [0.6 – 0.8]).

Figure 3.3*: Predicted means of three heteronormative socialization factors by sexual minority status, CHANGES 2010-2014*



Predicted mean values obtained from multilevel models with random school intercept, adjusted for age, racial minority status, gender, family income, and relationship status.

In terms of heterosexist faculty role modeling, LGB students had a predicted mean of 1.0 ([0.9 – 1.1], p<0.001) whereas heterosexual students had a predicted mean of 0.6 [0.5 – 0.6]. Finally, in terms of witnessed heterosexist microaggressions towards other students, those who identified as LGB had a predicted mean of 0.8 ([0.7 – 0.9], p<0.001) and heterosexual students had a predicted mean of 0.4 [0.3 – 0.4].

Estimates of the association between sexual minority status and overall heteronormative socialization climate scores (standardized), controlling for demographic characteristics, are shown in Table 3.3. Analogous to the unadjusted results, LGB students had adjusted heteronormative climate scores that were 0.8 standard deviations higher (95% CI: [0.6 – 0.9], p<0.001) than the scores of heterosexual students. Being female, a person of color, and single also predicted higher heteronormative climate scores, however the effect sizes were smaller (between 0.1 and 0.2).

***Table 3.3**: Association of sexual minority status and standardized heteronormative climate scores; CHANGES 2010-2014*

	Heteronormative socialization climate score (standardized)		
	Coef.	*95% CI*	*p value*
LGB *(ref. heterosexual)*	0.8	[0.6, 0.9]	<0.001
Female *(ref. male)*	0.1	[0.0, 0.2]	0.008
Person of color *(ref. white)*	0.2	[0.1, 0.3]	<0.001
Single *(ref. in a relationship)*	0.1	[0.0, 0.2]	0.011
Income less than $100,000 *(ref. $100,000+)*	0.0	[-0.0, 0.1]	0.149
Age *(continuous)*	0.0	[-0.0, 0.0]	0.068

Estimates from multilevel models with random school intercept. Climate scores standardized to a mean of 0 and standard deviation of 1. Coefficients are the number of standard deviations climate scores differed between groups.

Question 2 results

Table 3.4 presents the estimated change in depression and anxiety scores at follow-up with standardized heteronormative socialization climate scores. Adjusting for SM status only (Model 0), depression increased by 1.8 points ([1.5, 2.1], <0.0011) and anxiety increased by 1.0 points ([0.7-1.3], p<0.001) with each standard deviation increase in climate scores. Additionally adjusting for baseline depression/anxiety scores (Model 1) attenuated the effect size to a 1.3-point increase ([1.1, 1.6], p<0.001) in depression scores and a 0.8-point increase ([0.5-1.0], p<0.001) in anxiety scores. Further adjusting for demographic covariates did not meaningfully affect score estimates (Model 2). No interactions between climate scores and sexual minority status in predicting depression or anxiety scores at follow-up were observed (Interaction model).

The difference between the scores of those at the 25th and 75th percentiles of standardized climate scores (data not shown) was 1.6 points for depression (48.4 vs. 50.0) and 1.0 points for anxiety (57.3 vs. 56.3).

***Table 3.4**: Association between heteronormative climate and depression and anxiety scores at follow-up, CHANGES 2010-2014*

DEPRESSION AT FOLLOW-UP

	Model 0		Model 1 Model 0 + baseline depression		Model 2 Model 1 + demographic covariates		Interaction model Model 2 + climate score*SM status	
	Points	[95% CI] *p-value*	Points	[95% CI] *p-value*	Points	[95% CI] *p-value*	Points	[95% CI] *p-value*
Climate score *(standardized)*	1.8	[1.5, 2.1] *<0.001*	1.3	[1.0, 1.6] *<0.001*	1.2	[0.9, 1.5] *<0.001*	1.2	[0.9, 1.5] *<0.001*
SM status	0.7	[-0.8, 2.2] *0.381*	0.4	[-1.0, 1.8] *0.605*	0.2	[-1.2, 1.7] *0.758*	0.1	[-1.5, 1.7] *0.872*
Depression at baseline *(cont.)*			0.4	[0.4, 0.4] *<0.001*	0.4	[0.4, 0.4] *<0.001*	0.4	[0.4, 0.4] *<0.001*
Female (*ref. male*)					-0.3	[-0.8, 0.3] *0.314*	-0.3	[-0.8, 0.3] *0.319*
Person of color *(ref. white)*					0.6	[-0.0, 1.1] *0.059*	0.6	[-0.0, 1.1] *0.058*
Single *(ref. in a relationship)*					1.9	[1.3, 2.4] *<0.001*	1.9	[1.3, 2.4] *<0.001*
Income <$100K *(ref. $100K+)*					0.3	[-0.3, 0.8] *0.313*	0.3	[-0.3, 0.8] *0.313*
Age *(continuous)*					0.2	[0.1, 0.3] *<0.001*	0.2	[0.1, 0.3] *0.001*
Climate score*SM status (*interaction*)							0.2	[-0.9, 1.2] *0.787*

ANXIETY AT FOLLOW-UP

	Model 0		Model 1 Model 0 + baseline anxiety		Model 2 Model 1 + demographic covariates		Interaction model Model 2 + climate score*SM status	
	Points	[95% CI] *p-value*	Points	[95% CI] *p-value*	Points	[95% CI] *p-value*	Points	[95% CI] *p-value*
Climate score *(standardized)*	1.0	[0.7,1.3] <0.001	0.8	[0.5, 1.0] <0.001	0.8	[0.5, 1.0] <0.001	0.7	[0.4, 1.0] <0.001
SM status	0.1	[-1.5, 1.7] *0.899*	0.1	[-1.3, 1.6] *0.886*	0.4	[-1.0, 1.9] *0.563*	0.4	[-1.3, 1.0] *0.676*
Anxiety at baseline *(cont.)*			0.4	[0.4, 0.5] *<0.001*	0.4	[0.4, 0.4] *<0.001*	0.4	[0.4, 0.4] *<0.001*
Female (*ref. male*)					1.6	[1.0, 2.1] *<0.001*	1.6	[1.0, 2.1] *<0.001*
Person of color *(ref. white)*					0.1	[-0.5, 0.7] *0.671*	0.1	[-0.5, 0.7] *0.668*
Single *(ref. in a relationship)*					0.1	[-0.5, 0.7] *0.718*	0.1	[-0.5, 0.7] *0.721*
Income <$100K *(ref. $100K+)*					-0.4	[-1.0, 0.2] *0.153*	-0.4	[-1.0, 0.2] *0.153*
Age *(continuous)*					0.1	[-0.1, 0.2] *0.305*	0.1	[-0.1, 0.2] *0.306*
Climate score*SM status (*interaction*)							0.1	[-1.0, 1.3] *0.810*

Estimates from multilevel models with random school intercept. Climate scores standardized to a mean of 0 and standard deviation of 1.

DISCUSSION

This study is the first to empirically document the pervasiveness of heteronormative medical socialization in US medical schools, and its negative consequences on students' psychological distress. Strikingly, fully three-quarters of heterosexual students and nearly all LGB students in this sample reported some level of exposure to heteronormative socialization while pursuing their medical education. Moreover, being exposed to heteronormative socialization predicted greater psychological distress among all students, regardless of their sexual minority status.

Without exception, LGB medical students were much more likely to report exposure to heteronormative medical socialization factors than were heterosexual students. For example, one in five of LGB respondents reported that their medical school was unsafe for LGBT students, compared to less than one in 20 heterosexual students. The stark difference between heterosexual and LGB students in the reported levels of heteronormative exposures is unsurprising and, in fact, further underlines how imbedded, pervasive, and "normal" heteronormativity is within the context of medical socialization. Heteronormativity, by definition, is largely invisible, particularly to those who do not violate normative heterosexual expectations. If medical schools aim to meaningfully cease reproducing oppressive social norms, the voices and experiences of marginalized students must be centered within such efforts, as these students are more likely to notice and be aware of problematic and discriminatory behavior and events.

Heterosexist role modeling by faculty was unacceptably high, with half of heterosexual students and three-quarters of LGB students reporting being witness to discriminatory treatment towards, or derogatory comments about, LGB patients.

Interactions with medical school faculty, attendings, and residents have been identified as key to the medical socialization process.[23,46,49,58,61,79,80] This leads to the marginalization of minority students.[20,21,75,76] Moreover, exposure to role models who demonstrate prejudice, disrespect, or mistreatment of patients from marginalized groups conveys a message to all students that such behaviors are not only expected, but even desirable.[131] Students who internalize these messages risk reproducing such heterosexist behavior in their own practice, reducing the quality of care received by sexual minority patients and contributing to the well documented health disparities experienced by sexual minority people.

Medical students were also exposed to disconcertingly high levels of heterosexism towards other students. This is unfortunately characteristic of medical schools, which have failed to create a welcoming, supportive atmosphere for minority students in general.[77] Half of LGB students and a quarter of heterosexual students reported witnessing some type of microaggression towards others due to the target's sexual orientation. While the level of reported exposure varied both by type of microaggression and students' sexual minority status, even the most rarely witnessed microaggression – public humiliation – was reported by ten percent of heterosexual students and eighteen percent of LGB students. As another example, nearly a sixth of heterosexual students and a third of LGB students reported witnessing others receiving unjustly lower evaluations or grades due to their sexual orientation. The findings of this study comport with a study by Risdon, Cook, and Willms (2000),[75] who found that gay and lesbian physicians in Canada reported "a lot of covert homophobia." This should be of significant concern to medical schools, as the findings of this study reveal a pervasive

hostile climate that marginalizes sexual minority medical students. Indeed, there is a corresponding literature that finds that witnessing the discriminatory behavior of "significant others" in medical school can marginalize students who do not fit the normative "mold" of medical professionals, resulting in feelings of isolation and not belonging.[21,75] Furthermore, witnessing heterosexist events, such as LGB students being ignored or called offensive names, affirms heterosexual students' explicit and implicit biases, reproducing the very social conditions that give rise to discriminatory events.[132]

In terms of psychological distress, while LGB students had significantly higher depression scores at follow-up than did heterosexual students, this appears to be a disparity that arose exogenous of heteronormative medical socialization (or at least independent of the manner in which heteronormative medical socialization was operationalized in this study). Given the well-established association between minority stress and psychological distress among sexual minority people,[27,28,87,191–194] I had expected heteronormative medical school exposures to function as a type of minority stress in the etiology of depression and anxiety among LGB students. However, despite their demonstrably greater reported exposure to heterosexism in medical school, LGB students' psychological distress did not change meaningfully during medical school relative to heterosexual students.

In fact, heteronormative medical socialization was psychologically unhealthy for all students who perceived it, *regardless* of their sexual minority status. While surprising given my expectations, this finding parallels that of Hardeman, et al. (2016).[233] In this previously published study using CHANGES data, the authors found that students' perception of a negative racial climate was detrimental to the mental health of all

students, regardless of their racial identity. The authors interpreted their findings to suggest that recognizing one's medical school as being inequitable and hostile towards students who are members of racial/ethnic minority groups may be perceived by non-minority students as a reflection of an unwelcoming climate for all.

Indeed, it is possible that exposure to heteronormative school climates functions differently in the etiology of psychological distress of majority and minority group members, with LGB students experiencing it as a form of minority stress (i.e., chronic and socially-based stress that occurs above and beyond general stressors that are experienced by heterosexual people),[87] and heterosexual students viewing it as a reflection of a generally hostile climate. Alternatively, both LGB and heterosexual students might view themselves as members of the same marginalized in-group. Within medicine, medical students are seen to occupy the lowest rungs of the social hierarchy. As such, perceived heterosexism may be internalized by students not as a manifestation of sexuality-based marginalization, but rather of professionally-based marginalization.

Regardless of its etiology, the resulting psychological distress can have a significant impact on an individual's quality of life, social functioning, and future health.[211,234,235] For medical students, psychological distress can additionally lead to poorer academic performance, as demonstrated in a study by Hojat, et al. (1993)[7] who found that depression and anxiety were as predictive of subsequent grades as MCAT scores, and more predictive of clinical ratings. Similarly, Dyrbye and colleagues (2010)[9] found that students who had symptoms of depression had three times the odds of seriously considering dropping out of school. Another potential consequence of psychological distress is lower empathy. For example, Thomas and colleagues (2007)[236]

found that burnout and depression were inversely correlated with both cognitive and emotive empathy among students in medical schools in Minnesota. Empathy is a central characteristic of medical professionalism and a key component of patient care.[237] Such consequences, in addition to affecting the students' themselves, have broader implications for patient care.

Finally, the sexual identity diversity of medical students in this sample was also of interest. At most, 6.2% of the sample identified as gay, lesbian or bisexual at one point in medical school. On its face this proportion appears higher than the prevalence of LGB people in the general population (4.5%),[238] however this does not account for stratification by age. Given that 95% of students in the sample were millennials (i.e., born between 1980 and 1999), our results suggest that LGB students are, in fact, underrepresented in US medical schools, as current national estimates of the proportion of millennials who identify as LGB range from 8.2%-16%.[238,239] On an individual level, such underrepresentation may cause LGB students to feel unwelcomed in their medical programs, to struggle to find a community of peers, and to have limited mentorship opportunities. On a structural level, underrepresentation can reproduce the normative idea of medical doctors as heterosexual, further reifying heteronormative medical socialization.

The findings of this study must be interpreted within the context of its strengths and limitations. In terms of generalizability, this study leveraged a large survey of students recruited from a nationally representative sample of US medical schools. It also had a high response rate within its sampling frame (over 80%) and good retention over time (close to 80%). However, the study did not include nearly half of all first-year

students enrolled in the sampled medical schools due to our inability to obtain all potential participant's contact information, therefore limiting generalizability. Moreover, to increase our response rates we relied on snowball (referral) sampling, which may have introduced selection bias into the sample. Nonetheless, the racial and gender composition of the CHANGES cohort was similar to the that of all students who matriculated at U.S. medical schools in 2010 (the same year CHANGES participants were recruited into the study),[26] as reported by the AAMC.[25]

Another strength of this study is its longitudinal design. By surveying students both as they were commencing and completing medical school, it was possible to evaluate their psychological distress independent of their levels of distress upon entering medical school. In fact, a supplemental analysis revealed that without accounting for students' baseline depression scores, a cross-sectional analysis would have suggested a disparity by sexual minority status in depression. To be clear, LGB medical students do experience more depressive symptoms than their heterosexual peers: they enter medical school with more psychological distress, and they finish medical school with more psychological distress. It's just that medical schools do not appear to exacerbate this disparity, at least based on the findings of this study.

One critique of this study could be that it relied on students' *perceptions* of the heteronormative climate, not some "objective" assessment. I would argue, however, that any assessment that purports to be more "objective" than students' own lived experiences of marginalization is, in and of itself, perpetuating the very marginalization it seeks to measure. Instead of discounting the voices of students, particularly minority students, as somehow "subjective" and therefore deficient, these voices should instead be

acknowledged as the most meaningful and useful source of information possible, both in terms of understanding students' lived experiences, and in identifying points of intervention within the etiology of medical student psychological distress.

Similarly, one might criticize the manner in which heteronormative medical socialization was operationalized in this study. This is a fair concern, as heteronormativity can manifest in many different ways. CHANGES was not designed to specifically evaluate heteronormative medical socialization, and as such, I was limited to the measures included in the dataset. That being said, each of the heteronormative socialization factors I included in this study is theoretically justified and had been previously empirically identified as key to the socialization process.[23,46,49,58,61,79,80]

Finally, despite drawing from the largest longitudinal cohort of medical students to date, as with much sexual minority health research, this study was limited by small sample sizes. Had a larger sample been available, I would have further examined the role of different sexual minority identities (i.e., gay/lesbian vs. bisexual), as well as gender, racial minority status, and age, in the relationship between heteronormative socialization and psychological distress. Though there is no theory to currently suggest that these characteristics be considered within the context of this specific study (i.e., heteronormative medical socialization), emerging empirical evidence has revealed that in the general population, bisexual people may be at particular risk of psychological distress.[111,117,122,240] Similarly, people with intersecting marginalized identities (i.e., those who experience more than one form of social oppression, for example, sexual minority people of color)[241] may experience heteronormative medical socialization differently, resulting in variation in resulting psychological distress.

SUPPLEMENTAL ANALYSES

Comparison of LGB students included and excluded from the study

Assessing sexual identity at both baseline and follow-up allowed for an examination of sexual identity change over time. How students identified in the sample was quite dynamic, with 2.2% (n=79) of students reporting a change in their sexual minority status between baseline and follow-up. Of those who's SMS changed, 63.3% (n=50) went from identifying as heterosexual to identifying as LGB, and 36.7% (n=29) went from identifying as LGB to identifying as heterosexual.

There are at least two potential reasons for the (not insignificant) change in responses over the four years of medical school. The first is that this change is representative of the fluidity of sexual identity, particularly in younger cohorts.[242–244] The second is the change in the wording of the sexual identity question in the two surveys. Again, the baseline survey question asked "What is your sexual orientation: heterosexual, bisexual, homosexual, other", while the follow-up survey question asked "Do you think of yourself as: heterosexual or straight, gay or lesbian, bisexual, don't know, something else." In all likelihood, both reasons are at least partially true, though the latter is of lesser concern, as all terms used in these questions are likely to be understood by respondents with higher educational attainment, as suggested by prior research.[245,246]

In Supplemental Table S.1, I compare LGB respondents included in the analytic sample (i.e., those whose SMS did not change) with respondents who were excluded from the analytic sample because their SMS changed during medical school (i.e., they identified as LGB at only one time point).

Supplemental Table S.1*: Comparison of LGB respondents included and excluded from the analytic sample, CHANGES 2010-2014*

		No SMS change (included)	SMS change (excluded)	
		n=130	*n=79*	*p*
Demographics	Genders			
	Male	60.8%	46.8%	*0.049*
	Female	39.2%	53.2%	
	Racial minority status			
	Person of color	29.8%	31.5%	*0.806*
	White	70.2%	68.5%	
	Relationship status			
	In a relationship	62.3%	57.0%	*0.444*
	Single	37.7%	43.0%	
	Family income in high school			
	$100,000 or more	53.1%	51.9%	*0.864*
	less than $100,000	46.9%	48.1%	
	Age at baseline (mean)	24.9	24.1	*0.084*
Distress	Depression scores (mean)			
	Baseline	51.7	51.2	*0.688*
	Follow-up	51.0	51.6	*0.623*
	Anxiety scores (mean)			
	Baseline	58.3	60.8	*0.021*
	Follow-up	57.5	58.5	*0.443*
Climate	Unsafe (standardized mean)	0.4	0.3	*0.601*
	Role modeling (standardized mean)	0.7	0.4	*0.050*
	Microaggressions (standardized mean)	0.6	0.1	*0.003*
	Overall climate (standardized mean)	0.7	0.3	*0.023*

Two sample test of proportions used to evaluate the significance of differences for gender, racial minority status, relationship status, and income; two-sample ttest used for age, psychological distress, and climate variables. Climate variables were standardized to a mean of 0 and standard deviation of 1.

Few demographic and distress differences were observed: those who reported a change in SMS were more likely to be female (53.2% vs. 39.2%, p=0.049) and had higher baseline anxiety scores (60.8 vs. 58.3, p=0.021) than those whose SMS had not changed during medical school.

It is not surprising that students who identified as heterosexual for a portion of medical school reported less exposure to heteronormative socialization than those who did not have heterosexual privilege at any point during medical school. Heterosexual privilege, as with all forms of social privilege, renders the corresponding social

marginalization invisible. As such, the results of this supplemental analysis support my decision to exclude LGB students whose SMS changed during medical school from the analytic sample.

Association between SMS and standardized heteronormative socialization factors

In the main study analysis, I had estimated the predicted unstandardized means of the heteronormative socialization factors by SMS. However, the three factors were on different scales, so here I conduct a supplemental analysis to allow for a direct comparison across them.

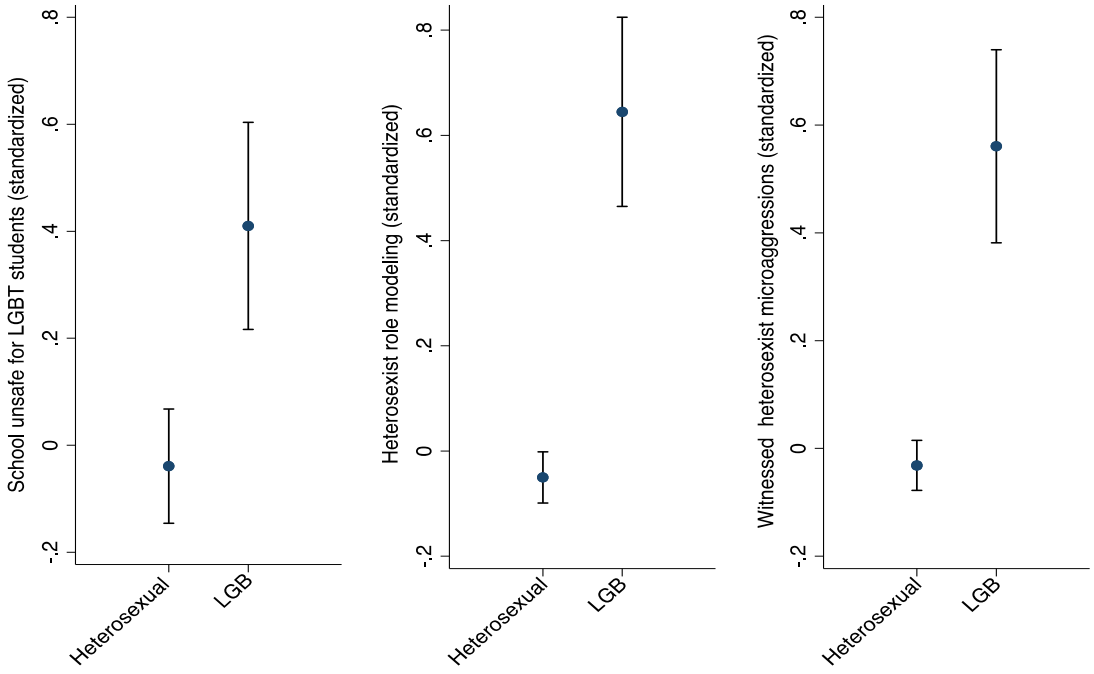
Supplemental Table S.2*: Adjusted associations between SMS and individual heteronormative socialization factors (standardized), CHANGES 2010-2014*

LGB (ref. heterosexual)	Unsafe (standardized)	Role modeling (standardized)	Microaggressions (standardized)
Predicted difference in standardized means	0.4	0.7	0.6
95% confidence interval	[0.3, 0.6]	[0.5, 0.9]	[0.4, 0.8]
p-value	<0.001	<0.001	<0.001

Estimates obtained from multilevel models with random school intercept, adjusted for age, racial minority status, gender, family income, and relationship status. Climate factors standardized to mean=0 and SD=1.

Compared to heterosexual students (Supplemental Table S.2), LGB students' standardized means were 0.4 ([0.3 – 0.6], p<0.001) standard deviations higher for unsafe school for LGBT students, 0.7 ([0.5 – 0.6], p<0001] standard deviations higher for heterosexist role modeling, and 0.6 ([0.4 – 0.8], p<0.001) standard deviations higher for witnessed microaggressions. The predicted standardized means for heterosexual and LGB students (which are now on the same scale) are visualized in Supplemental Figure S.1.

Supplemental Figure S.3*: Predicted standardized means of heteronormative factors by SMS, CHANGES 2010-2014*



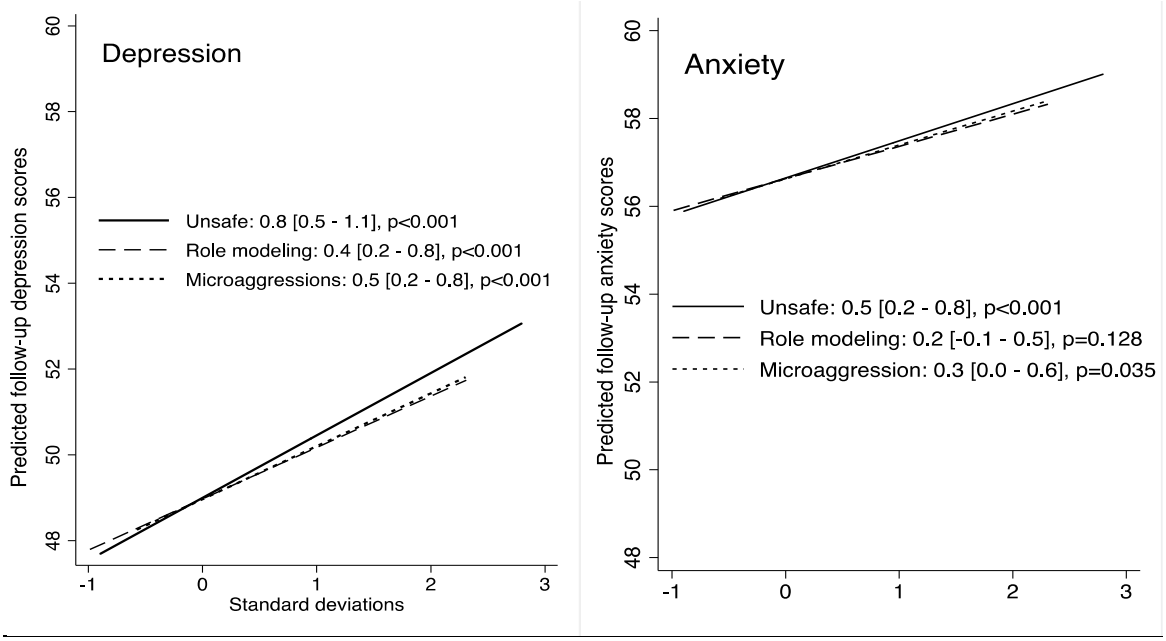
Predicted standardized means from multilevel models with random school intercept, adjusted for age, racial minority status, gender, family income, and relationship status. Factors standardized to a mean of 0 and SD of 1.

Independent associations between the three heteronormative socialization factors and psychological distress

In the main analysis I examined the association between overall heteronormative socialization climate scores and psychological distress. In this supplemental analysis, I loaded all three heteronormative socialization factors into the same multilevel model, adjusted for baseline distress scores, gender, racial minority status, age, income, and relationship status, and included a random component for school intercept, to estimate their independent association with depression and anxiety at follow-up. There was a weak positive correlation between the three factors (0.18-0.37) so collinearity was not a concern.

The estimated association between the three factors and psychological distress are presented in Supplemental Figure S.2. In terms of school safety for LGBT students, each standard deviation increase in reported exposure resulted in a 0.8-point increase in depression ([0.5 – 1.1], p<0.001) and a 0.5-point increase in anxiety ([0.2 – 0.8], p<0.001). Similarly, each standard deviation increase in witnessed microaggressions was associated with a corresponding 0.5-point increase in depression ([0.2 – 0.8], p<0.001) and a 0.3-point increase in anxiety ([0.0 – 0.6], p=0.035). Each standard deviation increase in heterosexist role modeling was associated with a 0.4-point increase in depression ([0.2 – 0.8], p<0.001), but not with anxiety.

Supplemental Figure S.4*: Linear prediction of the associations between three heteronormative socialization factors (standardized) and follow-up distress scores, CHANGES 2010-2014*



Obtained from multilevel models with random school intercept, controlling for baseline scores, gender, racial minority status, age, income, and relationship status. Climate scores standardized to a mean of 0 and standard deviation of 1.

While perceived medical school safety for LGBT students predicted the highest change in both depression and anxiety scores, the overlapping confidence intervals suggest that no one factor was more strongly predictive of psychological distress than the

others. Finally, there were no interactions between SMS and any of the three factors in predicting psychological distress at follow-up in the fully adjusted models, which is consistent with main study findigns (data not shown).

Change score models and the association between heteronormative climate and psychological distress

In the main analyses, I found that heteronormative school climate is associated with students' psychological distress at follow-up independent of students' depression and anxiety levels at baseline. To establish this, I had used baseline adjusted models, which are widely used in the literature, are conceptually straightforward, and are the preferred method of the CHANGES research team. However, baseline adjusted models have been critiqued for potentially inflating regression coefficient estimates, particularly when the exposure is associated with baseline health status or in cases of imperfectly measured baseline scores.[247,248]

Therefore, in this supplemental analysis, I evaluate whether estimates obtained from change score models – the analytic alternative to baseline adjusted models[247] – are consistent with main study findings. In change score models, the dependent variable is the *difference* between students' follow-up and baseline depression/anxiety scores (i.e., year 4 score – year 1 score), and baseline scores are not entered into the models at all.

The results of the change score models are presented in Supplemental Table S.3. The change score model estimates are consistent with those of baseline adjusted models (see Table 4.5 of main text), but the effect sizes were smaller. Each standard deviation increase in heteronormative climate scores corresponded to a 0.6-point increase in

depression scores from baseline in the change score model, whereas in the baseline adjusted model it corresponded to a 1.2-point increase. Similarly, each standard deviation in climate scores was associated with a 0.4-point increase in anxiety in change score models, and a 0.8-point increase in the baseline adjusted model.

Supplemental Table S.3*: Association of standardized heteronormative climate with psychological distress change scores without baseline adjustment, CHANGES 2010-2014*

	DEPRESSION					
	Model 0 No covariates			Model 1 + demographic covariates		
	Δ score	*95% CI*	*p*	Δ score	*95% CI*	*p*
Heteronormative socialization climate (standardized)	0.6	[0.3, 0.9]	<0.001	0.6	[0.2, 0.9]	0.001
Female *(ref. male)*				-1.3	[-1.9, -0.7]	<0.001
Person of color *(ref. white)*				0.0	[-0.7, 0.7]	0.970
Single *(ref. in a relationship)*				1.2	[0.6, 1.9]	<0.001
Income <$100K *(ref. $100K+)*				0.1	[-0.5, 0.8]	0.684
Age *(continuous)*				0.3	[0.1, 0.4]	<0.001
	ANXIETY					
	Model 0 No covariates			Model 1 + demographic covariates		
	Δ score	*95% CI*	*p*	Δ score	*95% CI*	*p*
Heteronormative socialization climate (standardized)	0.4	[0.1, 0.7]	0.009	0.4	[0.1, 0.7]	0.014
Female *(ref. male)*				0.0	[-0.6, 0.6]	0.947
Person of color *(ref. white)*				-0.0	[-0.7, 0.6]	0.921
Single *(ref. in a relationship)*				-0.1	[-0.7, 0.7]	0.732
Income <$100K *(ref. $100K+)*				-0.5	[-1.1, 0.2]	0.141
Age *(continuous)*				0.1	[0.0, 0.3]	0.050

Estimates from multilevel models with random school intercept. Climate scores standardized to a mean of 0 and standard deviation of 1. Coefficients are the number of standard deviations climate scores differed between groups.

While the change score models are more conservative, I decided to retain the baseline adjusted models as the main analysis for two reasons: one, they are conceptually more straightforward and easier to interpret, and two, it allowed me to directly examine SMS differences in follow-up depression and anxiety scores both with and without accounting for baseline distress.

Association between SMS and psychological distress

In the main study results, I found that, while heteronormative school climate is associated with students' psychological distress at follow-up, it appeared to neither increase or decrease the observed disparity in depression or anxiety between LGB and heterosexual students (i.e., non-significant interaction terms). However, this may have been a consequence of the way heteronormative climate was operationalized in the study: had I been able to evaluate other manifestations of heteronormativity in medical socialization, I may have observed moderation by sexual minority status.

Therefore, in lieu of a different operationalization of heteronormative climate, in this supplemental analysis, I used sexual minority status itself as a climate exposure proxy. In other words, by evaluating the association of LGB identity with psychological distress relative to heterosexual identity, it is possible to indirectly examine whether something about medical school is psychologically unhealthy for LGB medical students.

To do this, I fit three models to the data. In the first model (Model 0), I regressed sexual minority status on depression/anxiety at follow-up, model 1 additionally controlled for age, gender, racial minority status, family income, and relationship status, while model 2 also adjusted for baseline depression/anxiety scores.

Supplemental Table S.4 presents the association between sexual minority status and psychological distress at follow-up across the three models. Identifying as LGB predicted higher depression scores at follow-up in model 0 (unadjusted: 2.1 points [0.6 – 3.7] points, p=0.008) and model 1 (adjusted for demographic characteristics: 1.8 points [0.2 – 3.4], p=0.23). However, after including baseline depression scores in model 2, this association was no longer significant. Being a person of color, single, or older

significantly predicted higher depression scores at follow-up, even after accounting for baseline depression scores. Sexual minority status did not predict higher anxiety scores at follow-up in any of the models. The only demographic characteristic that predicted follow-up anxiety scores in the full model was female gender.

Supplemental Table S.4*: Association between sexual minority status and psychological distress, CHANGES 2010-2014*

DEPRESSION AT FOLLOW-UP									
	Model 0 No covariates			Model 1 + demographic covariates			Model 2 Model 1 + baseline depression		
	Points	*95% CI*	*p*	*Points*	*95% CI*	*p*	*Points*	*95% CI*	*p*
LGB *(ref. heterosexual)*	2.1	[0.6, 3.7]	0.008	1.8	[0.2, 3.4]	0.023	1.1	[-0.3, 2.5]	0.132
Female *(ref. male)*				0.6	[0.0, 1.2]	0.039	-0.2	[-0.8, 0.3]	0.424
Person of color *(ref. white)*				1.2	[0.5, 1.8]	<0.001	0.7	[0.1, 1.3]	0.014
Single *(ref. in a relationship)*				2.4	[1.8, 3.0]	<0.001	1.9	[1.3, 2.5]	<0.001
Income <$100K *(ref. $100K+)*				0.5	[-0.1, 1.1]	0.123	0.4	[-0.3, 0.9]	0.284
Age *(continuous)*				0.2	[0.0,0.3]	0.006	0.2	[0.1,0.3]	<0.001
Depression at baseline *(cont.)*							0.4	[0.4, 0.5]	<0.001
ANXIETY AT FOLLOW-UP									
	Model 0 No covariates			Model 1 + demographic covariates			Model 2 Model 1 + baseline anxiety		
	Points	*95% CI*	*p*	*Points*	*95% CI*	*p*	*Points*	*95% CI*	*p*
LGB *(ref. heterosexual)*	0.9	[-0.6, 2.5]	0.247	1.2	[-0.4, 2.8]	0.126	1.0	[-0.5, 2.5]	0.180
Female *(ref. male)*				2.7	[2.1, 3.3]	<0.001	1.6	[1.0, 2.2]	<0.001
Person of color *(ref. white)*				0.3	[-.3, 1.0]	0.301	0.3	[-0.3, 0.9]	0.368
Single *(ref. in a relationship)*				0.4	[-0.2, 1.1]	0.184	0.2	[-0.4, 0.8]	0.534
Income <$100K *(ref. $100K+)*				-0.2	[-0.8, 0.4]	0.501	-0.4	[-1.0, 0.2]	0.186
Age *(continuous)*				0.0	[-0.1, 0.1]	0.682	0.1	[-0.0, 0.2]	0.241
Anxiety at baseline *(cont.)*							0.4	[0.4, 0.5]	<0.001

Estimates from multilevel models with random school intercept.

These results support the main study findings that medical schools are not, in and of themselves, psychologically unhealthy for sexual minority students.

4. "It complicated my medical school experience" – an examination of sexual minority students' exposure to heteronormative medical socialization

BACKGROUND

Locating sexual minority students in heteronormative medical socialization

Medical socialization, as commonly defined, entails an assimilation of institutional attitudes, beliefs, values, and norms, resulting in the transformation of non-medical novices into medical professionals. This definition rests on a central assumption: medical socialization requires the internalization of these attitudes, values, beliefs, and norms – i.e., an acquisition of the culture of the profession – by medical students.

What often remains without adequate critique is the standard to which medical students are being socialized: what exactly is the culture of medicine that socialization seeks to reproduce? Indeed, it could be argued that the pressure to produce a uniform "kind" of physician has increased in recent years as a result of growing professional hand-wringing about medical practice variability, and an increasing focus on care standardization.[10,11] These discourses of standardization strive for homogeneity and fundamental sameness, conveying a message that there is only "a single uniform way of being a competent, professional physician."[11] This standard, much like medicine itself, is often interpreted as neutral, devoid of culture, "dispassionate, abstract, and objective."[12,13] However, as argued by Berger and Luckmann,[14] social institutions, including those of medical education, do not manifest an objective reality, but are instead socially constructed, and therefore possess a history and a culture. Thus, the professed neutrality of medicine renders invisible and ignorable the white, male, heterosexual, and upper/middle class cultural standards that underlie medical education.[15–17] A number of

scholars have acknowledged this normative standard as pervasive throughout medical and graduate education.[18,20,23,24]

The critical corollary of socialization to the standards of the dominant social groups is that non-normative group membership is construed as antithetical to the medical profession. As a result, medical socialization demands that members of formerly excluded groups, those who do not fit the "mold" of a typical physician, conform to "standards and norms that are supposedly neutral and universal, but in fact are socially and culturally specific."[13] This leads to the marginalization of students on the basis of their identities, experiences, characteristics, and other categories of difference.[17–22]

In this paper, my goal is to make visible the heteronormative standard to which medical students are socialized by centering the experiences of those who identify as lesbian, gay, or bisexual (LGB). In its simplest definition, *heteronormativity* is the privileging of a normative heterosexual sexual orientation. The word means "quite simply, that heterosexuality *is* the norm, [emphasizing] the extent to which everyone, straight or queer, will be judged, measured, probed, and evaluated from the perspective of the heterosexual norm."[33] Kitzinger defines it is the "myriad ways in which heterosexuality is produced as a natural, unproblematic, taken-for-granted, ordinary phenomenon."[34] Lauren Berlant and Michael Werner elaborate on heteronormativity as:

> *The institutions, structures of understanding, and practical orientations that make heterosexuality seem not only coherent – that is, organized as a sexuality – but also privileged. Its coherence is always provisional, and its privilege can take several (sometimes contradictory) forms: unmarked, as the basic idiom of the personal and the social; or marked as a natural state; or projected as an ideal or moral accomplishment.*[35]

Heteronormativity is so fundamental to the conceptualization of the world that heteronormative assumptions are often completely unacknowledged. “In spite of its prevalence, heteronormativity remains largely invisible and elusive to most people […] creating the conditions for the oppression, suffering, annihilation, and erasure of individuals who do not conform to […] the heterosexual mandate.”[36] In other words, heteronormativity is the norm that justifies or makes invisible the power hierarchy that privileges some and oppresses others. Importantly, as explained by Kitzinger[34] “complicity with heteronormativity does not necessarily imply prejudiced attitudes or beliefs (e.g., as these are usually conceptualized by homophobia scales) or any deliberate intent to discriminate against LGBT people.”

Clearly, medicine as an institution is not uniform, and not all medical schools are the same. Nonetheless, heteronormativity is a cultural standard that, to a varying degree, permeates these institutions, resulting in a social hierarchy that benefits heterosexual students while disadvantaging LGB students. However, unlike the overt pathologizing and criminalization of non-heterosexual identities and behaviors of the past century, modern medical institutions re(produce) heteronormativity through more covert social processes, embedded within medical school curricula.

The formal, informal, and hidden curricula of medical education

While a number of socializing factors have been identified in medical education – including formal coursework, clinical training, role modeling, mentorship, anatomy labs, interpersonal contact with faculty, and peer culture – systematic frameworks for operationalizing the process of medical socialization are sparse. One particular framework, borrowed from education theories and advanced by Hafferty,[65] that can be

useful is one that deconstructs medical socialization into the formal, informal, and hidden curriculum.

Within the context of medical education, the *formal curriculum* is comprised of all official, often written, educational activities undertaken by the institution. This includes courses, lab work, evaluations, and syllabi, and any planned and intentional activities occurring in an educational setting, from lecture halls and seminar rooms to labs and clinics.[66] On its face, the formal curriculum conveys the knowledge and skills considered necessary for the practice of medicine, or the so-called "science of medicine." The *informal curriculum*, on the other hand, is seen as being integral to learning the "art of medicine."[67] It encompasses teaching that occurs during the unscripted, idiosyncratic, and opportunistic interpersonal interactions, often outside formal education settings (e.g. at a patient's bedside, in the elevator, in the on-call room). The informal curriculum is of particular relevance within medical education, as much of the training takes on an apprenticeship format, with students learning in an ad hoc manner from those with more seniority and experience in the context of daily work, as well as from other students. The lessons of the informal curriculum are perceived to be "the mechanism by which the wisdom of clinical practice is imparted and a trainee's abstract knowledge and skills are commuted to practical clinical functionality."[68]

The *hidden curriculum* describes structural aspects of medical education that convey the implicit values and norms of the profession. Contemporary scholars locate the hidden curriculum in the latent meanings and rules, the unstated tenets and beliefs that are transmitted to students; embedded in the structures, routines, and social relations of the educational institution.[10,54,56,66] Another way to understand the hidden curriculum is as

the learning environment (or climate) of the medical school.[65] A hidden curriculum can be made visible by asking: "What are the fundamental values and messages [i.e., norms] being created and transmitted within" various structures of medical training institutions, such as evaluation practices, resource allocation, policies, and institutional language.[69]

Marginalizing factors in the formal, informal, and hidden curricula

The idea that the contents of officially sanctioned coursework overtly espouse heteronormativity may at first appear improbable, given that the formal curriculum is seen primarily as a means of conveying "unbiased" medical knowledge. This does not mean, however, that it is devoid of marginalization. For example, the formal curricular teaching of many medical schools and psychiatry residency programs includes lessons on the psychological diagnosis of gender identity disorder (recently renamed gender dysphoria). The diagnosis has been vigorously criticized for pathologizing and stigmatizing individuals with gender minority identities and perpetuating discrimination against trans*[b] people, while upholding heteronormative assumptions, i.e., that biologically deterministic binary gender categories are the only "normal" gender identities.[73,74] As another example, Risdon, Cook, and Willms find evidence of heteronormative contents of the formal curriculum, quoting a medical student: "Whenever a health care problem has a gay person it has to do with AIDS or adolescent sexuality. There aren't any heart attack victims or diabetics who happen to be gay."[75] Through these formal curricula, "in myriad subtle (and not so subtle) ways, students were

[b] I use trans* as an umbrella term for individuals whose gender identities transcend biologically deterministic binary gender categories, including people who identify as trans men, trans women, gender nonconforming, gender queer, androgynous, and two spirit. In other words, trans* captures all people who are not cisgender (cisgender describes people whose sex assigned at birth and gender identity align according to normative gender/sex binary).

reminded of the negative connotations of their group membership," resulting in their social isolation and marginalization.[76] Importantly, apart from the marginalizing effect these narratives have on minority students themselves, equally problematic is their normative message that sanctions dominant students' privilege, as well as affirms any negative beliefs about and attitudes towards their minority peers, perpetuating oppressive power dynamics and interpersonal marginalization.

The formal curriculum can also convey additional normative information about what the profession considers important and valuable through the amount of time dedicated to a particular topic, whether the topic is included as part of required or elective coursework, and whether competency on the topic is evaluated.[65,69,77] A number of studies have also identified the *absence* of particular topics or perspectives (also referred to as the *null curriculum*) as a marginalizing factor in students' experiences of medical and graduate socialization.[18,20] For example, researchers examining clinical case studies presented to medical students found that nearly all of the almost one thousand cases reviewed failed to specify patient sexual orientation (though race and gender were commonly included).[78] The authors argue that when no mention is made of sexuality, students will make the heteronormative assumption that the patient is heterosexual, not only reinforcing the normalcy of a specific sexual orientation, but also rendering non-heterosexual persons invisible, and therefore ignorable.[78]

Researchers have also examined marginalization resulting from the interpersonal interactions of the *informal curriculum*. Interactions with medical school faculty, attendings, residents and other students have been identified as key to the socialization process.[23,46,49,58,61,79,80] Unsurprisingly, there is a corresponding literature that finds that

the informal curriculum can marginalize students who do not fit the normative "mold" of medical and graduate education. One of the most common marginalizing aspects of interpersonal interactions examined in the literature is faculty and physician discrimination towards patients, other physicians and healthcare staff, or students themselves.[20,21,75,76] Ludmerer argues that such exposure to oppressive events is characteristic of medical schools in general, which have failed to create a welcoming, supportive atmosphere for minority students.[77] Indeed, as demonstrated Risdon, Cook, and Willms (2000), gay and lesbian physicians in training reported "a lot of covert homophobia", resulting in feelings of isolation and not belonging.[75] Specifically, through interviews and focus groups with medical students and residents at four medical training programs across Canada, the authors found that gay and lesbian medical students and residents must contend with "hateful jokes and remarks targeting gay and lesbian patients." Apart from the demonstrable negative impact exposure to discriminatory events, such as disparaging comments or unfair grading, can have on minority students themselves, they affirm heterosexual students' explicit and implicit biases, reproducing the very social conditions that give rise to discriminatory events.[132]

While discrimination and microaggressions in the informal curriculum marginalize students who do not fit the normative mold of a medical professional, there is an additional *hidden curriculum* within the policies and structures of medical school that shapes basic assumptions about what the medical profession considers acceptable behaviors. Specifically, the strict hierarchy of medicine, the lack of policies requiring formal institutional recourse in cases of discrimination, and individual inaction in response to problematic behaviors all combine to convey a message to students that

discriminatory events are acceptable, and indeed "it is folly to question or contradict" them.[80] Thus, along with students' reports of experiencing or witnessing discrimination are findings that these same students often feel powerless to respond to these events. For one, it can be awkward, difficult, even risky for students to challenge those who are in a position of power over their grades or academic progress.[21,75] Meanwhile, students learn to accept certain discriminatory behaviors as normal based on other's reactions to them. The lack of reaction to problematic behaviors also serves to enforce a norm that requires minority people to see their experiences "as particularistic rather than linked to larger cultural and societal forces"[20] – in other words not as manifestations of social oppression but rather as isolated events specific to the individual.

These marginalizing characteristics of interpersonal interactions, as well as the hidden curriculum of their acceptability within the medical profession, are compounded by the lack of diversity among faculty and physician-teachers. The underrepresentation of certain groups in medicine represents a structural hidden curriculum that conveys a message that medical professionals "look" a particular way. A bisexual female engineering student described the impact of the white straight male standard within her profession thus: "To not fit these criteria, to be somewhat abnormal, somewhat strange, is a problem."[19] The lack of diversity also makes it more difficult for minority students to identify role models or establish relationships with mentors at their institution. For example, minority students in one study saw the presence of minority faculty as critical to their ability to succeed in their doctoral programs.[20] This was further reflected in the findings of a recent study of sexual minority medical trainees and faculty, where "having a mentor of the same sexual orientation […] was described as critical to successful

mentorship."[81] Nevertheless, only 40% of sexual minority respondents in the study sample worked with an LGBT-identified mentor in the previous year. Similarly, findings of an older survey of members of the (no longer extant) Gay, Lesbian, and Bisexual People in Medicine student committee, revealed that a third did not know of a single gay male faculty member and half did not know of a single lesbian female faculty member at their school.[82]

Further, minority students may feel like they do not belong to the normative social category of medical students due to sheer numerical underrepresentation, and therefore may struggle to establish group membership with their medical peers. To quote a lesbian medical student: "While I realize that there aren't exactly a lot of thirty-year-old lesbian mothers attending medical school in Ohio, it would be nice not to be the only one."[89] According to Hafferty, "persistent evidence of medicine's failure to recruit and train non-majority students" conveys a message that medical schools are dysfunctional and problematic learning environments.[64] Numerous studies have indeed found that minority students experience feelings of social loneliness, alienation and isolation, of being "uninvited guests in a strange land."[13,20,77,90] Fewer connections with medical peers can lead to lower rates of supportive collaboration, and can have detrimental effects on students' wellbeing and their resilience to stressors and psychological distress.[86]

Sexual orientation disclosure in medical school

> *'The closet' is a dangerous, fabricated heterosexual notion based on mistaken thinking […] and which must be unmasked in order to uncover its capacity to feed on the internalised self-oppression of homosexuals and keep heterosexuals under the norm of hetero-patriarchy.*[249]

Given the relative (in)visibility – or concealability – of sexual minority identities, which distinguishes it from minority identities that are more readily apparent (e.g., racial identity, body size, visible disabilities), an important manifestation of heteronormativity is the construct of the "closet." The closet is a symbolic space within the ambient heterosexist culture that both contains and restrains sexual minority identities, requiring sexual minority people to undertake a continuous process of "coming out." With every new interaction, every new context, every new situation, sexual minority people face the continuous decision to either disclose their stigmatized identity or to "pass" (i.e., either actively or passively conceal their sexual identity).[250] This "dilemma of disclosure" forces those with stigmatized identities to regularly interpret ambiguous social situations and cues in an "ongoing process that occurs with each interaction," resulting in a decisional quagmire that has been described as "the most difficult career challenge" for sexual minority people.[250]

As argued by Goffman "Because of the great rewards in being considered normal, almost all persons who are in a position to pass will do so on some occasion by intent" (p.95).[251] There are significant benefits of "passing" as heterosexual. By passing, sexual minority people reduce the risk of experiencing discrimination and social avoidance or disapproval, while benefiting from the privilege experienced by their heterosexual peers. As a result, many sexual minority people decide to conceal their sexual minority status in certain situations. For example, a 2018 survey by the Human Rights Campaign found that 46% of LGBTQ workers were closeted at work.[252]

However, concealing one's stigmatized identity is not without costs. One is the stress of maintaining the secrecy of one's minority status from others. Labeled the

"secrecy cycle," it can lead to an obsessive preoccupation with the secret.[253] The detrimental impact of non-disclosure was examined in 2013 study that found that those who were "in the closet" had more symptoms of anxiety, depression, and burnout, and higher cortisol levels than those who were not.[254]

Sexual minority medical students must navigate the decision to disclose or conceal their sexual identity within the context of heteronormative medical schools - a *reinventive* institution that demands complete commitment from medical students, with an expectation that new recruits will "weaken existing ties with other social groups and give the organization their undivided loyalty."[83] In a highly heteronormative environment, the costs of disclosure are more likely to outweigh the benefits, tipping the balance of the "dilemma of disclosure" in favor of concealment. Thus, the frequency with which sexual minority students decide to intentionally conceal their sexual minority status is a potent indicator of the heteronormativity of the ambient medical school culture: "Selves are always situated and, as a consequence, they always reflect their context in significant ways."[255]

Information on sexual minority status disclosure among LGB medical students is limited. In a 2010 survey of medical students, nearly one-in-three sexual minority students reported not being "out" at their medical school.[134] Concealment was lowest among those who identified as gay, lesbian or queer, and highest among those who identified as bisexual or questioning. The study, however, did not examine the frequency of disclosure versus concealment, nor from whom did students conceal their sexual minority status. While "nobody's business" was the most frequent justification for not disclosing one's sexual identity in the study, other frequently endorsed reasons included

fear of discrimination, social and cultural norms, concern over career options, and a lack of a supportive environment in medical school.[134] These results echo an earlier study that found that sexual minority medical student are hesitant to come out in medical school out of fear that peer and faculty evaluations will be negatively impacted if they become aware of a student's minority sexual orientation.[75]

The goal of this paper is to not only quantify students' exposure to a range of heteronormative socialization factors, but to also to center the voices and experiences of sexual minority students. To do this, I conducted a mixed-method study that provided a space for students to share, in their own words, the challenges and tribulations as sexual minority students within a heteronormative social institution.

METHODS

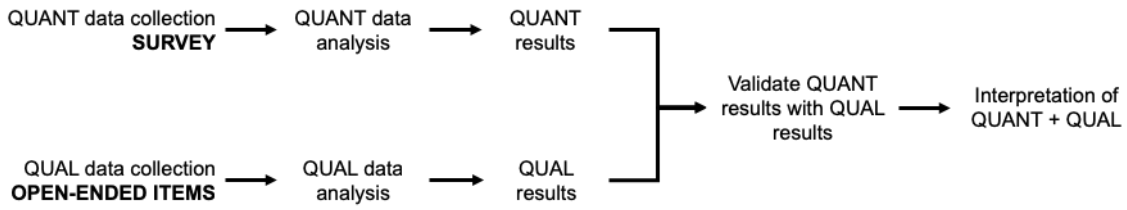
Study design

The study used a concurrent embedded mixed methods design,[256] i.e., it was primarily quantitative with a nested qualitative component. The qualitative component is useful in gaining a more comprehensive understanding of a particular phenomenon, and enhances the application of the quantitative component.[256]

Adding a second research method allows for triangulation that, in turn, can enhance understanding of the topic under investigation. The purpose of a triangulation design – one of the most popular mixed method designs – is to "bring together the differing strengths and nonoverlapping weaknesses of quantitative methods […] with those of qualitative methods" (p.62).[257] Triangulation is also key to establishing the *credibility* of study findings.

The specific triangulation design I use, as described by Creswell and Plano-Clark (2007) is the *validating quantitative data model*, whereby open-ended questions are embedded within a quantitative survey, allowing the researcher to validate and expand on quantitative survey findings.[257]

Figure 4.1*: Triangulation Design – Validating Quantitative Data Model*



Adapted from: Creswell JW, Plano-Clark VL. Choosing a Mixed Methods Design. In: Creswell JW, Plano Clark VL, eds. Designing and Conducting Mixed Methods Research. 1st ed. Thousand Oaks: Sage Publications, Inc.; 2007:58-88.

By design, the qualitative measures are secondary to the larger quantitative survey, and therefore they do not result in a rigorous standalone qualitative dataset.[257]

Questionnaire development

To develop the online questionnaire, I reviewed the literature to identify potential measures. While I was unable to find any validated measures of sexual minority students' medical school experiences (or their experiences in higher education in general), I did identify a small number of relevant, non-validated surveys and questionnaires that had been either published in peer-reviewed journals or made available online.[160,164,175,258,259] I compiled these into an item pool, reviewed and selected the items that were relevant to the study, and if necessary, adapted the item wording. Unfortunately, available items did not assess all relevant constructs of interest in this study. Therefore, in collaboration with key informants (sexual minority and heterosexual medical providers, heterosexual medical educator, sexual minority medical students and residents, a researcher on

attitudes toward sexual minority populations, and a sexual minority health researcher), I developed a number of study-specific measures.

A preliminary draft of the questionnaire was distributed to key informants for review. Based on key informant feedback, I made edits to existing items and included a number of additional measures. The questionnaire was then piloted with three individuals who were unaffiliated with the study and additional edits were made to increase survey flow and clarity. See Appendix C for a copy of the final questionnaire.

Study sample

Gay, lesbian, and bisexual medical students were recruited from an existing cohort of medical trainees enrolled in the Medical Student Cognitive Habits and Growth Evaluation Study (hereafter CHANGES). CHANGES a national longitudinal study of medical students enrolled in a nationally representative sample of 49 medical schools in the US. The study was designed to examine changes in medical students' attitudes, experiences, and wellbeing during medical school. Students completed a baseline questionnaire during the fall and winter of their first year of medical school (2010), and a follow-up questionnaire during the spring of their fourth year of medical school (2014). The University of Minnesota and Mayo Clinic Institutional Review Boards approved the study. Students received a $50 incentive for participation in the baseline questionnaire and $75 incentive for completing the follow-up questionnaire.

At baseline (fall of 2010), 4,732 first-year medical students participated in the CHANGES (81.3% of students contacted and 55.1% of all students enrolled in the 49 samples schools). Of these, 3,756 (retention rate 79%) also completed the follow-up

questionnaire in the spring of 2014. The response and retention rates were comparable to or exceeded other published studies of medical students.[9,105]

Gay, lesbian and bisexual students for this study were recruited during the follow-up measurement wave of CHANGES. After the sexual orientation question on the follow-up questionnaire ("Do you think of yourself as: heterosexual or straight, gay or lesbian, bisexual, don't know, something else."), those students who identified as gay, lesbian, or bisexual (n=187) were asked the following: *We are very interested in learning more about your experiences in medical school as they relate to your sexual orientation. Would you be willing to complete a 5-minute survey, emailed to you at a later time, about your unique experiences as a gay, lesbian, or bisexual medical student?* Students could opt into receiving this survey by responding *Yes, I'd like to participate in the survey* or could opt out. A total of 151 students (80.7%) who identified as LGB at follow-up expressed a willingness to be contacted about the LGB study.

Approximately one month after concluding data collection on the follow-up CHANGES measurement wave, an email containing an invitation to the LGB study, a link to the questionnaire, and information about a $10 incentive was sent to all LGB students who had indicated an interest in participating. 127 LGB medical students completed the questionnaire, which represents 67.9% of all LGB students enrolled in the CHANGES follow-up sample.

Measures

Quantitative measures. We assessed respondents' exposure to *heterosexist discrimination* using a nine-item scale adapted from the main CHANGE survey

(Cronbach's alpha: 0.895). We asked respondents: "to the best of your knowledge, because of your sexual orientation, have you ever been…": 1) verbally harassed or insulted? 2) threatened with physical violence? 3) treated with disrespect? 4) treated unfairly? 5) made to feel unwelcome? 6) socially ostracized? 7) laughed at or made fun of? 8) made to feel unsafe? and 9) pressured to hide your personal relationships? Respondents could indicate whether they had experienced these forms of discrimination and from whom (from students, faculty, administrators, and/or preceptors). I then created a variable that summed the number of heterosexist exposures each student reported across the four sources (students, faculty, administrative staff, and preceptors). Students who did not report any heterosexism from any source had a score of 0. The maximum possible score is 36 (experienced all 9 types of heterosexism from all four sources), but the highest score in this sample was 18.

Heteronormative medical school climate was assessed using an 8-items scale (Cronbach's alpha: 0.867). Respondents were asked to indicate whether they strongly disagreed, disagreed, neither agreed nor disagreed, agreed, strongly agreed with 8 statements: 1) My medical school is a safe place for LGB students; 2) My medical school treats LGB students with respect; 3) There is pressure for LGB students to stay closeted; 4) LGB students feel comfortable talking about their personal lives with people at my medical school; 5) LGB students are made to feel unwelcome; 6) It is harder for LGB students to find supportive mentors or advisers than it is for straight students; 7) The atmosphere for LGB students has improved at my medical school over the past four years; and 8) LGB students at my medical school experience harassment or discrimination due to their sexual orientation. I calculated the mean score across the 8

items for each respondent, reverse coding items if necessary (Cronbach's alpha = .87). We also asked respondents about their perception of the *overall medical school climate* ("How would you describe the overall climate of your medical school for lesbian, gay, and bisexual students?") from very negative to very positive.

Using sliders (min=0, max=30), we asked students to separately approximate the total number of mandatory and elective *hours of instruction on LGB health*. We also asked about their opinion on the *amount of LGB health instruction* ("How would you describe the amount of instruction and training specifically about lesbian, gay, and bisexual health that students receive at your medical school?) and *quality of LGB health instruction* ("How would you describe the quality of instruction and training specifically about lesbian, gay, and bisexual health that students receive at your medical school?").

We asked respondents to report the *presence of LGB faculty* at their medical school ("To your knowledge, are there any lesbian, gay, or bisexual faculty at your medical school?"), differentiating between whether the LGB faculty was out publicly or not.

We also assessed whether respondents knew of two LGB-relevant school policies at their medical schools: 1) whether their institution provided partner benefits for same-sex couples (i.e., *partner benefit parity*), and 2) whether their institution had a written policy that prohibited discrimination based on sexual orientation (i.e., *non-discrimination policy*).

We asked respondents to evaluate their *peers' competence providing care to LGB patients* across seven items. Specifically, we asked how strongly respondents agreed or disagreed that students graduating from their medical school: 1) are prepared to care for

LGB patients; 2) know about LGB-specific health concerns; 3) are uncomfortable interacting with LGB patients; 4) are likely to assume that their patients are heterosexual; 5) are able to create a clinical environment that is welcoming to LGB patients; 6) hold misconceptions, biases, or stereotypes about LGB people; and 7) know where to find information about LGB health.

We assessed respondents' degree of outness about and concealment of their sexual minority status from others. *Degree of outness* was measured by asking "Of the people you have interacted with at your medical school, how many know that you are lesbian, gay, or bisexual?" Respondents separately indicated the number (none, very few, some, about half, many, most) of other students, faculty, administrative staff, and preceptors who knew of their sexual minority status.

We also asked about *frequency of sexual minority status concealment* by asking respondents to report how often (never, rarely, sometimes, frequently, always) they concealed their sexual minority status from other students, faculty, administrative staff, and preceptors out of fear of negative consequences. I then calculated the mean frequency of concealment from students, faculty, administrative staff, and preceptors for each student (Cronbach's alpha = .94). We also asked how comfortable each respondent would be bringing a same-sex partner to a school function, from very uncomfortable, through neither comfortable not uncomfortable, to very comfortable.

Qualitative measures. I embedded two open-ended questions to elaborate on the medical school experiences of LGB students in relation to two specific phenomena: sexual minority status concealment and exposure to LGB-specific (i.e., heterosexist) discrimination. The first of these questions was asked of students who indicated that they

had ever concealed their sexual orientation from other students, faculty, administrative staff, or preceptors. The open-ended question appeared as a pop-up immediately after the quantitative question about concealment and asked: "You stated that you have concealed your sexual orientation due to a fear of negative consequences. What kinds of things did/do you fear might happen if you disclosed your sexual orientation?" A total of 105 respondents to the LGB sub-study indicated that they concealed their sexual orientation in front of a student, faculty member, administrative staff, or preceptor to some degree. Of these, 95 respondents (90%) provided an open-ended response.

The second open-ended measure appeared after the quantitative heterosexist discrimination questions. Once students reported their exposure to 9 types of heterosexist discrimination, they received the following prompt: "Please share any other thoughts or comments about your experiences as a lesbian, gay, or bisexual student in medical school." The measure intentionally allowed for a broad interpretation, allowing students to respond as they saw fit, whether that be with further descriptions of discriminatory exposures, or to share their positive experiences in medical school. Of 127 respondents to the LGB sub-study, 79 (62%) provided an open-ended response.

Finally, I included a general comments box ("Please feel free to share with us any additional comments, questions or concerns") at the end of the survey, and 20 students (15.7%) elected to provide additional information about their medical school experience.

Analysis

Quantitative analysis. I calculated descriptive statistics (prevalence, means) for the quantitative measures and examined differences in the medical school experiences of

sexual minority subpopulations (lesbian/gay versus bisexual), using analytic methods (e.g., t-tests, chi-square, ANOVA) to determine whether any observed differences between groups were statistically significant.

Qualitative analysis. I used thematic analysis to analyze the qualitative responses. This widely used method involves reading the data, assigning a word or short phrase to a portion of qualitative data that captures its summative and salient attribute, and then clustering the codes together into groups (based on conceptual similarity) that facilitate the development of themes.[260] I conducted the analysis using Atlas.ti, a computer-assisted qualitative data analysis software program.

The specific steps of the qualitative analysis are as follows. The responses to each of the three qualitative items were collected into cases in Atlas.ti. Next, I read the text of each case to familiarize myself with each respondent's experiences, actions, and interactions, along with their context, and assigned *emergent codes* (a word, phase, or short sentence) to relevant portions of each case. I assigned codes to information that a) I expected to find (hypothesis-driven, here that students were exposed to heteronormativity in the formal, informal, and hidden curriculum), b) was surprising/unexpected, or c) was conceptually interesting or unusual.[261] At this stage I identified 147 emergent codes. Next, I winnowed down this initial list of codes by combining conceptually duplicative codes, yielding 70 codes. Finally, given that the qualitative portion of this study was primarily designed to validate and expand upon the quantitative findings, I retained only those codes that were conceptually related to the stated study questions. The final codebook contained 33 codes. See Appendix D for the codebook and Appendix E for code reduction crosswalk tables.

Once coding was completed, I categorized these emergent codes into themes, i.e., "broad units of information that consist of several codes aggregated to form a common idea."[261] As a validatory qualitative analysis (i.e., qualitative data were used to validate and expand upon quantitative findings), the aggregation of codes into themes was primarily hypothesis-driven, using what Saldaña describes as "classification reasoning" plus a tacit and intuitive sense of similarity between codes.[260] When appropriate, I ascribed two or more themes to a particular response. For each theme, I included exemplary quotes to illustrate, in students' own words, their perspectives on heteronormative socialization in medical school.

Finally, I created code/theme networks to graphically represent each theme and its constitutive codes. These networks succinctly and visually present the relationships between codes and themes, and convey the complexity of the lived experiences of LGB medical students.

Establishing the trustworthiness of qualitative findings. Unlike quantitative data, the quality (i.e., trustworthiness) of qualitative research findings is based on four criteria: 1) their credibility, or the confidence in the "truth" of the findings; in this study established by the triangulation of research methods; 2) their transferability to other contexts; here based on the large number and broad sample of participants; 3) their dependability should the study be repeated; here established by including a detailed methodology, audit trail, and codebook; and 4) their confirmability; or their independence from researcher bias, motivations, or interests. To establish this last criterion, two dissertation committee members (Drs. Call and McAlpine) conducted an external audit, reviewing the source data and the ascribed codes.

Validating and elaborating on quantitative findings using qualitative data. Once the qualitative analysis was completed, I integrated both the quantitative and qualitative findings regarding 1) reasons for concealing sexual minority status and 2) experiences of LGB-specific discrimination.

RESULTS

The demographic characteristics of the LGB study respondents, as well as a comparison to non-responders, are presented in Table 4.1.

Table 4.1*: Characteristics and distress of respondents and non-respondents, LGB survey 2014*

		Survey respondents *n=127*	Non-respondents *n=60*	*p*
Demographics	Sexual identity			
	Gay/lesbian	67.2%	50.0%	*0.022*
	Bisexual	32.8%	50.0%	
	Gender			
	Male	59.0%	54.7%	*0.570*
	Female	41.0%	45.3%	
	Racial minority status			
	Person of color	22.6%	42.6%	*0.006*
	White	77.4%	57.4%	
	Relationship status			
	In a relationship	61.5%	50.0%	*0.133*
	Single	38.5%	50.0%	
	Family income in high school			
	$100,000 or more	53.3%	50.0%	*0.674*
	less than $100,000	46.7%	50.0%	
	Age at baseline (mean)	24.8	24.7	*0.748*
Distress	Depression scores (mean)			
	Baseline	51.3	51.5	*0.903*
	Follow-up	50.0	53.0	*0.037*
	Anxiety scores (mean)			
	Baseline	58.5	59.8	*0.250*
	Follow-up	57.2	59.3	*0.127*

Significance of differences obtained from t-tests or two-sample tests of proportions

Those who participated in the survey were more likely to identify as gay or lesbian (67.2% vs. 50.0%, p=0.022) and more likely to be white (77.4% vs. 57.4%, p=0.006) than those who did not participate in the LGB survey. Respondents also had depression scores at follow-up that were three points lower than non-respondents (50.0

vs. 53.0, p=0.037). Respondents and non-respondents did not differ in terms of gender, relationship status, family income, age, depression scores at baseline, or anxiety scores at either baseline or follow-up.

Heterosexist and heteronormative exposures in medical school

Following my conceptual framework, there are three domains within which heteronormativity in medical school occurs: the formal, informal, and hidden curricula. Within each of these, respondents reported a number of heteronormative exposures, both quantitatively and qualitatively.

Theme 1: Heteronormativity in the formal curriculum

The *formal curriculum* is comprised of all official, often written, educational activities undertaken by the institution. This includes courses, lab work, evaluations, and syllabi, and any planned and intentional activities occurring in an educational setting, from lecture halls and seminar rooms to labs and clinics.

Quantitative findings highlight a serious deficiency in both the quantity and quality of LGBTQ health-specific content in the curriculum. Respondents indicated that students at their medical school receive a median of 4 mandatory hours and 5 elective hours of instruction/training specifically about LGB health (median total hours: 10, interquartile range: 3-20 hours); 17% of respond ents (n=21) reported that students at their medical school received zero hours of mandatory LGB health-specific instruction.

Approximately 80% of respondents stated that this was too little or far too little instruction/training in LGB health (see Figure 4.2). None of the respondents indicated that there was too much or way too much instruction.

***Figure 4.2**: Amount of LGB health instruction, LGB survey 2014*

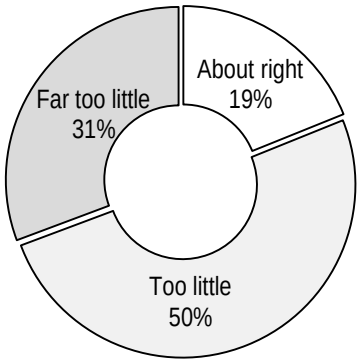


***Figure 4.3**: Quality of LGB health instruction, LGB survey 2014*

The majority of respondents described the quality of LGB health instruction as fair, poor or very poor (Figure 4.3). Gay/lesbian and bisexual respondents did not differ in the reported hours of instruction, or in their perceptions of the amount or quality of LGB health-specific instruction students received at their medical schools.

Qualitative findings support and clarify the quantitative findings, with a number of students listing **inadequate LGBTQ-specific health training** as an important factor in their medical education. A gay man wrote: “My school did very little to truly discuss issues that LGB people face. There was an effort made to have students treat all patients with respect, but beyond that, very little specific instruction was provided about how to do that for LGBTQ patients.” A bisexual woman concurred: “I don't think there is enough talked about to address the specific needs of both LGB and transgendered [sic] patients.”

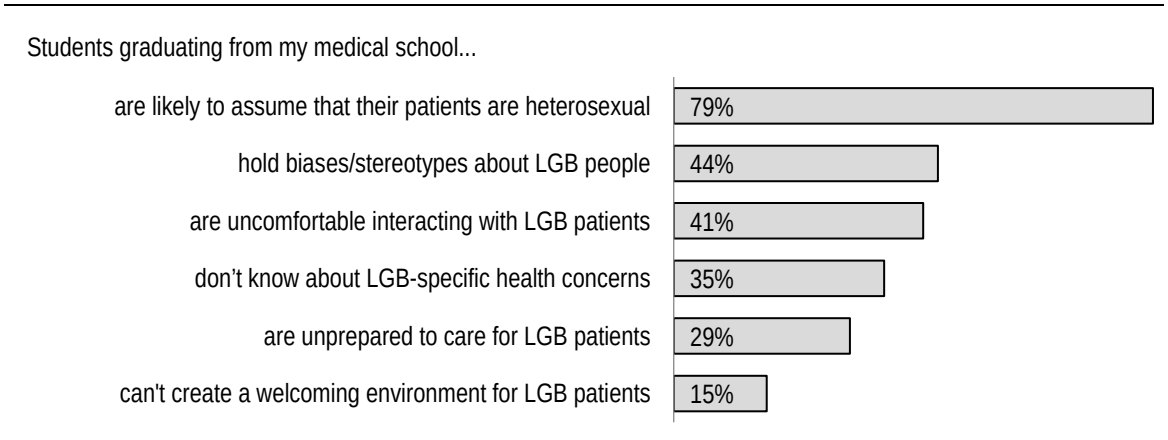
While most students pointed to a lack of LGBTQ content in the curriculum (i.e., null curriculum), one gay/lesbian woman shared that the content of the curriculum was

itself heteronormative: “The administration at my school has been welcoming and tried to make it a safe [space]. However, the instructors often express bias in their lectures.”

Students were concerned about the implications of this lack of education of their and other’s ability to provide care to LGBTQ patients. A gay man wrote: “Every medical school should have at minimum one hour of lecture covering LGBT healthcare issues. It is a significant number of people, enough for several successful primary care practices I know of to have nothing but gay clientele, even in [state]. My school barely acknowledged this patient group.”

Quantitative results highlight the extent of the perceived deficiencies in their peers’ ability to care for LGBT patients (Figure 4.4). For example, 44% of respondents agreed or strongly agreed that their peers hold misconceptions, biases and stereotypes about LGB people, and 41% agreed or strongly agreed that their peers are uncomfortable interacting with LGB patients. Furthermore, over a third of respondents agreed that their peers didn’t know about LGB-specific health concerns, nor did they know where to find information about LGB health.

***Figure 4.4**: Medical student preparation to care for LGB patients*

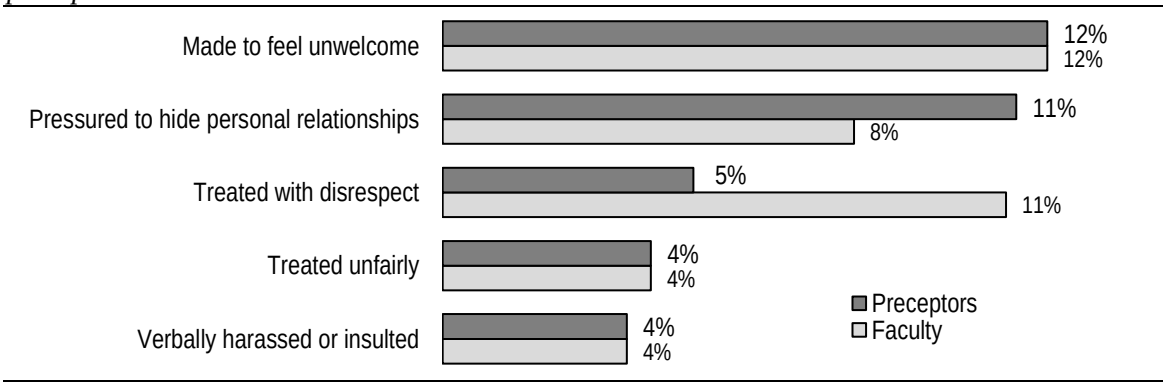


Theme 2: Heteronormativity in the informal curriculum

The *informal curriculum* encompasses teaching that occurs during unscripted, idiosyncratic, and opportunistic interpersonal interactions with faculty, preceptors, attendings, and residents, often outside formal education settings (e.g. at a patient's bedside, in the elevator, in the on-call room).

Quantitative results reveal frequent experiences of heterosexism from educators, with 20.5% (n=26) of respondents reporting at least one kind of heterosexist behavior perpetrated by a faculty member and 17.3% (n=22) of respondents reporting at least one kind of heterosexist behavior by preceptors (Figure 4.5).

Figure 4.5*: Percent of LGB medical students who experienced heterosexism from faculty and preceptors.*



Qualitatively, many students described **heterosexist discrimination from faculty, attendings, preceptors, and other educators** (i.e., role models) within the context of interpersonal interactions during clinical service.[c] One gay/lesbian woman wrote: "[I] would often overhear negative comments about LGBT people (other healthcare providers, or patients) from: ancillary staff (nurses, technologists), residents

[c] Note that the heterosexist behavior of faculty, attendings, and preceptors was also an influential code in LGB medical students' decision to either disclose or conceal their sexual identity

and attendings (in front of medical students), patients. They sometimes made these comments to each other, sometimes to me, assuming that I was straight and therefore ok with it??"

Students were explicit about the impact of these heterosexist exposures on their medical school experiences. One gay man wrote: "I have heard disparaging comments against LGBT people that have made the working environment in the hospital or clinic difficult." As one gay/lesbian woman explained:

> *Most of the faculty and preceptors I have had over the four years have been conservative and religious and have openly voiced negative attitudes towards LGBTQ individuals/patients/students […] and have contributed overall to a judgmental, prejudicial environment that does not allow medical students to express themselves freely without professional repercussions.*

Respondents themselves did not have to be the direct targets of heterosexism in order to experience its detrimental effects. For example, one gay man wrote:

> *I have not had issues with other students or faculty, the only (infrequent) issues I have had being out were with academic or clinical staff members saying homophobic slurs. Granted, they were not directed at me, but when a nurse says 'faggot' and the attending physician does not correct her--despite the fact that the attending knows I am gay--it hurts.*

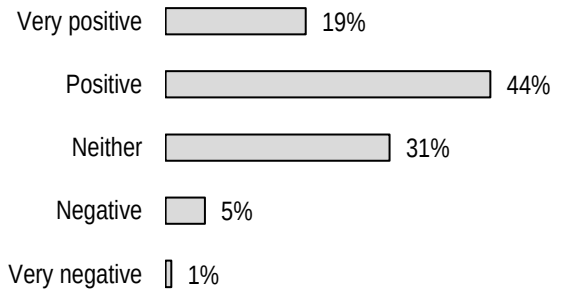
Another gay/lesbian woman wrote: "What was most disappointing and shocking was the comments and behavior I've witnessed of attending physicians that were blatantly anti-LGBTQ said/done by faculty unaware of my orientation which made me feel VERY unwelcome, to say the least."

Theme 3: Heteronormativity in the hidden curriculum

The *hidden curriculum* describes structural aspects of medical education that convey the implicit values and norms of the profession; these factors are embedded in the structures, routines, and social relations of the educational institution. The hidden curriculum can also be understood as the climate of the medical school.

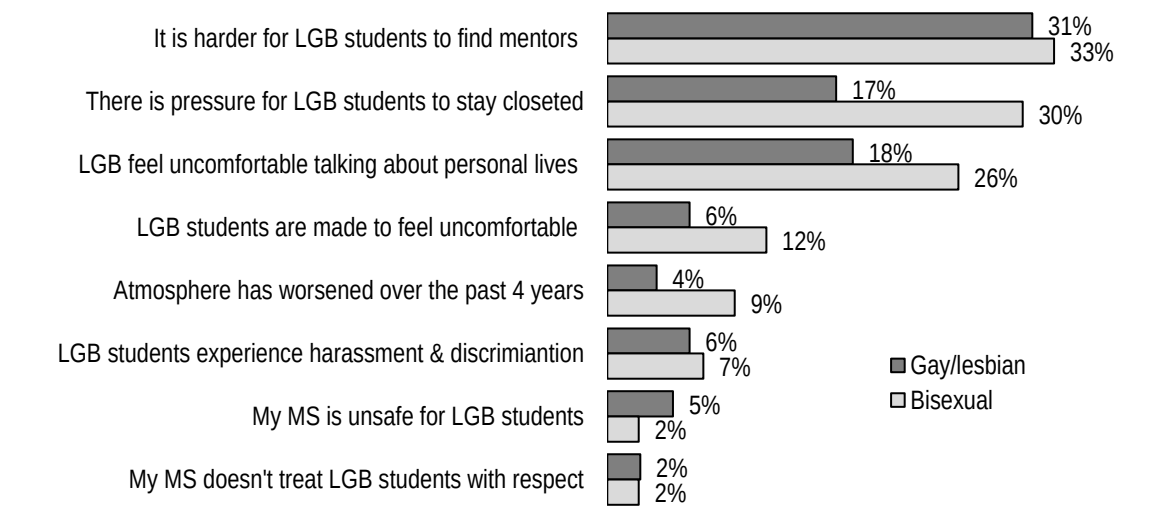
In response to the one-item climate question (i.e., "How would you describe the overall climate of your medical school for LGB students?"), a majority (63.4%) described the climate as positive or very positive (Figure 4.6).

***Figure 4.6**: Climate for LGB students*



Half of LGB students agreed or strongly agreed with at least one item in the heteronormative medical school climate scale. The distribution of students who agreed or strongly agreed with each climate item is shown in Figure 4.7.

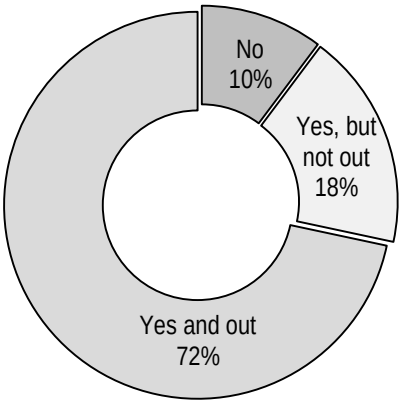
***Figure 4.7**: Percent of LGB medical students who agreed or strongly agreed with each heteronormative medical school climate scale item*



Many students discussed **queer underrepresentation**, an element of the hidden curriculum, as an important aspect of their medical school experiences. One gay man wrote: “There were only 3 out students in my class of 175. The LGBT community is not represented well in my class.” A gay/lesbian woman had a similar experience: “There were only 2 other students in my class who identified as LGBT so it felt difficult to find a community while in medical school.” The lack of a queer community was acutely felt by a number of students, and, as explained by one gay man, had negative implications on the medical school climate for queer students: “Many medical schools are LGBT friendly, but that does not mean all med schools have large LGBT communities. It's one thing if a school promotes a culture of acceptance, but if the school does not attract LGBT students, faculty, and staff, the medical schools can still seem unfriendly to LGBT students.” A bisexual woman agreed: “I knew one students [sic] who came out in medical school. He was the only one I knew who was openly gay. He wasn't ostracized but it really seems like not the most inviting atmosphere to come out of the closet.”

While quantitative findings show (Figure 4.8) that respondents (90%) were aware of at least one LGB faculty member at their medical school, 18% said that the faculty member was not out publicly; 10% reported that they did not know of any LGB faculty at their medical school.

Figure 4.8*: Are there LGB faculty at your medical school?*

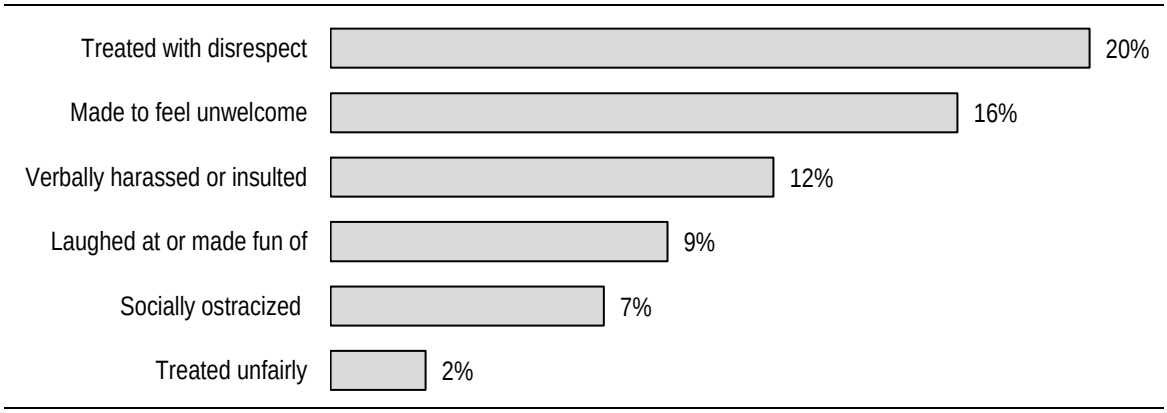


Queer underrepresentation among faculty, administrators, and staff was problematic for many students, both in terms of mentorship and education. About a third of respondents stated that it was more difficult for LGB

students to find mentors that for heterosexual students. As one gay man wrote: “Difficult to find LGBT faculty, let alone administrators. No out LGBT mentors at my medical school, and few LGBT students.” A gay/lesbian woman wrote: “Very difficult time finding any faculty or preceptors who identified as LGBT or were knowledgable [sic] about lgbt health issues.” One gay man identified queer underrepresentation as a cause of inadequate LGBTQ health-specific instruction: “My school did very little to truly discuss issues that LGB people face. […] Part of the problem was that none of the lecturing faculty were gay. There were very few openly gay attendings.”

The **heterosexist behaviors of other students and the institutional response** was another aspect of the hidden curriculum that respondents reported both quantitatively and qualitatively. Overall, 31.5% (n=40) of respondents reported experiencing at least one form of heterosexism perpetrated by other students. Being treated with disrespect and being made to feel unwelcome due to their sexual orientation were the two most common heterosexist exposures (Figure 4.9).

***Figure 4.9**: Percent of LGB medical students who experienced heterosexism from other students*



Respondents’ exposure to heterosexist behavior from other students also emerged in the qualitative data. One gay/lesbian woman wrote: “The few blatantly homophobic

classmates that I have are self-segregating, actively resent having LGBTQ issues taught in the curriculum, and are basically impossible to reach despite being the people who need to be reached the most." Another gay/lesbian woman offered a detailed account of such an occurrence:

> *In my school we had several very conservative and religious students that openly voiced their disagreement about the "way of life" for transgender, gay, lesbian and bisexual individuals. In our first year they mentioned this during a patient presentation, expressing concern about how to care for patients when they "disagree with their way of life." This was in no way directed at me and while it was handled fairly well by the faculty it was a difficult thing to witness. Three years later I still feel upset and uncomfortable when thinking about the situation and have my doubts about how these students will be with future patients (hopefully kinder). These individuals reinforce the stigma associated with any queer orientation. I don't wish for these students to be punished, but I wish schools would take a strong stand for encouraging equality and not just in their statements, but in their actions and open dialogue with the medical community*

Presumption of heterosexuality was another factor that contributed to queer students' negative experienced in medical school. One gay/lesbian woman wrote: "A lot of preceptors and faculty assume I am straight, however, and ask about my 'boyfriend' or 'husband.' It would make me feel more welcome if they used inclusive language." This was echoed by another gay/lesbian woman, who wrote: "The most pervasive negative thing I've noticed is how heterosexuality (and cisgender status) are routinely assumed of everyone." In addition to personally experiencing this form of heteronormativity, in quantitative assessment 79% of respondents reported that students graduating from their medical school would likely assume that their patients were heterosexual.

In quantitative assessment, 18% of gay/lesbian and 26% of bisexual students felt that the climate at their medical school made it uncomfortable to talk about their personal lives. For some students this was related to the perception that their **same-gender partners were unwelcome** at their medical school. One bisexual woman wrote about her experience at length:

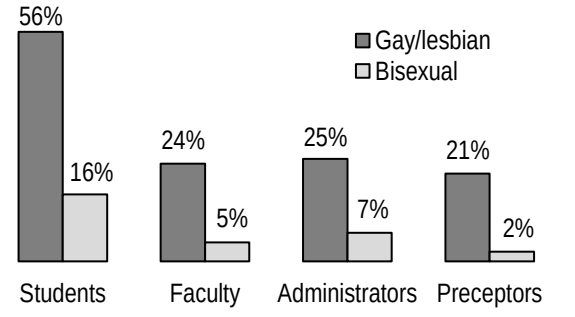
> *I was very envious of heterosexual students who would openly talk about their engagements or whatever during small talk on the wards, and I did not feel like I had that luxury because I could not be sure if I would be judged or discriminated against for dating someone of the same sex, even though I was in just as loving, stable, healthy relationship as the straight people. Even with people who you know to be progressive, you still wonder if they're going to treat you differently, even unconsciously since it is not the majority orientation. I remember bringing my partner at that time to our "medical school prom" as my date and feeling like I was being judged. It started to affect not just me but her too because she felt like she was going back in the closet when around my colleagues.*

One gay/lesbian woman explained: "Bringing my partner to faculty events was out of the question. It took me a solid 2 years to get comfortable to go to student events with her and actually stay for the length of [the event] rather than just make a short appearance."

Disclosure and concealment as indicators of a heteronormative climate

On average, LGB medical students had disclosed their sexual minority status to fewer than half of the individuals at their medical school. Gay and lesbian students, on average, had disclosed their sexual minority status to about half of the individuals at their medical

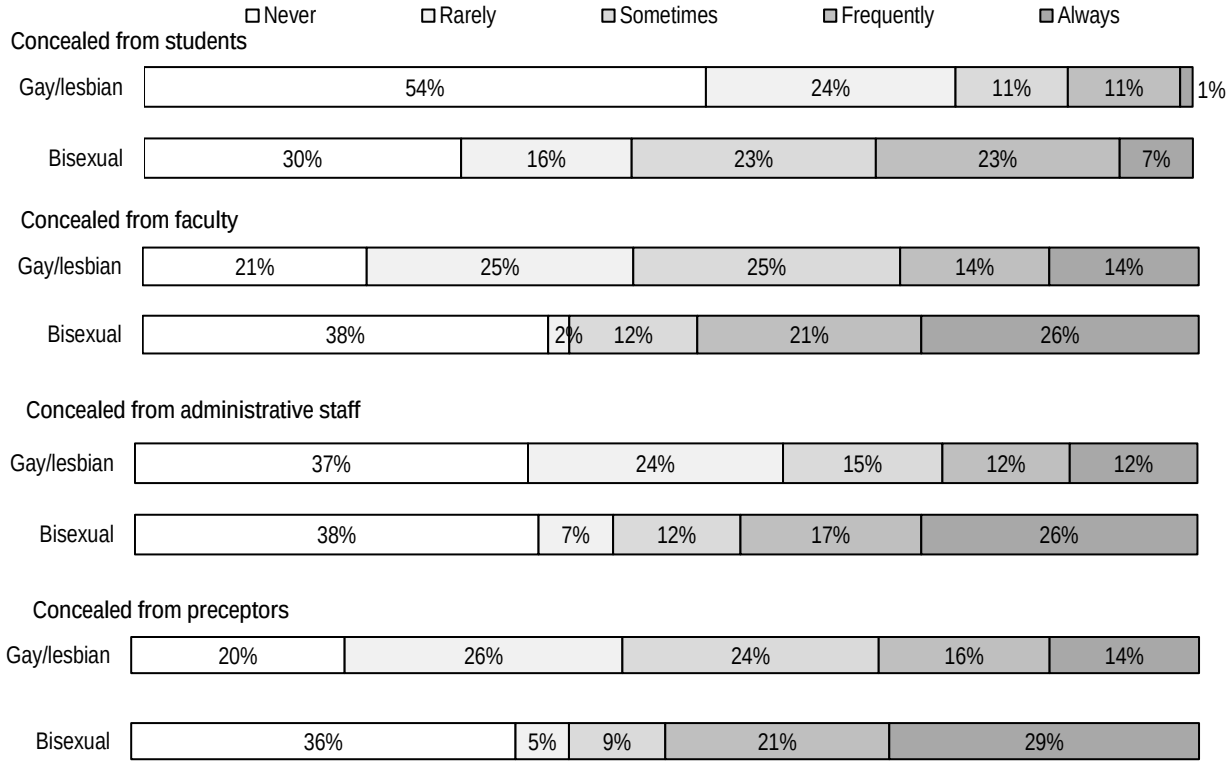
***Figure 4.10**: Percent of LGB students who are out to half or more of each category of people*



school, while bisexual students had disclosed to only some or very few individuals at their medical school ($p<.001$). Figure 4.10 shows the percent of LGB students who had disclosed to half or more students, faculty, preceptors, and administrative staff at their medical school.

LGB students were also asked about their personal experiences with concealing their sexual orientation out of fear of negative consequences from other students, faculty, administrative staff, or preceptors (Figure 4.11).

***Figure 4.11**: How often do LGB students conceal their sexual orientation out of fear of negative consequences?*



A quarter of bisexual students reported that they <u>always</u> concealed their sexual minority status from faculty, administrators, and preceptors out of fear of negative consequences; a quarter also reported that they <u>frequently</u> conceal their sexual minority

status from other students. Gay/lesbian students were less likely to conceal their sexual minority status, however, a majority reported that they hid it from faculty, staff, and preceptors at least some of the time.

When students were asked whether there was pressure on LGB students at their medical school to conceal their sexual identity, 17% of gay/lesbian students and 30% of bisexual students agreed or strongly agreed.

It is important to also note that asking students if they are "out" is also conceptually distinct from asking whether they have concealed their sexual identity. The former is more often understood as a later developmental stage of sexual minority identity formation, whereas the latter is the active withholding of certain information from others. Indeed, LGB students in the present study were themselves sensitive to this distinction: "It's not so much that I concealed it, but rather didn't go out of my way to correct faculty, administrators, or preceptors when they assumed that I was heterosexual."

The quantitative findings are best understood within the context of the qualitative findings. In the present study we specifically asked students to describe the negative consequences (i.e., repercussions) that they feared should they reveal their sexual minority status. Many respondents additionally described specific experiences that informed their decision to conceal (i.e., influencing factors). As a result, four themes related to disclosure/concealment emerged from the data. The first two themes describe the factors that LGB students considered influential in their decision to conceal, while the second two themes describe the specific consequences that students were hoping to avoid by remaining in the closet.

Theme 4: Disclosure is influenced by social and structural factors in medical schools

A common social/structural factor that influenced students' decisions to disclose were the **heterosexist behaviors and comments** that respondents witnessed while in medical school. As one gay man shared, "I have heard attendings make disparaging comments about LBGT patients, so this prompted me to not disclose my sexuality." A gay/lesbian woman wrote, "Multiple faculty members and staff have off and on made comments that made me believe it was a great idea to conceal my orientation."

The **negative experiences of out LGB peers** persuaded some students to conceal their sexual identity. One gay man wrote: "I had heard from students in classes above mine that after coming out to some faculty it hurt their education, either it cooled the relationship with attending [sic], or they weren't invited to interesting cases, or generally received less teaching/attention." One bisexual woman described the repercussions other students experienced because of disclosing their sexual minority status:

> *It seems half the people I know who are GLBT are in the closet, or have gone back into the closet during medical school. […] I have known a few [GLBT] students to be surprised to find out that one of their esteemed professors they thought was open-minded was in fact, not. Thus leading to them not getting to help as much during a rotation or receiving lower grades on things (patient care, etc) [that] other professors thought they performed well in.*

Students perceived concealing their sexual identity as a pragmatic way of **averting the risk of negative repercussions**: "I try my best to avoid awkward situations with preceptors and other staff – you never know who's completely safe and what recriminations that might follow disclosure. I had no intention of putting myself out on a ledge to find out – either with getting excluded from clinical experience or instigating

negative reactions with preceptors. […] I'm a private person and a pragmatist – not everyone needs to know" (gay man). Another gay man wrote: "I was open with my sexuality to close friends, but I made significant efforts to separate my personal/dating life from my work life. I did not want to risk any potential career advancement by [sic] my sexual orientation."

The indeterminate risk of disclosure in medical school was a result of the **uncertainty about the possible reactions** to this information. As one gay man wrote: "I do not wish my sexual orientation to somehow poorly affect my preceptorships, clerkships, etc. Basically, I don't want to risk negative consequences by revealing my orientation to anyone with authority over me unless I know them very well." A gay/lesbian woman echoed this sentiment: "You never know what to expect from people, so I chose not to share to avoid any conflict."

Another important factor in students' decisions to disclose their sexual minority status was the specific **context of the decision**: the setting and/or person (people) to whom they would be disclosing. As one gay man explained: "It's a very fine line between being out or not in the professional setting. It really varies by department and faculty whether or not you feel comfortable being out." Disclosure was seen as riskier in clinical settings. One bisexual woman wrote: "I felt that the administration was very supportive of the LGBT community, but the same couldn't be said for faculty and preceptors in the school community. In other words, you were pretty safe the first two years when you were doing book-learning, but were on your own in the real word (re: 3rd and 4th yr)." This was echoed by a gay man who wrote "My biggest place of concern was in a few affiliated, outside Catholic hospitals. I had a few bad experiences at these hospitals." The

broader geographic and cultural context also impacted some students' decision to disclose, as explained by one gay man:

> *As I understand it, discrimination against homosexuals in [state where medical school is located] is legal. […] On an almost daily basis, there are news stories and such regarding discrimination against us in this state. People have a tendency here to justify their bigotry using religion. Basically, I don't want to risk negative consequences by revealing my orientation to anyone with authority over me unless I know them very well.*

Theme 5: Disclosure is influenced by personal factors.

A number of respondents cited personal factors that informed their decision to conceal their sexual identity. Most commonly, students perceived their sexual identity as **personal information that was either irrelevant or inappropriate to share** in certain medical school contexts. One gay man wrote: "It was mostly that I didn't feel it appropriate to share details of my personal life with preceptors I barely knew, in the same way that I would never ask them about their personal lives when first working with them." A bisexual woman concurred: "We also just didn't talk much about partners – I like to keep my personal life personal in the medical world, it's a bit if [sic] a fishbowl and I don't like lots if people thinking they need to be in my business." A gay man wrote: "I am not fearful of faculty treating me differently. I have never really had to 'hide' it with faculty, admin, or preceptors, it was never a topic of conversation."

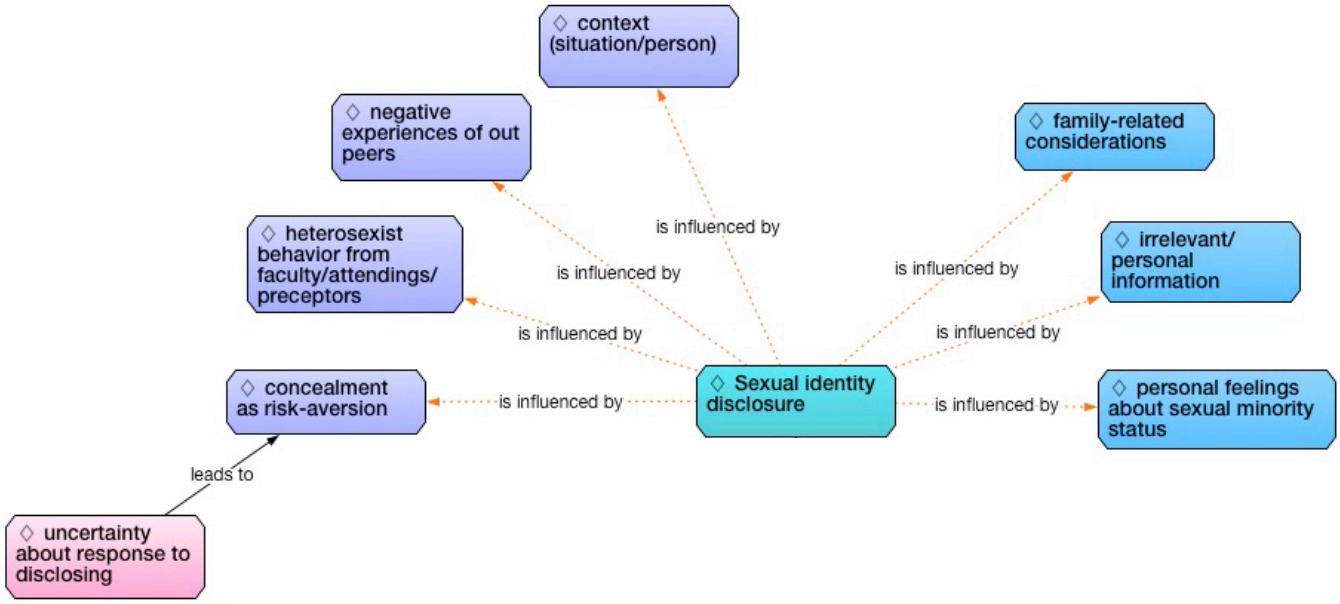
For other students, **personal feelings about sexual minority status** were implicated in their decision to disclose or conceal. For a few students, their own comfort with their sexual identity and long history of being out played a significant role in disclosing their sexual minority status to others. As one gay man wrote "I have been out for many many years so it is largely a non-issue for me." Other students, however,

concealed their sexual identity because they were uncomfortable with their sexual minority status: “I am newly ‘out’ since 3 months [sic] and still feel uncomfortable around friends from med school. I still have not told any faculty/staff/advisers” (gay man); “My discomfort with my sexual orientation is my own; I believe I would have had support had I sought it” (bisexual woman).

Finally, a few students cited **family-related considerations** when deciding to conceal their sexual identity. Specifically, students who were not out to, or accepted by, their families avoided disclosing in medical school: “I have not talked to my family, first and foremost. Otherwise, it honestly didn't come up and I answered questions generally” (bisexual woman). For one gay man, concealment was a way to avoid risking familial financial support: “I'm not out at home either, and my parents were the primary sources of funding for med school. While I try to keep family and professional associations separate, they can, and do, overlap sometimes. Finally, as a bisexual woman shared: “If I had an accepting family, I wouldn't give a damn what people thought of me and my partner. But since I don't, I'm more wary of disturbing the status quo.”

Theme/code network. Graphically, the relationship between the various factors impacting students’ decisions to disclose or conceal their sexual minority status can be represented as follows (Figure 4.12)

***Figure 4.12**: What influences LGB medical students' decision to conceal their sexual minority status?*



Theme 6: Disclosure can have significant educational & professional repercussions

Respondents provided a number of repercussions that they feared should they reveal their sexual minority status. Chief among them was the concern that it would lead to **discrimination in grading/evaluations**. However, this fear was generally (though not exclusively) specific to the more subjective, clinical evaluations that are part of preceptorships, clerkships, and rotations in the third and fourth years of medical school. As expressed by a bisexual woman: "Grading in the clinical years is SO. SUBJECTIVE. [capitalization in original] and so anything that might cause anyone to think less of me made me wary." A gay man further explained the subjectivity of grades/evaluations assigned during clinical experiences:

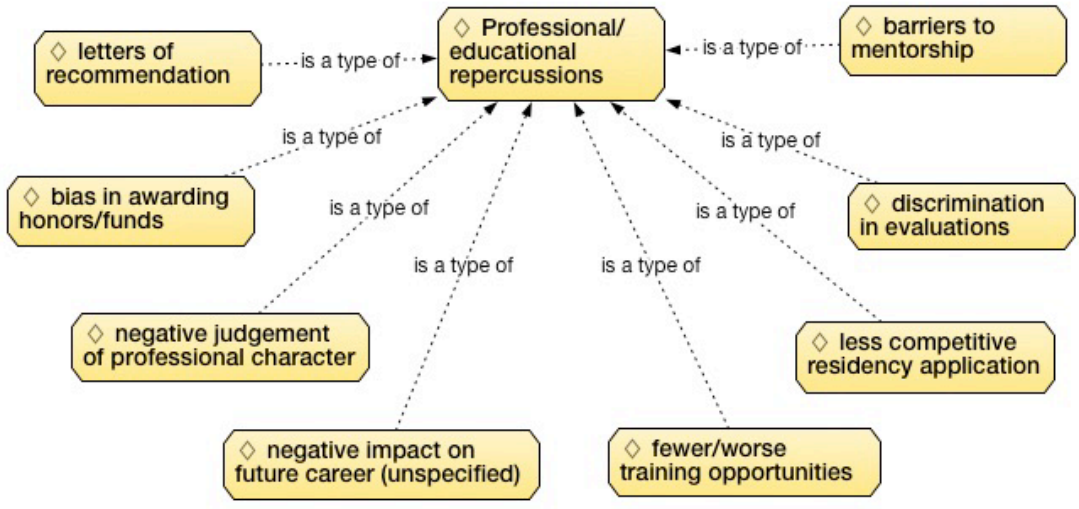
> *But preceptors are different from other categories in that they define the comments and grades for the second two years of school. It is largely known that grades and comments are more closely correlated to how well the student gets along with the preceptors than on knowledge or work ethic. So, in order to better get along with preceptors that were not openly gay or lesbian themselves, hiding sexual orientation is more paramount to facilitate conversation and avoid conflict.*

A gay man wrote: "I fear that people in a position of power above me (attending physicians, residents, etc.) may harbor negative views regarding homosexuals. These people are grading and evaluating me, so I would not want to make myself stand out in any way that would be detrimental to my career advancement." A gay/lesbian woman stated: "I was also worried I would be graded differently. While unlikely it seems that every encounter and experience can influence how one is graded so I chose to keep this confidential." Another gay/lesbian woman wrote "I do worry that clinical preceptors or other faculty who have control over my performance and grades would, consciously or not, think of me more negatively, or pay less attention to me than they would a heterosexual classmate."

The negative educational & professional repercussions of disclosure extended beyond grading. One gay woman concealed her sexual identity in order to avoid multiple educational consequences, including: **barriers to mentors, fewer/worse training opportunities** ("preceptors or clinical faculty forming negative opinions of me that would adversely affect the cases or patients I got to see"), and **negative judgment of professional character** (e.g., professionalism). Other potential educational/professional repercussions identified by students included: **not receiving letters of recommendation, decreased competitiveness in residency applications, bias in the awarding of honors and funds, and general (unspecified) risks to career advancement**.

Theme/code network. Below is the graphic representation of the professional/educational repercussions that students were avoiding when they decided to conceal their sexual orientation.

***Figure 4.13**: Possible professional and educational repercussions of sexual minority status disclosure in medical school*



Theme 7: Disclosure has wide-ranging social & interpersonal repercussions

Apart from educational/professional consequences of sexual identity disclosure, a large number of students described social/interpersonal repercussions, both with peers and with faculty, attendings, and/or preceptors. Some students concealed their sexual identity in an effort to avoid **causing awkwardness or discomfort** in interpersonal interactions. As explained by one bisexual woman: “It's just an awkward thing to [bring] up. When everyone is talking about their hetrosexual [sic] partners, I'm wary of making the mood awkward by mentioning a same sex [partner]. Not really afraid of consequences as I am of making other people feel odd.” A gay man expressed a similar concern: “I also

wanted people to be comfortable around me and felt that they might not know how to 'act appropriately.'" A gay man alluded to the precariousness of "embarrassing" those in positions of power: "I also did not want to embarrass the attending because of the hierarchy in medicine."

A number of students said that they were concerned about **being othered**. Most students spoke about this in terms of being seen and/or treated differently, either by faculty or other students. Some respondents specified that they were nervous about being treated worse than heterosexual students, but others didn't specify whether the dissimilar treatment was positive or negative – for these students, being treated differently was reason enough to conceal their sexual identity. As one gay/lesbian woman wrote: "I have been concerned that people may view and treat me differently if they knew – not necessarily badly, but differently."

Students associated being othered with an increased risk of **being the target of discrimination or microaggressions**. By concealing their sexual identity, students sought to avoid "changes in the perception of who [they are]", thereby reducing the "potential for mistreatment" (gay man). As explained by a bisexual man, "I'm worried I'd be treated differently by attending physicians and other residents, especially going into general surgery. There is just too much of a stigma. […] I just don't want most people knowing. I don't want it to be a factor others consider during work."

Students were also concerned about **being stereotyped or tokenized** (or as one student described, "type-casted"). A gay/lesbian woman wrote: "I was worried about having to discuss my private life in a professional setting. I feared negative comments or too much curiosity." Another bisexual woman said that she didn't disclose her sexual

identity in order to avoid assumptions about how she spent her "recreational time." One bisexual woman didn't want to be "expected to be an 'ambassador' for all bisexual medical students." A gay man elaborated on this point:

> *It made for particularly interesting conversations regarding LGBT health-related issues as everyone was overly sensitive to my opinions and I felt I needed to be an expert at all things LGBT. It was good in that it motivated me to educate myself so i could fairly and justly represent my community, but I also felt it was uncessary [sic] and improbable that I should know all there is to LGBT health.*

For a number of students, their desire to avoid being othered, being tokenized, or being the cause of discomfort was underpinned by a fear of being socially ostracized/isolated. As one bisexual man wrote "Being anything other than straight in medicine can feel isolating." According to one gay man "It was difficult to feel a part of the class at first because I was exotified by the medical community that I was learning how to part of." A gay/lesbian woman wrote: "I never told any faculty or residents just out of fear they would relate to me differently, think I was different rather than 'one of them'. I feared it would be harder to fit in." As a gay man explained: "In my first two years I certainly felt more uncomfortable disclosing my sexual orientation and my relationship with another man. […] I worried that I would be viewed as an outsider and be ostracized." Another gay man explained that he concealed his sexual identity because "they [fellow students] might not want to get to know me or be hesitant to be good friends with me... i think they'd prefer to just be acquaintances." One gay man offered the following insight:

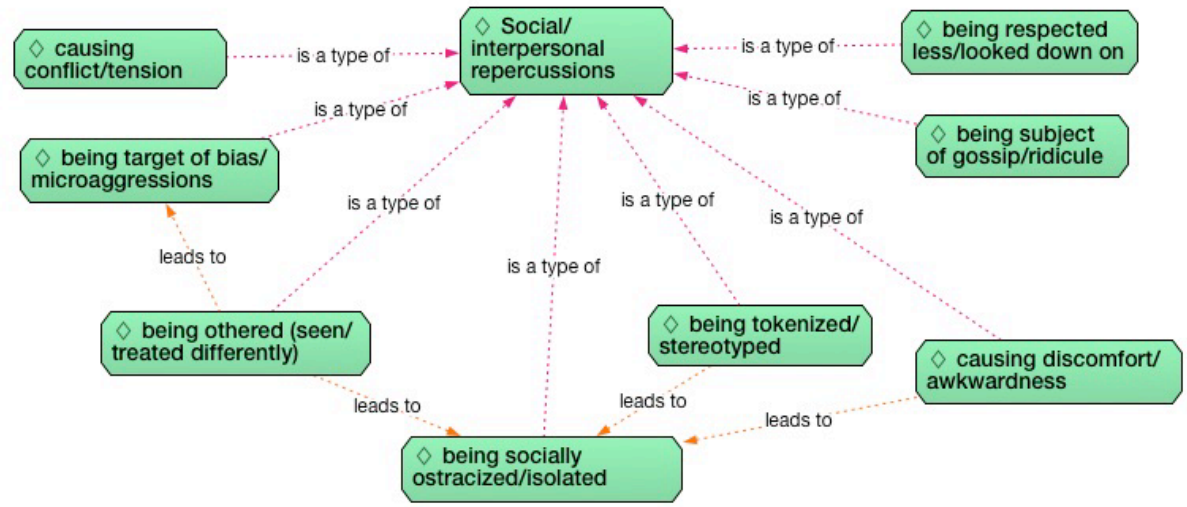
> *Weakness is a vulnerability amongst competitive people. Ignorance regarding sexual orientation leads some to view homosexuality as a weakness of character. This thinking leads to opposition and defenses*

overall severing connections between classmates. Once severed by some, it is often the case that others will follow leading to an eventual isolation. Isolation in medical school can be a huge disadvantage.

Students also concealed their sexual identity in order to avoid **being ridiculed or gossiped about**, as well as to avoid **being respected less and looked down on**, with a number of students listing these factors as reasons they did not share their sexual identities in medical school.

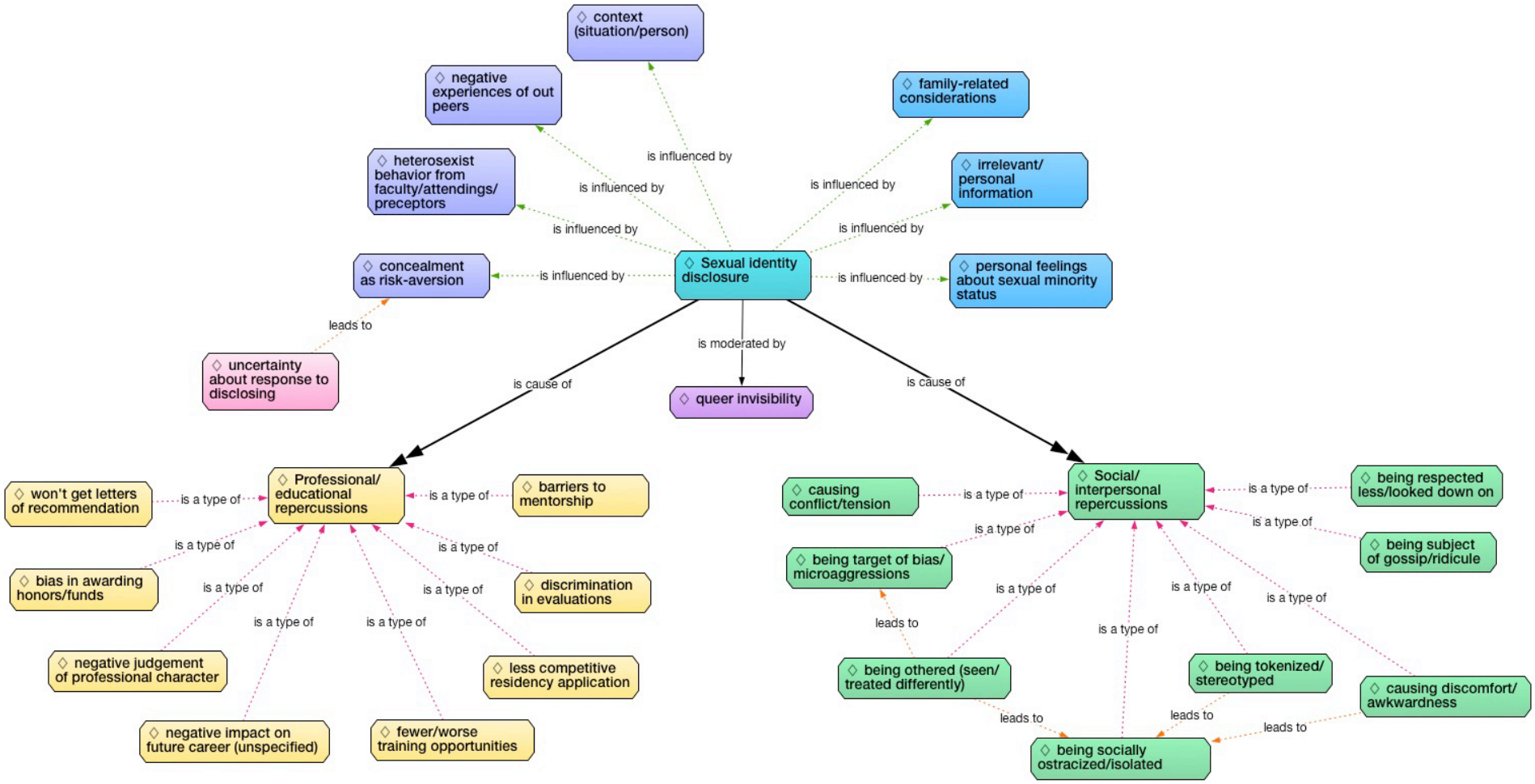
Theme/code network. Below is the graphic representation of the social/interpersonal repercussions that students were avoiding when they decided to conceal their sexual orientation.

***Figure 4.14**: Possible social and interpersonal repercussions of sexual minority status disclosure in medical school*



The complexity of LGB medical students' decision whether to disclose or conceal their sexual orientation becomes immediately evident when viewing the full network of influencing factors and repercussions (Figure 4.15, next page).

***Figure 4.15**: The complexity of sexual minority status disclosure in medical school*



Sexual identities and intersectionality

Certain heteronormative exposures in medical school were unique to bisexual students. Firstly, **bisexual invisibility** often meant that bisexual students could more easily conceal their sexual identity because they happened to be dating a different-gender partner during medical school. As one bisexual woman wrote:

> *I am a bisexual woman, and I have never experienced any hardships on account of my sexual orientation. However, I am in a steady relationship with a male during the course of my med school experience, and since this is aligned with the social norm, I do not feel that I am a true representative of the LGBTQ students that are currently experiencing any problems that may be associated with their personal life*

Students spoke about bisexual invisibility both as protective, as with the previous example, and as problematic: "[bisexuality] is not talked about and I am part of the problem as I don't talk about it myself." Bisexuality also enabled some students to compare their medical school experiences: "Being bisexual I have the privilege of 'hiding' my true orientation if I happen to be dating a man but for several years I was in a very serious relationship with a woman and I felt l could not be as honest about our relationship with faculty and sometimes other students as I could if I were dating a man."

Bisexual students also wrote about **bisexual-specific discrimination**. As one bisexual woman explained: "People often equate bisexual people with confused or experimenting. I have found both straight and gay individuals often find bisexuals off-putting, believing that we are hypersexual, uncontrolled sluts/whores who cannot make a commitment or be trusted." Another bisexual woman concurred: "I'm afraid I'd be judged

and possibly mistreated. Mostly I don't think other people understand what being bisexual means."

Students with **intersectional identities** also discussed the unique challenges they faced in medical school. A black gay man who had concealed his sexual identity from faculty, administrators, preceptors, and most students, wrote: "I'm a double minority and there was absolutely no need to rock the boat." A black bisexual woman wrote about the intersection of racism and heterosexism on an institutional and interpersonal level:

> *I felt that by disclosing my sexual orientation in the Deep South, where I was put in offices where staff openly voiced their bigotism on minorities of all creeds, would make my work environment even more hostile. I had enough trouble with stereotypes as a Black female. Personally, I only shared my sexual orientation with my classmates and hid it from everyone else. […] It was an interesting experience being LGBT person of color in the Deep South. I felt that our school went out of their way to promote the LGBT community for publicity – it was a very nondiverse school in terms of race and socioeconomic status, but administrators would highlight the LGBT community as their outlet for diversity (which us underrepresented minorities found offensive). That being said, the school did a good job supporting LGBT student group efforts (albeit while ignoring the programming efforts of underrepresented minority groups – it seems that they were unable to support both and chose to put all their efforts into the LGBT community, which seems to be the new minority group to support. I found it offensive as a member of both groups that they could somehow only support one).*

"It complicated my medical school experience." The words of this black gay man attending medical school succinctly – if understatedly – summarize the way in which heteronormativity impacts bisexual, lesbian, and gay medical students. From increased exposure to heterosexist discrimination, pressure to hide one's identity out of fear of negative repercussions, to an ambient heteronormative climate, obtaining a medical education is fraught and complicated for sexual minority students.

DISCUSSION

Gay, lesbian and bisexual students face distinct obstacles to participating fully and authentically in their medical educations. The findings of this study revealed that heteronormativity was pervasive across the formal, informal, and hidden curricula of medical schools.

Within the formal curriculum, adequate LGBTQ-specific health instruction was sorely lacking, and when available, the quality of training was perceived as mostly deficient. LGB students reported a median of 10 hours of LGBTQ health-related instruction during medical school. This is twice the median number of hours reported by Obedin-Maliver and colleagues,[262] who surveyed deans of medical schools between 2009 and 2010. It is possible that this reflects an actual increase in instruction on LGBTQ health across US medical schools in the 4 years between the two studies. However, it is also possible that LGB medical students are more likely to seek out LGBTQ health instruction as part of their elective curriculum. Indeed, students reported feeling pressure to be "experts on all things LGBT." This not only places an unfair burden on marginalized people to educate those in dominant groups, but also tokenizes LGB students, forcing them to act as ambassadors for the entire queer community.

Exposure to heterosexism in the informal curriculum was unacceptably high, with one in five LGB students reporting heterosexism perpetrated by faculty, and a slightly smaller proportion reporting heterosexism perpetrated by preceptors. While there were no reports of homophobic violence or threats of violence, LGB students experienced verbal harassment, disrespect, social ostracism, and unfair treatment in their interactions with faculty and preceptors. On the one hand, the true prevalence of personally experienced

heterosexism is likely higher than that reported in the quantitative data, given the large percentage of respondents who were closeted in their interactions with others and therefore less likely to themselves be the target of stigma and prejudice. On the other hand, qualitative findings revealed that students who had passed as heterosexual may have been more likely to *witness* heterosexist discrimination. As observed by Goffman,[251] "he who passes leaves himself open to learning what others 'really' think of persons of his kind" (p. 105).

Heteronormativity within the hidden curriculum manifested starkly in both quantitative and qualitative data. The findings revealed that a majority of LGB students perceived the climate at their medical school to be positive or very positive overall. However, the interpretation of this finding depends on one's point of reference. Specifically, if the goal is to be fully welcoming and inclusive for all students, then any response other than "very positive" regarding the LGB climate indicates a perceived deficit relative to an environmental optimum. From this vantage point, it is of concern that less than a fifth of LGB students in this study described the climate at their medical school as very positive. And while relatively few reported that their medical school climate was openly hostile (e.g., unsafe, harassing, or disrespectful), a meaningful proportion of LGB students perceived a number of subtle heteronormative cues in the hidden curriculum of their medical school.

One such cue that emerged from the data was a lack of sexual identity diversity in medical schools. Nearly a third of LGB students did not know of a single sexual minority faculty member who was out publicly at their medical school. Disconcertingly, a number of these students reported that there actually were LGB faculty at their medical school,

but these faculty members concealed their sexual minority status publicly. The presence of closeted LGB faculty is likely to be perceived as a clear cue of an identity-hostile environment for sexual minority students. Indeed, LGB students who reported the presence of closeted faculty at their medical school were more likely to conceal their sexual minority status themselves. In qualitative data, students also spoke of a lack of sexual identity diversity among students, and the resulting struggles to find a community of peers at their medical school. The implications of queer underrepresentation are both personal and structural. On an individual level, underrepresentation causes LGB students to feel unwelcomed in their medical programs, to struggle to find a community of peers, and to have limited mentorship opportunities. On a structural level, it reproduces a normative idea of medical doctors as heterosexual, further reifying heteronormative medical socialization.

Another potent cue of a heteronormative hidden curriculum is revealed in the patterns of students' sexual minority status disclosure and concealment in medical school. Those with concealable stigmatized identities must continuously evaluate the particulars of each disclosure opportunity – i.e., the decision to "to display or not to display; to tell or not to tell; to let on or not to let on; to lie or not to lie; and in each case, to whom, how, when, and where" (p.56)[251] – in order to determine whether the benefits of disclosure outweigh the risks. Unfortunately, an alarming number of LGB students determined that the risks of disclosure in medical school were too great – three quarters of LGB students reported concealing their sexual minority status from faculty, preceptors or administrators out of fear of negative consequences at least once while in medical school.

Sexual minority status concealment in this sample was higher than that previously reported in the literature. Mansh et al[134] reported that a third of LGB students concealed their sexual identity in medical school. The reason for the discrepancy between the two studies is likely due to the manner in which concealment was measured. In the Mansh study, respondents were asked a single question: "Are you 'out' about your sexual orientation at your medical school? Yes/No/Decline to Answer." The authors then classified those who responded "No" as having concealed their sexual minority status. However, inquiring about such global states of "outness" is more likely to capture a respondent's explicit understanding of self, as opposed to a more context-specific decisions that "reflect differences in attending, perceiving, feeling, thinking, and acting that arise as people attune themselves to the contexts."[255]

Fundamentally, the act of "coming out" (as opposed to a self-perception of "being out") is not a singular phenomenon, but an ongoing decisional quagmire. LGB medical students must continuously negotiate the degree of disclosure, to whom, and in what context. It is therefore unsurprising that the present study not only revealed much higher levels of sexual identity concealment among LGB students, but that the frequency of concealment differed both by sexual identity and type of interaction.

One's decision to conceal or "tone down" an element of one's identity signals the level to which a particular context is perceived as identity-safe. The high level of sexual minority status concealment in this sample reveals that medical schools are much less inclusive toward LGB students than previous research suggests. Again, points of reference are important when interpreting such findings: if medical schools are truly committed to creating fully inclusive, identity-safe environments for their LGB students,

any level of sexual identity concealment out of fear of negative consequences is a cause for concern.

It is also important to acknowledge that medical education is not limited to the physical confines of medical schools. Medical students very often engage in some form of apprenticeship – such as preceptorships, internships, or rotations – in affiliated community hospitals and clinics. LGB medical students were the least likely to be out about their sexual minority status to preceptors in such settings, and 17.3% reported experiencing heterosexist behavior from preceptors. Qualitative findings highlighted the precariousness of queer inclusion in these "real world" settings, which were seen as unsafe by some, and unwelcoming by many sexual minority students.

Students' qualitative descriptions of the antecedents and consequences of disclosure (or concealment) offered some of the most revelatory evidence of the pervasiveness and nuance of the ambient heteronormative culture of medical schools. For instance, LGB medical students reported others assuming they were heterosexual – a hallmark of heteronormativity. The "taken for granted"-ness of heterosexuality within medical schools subtly, yet strongly, signals to students that to be queer is to be deviant. Apart from making students feel unwelcomed in their medical schools, this also reifies the closet and propagates the "dilemma of disclosure" among LGB students. For one, presuming heterosexuality forces LGB people to make an immediate decision "between disclosing [their] identity or allowing the assumption of a false identity to continue."[263] Furthermore, when faculty, preceptors, and others presume that an LGB student is heterosexual, the LGB individual must now additionally consider the impact of correcting – and possibly embarrassing – those who have made this assumption. Indeed, LGB

students reported staying in the closet to avoid making uncomfortable those who had presumed heterosexuality.

Alarming was also how frequently LGB students feared that disclosure of their sexual minority status would lead to discrimination in grading, particularly in the more subjective evaluations that are often a part of internships and preceptorships. In fact, a fear of bias in grading was the most commonly cited reason for concealing one's sexual minority status in medical school. LGB students were candid about the risk of explicit or implicit biases affecting the graders' perceptions of their skills, professionalism, or competence. LGB students therefore often chose to conceal their sexual minority status to maintain the perceived "social neutrality" (in the words of one student) of heterosexuality. One could argue that LGB students' fears are misplaced, since we don't know whether sexual minority status disclosure would have resulted in lower evaluations. However, given the high-stakes and competitive nature of medical education, it is unsurprising that LGB students erred on the side of caution by concealing their sexual identity. What matters here is that LGB students *perceived* medical educators to be susceptible to heterosexist biases in evaluations. Members of marginalized groups "tune their radar screens to cues indicating whether or not they belong, can trust others or expect fairness."[264] Therefore, if medical educators are committed to fostering a fully inclusive environment for all their students, they must proactively demonstrate fairness and cue identity-safety for students from marginalized groups.

Fundamentally, LGB students' frequent decision to conceal their sexual minority makes evident the heteronormative standard to which all medical students are socialized, whereby queerness is incongruent with fitting the "mold" of medical student. In highly

heteronormative contexts, constructing a new identity as a medical doctor "may require students to shift their social identities or let go of certain aspects of who they are to align with the perceived norms."[11] Indeed, LGB students spoke of concealing their sexual identity to avoid being perceived as "different" or as an "outsider" – the corollary of which is that the "right kind of physician" is a heterosexual physician. In the words of one student "being anything other than straight in medicine can feel isolating."

5. Conclusion

Every year, medical schools undertake the "standardized and centralized production of professional producers"[38] – a monumental task of transforming over twenty thousand laypeople into medical doctors. In addition to transferring knowledge about human physiology, the etiologies and symptoms of diseases, and the skills necessary to preform medical procedures, medical schools are tasked with instilling into these future physicians the culture of medicine: the attitudes, beliefs, values and norms perceived necessary to produce professionals who "think, act, and feel like a physician."[41]

The culture of medicine is usually perceived and conceptualized as neutral or even beneficent. In actuality though, it is permeated by normative cultural standards that reproduce broader social systems of oppression within the demanding and reinventive context of medical education.[83] Not only does this lead to the marginalization of minority students who do not fit the normative "mold" of a medical professional, but also reinforces majority students' explicit and implicit biases,[131–133,265] reinforcing the very cognitive habits that give rise to interpersonal discrimination and oppression.

In this dissertation I focused on heteronormativity – a particular cultural standard that privileges some and oppresses others on the basis of their sexual identities, behaviors, attractions, or relationships. My goal was two-fold: first, to characterize and quantify the extent to which medical socialization manifests a heteronormative cultural standard; and second, to evaluate whether exposure to heteronormative medical socialization increases medical students' psychological distress. I was able to accomplish this goal by leveraging the largest longitudinal cohort of students enrolled in a nationally representative sample of

allopathic medical schools in the United States, and centering the voices and experiences of sexual minority students themselves.

My findings paint a distressing picture of medical education that manifests heteronormativity across its formal, informal, and hidden curricula; from inadequate instruction on LGBT health, heterosexist discrimination perpetrated by faculty, to an overall climate that strongly disincentivizes sexual minority status disclosure. Within this context, sexual minority students are effectively precluded from fully and authentically participating in their medical education. In and of themselves, these findings should be of clear concern to medical schools, which have articulated a vision of diversity and inclusion as "powerful tools for enhancing the medical education environment and ultimately the overall health of the nation."[25] If the profession of medicine is sincere in its stated efforts to prepare diverse and culturally competent physicians who meet the evolving health needs of all,[130] it must do the hard work of confronting and subverting the heteronormative marginalization that is currently characteristic of medical education. This will require substantial effort as heteronormativity, like other oppressive social norms, is not only pervasive, but also largely invisible, particularly to those who enjoy heterosexual privilege.

On an institutional level, medical schools must include both sexual orientation and gender identity as protected categories in their nondiscrimination policies. This is critical as nearly half of sexual and gender minority people live in states that do not protect them from discrimination in employment, housing, or public accommodations.[266] Similarly, all medical schools need to critically evaluate all institutional policies and procedures to ensure that all students, regardless of their sexual or gender minority status, have equitable access to benefits and health care.

However, simply having a nondiscrimination policy that protects sexual and gender minority people is not enough to reduce the disconcertingly high prevalence of heterosexist interpersonal behavior in medical school. Whether perpetrated by faculty, preceptors, administrators, or other students, medical schools need to adopt and meaningfully enforce policies that address discriminatory behavior. More importantly, medical schools must commit to *preventing* discrimination and marginalization by implementing interventions that not only enable medical educators to learn about and confront their implicit and explicit heterosexist attitudes, but also to develop interpersonal skills that promote inclusion, empathy, and mutual respect. While challenging, changing people's attitudes and behaviors is not impossible, particularly if medical schools build on the fact that medical educators, by and large, want to teach inclusively and equitably – they often simply do not have the knowledge and skills to effectively do so.

Medical schools must also take meaningful steps to create an educational and social climate that is not only nondiscriminatory, but *welcoming and inclusive*. Currently, many sexual minority students do not feel safe to express themselves fully and authentically in the context of their medical school. I found that an unacceptably high proportion of gay, lesbian, and bisexual students believed it safer to conceal their sexual minority status than risk the possible negative consequences of disclosure. LGB students' own words revealed that they continuously confront a high-stakes decisional quagmire, having to weigh living authentically against the risks of negative professional and interpersonal repercussions, ranging from biased grading and reduced mentorship to social ostracism, tokenizing, and microaggressions. Creating an identity-safe environment for sexual minority students (and any students with "invisible" stigmas) will

require an elimination of (or at least a significant reduction in) negative repercussions following disclosure, as well as a meaningful and concerted effort to (re)gain students' trust that their identities won't hinder their professional and personal goals.

If reducing the marginalization of minority medical students isn't enough to motivate meaningful action, medical schools should also consider the negative psychological ramifications of medical socialization that reproduces a heteronormative cultural standard. I found that exposure to heteronormativity not only increases psychological distress among sexual minority students, but is equally detrimental to the psychological well-being of heterosexual students as well. Psychological distress, such as burnout and depression, can have negative professional and personal repercussions, including impaired academic performance and higher risk of dropping out of medical school, as well as increased risk of substance use and suicidal ideation.[6–9] Psychological distress can also lead to lower empathy, less altruistic professional values, and unprofessional conduct, impacting the quality and patient-centeredness of care provided by these future physicians.[6]

Recognizing the significant implications of psychological distress, both for medical professionals themselves and for their effective practice of medicine, medical schools have made efforts to improve student mental health by primarily focusing on increasing access to mental health services, reducing the stigma surrounding mental illness, and implementing various wellness initiatives,[267] such as mindfulness meditation. Unfortunately, the effectiveness of these efforts will be limited unless medical schools make a corresponding effort to proactively confront the legacy of reproducing oppressive normative standards disguised as a beneficent culture of the medical profession.

6. Works cited

1. AAMC. US Medical School Applications and Matriculants by School, State of Legal Residence, and Sex, 2018-2019. *FACTS Appl Matricul Enrollment, Grad MD/PhD, Resid Appl Data*. 2019.
2. Dyrbye LN, Thomas M, Shanafelt T. Systematic review of depression, anxiety, and other indicators of psychological distress among US and Canadian medical students. *Acad Med*. 2006;81:354-373.
3. Levine RE, Litwins SD, Frye AW. An evaluation of depressed mood in two classes of medical students. *Acad Psychiatry*. 2006;30(3):235-7. Available at: http://www.ncbi.nlm.nih.gov/pubmed/16728770. Accessed February 2, 2015.
4. Goebert D, Thompson D, Takeshita J, et al. Depressive Symptoms in Medical Students and Residents : A Multischool Study. *Acad Med*. 2009;84(2):236-241.
5. Dyrbye LN, West CP, Satele D, et al. Burnout among U.S. medical students, residents, and early career physicians relative to the general U.S. population. *Acad Med*. 2014;89(3):443-51. Available at: http://www.ncbi.nlm.nih.gov/pubmed/24448053. Accessed November 17, 2014.
6. Dyrbye L, Thomas M, Shanafelt T. Medical student distress: causes, consequences, and proposed solutions. *Mayo Clin Proc*. 2005;80(12):1613-1622.
7. Hojat M, Robeson M, Damjanov I, Veloski JJ, Glaser K, Gonnella JS. Students' psychosocial characteristics as predictors of academic performance in medical school. *Acad Med*. 1993;68(8):635-7. Available at: http://www.ncbi.nlm.nih.gov/pubmed/8352877. Accessed February 2, 2015.
8. Clark DC. Vicissitudes of Depressed Mood During Four Years of Medical School. *JAMA J Am Med Assoc*. 1988;260(17):2521. Available at: http://jama.jamanetwork.com/article.aspx?articleid=374777. Accessed July 9, 2013.
9. Dyrbye LN, Thomas MR, Power D V, et al. Burnout and serious thoughts of dropping out of medical school: a multi-institutional study. *Acad Med*. 2010;85(1):94-102. Available at: http://www.ncbi.nlm.nih.gov/pubmed/20042833.
10. Hafferty FW, Hafler JP. The Hidden Curriculum, Structural Disconnects, and the Socialization of New Professionals. In: Hafler JP, ed. *Extraordinary Learning in the Workplace*. Dordrecht: Springer Netherlands; 2011:17-35. Available at: http://link.springer.com/10.1007/978-94-007-0271-4. Accessed October 10, 2014.
11. Frost HD, Regehr G. "I AM a Doctor": Negotiating the Discourses of Standardization and Diversity in Professional Identity Construction. *Acad Med*. 2013;88:1570-1577. Available at: http://www.ncbi.nlm.nih.gov/pubmed/23969361.
12. Hafferty FW, Franks R. The hidden curriculum, ethics teaching, and the structure of medical education. *Acad Med*. 1994;69(11):861-71.

13. Beagan BL. Neutralizing differences: producing neutral doctors for (almost) neutral patients. *Soc Sci Med*. 2000;51(8):1253-65.

14. Berger PL, Luckmann T. *The Social Construction of Reality*. First Anchor Books; 1966.

15. Beagan BL. Personal, public and professional identities: Conflicts and congruences in medical school. 1998;(December).

16. Martimianakis MA, Maniate JM, Hodges BD. Sociological interpretations of professionalism. *Med Educ*. 2009;43(9):829-37. Available at: http://www.ncbi.nlm.nih.gov/pubmed/19674298. Accessed May 25, 2014.

17. Gardner SK. Fitting the Mold of Graduate School: A Qualitative Study of Socialization in Doctoral Education. *Innov High Educ*. 2008;33(2):125-138. Available at: http://link.springer.com/10.1007/s10755-008-9068-x. Accessed May 1, 2014.

18. Ellis EM. Impact of race and gender on graduate school socialization, satisfaction with doctoral study, and commitment to degree completion. *West J Black Stud*. 2001;25(1):30-45.

19. Cech EA, Waidzunas TJ. Navigating the Heteronormativity of Engineering: the experiences of lesbian, gay, and bisexual students. *Eng Stud*. 2011;3(1):1-24.

20. Daniel C. Outsiders-within: Critical race theory, graduate education and barriers to professionalization. *J Sociol Soc Welf*. 2007;34(1):25-42.

21. Beagan BL. Micro Inequities and Everyday Inequalities : "Race," Gender , Sexuality and Class in Medical School. *Can J Sociol*. 2001;26(4):583-610.

22. Griffith EEH, Delgado A. On the professional socialization of black residents in psychiatry. *J Med Educ*. 1979;54:471-476.

23. Weidman JC, Twale DJ, Stein EL. *Socialization of graduate and professional students in higher education: a perilous passage?* San Francisco: Jossey-Bass Publishers, Inc.; 2001. Available at: http://eric.ed.gov/?id=ED457710.

24. Hafferty FW. Cadaver stories and the emotional socialization of medical students. *J Health Soc Behav*. 1988;29(4):344-56.

25. Castillo-Page L. *Diversity in the Physician Workforce: Facts & Figures 2010*. Washington DC; 2010.

26. Przedworski JM, Dovidio JF, Hardeman RR, et al. A Comparison of the Mental Health and Well-Being of Sexual Minority and Heterosexual First-Year Medical Students. *Acad Med*. 2015;90(5):652-659. Available at: http://content.wkhealth.com/linkback/openurl?sid=WKPTLP:landingpage&an=00001888-201505000-00031.

27. Meyer IH. Minority stress and mental health in gay men. *J Health Soc Behav*. 1995;36(1):38-56.

28. Hatzenbuehler ML. How does sexual minority stigma "get under the skin"? A psychological mediation framework. *Psychol Bull*. 2009;135(5):707-30. Available

at:
http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2789474&tool=pmcentrez&rendertype=abstract. Accessed March 2, 2013.

29. Bauer GR, Jairam J a. Are lesbians really women who have sex with women (WSW)? Methodological concerns in measuring sexual orientation in health research. *Women Health*. 2008;48(4):383-408. Available at: http://www.ncbi.nlm.nih.gov/pubmed/19301530. Accessed February 7, 2013.

30. Pathela P, Blank S, Sell RL, Schillinger J a. The importance of both sexual behavior and identity. *Am J Public Health*. 2006;96(5):765; author reply 766. Available at: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1470570&tool=pmcentrez&rendertype=abstract. Accessed February 7, 2013.

31. Pew Research Center. *In Gay Marriage Debate, Both Supporters and Opponents See Legal Recognition as 'Inevitable.'* Washington DC; 2013.

32. Human Rights Campaign. Maps of State Laws and Policies. 2014.

33. Chambers S a. Telepistemology of the closet; or, The queer politics of Six Feet Under. *J Am Cult*. 2003;26(1):24-41. Available at: http://doi.wiley.com/10.1111/1542-734X.00071.

34. Kitzinger C. Heteronormativity in Action: Reproducing the Heterosexual Nuclear Family in After-hours Medical Calls. *Soc Probl*. 2005;52(4):477-498. Available at: http://www.jstor.org/stable/info/10.1525/sp.2005.52.4.477.

35. Berlant L, Warner M. Sex in public. *Crit Inq*. 1998;24(2):547-566.

36. Sears J. *Youth, education, and sexualities: An international encyclopedia*.; 2005.

37. Vasas EB. Examining the margins: a concept analysis of marginalization. *ANS Adv Nurs Sci*. 2005;28(3):194-202.

38. Larson MS. *The Rise of Professionalism: a Sociological Analysis*. Berkeley, California: University of California Press; 1977.

39. Brown J. *The Definition of a Profession: the Authority of Metaphor in the History of Intelligence Testing, 1890-1930*. Princeton, NJ: Princeton University Press; 1992.

40. Jackson JA. *Professions and Professionalization*. New York: Cambridge University Press; 1970.

41. Merton RK, Reader G, Kendall PL. *The Student physician: Introductory studies in the sociology of medical education*. Oxford: Harvard University Press; 1957.

42. Becker H, Geer B, Hughes EC, Strauss A. *Boys in white: Student culture in medical school*. Transaction Publishers; 1961.

43. Parsons T. Social Structure and Dynamic Process: The case of modern medical practice. In: *Social Systems*. Toronto: Collier-Macmillan Canada, Ltd.; 1951:428-479.

44. Durkheim E. *Education and sociology*. New York: Free Press; 1956.

45. Baszanger I. Professional socialization and social control: from medical students to general practitioners. *Soc Sci Med*. 1985;20(2):133-43.

46. Clouder L. Becoming professional: exploring the complexities of professional socialization in health and social care. *Learn Heal Soc Care*. 2003;2(4):213-222. Available at: http://doi.wiley.com/10.1046/j.1473-6861.2003.00052.x.

47. Conrad P. Learning To Doctor : Reflections on Recent Accounts of the Medical School Years. *J Health Soc Behav*. 1988;29(4):323-332.

48. Nash R. Social explanation and socialization: on Bourdieu and the structure, disposition, practice scheme. *Sociol Rev*. 2008;51(1):43-62. Available at: http://doi.wiley.com/10.1111/1467-954X.00407.

49. Gopaul B. Distinction in Doctoral Education: Using Bourdieu's Tools to Assess the Socialization of Doctoral Students. *Equity Excell Educ*. 2011;44(1):10-21. Available at: http://www.tandfonline.com/doi/abs/10.1080/10665684.2011.539468. Accessed May 21, 2014.

50. Pitkala KH, Mantyranta T. Professional socialization revised: medical students' own conceptions related to adoption of the future physician's role--a qualitative study. *Med Teach*. 2003;25(2):155-60. Available at: http://www.ncbi.nlm.nih.gov/pubmed/12745523. Accessed May 16, 2014.

51. Lutfey K, Mortimer JT. Development and Socialization through the Adult Life Course. In: Delamater J, ed. *Handbook of Social Psychology*. New York: Kluwer Academic; 2003:183-202.

52. Cockerham WC. Bourdieu and an Update of Health Lifestyle Theory. In: Cockerham WC, ed. *Medical Sociology on the Move*. Dordrecht: Springer Netherlands; 2013:127-154. Available at: http://link.springer.com/10.1007/978-94-007-6193-3. Accessed March 23, 2014.

53. Cockerham WC. A note of the fate of postmodern theory and its failure to meet the basic requirements for success in medical sociology. *Soc theory Heal*. 2007;5:285-296.

54. Giroux HA. Theories of Reproduction and Resistance in the New Sociology of Education: A Critical Analysis. *Harv Educ Rev*. 1983;53(3):257-293.

55. Collins PH. What's Going On? Black Feminist Thought and the Politics of Postmodernism. In: *Fighting Words: Black Women and the Search for Justice*. Minneapolis: University of Minnesota Press; 1998:124-186.

56. Margolis E, Soldatenko M, Acker S, Gair M. Peekaboo: Hiding and Outing the Curriculum. In: Margolis E, ed. *The Hidden Curriculum in Higher Education*. New York: Routledge; 2001:1-20.

57. Wentworth WM. *Context and understanding: An inquiry into socialization theory*. New York: Elsevier; 1980.

58. Antony JS. Reexamining doctoral student socialization and professional development: Moving beyond the congruence and assimilation orientation. In:

Higher Education: Handbook of Theory and Research. Dordrecht: Springer Science+Business Media; 2002:349-380.

59. Reinharz S. *On becoming a social scientist*. New Brunswick: Transaction Books; 1984.

60. Tierney WG. Organizational Socialization in Education Higher. *J Higher Educ*. 1997;68(1):1-16.

61. Stein EL, Weidman JC. Socialization in graduate school: a conceptual framework. In: *Association for the Study of Higher Education*. Atlanta; 1989.

62. Long TE., Hadden JK. A Reconception of Socialization. *Sociol Theory*. 1985;3(1):39-49.

63. Haas J, Shaffir W. Ritual Evaluation of Competence: The Hidden Curriculum of Professionalization in an Innovative Medical School Program. *Work Occup*. 1982;9(2):131-154. Available at: http://wox.sagepub.com/cgi/doi/10.1177/0730888482009002001. Accessed September 30, 2014.

64. Hafferty FW. Professionalism and the Socialization of Medical Students. In: Cruess RL, Cruess SR, Steinert Y, eds. *Teaching Medical Professionalism*. New York: Cambridge University Press; 2009:53-72.

65. Hafferty FW, Castellani B. The hidden curriculum: A theory of medical education. In: Brosnan C, Turner BS, eds. *Handbook of the Sociology of Medical Education*. New York: Routledge; 2009:30-50.

66. Wear D, Skillicorn J, Martin JR. Hidden in plain sight: the formal, informal, and hidden curricula of a psychiatry clerkship. *Acad Med*. 2009;84(4):451-458. Available at: http://www.ncbi.nlm.nih.gov/pubmed/19318777.

67. Ozolins I, Hall H, Peterson R. The student voice: recognising the hidden and informal curriculum in medicine. *Med Teach*. 2008;30(6):606-11. Available at: http://www.ncbi.nlm.nih.gov/pubmed/18608968. Accessed October 6, 2014.

68. Gofton W, Regehr G. What we don't know we are teaching: unveiling the hidden curriculum. *Clin Orthop Relat Res*. 2006;449(449):20-7. Available at: http://www.ncbi.nlm.nih.gov/pubmed/16735868. Accessed October 6, 2014.

69. Hafferty FW. Beyond curriculum reform: Confronting medicine's hidden curriculum. *Acad Med*. 1998;73:403-407.

70. Martin JR. What should we do with a hidden curriculum when we find one? *Curric Inq*. 1976;6(2):135-151.

71. Margolis E, ed. *The Hidden Curriculum in Higher Education*. New York: Routledge; 2001.

72. Lombardo P a, Dorr GM. Eugenics, medical education, and the Public Health Service: Another perspective on the Tuskegee syphilis experiment. *Bull Hist Med*. 2006;80(2):291-316. Available at: http://www.ncbi.nlm.nih.gov/pubmed/16809865. Accessed September 24, 2014.

73. Drescher J. Queer diagnoses: parallels and contrasts in the history of homosexuality, gender variance, and the diagnostic and statistical manual. *Arch Sex Behav*. 2010;39(2):427-60. Available at: http://www.ncbi.nlm.nih.gov/pubmed/19838785. Accessed October 12, 2014.

74. Vance SR, Cohen-Kettenis PT, Drescher J, Meyer-Bahlburg HFL, Pfäfflin F, Zucker KJ. Opinions About the DSM Gender Identity Disorder Diagnosis: Results from an International Survey Administered to Organizations Concerned with the Welfare of Transgender People. *Int J Transgenderism*. 2010;12(1):1-14. Available at: http://www.tandfonline.com/doi/abs/10.1080/15532731003749087. Accessed October 12, 2014.

75. Risdon C, Cook D, Willms D. Gay and lesbian physicians in training : a qualitative study. *Can Med Assoc J*. 2000;162(3):331-334.

76. Antony JS, Taylor E. Theories and strategies of academic career socialization: improving paths to the professoriate for black graduate students. In: *Paths to the Professoriate: Strategies for Enriching the Preparation of Future Faculty*. Jossey-Bass Publishers, Inc.; 2004:92-114.

77. Ludmerer KM. *Time to Heal: American medical education from the turn of the century to the era of managed care*. New York: Oxford University Press; 1999.

78. Turbes S, Krebs E, Axtell S. The Hidden Curriculum in Multicultural Medical Education: The Role of Case Examples. *Acad Med*. 2002;77(3):209-216.

79. Egan JM. Graduate school and the self: A theoretical view of some negative effects of professional socialization. *Teach Sociol*. 1989;17(2):200-207.

80. Haidet P, Stein HF. The role of the student-teacher relationship in the formation of physicians. The hidden curriculum as process. *J Gen Intern Med*. 2006;21 Suppl 1(152):S16-20. Available at: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1484835&tool=pmcentrez&rendertype=abstract. Accessed May 7, 2014.

81. Sanchez NF, Rankin S, Callahan E, et al. LGBT Trainee and Health Professional Perspectives on Academic Careers-Facilitators and Challenges. *Lgbt Heal*. 2015;2(4):346-356.

82. Townsend MH, Wallick MM, Combre KM. Follow-up survey of support services for lesbian, gay, and bisexual medical students. *Acad Med*. 1996;71(9):1012-1014.

83. Scott S. Revisiting the Total Institution: Performative Regulation in the Reinventive Institution. *Sociology*. 2010;44(2):213-231. Available at: http://soc.sagepub.com/cgi/doi/10.1177/0038038509357198. Accessed October 30, 2014.

84. Beagan BL. “Even if I don’t know what I’m doing I can make it look like I know what I’m doing”: becoming a doctor in the 1990s. *Can Rev Sociol Anthropol*. 2001;38(3):275-92.

85. Settles IH. When multiple identities interfere: the role of identity centrality. *Pers Soc Psychol Bull*. 2004;30(4):487-500. Available at:

http://www.ncbi.nlm.nih.gov/pubmed/15070477. Accessed May 26, 2014.

86. Mavor KI, McNeill KG, Anderson K, Kerr A, O'Reilly E, Platow MJ. Beyond prevalence to process: the role of self and identity in medical student well-being. *Med Educ*. 2014;48(4):351-60. Available at: http://www.ncbi.nlm.nih.gov/pubmed/24606619. Accessed May 31, 2014.

87. Meyer IH. Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: conceptual issues and research evidence. *Psychol Bull*. 2003;129(5):674-97. Available at: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2072932&tool=pmcentrez&rendertype=abstract. Accessed March 2, 2013.

88. Settles IH, Jellison W a., Pratt-Hyatt JS. Identification with multiple social groups: The moderating role of identity change over time among women-scientists. *J Res Pers*. 2009;43(5):856-867. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0092656609001202. Accessed May 29, 2014.

89. Holman L. Sometimes, all you can do is laugh. In: Takakuwa KM, Rubashkin N, Herzig KE, eds. *What I Learned in Medical School: Personal Stories of Young Doctors*. University of California Press; 2004:114-120.

90. Lewis CW, Ginsberg R, Davies T, Smith K. Experiences of African American PhD students at a predominately white carnegie I research institution. *Coll Stud J*. 2004;38(2):231.

91. Devi S. Doctors in distress. *Lancet*. 2011;377(9764):454-5. Available at: http://www.ncbi.nlm.nih.gov/pubmed/21300592. Accessed February 10, 2015.

92. Rubin R. Recent suicides highlight need to address depression in medical students and residents. *JAMA*. 2014;312(17):1725-1727. Available at: http://www.ncbi.nlm.nih.gov/pubmed/25369478. Accessed February 10, 2015.

93. Sacks MH, Frosch WA, Kesselman M, Parker L. Psychiatric problems in third-year medical students. *Am J Psychiatry*. 1980;137(7):822-5.

94. Dyrbye LN, Harper W, Durning SJ, et al. Patterns of distress in US medical students. *Med Teach*. 2011;33(10):834-9. Available at: http://www.ncbi.nlm.nih.gov/pubmed/21942482. Accessed January 19, 2015.

95. Compton MT, Carrera J, Frank E. Stress and depressive symptoms/dysphoria among US medical students: results from a large, nationally representative survey. *J Nerv Ment Dis*. 2008;196(12):891-897. Available at: http://www.ncbi.nlm.nih.gov/pubmed/19077856. Accessed February 10, 2015.

96. Chang E, Eddins-folensbee F, Coverdale J, Ed M. Survey of the prevalence of burnout, stress, depression, and the use of supports by medical students at one school. *Acad Psychiatry*. 2012;36(3):177-182. Available at: http://www.ncbi.nlm.nih.gov/pubmed/22751817. Accessed February 2, 2015.

97. Dyrbye LN, Thomas MR, Massie FS, et al. Burnout and suicidal ideation among U.S. medical students. *Ann Intern Med*. 2008;149(5):334-41.

98. Schwenk TL, Davis L, Wimsatt LA. Depression, Stigma, and Suicidal Ideation in Medical Students. *JAMA J Am Med Assoc*. 2010;304(11):1181-1190. Available at: http://www.ncbi.nlm.nih.gov/pubmed/20841531. Accessed February 10, 2015.

99. Tjia J, Givens JL, Shea JA. Factors associated with undertreatment of medical student depression. *J Am Coll Heal*. 2005;53(5):219-24. Available at: http://www.ncbi.nlm.nih.gov/pubmed/15813232. Accessed February 10, 2015.

100. Givens JL, Tjia J. Depressed Medical Students ' Use of Mental Health Services and Barriers to Use. *Acad Med*. 2002;77:918-921.

101. Ghodasara SL, Davidson M a, Reich MS, Savoie C V, Rodgers SM. Assessing student mental health at the Vanderbilt University School of Medicine. *Acad Med*. 2011;86(1):116-21. Available at: http://www.ncbi.nlm.nih.gov/pubmed/21099385. Accessed February 10, 2015.

102. Henning K, Ey S, Shaw D. Perfectionism, the imposter phenomenon and psychological adjustment in medical, dental, nursing and pharmacy students. *Med Educ*. 1998;32:456-464.

103. Toews JA, Lockyer JM, Dobson DJ, et al. Analysis of stress levels among medical students, residents, and graduate students at four Canadian schools of medicine. *Acad Med*. 1997;72(11):997-1002.

104. Brazeau CMLR, Shanafelt T, Durning SJ, et al. Distress Among Matriculating Medical Students Relative to the General Population. *Acad Med*. 2014;89(11):1-6. Available at: http://www.ncbi.nlm.nih.gov/pubmed/25250752. Accessed October 11, 2014.

105. Dyrbye LN, Thomas MR, Harper W, et al. The learning environment and medical student burnout: a multicentre study. *Med Educ*. 2009;43(3):274-282. Available at: http://www.ncbi.nlm.nih.gov/pubmed/19250355. Accessed May 25, 2013.

106. Dyrbye LN, Thomas MR, Eacker A, et al. Race, ethnicity, and medical student well-being in the United States. *Arch Intern Med*. 2007;167(19):2103-2109. Available at: http://www.ncbi.nlm.nih.gov/pubmed/17954805. Accessed February 10, 2015.

107. Hardeman RR, Przedworski JM, Burke SE, et al. Mental well-being in 1st year medical students - A comparison by race and gender: A Report from the Medical Student CHANGE Study. *J Racial Ethn Heal Disparities*. 2015;In press.

108. King M, Semlyen J, Tai SS, et al. A systematic review of mental disorder, suicide, and deliberate self harm in lesbian, gay and bisexual people. *BMC Psychiatry*. 2008;8:70. Available at: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2533652&tool=pmcentrez&rendertype=abstract. Accessed May 22, 2013.

109. Cochran S, Sullivan J, Mays V. Prevalence of mental disorders, psychological distress, and mental services use among lesbian, gay, and bisexual adults in the United States. *J Consult Clin Psychol*. 2003;71(1):53-61.

110. Meyer IH, Dietrich J, Schwartz S. Lifetime prevalence of mental disorders and

suicide attempts in diverse lesbian, gay, and bisexual populations. *Am J Public Health*. 2008;98(6):1004-6. Available at: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2377299&tool=pmcentrez&rendertype=abstract. Accessed February 3, 2013.

111. Bostwick WB, Boyd CJ, Hughes TL, McCabe SE. Dimensions of sexual orientation and the prevalence of mood and anxiety disorders in the United States. *Am J Public Health*. 2010;100(3):468-75. Available at: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2820045&tool=pmcentrez&rendertype=abstract. Accessed February 7, 2013.

112. Fergusson DM, Horwood LJ, Ridder EM, Beautrais AL. Sexual orientation and mental health in a birth cohort of young adults. *Psychol Med*. 2005;35(7):971-981. Available at: http://www.journals.cambridge.org/abstract_S0033291704004222. Accessed May 22, 2013.

113. Mustanski BS, Garofalo R, Emerson EM. Mental health disorders, psychological distress, and suicidality in a diverse sample of lesbian, gay, bisexual, and transgender youths. *Am J Public Health*. 2010;100(12):2426-32. Available at: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2978194&tool=pmcentrez&rendertype=abstract. Accessed September 18, 2013.

114. Almazan EP, Roettger M, Acosta PS. Measures of Sexual Minority Status and Suicide Risk among Young Adults in the United States. *Arch suicide Res*. 2014;18(3):274-281.

115. Marshal MP, Dietz LJ, Friedman MS, et al. Suicidality and depression disparities between sexual minority and heterosexual youth: a meta-analytic review. *J Adolesc Heal*. 2011;49(2):115-23. Available at: http://dx.doi.org/10.1016/j.jadohealth.2011.02.005. Accessed May 28, 2014.

116. Herek GM, Garnets LD. Sexual orientation and mental health. *Annu Rev Clin Psychol*. 2007;3:353-375. Available at: http://www.ncbi.nlm.nih.gov/pubmed/17716060. Accessed March 9, 2013.

117. Pyra M, Weber KM, Wilson TE, et al. Sexual minority women and depressive symptoms throughout adulthood. *Am J Public Health*. 2014;104(12):e83-90. Available at: http://www.ncbi.nlm.nih.gov/pubmed/25320890. Accessed January 26, 2015.

118. Fredriksen-Goldsen KI, Kim H-J, Barkan SE, Muraco A, Hoy-Ellis CP. Health disparities among lesbian, gay, and bisexual older adults: results from a population-based study. *Am J Public Health*. 2013;103(10):1802-9. Available at: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3770805&tool=pmcentrez&rendertype=abstract. Accessed March 19, 2014.

119. Marshal MP, Dermody SS, Cheong J, et al. Trajectories of depressive symptoms and suicidality among heterosexual and sexual minority youth. *J Youth Adolesc*. 2013;42(8):1243-56. Available at: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3744095&tool=pmcentrez&rendertype=abstract. Accessed January 7, 2015.

120. Przedworski JMJM, VanKim NANA, Eisenberg MEME, McAlpine DDDD, Lust KKA, Laska MNMN. Self-Reported Mental Disorders and Distress by Sexual Orientation: Results of the Minnesota College Student Health Survey. *Am J Prev Med*. 2015;49(1).

121. Fredriksen-Goldsen KI, Kim H-J, Barkan SE, Balsam KF, Mincer SL. Disparities in health-related quality of life: a comparison of lesbians and bisexual women. *Am J Public Health*. 2010;100(11):2255-61. Available at: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2951966&tool=pmcentrez&rendertype=abstract. Accessed February 7, 2013.

122. Kerr DL, Ding K, Thompson AJ. A comparison of lesbian, bisexual, and heterosexual female college undergraduate students on selected reproductive health screenings and sexual behaviors. *Women's Heal issues*. 2013;23(6):e347-55. Available at: http://www.ncbi.nlm.nih.gov/pubmed/24183409. Accessed January 26, 2015.

123. Gilman SE, Cochran SD, Mays VM, Hughes M, Ostrow D, Kessler RC. Risk of psychiatric disorders among individuals reporting same-sex sexual partners in the National Comorbidity Survey. *Am J Public Health*. 2001;91(6):933-9.

124. Adkins DE, Wang V, Elder GH. Structure and Stress: Trajectories of Depressive Symptoms across Adolescence and Young Adulthood. *Soc Forces*. 2009;88(1):31. Available at: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2812933&tool=pmcentrez&rendertype=abstract.

125. Sutin AR, Terracciano A, Milaneschi Y, An Y, Ferrucci L, Zonderman AB. The trajectory of depressive symptoms across the adult life span. *JAMA psychiatry*. 2013;70(8):803-11. Available at: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3740038&tool=pmcentrez&rendertype=abstract.

126. Needham BL. Sexual Attraction and Trajectories of Mental Health and Substance Use During the Transition from Adolescence to Adulthood. *J Youth Adolesc*. 2012;41(2):179-190.

127. Lapinski J, Yost M, Sexton P, Labaere RJ. Factors Modifying Burnout in Osteopathic Medical Students. *Acad Psychiatry*. 2016;40(1):55-62.

128. Lapinski J, Sexton P. Still in the closet: the invisible minority in medical education. *BMC Med Educ*. 2014;14(1):171. Available at: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=4137271&tool=pmcentrez&rendertype=abstract.

129. Grbic D, Sondheimer H. Personal Well-being Among Medical Students: Findings from an AAMC Pilot Survey. *AAMC Anal Br*. 2014;14(4):4-8.

130. AAMC. Vision of the Association of American Medical Colleges. 2017.

131. Phelan SM, Puhl RM, Burke SE, et al. The mixed impact of medical school on medical students' implicit and explicit weight bias. *Med Educ*. 2015;49(10):983-992. Available at:

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4755318/pdf/nihms754060.pdf. Accessed March 22, 2019.

132. Phelan SM, Burke SE, Hardeman RR, et al. Medical School Factors Associated with Changes in Implicit and Explicit Bias Against Gay and Lesbian People among 3492 Graduating Medical Students. *J Gen Intern Med*. 2017;32(11):1193-201. Available at: http://www.ncbi.nlm.nih.gov/pubmed/28766125. Accessed March 20, 2019.

133. van Ryn M, Hardeman R, Phelan SM, et al. Medical School Experiences Associated with Change in Implicit Racial Bias Among 3547 Students: A Medical Student CHANGES Study Report. *J Gen Intern Med*. 2015;30(12):1748-1756.

134. Mansh M, White W, Gee-tong L, et al. Sexual and gender minority identity disclosure during undergraduate medical education: "In the Closet" in medical school. *Acad Med*. 2015;90(5):634-644. Available at: http://www.ncbi.nlm.nih.gov/pubmed/25692563. Accessed February 19, 2015.

135. Institute of Medicine (IOM). *The Health of Lesbian, Gay, Bisexual, and Transgender People: Building a Foundation for Better Understanding*. Washington DC: The National Academies Press; 2011.

136. Burke BP. The well-being of gay, lesbian, and bisexual physicians. *West J Med*. 2001;174(January):59-62.

137. American Medical Association. Strategies for Enhancing Diversity in the Physician Workforce (H-200.951).

138. Pan RJ. Diversity in the Physician Workforce and Access to Care. *Counc Med Educ Rep*. 2007:1-6.

139. Phelan SM, Dovidio JF, Puhl RM, et al. Implicit and explicit weight bias in a national sample of 4,732 medical students: The medical student CHANGES study. *Obesity*. 2013;Epub 9 Jan. Available at: http://www.ncbi.nlm.nih.gov/pubmed/24375989. Accessed February 27, 2014.

140. Särndal C-E, Swensson B, Wretman JH. *Model Assisted Survey Sampling*. New York: Springer-Verlag; 1992.

141. Pilkonis PA, Choi SW, Reise SP, Stover AM, Riley WT, Cella D. Item banks for measuring emotional distress from the Patient-Reported Outcomes Measurement Information System (PROMIS®): depression, anxiety, and anger. *Assessment*. 2011;18(3):263-83. Available at: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3153635&tool=pmcentrez&rendertype=abstract. Accessed January 24, 2014.

142. PROMIS Cooperative Group. PROMIS Scoring Guide. 2011;(January):0-82.

143. Yost KJ, Eton DT, Garcia SF, Cella D. Minimally important differences were estimated for six Patient-Reported Outcomes Measurement Information System-Cancer scales in advanced-stage cancer patients. *J Clin Epidemiol*. 2011;64(5):507-16. Available at: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3076200&tool=pmcen

trez&rendertype=abstract. Accessed July 9, 2013.

144. DeSalvo K, Fisher W, Tran K. Assessing measurement properties of two single-item general health measures. *Qual Life Res*. 2006;15(2):191-201.

145. Clark R, Coleman AP, Novak JD. Brief report: Initial psychometric properties of the everyday discrimination scale in black adolescents. *J Adolesc*. 2004;27(3):363-8. Available at: http://www.ncbi.nlm.nih.gov/pubmed/15159094. Accessed February 27, 2014.

146. Russell D. UCLA Loneliness Scale (Version 3): Reliability, validity, and factor structure. *J Pers Assess*. 1996;66(1):20-40.

147. Crowne D, Marlowe D. A new scale of social desirability independent of psychopathology. *J Consult Psychol*. 1960.

148. Cummings P. Methods for estimating adjusted risk ratios. *Stata J*. 2009;9(2):175-196.

149. Zou G. A Modified Poisson Regression Approach to Prospective Studies with Binary Data. *Am J Epidemiol*. 2004;159(7):702-706. Available at: http://aje.oupjournals.org/cgi/doi/10.1093/aje/kwh090. Accessed May 24, 2013.

150. McLean CP, Asnaani A, Litz BT, Hofmann SG. Gender differences in anxiety disorders: prevalence, course of illness, comorbidity and burden of illness. *J Psychiatr Res*. 2011;45(8):1027-35. Available at: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3135672&tool=pmcentrez&rendertype=abstract. Accessed November 16, 2013.

151. Kessler RC, McGonagle K a, Swartz M, Blazer DG, Nelson CB. Sex and depression in the National Comorbidity Survey. I: Lifetime prevalence, chronicity and recurrence. *J Affect Disord*. 1993;29(2-3):85-96.

152. Franks P, Gold MR, Fiscella K. Sociodemographics, self-rated health, and mortality in the US. *Soc Sci Med*. 2003;56(12):2505-14.

153. Cunningham WE, Hays RD, Burton TM, Kington RS. Health Status Measurement Performance and Health Status Differences by Age, Ethnicity, and Gender: Assessment in the Medical Outcomes Study. *J Health Care Poor Underserved*. 2000;11(1):58-76. Available at: http://muse.jhu.edu/content/crossref/journals/journal_of_health_care_for_the_poor_and_underserved/v011/11.1.cunningham.html. Accessed May 25, 2014.

154. Piccinelli M. Gender differences in depression: Critical review. *Br J Psychiatry*. 2000;177(6):486-492. Available at: http://bjp.rcpsych.org/content/177/6/486.full. Accessed May 25, 2014.

155. Nolen-Hoeksema S. Sex differences in unipolar depression: evidence and theory. *Psychol Bull*. 1987.

156. Weissman M, Klerman G. Sex differences and the epidemiology of depression. *Arch Gen Psychiatry*. 1977.

157. National Center for Health Statistics. Sexual orientation and health among U.S.

adults: National Health Interview Survey 2015. 2015:Table 1.

158. Gates GJ. *How many people are lesbian, gay, bisexual and transgender?*; 2011.

159. Gates GJ, Newport F. Special Report: 3.4% of U.S. Adults Identify as LGBT | Gallup. *Gallup*. 2012.

160. Schatz B, O'Hanlan KA. *Anti-Gay Discrimination in Medicine: Results of a National Survey of Lesbian, Gay and Bisexual Physicians.*; 1994.

161. Oriel K, Madlon-Kay D, Govaker D, Mersy D. Gay and lesbian physicians in training: family practice program directors' attitudes and students' perceptions of bias. *Fam Med*. 1996;28(1):720-725.

162. Brogan DJ. Harassment of Lesbians as Medical Students and Physicians. *JAMA J Am Med Assoc*. 1999;282(13):1290-1292. Available at: http://jama.ama-assn.org/cgi/doi/10.1001/jama.282.13.1290. Accessed May 22, 2013.

163. Harris S. Gay Discrimination Still Exists in Medical Schools. *AAMC Reporter*. 2007:online edition.

164. Eliason MJ, Dibble SL, Robertson P a. Lesbian, gay, bisexual, and transgender (LGBT) physicians' experiences in the workplace. *J Homosex*. 2011;58(10):1355-71. Available at: http://www.ncbi.nlm.nih.gov/pubmed/22029561. Accessed May 22, 2013.

165. Merchant RC, Jongco AM, Woodward L. Disclosure of sexual orientation by medical students and residency applicants. *Acad Med*. 2005;80(8):786.

166. Case P, Austin SB, Hunter DJ, et al. Sexual orientation, health risk factors, and physical functioning in the Nurses' Health Study II. *J Womens Health (Larchmt)*. 2004;13(9):1033-47. Available at: http://www.ncbi.nlm.nih.gov/pubmed/15665660.

167. Kerr DL, Santurri L, Peters P. A comparison of lesbian, bisexual, and heterosexual college undergraduate women on selected mental health issues. *J Am Coll Health*. 2013;61(4):185-94. Available at: http://www.ncbi.nlm.nih.gov/pubmed/23663122. Accessed October 22, 2013.

168. Rothblum ED, Factor R. Lesbians and their sisters as control group: Demographic and mental health factors. *Psychol Sci*. 2001;12(1):63-69. Available at: http://journals.sagepub.com/doi/10.1111/1467-9280.00311. Accessed May 22, 2017.

169. Dahlin M, Joneborg N, Runeson B. Stress and depression among medical students : a cross-sectional study. *Med Educ*. 2005;39:594-604.

170. Rosal MC, Ockene IS, Ockene JK, Barrett S V, Ma Y, Herbert J. Rosal, A longitudinal study of students depression at one medical school (1997).pdf. *Acad Med*. 1997;72:542-546.

171. Rosenthal JM, Okie S. White coat, mood indigo--depression in medical school. *N Engl J Med*. 2005;353(11):1085-8. Available at: http://www.ncbi.nlm.nih.gov/pubmed/16162877.

172. Roberts LW. Understanding Depression and Distress Among Medical Students. *JAMA J Am Med Assoc*. 2010;304(11):1231-1233. Available at: http://www.ncbi.nlm.nih.gov/pubmed/20841539. Accessed February 10, 2015.

173. Dyrbye LN, Thomas MR, Shanafelt TD. Medical student distress: causes, consequences, and proposed solutions. *Mayo Clin Proc*. 2005;80(12):1613-22. Available at: http://www.ncbi.nlm.nih.gov/pubmed/16342655. Accessed May 10, 2014.

174. Maslach C, Jackson S. Burnout in health professions: a social psychological analysis. In: Sanders G, Suls J, eds. *Social Psychology of Health and Illness*. Hillsdale, NJ: Lawrence Erlbaum Associates; 1982:227-251.

175. Sanchez NF, Rabatin J, Sanchez JP, Hubbard S, Kalet A. Medical students' ability to care for lesbian, gay, bisexual, and transgendered patients. *Fam Med*. 2006;38(1):21-7.

176. Lemm KM. Positive Associations Among Interpersonal Contact, Motivation, and Implicit and Explicit Attitudes Toward Gay Men. *J Homosex*. 2006;51(2):79-99. Available at: http://www.tandfonline.com.ezp2.lib.umn.edu/doi/abs/10.1300/J082v51n02_05#.Ud1Y0z54ZRY. Accessed July 10, 2013.

177. Herek GM, Glunt EK. Interpersonal contact and heterosexuals' attitudes toward gay men: Results from a national survey. *J Sex Res*. 1993;30(3):239-244. Available at: http://www.tandfonline.com.ezp2.lib.umn.edu/doi/abs/10.1080/00224499309551707#.Ud1ZTD54ZRY. Accessed July 10, 2013.

178. Burke SE, Dovidio JF, Przedworski JM, et al. Do Contact and Empathy Mitigate Bias Against Gay and Lesbian People Among Heterosexual First-Year Medical Students? A Report From the Medical Student CHANGE Study. *Acad Med*. 2015;90(5):645-51. Available at: http://www.ncbi.nlm.nih.gov/pubmed/25674910. Accessed June 11, 2015.

179. Smith EM, Johnson SR, Guenther SM. Health care attitudes and experiences during gynecologic care among lesbians and bisexuals. *Am J Public Health*. 1985;75:1085-1087.

180. Bonvicini K a, Perlin MJ. The same but different: clinician-patient communication with gay and lesbian patients. *Patient Educ Couns*. 2003;51(2):115-22.

181. O'Hanlan K, Cabaj R, Schatz B. A review of the medical consequences of homophobia with suggestions for resolution. *J Gay Lesbian Med Assoc*. 1997;1(1):25-39.

182. Mayer KH, Bradford JB, Makadon HJ, Stall R, Goldhammer H, Landers S. Sexual and gender minority health: what we know and what needs to be done. *Am J Public Health*. 2008;98(6):989-95. Available at: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2377288&tool=pmcentrez&rendertype=abstract. Accessed March 26, 2012.

183. Ball S, Bax A. Self-care in Medical Education: Effectiveness of Health-habits

Interventions for First-year Medical Students. *Acad Med*. 2002;77:911-917.

184. Bloodgood R, Short J. A change to pass/fail grading in the first two years at one medical school results in improved psychological well-being. *Acad Med*. 2009;84:655-662.

185. Snowdon S. *Recommendations for Enhancing the Climate for LGBT Students and Employees in Health Professional Schools: A GLMA White Paper*. Washington DC; 2013.

186. Dohrenwend A. Perspective: A grand challenge to academic medicine: speak out on gay rights. *Acad Med*. 2009;84(6):788-92. Available at: http://www.ncbi.nlm.nih.gov/pubmed/19474561.

187. Fish J. *Heterosexism in Health and Social Care*. Basingstoke: Palgrave; 2006.

188. Van Ryn M. Research on the Provider Contribution to Race/Ethnicity Disparities in Medical Care. *Med Care*. 2002;40(1):1140-1151.

189. van Ryn M, Fu SS. Paved with good intentions: do public health and human service providers contribute to racial/ethnic disparities in health? *Am J Public Health*. 2003;93(2):248-55.

190. The Joint Commission. *Advancing Effective Communication, Cultural Competence, and Patient- and Family Centered Care for the Lesbian, Gay, Bisexual, and Transgender (LGBT) Community: A Field Guide*. Oak Brook, IL; 2011.

191. Lehavot K, Simoni JM. The impact of minority stress on mental health and substance use among sexual minority women. *J Consult Clin Psychol*. 2011;79(2):159-70. Available at: http://www.ncbi.nlm.nih.gov/pubmed/21341888. Accessed March 2, 2013.

192. Carter LW, Mollen D, Smith NG. Locus of control, minority stress, and psychological distress among lesbian, gay, and bisexual individuals. *J Couns Psychol*. 2014;61(1):169-75. Available at: http://www.ncbi.nlm.nih.gov/pubmed/24188657. Accessed January 26, 2015.

193. Baams L, Grossman AH, Russell ST. Minority Stress and Mechanisms of Risk for Depression and Suicidal Ideation Among Lesbian, Gay, and Bisexual Youth. *Dev Psychol*. 2015. Available at: http://www.ncbi.nlm.nih.gov/pubmed/25751098. Accessed April 27, 2015.

194. Shilo G, Mor Z. The impact of minority stressors on the mental and physical health of lesbian, gay, and bisexual youths and young adults. *Health Soc Work*. 2014;39(3):161-71.

195. Pearlin LI. The sociological study of stress. *J Health Soc Behav*. 1989;30(3):241-256.

196. Dahlhamer JM, Galinsky AM, Joestl SS, Ward BW. Sexual orientation in the 2013 national health interview survey: a quality assessment. *Vital Health Stat 2*. 2014;(169):1-32.

197. Everett B. Sexual orientation identity change and depressive symptoms: a longitudinal analysis. *J Health Soc Behav*. 2015;56(1):37-58. Available at: http://www.ncbi.nlm.nih.gov/pubmed/25690912. Accessed February 23, 2015.

198. A brief guide to the PROMIS Depression instruments. 2013.

199. A brief guide to the PROMIS Anxiety instruments. 2013.

200. Assessment Center. HealthMeasures Scoring Service Application.

201. Cella D, Choi S, Garcia S, et al. Setting standards for severity of common symptoms in oncology using the PROMIS item banks and expert judgment. *Qual Life Res*. 2014;23(10):2651-61. Available at: http://www.ncbi.nlm.nih.gov/pubmed/24938431. Accessed March 12, 2019.

202. Pilkonis PA, Yu L, Dodds NE, Johnston KL, Maihoefer CC, Lawrence SM. Validation of the depression item bank from the Patient-Reported Outcomes Measurement Information System (PROMIS) in a three-month observational study. *J Psychiatr Res*. 2014;56:112-9. Available at: http://www.ncbi.nlm.nih.gov/pubmed/24931848. Accessed November 12, 2018.

203. Schalet BD, Cook KF, Choi SW, Cella D. Establishing a common metric for self-reported anxiety: Linking the MASQ, PANAS, and GAD-7 to PROMIS Anxiety. *J Anxiety Disord*. 2014;28(1):88-96. Available at: https://www.sciencedirect.com/science/article/pii/S0887618513002156. Accessed November 12, 2018.

204. Choi SW, Podrabsky T, Mckinney N, et al. *PROsetta Stone® Analysis Report: A Rosetta Stone for Patient Reported Outcomes*.; 2015.

205. Hardeman RR, Przedworski JM, Burke SE, et al. Mental Well-Being in First Year Medical Students: A Comparison by Race and Gender: A Report from the Medical Student CHANGE Study. *J racial Ethn Heal disparities*. 2015;2(3).

206. Skelly AC, Dettori JR, Brodt ED. Assessing bias: the importance of considering confounding. *Evid Based Spine Care J*. 2012;3(1):9-12. Available at: http://www.ncbi.nlm.nih.gov/pubmed/23236300. Accessed September 11, 2017.

207. Kessler RC, Berglund P, Demler O, Jin R, Merikangas KR, Walters EE. Lifetime Prevalence and Age-of-Onset Distributions of DSM-IV Disorders in the National COmorbidity Survey Replication. *Arch Gen psychiatry2*. 2005;62:593-602.

208. Kessler RC, Foster C, Webster PS, House JS. The relationship between age and depressive symptoms in two national surveys. *Psychol Aging*. 1992;7(1):119-126. Available at: http://doi.apa.org/getdoi.cfm?doi=10.1037/0882-7974.7.1.119. Accessed May 19, 2017.

209. Mirowsky J, Ross CE. Age and Depression. *J Health Soc Behav*. 1992;33(3):187. Available at: http://www.jstor.org/stable/2137349?origin=crossref. Accessed May 19, 2017.

210. Cook EP. Gender and Psychological Distress. *J Couns Dev*. 1990;68(4):371-375. Available at: http://doi.wiley.com/10.1002/j.1556-6676.1990.tb02513.x. Accessed May 19, 2017.

211. Reeves WC, Strine TW, Pratt L a, et al. Mental illness surveillance among adults in the United States. *MMWR Surveill Summ*. 2011;60(3):1-29.

212. Stockdale SE, Lagomasino IT, Siddique J, McGuire T, Miranda J. Racial and ethnic disparities in detection and treatment of depression and anxiety among psychiatric and primary health care visits, 1995-2005. *Med Care*. 2008;46(7):668-77. Available at: http://www.ncbi.nlm.nih.gov/pubmed/18580385. Accessed May 19, 2017.

213. Simpson SM, Krishnan LL, Kunik ME, Ruiz P. Racial Disparities in Diagnosis and Treatment of Depression: A Literature Review. *Psychiatr Q*. 2007;78(1):3-14. Available at: http://link.springer.com/10.1007/s11126-006-9022-y. Accessed May 19, 2017.

214. Camacho Á, Gonzalez P, Buelna C, et al. Anxious-depression among Hispanic/Latinos from different backgrounds: results from the Hispanic Community Health Study/Study of Latinos (HCHS/SOL). *Soc Psychiatry Psychiatr Epidemiol*. 2015;50(11):1669-1677. Available at: http://www.ncbi.nlm.nih.gov/pubmed/26363900. Accessed May 19, 2017.

215. Lee CH, Duck IM, Sibley CG. Ethnic inequality in diagnosis with depression and anxiety disorders. *N Z Med J*. 2017;130(1454):10-20.

216. Lau AS, Tsai W, Shih J, Liu LL, Hwang W-C, Takeuchi DT. The immigrant paradox among Asian American women: are disparities in the burden of depression and anxiety paradoxical or explicable? *J Consult Clin Psychol*. 2013;81(5):901-11. Available at: http://doi.apa.org/getdoi.cfm?doi=10.1037/a0032105. Accessed May 19, 2017.

217. Zhang J, Fang L, Wu Y-WB, Wieczorek WF. Depression, anxiety, and suicidal ideation among Chinese Americans: a study of immigration-related factors. *J Nerv Ment Dis*. 2013;201(1):17-22. Available at: http://content.wkhealth.com/linkback/openurl?sid=WKPTLP:landingpage&an=00005053-201301000-00004. Accessed May 19, 2017.

218. González HM, Tarraf W, West BT, et al. Antidepressant use in a nationally representative sample of community-dwelling US Latinos with and without depressive and anxiety disorders. *Depress Anxiety*. 2009;26(7):674-81. Available at: http://www.ncbi.nlm.nih.gov/pubmed/19306305. Accessed May 19, 2017.

219. Shim RS, Ye J, Baltrus P, Fry-Johnson Y, Daniels E, Rust G. Racial/ethnic disparities, social support, and depression: examining a social determinant of mental health. *Ethn Dis*. 2012;22(1):15-20.

220. Williams DR, González HM, Neighbors H, et al. Prevalence and Distribution of Major Depressive Disorder in African Americans, Caribbean Blacks, and Non-Hispanic Whites. *Arch Gen Psychiatry*. 2007;64(3):305. Available at: http://www.ncbi.nlm.nih.gov/pubmed/17339519. Accessed May 19, 2017.

221. Gibb SJ, Fergusson DM, Horwood LJ. Relationship duration and mental health outcomes: findings from a 30-year longitudinal study. *Br J Psychiatry*. 2011;198(1).

222. Dehle C, Weiss RL. Sex Differences in Prospective Associations between Marital Quality and Depressed Mood. *J Marriage Fam*. 1998;60(4):1002. Available at: http://www.jstor.org/stable/353641?origin=crossref. Accessed May 19, 2017.

223. Whisman MA. Marital dissatisfaction and psychiatric disorders: results from the National Comorbidity Survey. *J Abnorm Psychol*. 1999;108(4):701-6.

224. Gove WR, Hughes M, Style CB. Does marriage have positive effects on the psychological well-being of the individual? *J Health Soc Behav*. 1983;24(2):122-31.

225. Leach LS, Butterworth P, Olesen SC, Mackinnon A. Relationship quality and levels of depression and anxiety in a large population-based survey. *Soc Psychiatry Psychiatr Epidemiol*. 2013;48(3):417-425. Available at: http://www.ncbi.nlm.nih.gov/pubmed/22875222. Accessed May 19, 2017.

226. Kiecolt-Glaser JK, Newton TL. Marriage and health: his and hers. *Psychol Bull*. 2001;127(4):472-503.

227. Lorant V, Deliège D, Eaton W, Robert A, Philippot P, Ansseau M. Socioeconomic Inequalities in Depression: A Meta-Analysis. *Am J Epidemiol*. 2003;157(2):98-112. Available at: https://academic.oup.com/aje/article-lookup/doi/10.1093/aje/kwf182. Accessed May 19, 2017.

228. Fryers T, Melzer D, Jenkins R. Social inequalities and the common mental disorders. *Soc Psychiatry Psychiatr Epidemiol*. 2003;38(5):229-237. Available at: http://www.ncbi.nlm.nih.gov/pubmed/12719837. Accessed May 19, 2017.

229. Lorant V, Croux C, Weich S, Deliège D, Mackenbach J, Ansseau M. Depression and socio-economic risk factors: 7-year longitudinal population study. *Br J Psychiatry*. 2007;190(4):293-298.

230. Skapinakis P, Weich S, Lewis G, Singleton N, Araya R. Socio-economic position and common mental disorders. *Br J Psychiatry*. 2006;189(2):109-117.

231. Green MJ, Benzeval M. The development of socioeconomic inequalities in anxiety and depression symptoms over the lifecourse. *Soc Psychiatry Psychiatr Epidemiol*. 2013;48(12):1951-1961. Available at: http://www.ncbi.nlm.nih.gov/pubmed/23732706. Accessed June 2, 2017.

232. StataCorp. Stata Statistical Software: Release 15. 2017.

233. Hardeman RRR, Przedworski JMJM, Burke S, et al. Association Between Perceived Medical School Diversity Climate and Change in Depressive Symptoms Among Medical Students: A Report from the Medical Student CHANGE Study. *J Natl Med Assoc*. 2016;108(4):225-235. Available at: http://dx.doi.org/10.1016/j.jnma.2016.08.005.

234. Newman DL, Moffitt TE, Caspi a, Magdol L, Silva P a, Stanton WR. Psychiatric disorder in a birth cohort of young adults: prevalence, comorbidity, clinical significance, and new case incidence from ages 11 to 21. *J Consult Clin Psychol*. 1996;64(3):552-62.

235. Hunt J, Eisenberg D. Mental health problems and help-seeking behavior among

college students. *J Adolesc Health*. 2010;46(1):3-10. Available at: http://www.ncbi.nlm.nih.gov/pubmed/20123251. Accessed October 22, 2013.

236. Thomas MR, Dyrbye LN, Huntington JL, et al. How do distress and well-being relate to medical student empathy? A multicenter study. *J Gen Intern Med*. 2007;22(2):177-183.

237. Halpern J. What is Clinical Empathy? *J Gen Intern Med*. 1991;18:670-674.

238. Newport F. *In U.S., Estimate of LGBT Population Rises to 4.5%*. Washington, DC; 2018.

239. GLAAD/Harris Poll. *Accelerating Acceptance 2017*. Los Angeles; 2017.

240. Mereish EH, Bradford JB. Intersecting identities and substance use problems: sexual orientation, gender, race, and lifetime substance use problems. *J Stud Alcohol Drugs*. 2014;75(1):179-88.

241. Crenshaw K. Mapping the margins: Intersectionality, identity politics, and violence against women of color. *Stanford Law Rev*. 1991.

242. Diamond LM. Sexual identity, attractions, and behavior among young sexual-minority women over a 2-year period. *Dev Psychol*. 2000;36(2):241-50.

243. Diamond LM. Was it a phase? Young women's relinquishment of lesbian/bisexual identities over a 5-year period. *J Pers Soc Psychol*. 2003;84(2):352-364. Available at: http://doi.apa.org/getdoi.cfm?doi=10.1037/0022-3514.84.2.352. Accessed July 4, 2013.

244. Katz-Wise SL, Hyde JS. Sexual fluidity and related attitudes and beliefs among young adults with a same-gender orientation. *Arch Sex Behav*. 2014. Available at: http://www.ncbi.nlm.nih.gov/pubmed/25378265. Accessed June 11, 2015.

245. Division of Health Interview Statistics. *A Brief Quality Assessment of the NHIS Sexual Orientation Data*. Hyattsville, MD; 2014.

246. Miller K, Raynard N, Brody D. *Cognitive Testing of the NHANES Sexual Orientation Questions*.

247. Glymour MM, Weuve J, Berkman LF, Kawachi I, Robins JM. When is baseline adjustment useful in analyses of change? An example with education and cognitive change. *Am J Epidemiol*. 2005;162(3):267-278. Available at: http://www.ncbi.nlm.nih.gov/pubmed/15987729. Accessed November 28, 2014.

248. Allison PD. Change Scores as Dependent Variables in Regression Analysis. *Sociol Methodol*. 1990;20:93-114.

249. van den Berg E. 'The closet': A dangerous heteronormative space. *South African Rev Sociol*. 2016;47(3):25-43.

250. Rose Ragins B, Singh R, Cornwell JM. Making the Invisible Visible: Fear and Disclosure of Sexual Orientation at Work. *J Appl Psychol*. 2007;92(4):1103-1118. Available at: http://doi.apa.org/getdoi.cfm?doi=10.1037/0021-9010.92.4.1103. Accessed January 7, 2019.

251. Goffman E. *Stigma: Notes on the management of spoiled identity*. New York:

Penguin Group; 1963.

252. Fidas D, Cooper L. *A Workplace Divided: Understanding the Climate for LGBTQ Workers Nationwide*. Washington DC; 2018.

253. Corrigan PW, Matthews AK. Stigma and disclosure: Implications for coming out of the closet. *J Ment Heal*. 2003;12(3):235-248. Available at: www.stimgaresearch.org. Accessed January 7, 2019.

254. Juster R-PP, Smith NG, Ouellet É, Sindi S, Lupien SJ. Sexual orientation and disclosure in relation to psychiatric symptoms, diurnal cortisol, and allostatic load. *Psychosom Med*. 2013;75(2):103-116. Available at: http://content.wkhealth.com/linkback/openurl?sid=WKPTLP:landingpage&an=00006842-201302000-00003. Accessed January 7, 2019.

255. Markus HR, Kitayama S. Cultures and selves: A cycle of mutual constitution. *Perspect Psychol Sci*. 2010;5(4):420-430.

256. Creswell JW, Plano Clark VL. *Designing and conducting mixed methods research*. 2nd ed. Thousand Oaks; 2011.

257. Creswell JW, Plano-Clark VL. Choosing a Mixed Methods Design. In: Creswell JW, Plano Clark VL, eds. *Designing and Conducting Mixed Methods Research*. 1st ed. Thousand Oaks: Sage Publications, Inc.; 2007:58-88.

258. McGarry K, Clarke J, Cyr M. Evaluating a lesbian and gay health care curriculum. *Teach Learn Med An Int J*. 2002;14(4):244-248.

259. Rankin SR. LGBTQA Students on Campus: Is Higher Education Making the Grade? *J Gay Lesbian Issues Educ*. 2006;3(2/3):111-118.

260. Saldaña J. *The Coding Manual for Qualitative Researchers*. 2nd ed. Thousand Oaks: Sage Publications, Inc.; 2013.

261. Creswell JW. *Qualitative Inquiry and Research Design*. 3rd ed. Los Angeles: Sage Publications, Inc.; 2013.

262. Obedin-Maliver J, Goldsmith ES, Stewart L, et al. Lesbian, gay, bisexual, and transgender-related content in undergraduate medical education. *Jama J Am Med Assoc*. 2011;306:971-977.

263. Ragins BR. Disclosure disconnects: Antecedents and consequences of disclosing invisible stigmas across life domains. *Acad Manag Rev*. 2008;33(1):194-215.

264. Geronimus AT, James SA, Destin M, et al. Jedi public health: Co-creating an identity-safe culture to promote health equity. *SSM - Popul Heal*. 2016;2:105-116. Available at: http://dx.doi.org/10.1016/j.ssmph.2016.02.008.

265. Burke SE, Dovidio JF, Perry SP, et al. Informal Training Experiences and Explicit Bias against African Americans among Medical Students. *Soc Psychol Q*. 2017;80(1).

266. Movement Advancement Project. Non-Discrimination Laws. 2019.

267. Slavin SJ, Schindler DL, Chibnall JT. Medical student mental health 3.0: improving student wellness through curricular changes. *Acad Med*.

2014;89(4):573-7. Available at: http://www.ncbi.nlm.nih.gov/pubmed/24556765. Accessed February 10, 2015.

7. Appendices

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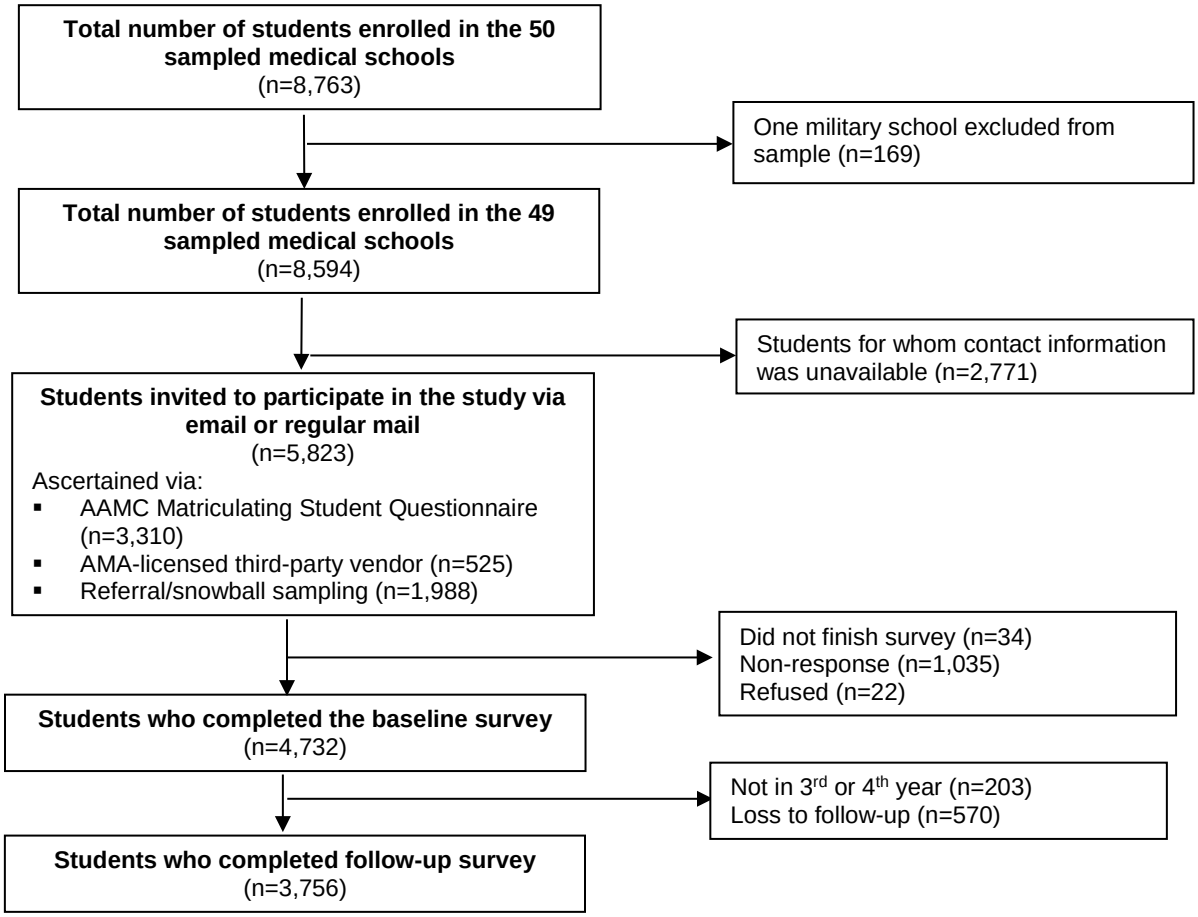
APPENDIX A: CHANGES RECRUITMENT FLOWCHART



Abbreviations: CHANGES indicates Cognitive Habits and Growth Evaluation Study; AAMC, Association of American Medical Colleges; AMA, American Medical Association.

APPENDIX B: CHANGES & AAMC DEMOGRAPHIC DATA COMPARISON

Medical Student CHANGES Sample Demographic Characteristics Compared to National Matriculant Data for U.S. MD-granting Medical Schools, 2010

Characteristic	CHANGES sample 49 schools n=4,732	All matriculants [a,b]: 131 schools n=18,665
Gender		
Male	50.0%	53.1%
Female	49.9%	46.9%
Race/ethnicity		
Black or African American, non-Hispanic	5.1%	6.3%
Alaska Native, American Indian, or Pacific Islander, non-Hispanic	0.3%	0.4%
Asian, non-Hispanic	21.3%	20.4%
White, non-Hispanic	60.2%	57.1%
Hispanic / Latino	6.1%	8.2%
Unknown/other, non-Hispanic	2.4%	3.3%
Multiracial, non-Hispanic[c]	4.6%	2.8%

[a]*Source: Association of American Medical Colleges. Applicants and Matriculants Data. Table 9: Matriculants to U.S. Medical Schools by Selected Combinations of Race/Ethnicity and Sex, YEAR RANGES. https://www.aamc.org/data/facts/applicantmatriculant. Accessed February 7, 2014*
[b]*Percentages may not sum to 100 due to rounding.*

APPENDIX C: LGB STUDENT SURVEY

WELCOME BACK TO THE MEDICAL STUDENT CHANGES STUDY!

You have been asked to be a part of this study because you participated in the CHANGES research project earlier this year AND because you expressed an interest in participating in a survey about the experiences of lesbian, gay, and bisexual medical students at your institution. Please read the online consent form below and scroll down to agree to participate in the study. The online survey should take between 7 and 10 minutes.

Study Purpose

The purpose of this study is to better understand the experiences of lesbian, gay, and bisexual medical students, as well as to inform recommendations for improving student experiences in medical school. We need your participation to make sure that the study findings are accurate and the recommendations are relevant and representative. This study is being conducted by researchers at the University of Minnesota.

Risks and Benefits of Being in the Study

This is a minimal risk study, which means there is very little risk to participate in the study. Some people may experience psychological stress from filling out surveys. If you begin to feel tired or anxious, please feel free to take a break and return to the survey at a later time. There are no direct benefits to you from participating in this study. However, many people find helping with a study that will be used to create positive change is a rewarding experience.

Compensation

If you complete this web-based survey you will receive $10 that will be sent to the address you provide within a few business days from the day you complete the survey. Once you start the survey, you are free to skip any questions you don't wish to answer. You will still receive the $10.

Confidentiality

If you choose to participate, you have rights as a research participant. Your answers are confidential. They will never be associated with your name or medical school. We will report findings in aggregate and will never report on specific participants or a specific medical school. The records of this study will be kept private. Your answers will be linked to a unique ID number, never your name. Research records will be stored securely and only researchers and technical support staff with security clearances will have access to the record. The rights of research participants are regulated and monitored by the University of Minnesota. Confidentiality and privacy are a basic right for research participants.

Voluntary Nature of the Study

Your participation is voluntary and you are free to refuse. Your decision on whether or not to participate is also confidential. No one outside of the study team will know whether you participate or not. If you decide to participate, you are free to skip any question you don't wish to answer and can withdraw at any time.

Contacts and Questions

You are encouraged to contact the Study Investigator, Julia Przedworski, at: University of Minnesota Medical School Suite 220, Dinnaken Office Building 925 Delaware St. S.E. Minneapolis, MN 55414 1-877-629-1004 mchanges@umn.edu

If you have any questions or concerns regarding the study and would like to talk to someone other than the researchers, you are encouraged to contact the Fairview Research Helpline at telephone number 612-672-7692 or toll free at 866-508-6961. You may also contact this office in writing or in person at Fairview Research Administration, 2344 Energy Park Drive, St. Paul, MN 55108

This study has been approved by the Internal Review Boards of the University of Minnesota (#0905S66901)

Statement of Consent

- I agree to participate. Send me to the first page of the survey
- I do not wish to complete this survey.

Do you consider yourself to be:

- Gay or lesbian
- Bisexual
- Straight

Of the people you have interacted with at your medical school, how many know that you are lesbian, gay, or bisexual?

	None	Very few (<10%)	Some (10-39%)	About half (40-59%)	Many (60-90%)	Most (>90%)
Other students						
Faculty						
Administrative staff						
Preceptors						

When interacting with the people at your medical school, how often have you concealed your sexual orientation out of fear of negative consequences?

	Never	Rarely	Sometimes	Frequently	Always
Other students					
Faculty					
Administrative staff					
Preceptors					

[Skip pattern]

You stated that you have concealed your sexual orientation due to a fear of negative consequences. What kinds of things did/do you fear might happen if you disclosed your sexual orientation?

How would you feel about bringing a same-sex spouse or partner to a school function?

- Very uncomfortable
- Uncomfortable
- Neither comfortable nor uncomfortable
- Comfortable
- Very comfortable

Please indicate whether you have experienced any of the following events. (check all that apply)

	Yes	No
Been unfairly denied admission to a medical school		
Been unfairly denied educational opportunities while in medical school		
Had difficulty finding a supportive adviser or mentor while in medical school		
Been unfairly denied a slot in a residency program		
Been discouraged from applying to or entering a residency program		

[Skip pattern] You indicated that you experienced the following events. How likely is it that your sexual orientation contributed?

	Very Unlikely	Unlikely	Likely	Very Likely	I don't know
Been unfairly denied admission to a medical school					
Been unfairly denied educational opportunities while in medical school					
Had difficulty finding a supportive adviser or mentor while in medical school					
Been unfairly denied a slot in a residency program					
Been discouraged from applying to or entering a residency program					

This question is about your personal experiences while in medical school. Check all that apply.
To the best of your knowledge, because of your sexual orientation, have you ever been...

	No	Yes, by other students	Yes, by faculty	Yes, by administrative staff	Yes, by preceptors
...verbally harassed or insulted?					
...threatened with physical violence?					
...subjected to physical violence?					
...treated with disrespect?					
...treated unfairly?					
...made to feel unwelcome?					
...socially ostracized?					
...laughed at or made fun of?					
...made to feel unsafe?					
...pressured to hide your personal relationships?					

Please share any other thoughts or comments about your experiences as a lesbian, gay, or bisexual student in medical school.

How strongly do you agree or disagree with the following statements about your medical school?
LGB: lesbian, gay, and bisexual

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
My medical school is a safe place for LGB students					
My medical school treats LGB students with respect					
There is pressure for LGB students to stay closeted					
LGB students feel comfortable talking about their personal lives with people at my medical school					
LGB students are made to feel unwelcome at my medical school					
It is harder for LGB students to find supportive mentors or advisers than it is for straight students					
The atmosphere for LGB students has improved at my medical school over the past four years					
LGB students at my medical school experience harassment or discrimination due to their sexual orientation					

How would you describe the overall climate of your medical school for lesbian, gay, and bisexual students?

- Very negative
- Negative
- Neither negative nor positive
- Positive
- Very positive

Approximately how many total hours of instruction and training specifically about lesbian, gay, or bisexual health do students at your institution receive over the course of medical school?
_____ # of mandatory (required) hours
_____ # of elective (optional) hours

How would you describe the amount of instruction and training specifically about lesbian, gay, and bisexual health that students receive at your medical school?

- Far too Little
- Too Little
- About Right
- Too Much
- Far too Much

How would you describe the quality of instruction and training specifically about lesbian, gay, and bisexual health that students receive at your medical school?

- Very Poor
- Poor
- Fair
- Good
- Very Good

To your knowledge, are there any lesbian, gay, or bisexual (LGB) faculty at your medical school?

- No, I do not know of any LGB faculty at my school
- Yes, there are LGB faculty, but they are not out publicly (i.e., few people know they are LGB)
- Yes, there are LGB faculty and they are out publicly (i.e., most people know they are LGB)

Does your medical school provide partner benefits (e.g., health insurance) for same-sex couples?

- Yes, with proof of marriage
- Yes, with proof of domestic partnership
- No
- I don't know

Does your medical school have a written policy that prohibits discrimination based on sexual orientation?

- Yes
- No
- I don't know

The following statements relate to your opinions about your fellow students. Please answer these to the best of your knowledge. *(LGB: lesbian, gay or bisexual)*

Students graduating from my medical school...

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
...are prepared to care for LGB patients					
...know about LGB-specific health concerns					
...are uncomfortable interacting with LGB patients					
...are likely to assume that their patients are heterosexual					
...are able to create a clinical environment that is welcoming to LGB patients					
...hold misconceptions, biases, or stereotypes about LGB people					
...know where to find information about LGB health					

Please feel free to share with us any additional comments, questions or concerns.

THANK YOU FOR PARTICIPATING IN THE STUDY!

The findings of this study will help us develop recommendations and interventions for improving the medical school experiences of gay, lesbian, and bisexual students. We hope to continue this important work to better understand the experiences of lesbian, gay and bisexual physicians throughout their careers. Your insights and perspectives are very important.

If you would like information on study results or are willing to participate in future study activities, please enter your email below.

APPENDIX D: QUALITATIVE CODEBOOK & ASSOCIATED DATA

Arranged alphabetically

barriers to mentorship (4 quotes)

- preceptorship or clinical faculty being less willing to mentor me
- Evangelical Christian mentor would have compromised mentoring relationship had I disclosed
- Microaggressions, losing the benefit of the doubt, poorer grades, worse service, worse mentoring/teaching, all the effects of prejudice
- Difficult to find LGBT faculty, let alone administrators. No out LGBT mentors at my medical school, and few LGBT students.

being othered (seen/treated differently) (20 quotes)

- I will be viewed and/or treated differently by my mentors
- Just that people would judge me differently and treat me differently
- Different treatment, unrealized/unconscious homophobic actions, gossip spread and limitation on future career potential
- Fear of a different culture's perception of being gay and married
- Judgement. Different treatment - grading in the clinical years is SO. SUBJECTIVE. and so anything that might cause anyone to think less of me made me wary.
- With other students I would hide it to not be viewed in a different light.
- I also felt that I would be treated differently (worse) than if I kept my mouth shut
- I'm worried I'd be treated differently by attending physicians and other residents, especially going into general surgery. There is just too much of a stigma
- I have been concerned that people may view and treat me differently if they knew--not necessarily badly, but differently. I never told any faculty or residents just out of fear they would relate to me differently, think I was different rather than "one of them"
- People would treat me differently
- Judgement, different treatment
- Being looked at differently, being expected to be an "ambassador" for all bisexual medical students
- I might get a lower grade or be treated differently on certain rotations
- Discrimination or judgement. Different treatment or being thought of differently in a negative light.
- People acting differently in social situations
- The faculty member may view me differently than the other students
- Being treated differently than other students.
- I heard an attending make inappropriate comments about a gay patient and I did not want to be treated differently.
- I worried I would be treated differently from other students or that their impression of me would have changed (and changed to something more negative).

being respected less/looked down on (6 quotes)

- Lack of respect
- I fear that if I shared it would make people respect me less.
- Fear that I would be looked down upon
- Judgement. Different treatment - grading in the clinical years is SO. SUBJECTIVE. and so anything that might cause anyone to think less of me made me wary.
- Being graded differently. Not taken serious
- Being silently discriminated against, thought less-than, left out of things, being given a hard time

being socially ostracized/isolated (18 quotes)

- Being anything other than straight in medicine can feel isolating.
- Feeling ostracized
- Making social situation awkward with fellow students ie: they might not want to get to know me or be hesitant to be good friends with me... i think they'd prefer to just be acquaintances

- not being treated as a full member of the team
- I never told any faculty or residents just out of fear they would relate to me differently, think I was different rather than "one of them". I feared it would be harder to fit in.
- Uncomfortable conversation, being viewed as an outsider
- In my first two years I certainly felt more uncomfortable disclosing my sexual orientation and my relationship with another man.w Without knowing any of my classmates or faculty before entering medical school, I worried that I would be viewed as an outsider and be ostracized
- Social exclusion, judgmental attitudes, and making people feel uncomfortable
- Weakness is a vulnerability amongst competitive people. Ignorance regarding sexual orientation leads some to view homosexuality as a weakness of character. This thinking leads to opposition and defenses overall severing connections between classmates. Once severed by some, it is often the case that others will follow leading to an eventual isolation. Isolation in medical school can be a huge disadvantage
- ostracism
- Students: I thought they would be afraid to be my platonic friend if they knew.
- Having been out of the closet for many years prior to coming to medical school, I was shocked by the dichotomous and polar reactions from my classmates. Those who were supportive were overly enthusiastic about having a gay classmate and those who were more closed-minded were very timid to approach me. Years after, I know now that both of these reactions kept other LGBT classmates in the closet while on campus, which suggests an unsafe professional environment.
- I feared it would be harder to fit in.
- For students and most times, fear of social rejection or conflict was the primary driving factor.
- Being silently discriminated against, thought less-than, left out of things, being given a hard time
- Harm to interpersonal relationships
- Ostracism, poor/lower grades
- It was difficult to feel a part of the class at first because I was exotified by the medical community that I was learning how to part of.

being subject of gossip/ridicule (6 quotes)

- I still tried to conceal it from them because i didn't want them talking about me behind my back
- Different treatment, unrealized/unconscious homophobic actions, gossip spread and limitation on future career potential
- made fun of
- I was also afraid of being gossiped about and/or teased/insulted.
- Rude remarks, gossip
- Offensive comments or unacceptance

being target of bias/ microaggressions (16 quotes)

- Prejudice and different treatment. Especially when working with attendings that may be homophobic.
- I am not only openly bisexual, but I am openly liberal and atheist in an extremely conservative city. Most of the faculty and preceptors I have had over the four years have been conservative and religious and have openly voiced negative attitudes towards LGBTQ individuals/patients/students, women's reproductive choice, democrats, atheists, and others, and have contributed overall to a judgmental, prejudicial environment that does not allow medical students to express themselves freely without professional repercussions
- Different treatment, unrealized/unconscious homophobic actions, gossip spread and limitation on future career potential
- Negative attitudes toward me while on the service, not being treated as a full member of the team, personal feelings about my sexual orientation affecting my grades and views on my performance
- Basically, I don't want to risk negative consequences by revealing my orientation to anyone with authority over me unless I know them very well.
- I try my best to avoid awkward situations with preceptors and other staff- you never know who's completely safe and what recriminations that might follow disclosure. I had no intention of putting myself out on a ledge to find out- either with getting excluded from clinical experience or instigating negative reactions with preceptors. And I had no intention of screwing myself over this early in life in terms of funding. I'm a private person and a pragmatist- not everyone needs to know.
- Changes in their perception of who I am, potential for mistreatment

- I'm worried I'd be treated differently by attending physicians and other residents, especially going into general surgery. There is just too much of a stigma
- Microaggressions, losing the benefit of the doubt, poorer grades, worse service, worse mentoring/teaching, all the effects of prejudice
- I was afraid I would be judged and discriminated against because of my sexual orientation.
- I'm afraid I'd be judged and possibly mistreated. Mostly I don't think other people understand what being bisexual means.
- Offensive comments or unacceptance
- Discrimination or judgement. Different treatment or being thought of differently in a negative light.
- Discrimination against me based on sexual orientation
- Getting reprimanded for small things merely because of my orientation
- I was worried about having to discuss my private life in a professional setting. I feared negative comments or too much curiosity.

being tokenized/stereotyped (7 quotes)

- It just wasn't something I wanted to be knowm by
- Fear of being 'type-casted'
- I would fear judgments about my professionalism and assumptions about how I spend my recreational time
- It made for particularly interesting conversations regarding LGBT health-related issues as everyone was overly sensitive to my opinions and I felt I needed to be an expert at all things LGBT. It was good in that it motivated me to educate myself so i could fairly and justly represent my community, but I also felt it was uncessary and improbable that I should know all there is to LGBT health.
- Being looked at differently, being expected to be an "ambassador" for all bisexual medical students
- Low evaluations, judgement of my character, stereotypes, irrelavnce to my medical studies.
- I was worried about having to discuss my private life in a professional setting. I feared negative comments or too much curiosity.

bias in awarding honors/funds (2 quotes)

- Discrimination in grading, awarding of honors and funds, etc
- And I had no intention of screwing myself over this early in life in terms of funding. I'm a private person and a pragmatist- not everyone needs to know.

bisexual double-stigma (2 quotes)

- People often equate bisexual people with confused or experimenting. I have found both straight and gay individuals often find bisexuals off-putting, believing that we are hypersexual, uncontrolled sluts/whores who cannot make a commitment or be trusted.
- I'm afraid I'd be judged and possibly mistreated. Mostly I don't think other people understand what being bisexual means.

bisexual invisibility (6 quotes)

- I think that my experience may be skewed by the fact that--while I have dated women in the past, I did not date any women while in medical school.
- It appears that gay/lesbian/straight students are fairly open but I don't know anyone else who feels they are bisexual. It is not talked about and I am part of the problem as I don't talk about it myself.
- I am a bisexual woman, and I have never experienced any hardships on account of my sexual orientation. However, I am in a steady relationship with a male during the course of my med school experience, and since this is aligned with the social norm, I do not feel that I am a true representative of the LGBTQ students that are currently experiencing any problems that may be associated with their personal life
- I find my medical school very supportive of LGBT students. I am personally married to an opposite-sex partner, so my own experiences with my sexual orientation have not come up a lot.
- I am married to an opposite-gender spouse, so questions about my sexuality were almost never brought up. / Everyone assumes you are straight
- Being bisexual I have the privilege of "hiding" my true orientation if I happen to be dating a man but for several years I was in a very serious relationship with a woman and I felt I could not be as honest about our relationship with faculty and sometimes other students as I could if I were dating a man.

causing conflict/tension (5 quotes)

- You never know what to expect from people, so I chose not to share to avoid any conflict
- For students and most times, fear of social rejection or conflict was the primary driving factor.
- But preceptors are different from other categories in that they define the comments and grades for the second two years of school. It is largely known that grades and comments are more closely correlated to how well the student gets along with the preceptors than on knowledge or work ethic. So, in order to better get along with preceptors that were not openly gay or lesbian themselves, hiding sexual orientation is more paramount to facilitate conversation and avoid conflict
- There was some degree of fear that as a medical student, an intolerant preceptor, faculty member, or resident could make life very unpleasant or submit a negative evaluation at the end of my rotation.
- General concerns that it may affect my grade by causing tension between myself and a preceptor.

causing discomfort/awkwardness (11 quotes)

- I don't want to make either of us uncomfortable
- General concerns that it may affect my grade by causing tension between myself and a preceptor.
- Making social situation awkward with fellow students ie: they might not want to get to know me or be hesitant to be good friends with me... i think they'd prefer to just be acquaintances
- Uncomfortable conversation, being viewed as an outsider
- Social exclusion, judgmental attitudes, and making people feel uncomfortable
- Not fear of retribution, more just not wanting to make things awkward with some of the older faculty who maybe did not seem as open
- I also wanted people to be comfortable around me and felt that they might not know how to 'act appropriately"
- It's not so much that I concealed it, but rather didn't go out of my way to correct faculty, administrators, or preceptors when they assumed that I was heterosexual. For example, when making small talk during brief encounters with faculty I didn't know well, I didn't always explain myself when I'd answer "no" to whether or not I had a girlfriend, or that I was couples matching with my (male) partner when asked what "she" was specializing in. I didn't fear consequences from revealing my sexual orientation but rather thought it might introduce a potentially awkward moment when it really didn't matter. I did not ever actively conceal my sexual orientation that I can recall. Most of the time sexual orientation never came up.
- That my relationship with my preceptor may become uncomfortable
- I also did not want to embarrass the attending (because of the hierarchy in medicine), nor did I want to experience the awkward situation that would produce.
- It's just an awkward thing to being up. When everyone is talking about their hetrosexual partners , I'm wary of making the mood awkward by mentioning a same sex awkward. Not really afraid of consequences as I am of making other people feel odd.

concealment as risk-aversion (4 quotes)

- Basically, I don't want to risk negative consequences by revealing my orientation to anyone with authority over me unless I know them very well.
- I had no intention of putting myself out on a ledge to find out- either with getting excluded from clinical experience or instigating negative reactions with preceptors.
- I feel very supported. I have never been personally discriminated against. I just have feared for my competitiveness as a residency applicant due to my sexual orientation. I have struggled whether or not I should be out on my application, even though I have been very active in organizations and research projects that deal heavily with sexual orientation and health. Also, in other environments, I have heard disparaging comments against LGBT people that have made the working environment in the hospital or clinic difficult.
- I was open with my sexuality to close friends, but I made significant efforts to separate my personal/dating life from my work life. I did not want to risk any potential career advancement by my sexual orientation. I do not believe there is anything wrong with being gay, but I think there are some attending physicians (particularly older) who harbor negative feelings toward gay people. I did not want it to even be an issue.

context (situation/person) (6 quotes)

- I was only out to one faculty who was an assistant dean whom I was close with.
- Basically, I don't want to risk negative consequences by revealing my orientation to anyone with authority over me unless I know them very well.

- Additionally, I felt that the administration was very supportive of the LGBT community, but the same couldn't be said for faculty and preceptors in the school community. In other words, you were pretty safe the first two years when you were doing book-learning, but were on your own in the real word (re: 3rd and 4th yr).
- It's a very fine line between begin out or not in the professional setting. It really varies by department and faculty whether or not you feel comfortable being out.
- My biggest place of concern was in a few affiliated, outside Catholic hospitals. I had a few bad experiences at these hospitals
- As I understand it, discrimination against homosexuals in [state where medical school is located] is legal. […] On an almost daily basis, there are news stories and such regarding discrimination against us in this state. People have a tendency here to justify their bigotry using religion.

discrimination in evaluations (40 quotes)

- less opportunity on the teams, possibly worse grades. Or that I would receive poorer subjective evaluations
- fear of discrimination when it comes to grading/evaluations
- I was afraid that the attending would not engage with me as much, and that it could potentially effect my final grade
- Grades are based on preceptor evaluations. It's best to remain as socially neutral as possible in most scenarios
- Living in [state], many of the physicians here are very vocal about their opinions against homosexuality. And while there is a lot of support for it amongst faculty, there are also others that are clearly against it. And I have known a few students to be surprised to find out that one of their esteemed professors they thought was open-minded was in fact, not. Thus leading to them not getting to help as much during a rotation or receiving lower grades on things (patient care, etc) they other professors thought the performed well in
- General concerns that it may affect my grade by causing tension between myself and a preceptor.
- Unconscious bias affecting evaluations/interactions
- Poor grading
- Poor grades, preceptorship or clinical faculty being less willing to mentor me, preceptors or clinical faculty forming negative opinions of me that would adversely affect the cases or patients I got to see, and/or their assessments of my skills, professionalism, and competence
- Clinical grades are so subjective, wouldn't want to give a reason for bias
- Personal bias may interfere with impartial grading
- Judgement. Different treatment - grading in the clinical years is SO. SUBJECTIVE. and so anything that might cause anyone to think less of me made me wary.
- Negative attitudes toward me while on the service, not being treated as a full member of the team, personal feelings about my sexual orientation affecting my grades and views on my performance
- I also worried that faculty would either consciously or unconsciously give me lower evaluations or less opportunity.
- I do not wish my sexual orientation to somehow poorly affect my preceptorships, clerkships, etc
- Some folks were not particularly kind or empathetic in general so I'd prefer to not risk getting a lower grade on subjective clinical score
- I was afraid that disclosing my sexual orientation would compromise my ability to be evaluated on an equal level with everyone else
- I felt I might receive a lower evaluation
- Being graded differently. Not taken serious
- Getting bad reviews and not having the same opportunities as others.
- Poor grades, impaired professional relationship
- I was also worried I would be graded differently. While unlikely it seems that every encounter and experience can influence how one is graded so I chose to keep this confidential.
- Microaggressions, losing the benefit of the doubt, poorer grades, worse service, worse mentoring/teaching, all the effects of prejudice
- I was afraid I would get lower grades than I deserved and that I would not get letters of recommendations I wanted.
- Low evaluations, judgement of my character, stereotypes, irrelavnce to my medical studies.
- I might get a lower grade or be treated differently on certain rotations
- Discrimination in grading, awarding of honors and funds, etc

- But preceptors are different from other categories in that they define the comments and grades for the second two years of school. It is largely known that grades and comments are more closely correlated to how well the student gets along with the preceptors than on knowledge or work ethic. So, in order to better get along with preceptors that were not openly gay or lesbian themselves, hiding sexual orientation is more paramount to facilitate conversation and avoid conflict
- Being gay and having an SO made things difficult. I worked with some older attendings at the start of my clinical rotations who made derogatory comments about HIV and LGBT patients or homosexuality in general and afterwards I made a point to never divulge my sexuality in that setting. The topic of SOs would come up on teams and I would never feel comfortable sharing about mine because I didn't know if it would negatively impact my evaluation or educational experience.
- Changes in opinions/impressions of me that might affect the way they perceive my efforts on the wards or evaluate my work
- I fear that people in a position of power above me (attending physicians, residents, etc) may harbor negative views regarding homosexuals. These people are grading and evaluating me, so I would not want to make myself stand out in any way that would be detrimental to my career advancement.
- Bad evaluations
- I felt it may impact my evaluations negatively, but only in a few situations
- Fear of judgement from faculty or preceptors which may or may not affect my evaluations of performance.
- Residents were the most difficult persons to approach regarding sexuality. They were intimately involved in the evaluation process, and this was often a benefit unless a resident said disparaging comments regarding sexuality which immediately made them a controversial leader
- Afraid my grades would be affected negatively.
- do worry that clinical preceptors or other faculty who have control over my performance and grades would, consciously or not, think of me more negatively, or pay less attention to me than they would a heterosexual classmate.
- Embarrassement at discussing personal issues. Or worries that it would affect an evaluation
- Ostracism, poor/lower grades
- There was some degree of fear that as a medical student, an intolerant preceptor, faculty member, or resident could make life very unpleasant or submit a negative evaluation at the end of my rotation.

family-related considerations (3 quotes)

- I have not talked to my family, first and foremost. Otherwise, it honestly didn't come up and I answered questions generally. I was in a long-distance relationship.
- I'm not out at home either, and my parents were the primary sources of funding for med school. While I try to keep family and professional associations separate, they can, and do, overlap sometimes.
- Being bisexual wasn't an additional huge burden but it just made things difficult. If I had an accepting family, I wouldn't give a damn what people thought of me and my partner. But since I don't, I'm more wary of disturbing the status quo.

fewer/worse training opportunities (9 quotes)

- less opportunity on the teams, possibly worse grades. Or that I would receive poorer subjective evaluations
- I was afraid that the attending would not engage with me as much, and that it could potentially effect my final grade
- Living in [state], many of the physicians here are very vocal about their opinions against homosexuality. And while there is a lot of support for it amongst faculty, there are also others that are clearly against it. And I have known a few students to be surprised to find out that one of their esteemed professors they thought was open-minded was in fact, not. Thus leading to them not getting to help as much during a rotation or receiving lower grades on things (patient care, etc) they other professors thought the performed well in
- I felt that opportunities would be denied to me.
- Getting bad reviews and not having the same opportunities as others.
- impaired professional relationship
- I had heard from students in classes above mine that after coming out to some faculty it hurt their education, either it cooled the relationship with attending, or they weren't invited to interesting cases, or generally received less teaching/attention.
- Being treated differently in regards to not getting to participate as much with patients

- Fear of dislike from attending leading to less pleasant work environment.

heterosexist behavior from faculty/attendings/preceptors (22 quotes)

- I've not experienced any direct bigotry but occasionally indirectly (e.g. residents making negative comments about gay/lesbian patients that creates an uncomfortable work environment).
- I have not had issues with other students or faculty, the only (infrequent) issues I have had being out were with academic or clinical staff members saying homophobic slurs. Granted, they were not directed at me, but when a nurse says 'faggot' and the attending physician does not correct her--despite the fact that the attending knows I am gay--it hurts.
- Living in [state], many of the physicians here are very vocal about their opinions against homosexuality. And while there is a lot of support for it amongst faculty, there are also others that are clearly against it.
- Most of the faculty and preceptors I have had over the four years have been conservative and religious and have openly voiced negative attitudes towards LGBTQ individuals/patients/students, women's reproductive choice, democrats, atheists, and others, and have contributed overall to a judgmental, prejudicial environment that does not allow medical students to express themselves freely without professional repercussions. Though that was often true and quite common, it was not always the case, and I did find compassionate, non-judgmental faculty, staff, and preceptors over the four years who did not contribute to such an environment.
- I have definitely experienced preceptors speaking negatively about transgender patients
- With residents on surgery, frequently heard the word "gay" used in a derogatory manner.
- While on certain rotations, I would sometimes hear residents use the term "gay" in a negative manner.
- I felt that by disclosing my sexual orientation in the Deep South, where I was put in offices where staff openly voiced their bigotism on minorities of all creeds, would make my work environment even more hostile. I had enough trouble with stereotypes as a Black female
- Some preceptors make inapporpriate comments but I always ignored them since my interactions would end with them within a month or 2
- There were occasional comments made by faculty about the LGBT population, but they did not know that I was an out gay male
- Would often overhear negative comments about LGBT people (other healthcare providers, or patients) from: / ancillary staff (nurses, technologists) / residents and attendings (in front of medical students) / patients. / They sometimes made these comments to each other, sometimes to me, assuming that I was straight and therefore ok with it?? /
- I have heard attendings make disparaging comments about LBGT patients, so this prompted me to not disclose my sexuality.
- Also, in other environments, I have heard disparaging comments against LGBT people that have made the working environment in the hospital or clinic difficult.
- The administration at my school has been welcoming and tried to make it a safe doace. However, the instructors often express bias in their lectures and many students are ignorant, hostile or unaware of how to interact and be respectful of LGB peers.
- I worked with some older attendings at the start of my clinical rotations who made derogatory comments about HIV and LGBT patients or homosexuality in general and afterwards I made a point to never divulge my sexuality in that setting.
- It is getting better, but some faculty, especially older ones are still not open to LGBT equality
- Multiple faculty members and students have made anti-LGBTQ comments frequently. Once some of those found out about my orientation, the comments became rarer but only if around me, which is only mildly better. / What was most disappointing and shocking was the comments and behavior I've witnessed of attending physicians that were blatantly anti-LGBTQ said/done by faculty unaware of my orientation which made me feel VERY unwelcome, to say the least, and very uncomfortable coming out to them or to any other faculty in the hospital. Bringing my partner to faculty events was out of the question. It took me a solid 2 years to get comfortable to go to student events with her and actually stay for the length of hte even rather than just make a short appearance.
- I was open with my sexuality to close friends, but I made significant efforts to separate my personal/dating life from my work life. I did not want to risk any potential career advancement by my sexual orientation. I do not believe there is anything wrong with being gay, but I think there are some attending physicians (particularly older) who harbor negative feelings toward gay people. I did not want it to even be an issue.

- Residents were the most difficult persons to approach regarding sexuality. They were intimately involved in the evaluation process, and this was often a benefit unless a resident said disparaging comments regarding sexuality which immediately made them a controversial leader
- I heard an attending make inappropriate comments about a gay patient and I did not want to be treated differently.
- They had expressed homophobic comments or sentiments.
- Multiple faculty members and staff have off and on made comments that made me believe it was a great idea to conceal my orientation

heterosexist behaviors of other students and the institutional response (5 quotes)

- In my school we had several very conservative and religious students that openly voiced their disagreement about the "way of life" for transgender, gay, lesbian and bisexual individuals. In our first year they mentioned this during a patient presentation, expressing concern about how to care for patients when they "disagree with their way of life." This was in no way directed at me and while it was handled fairly well by the faculty it was a difficult thing to witness. Three years later I still feel upset and uncomfortable when thinking about the situation and have my doubts about how these students will be with future patients (hopefully kinder). These individuals reinforce the stigma associated with any queer orientation. I don't wish for these students to be punished, but I wish schools would take a strong stand for encouraging equality and not just in their statements, but in their actions and open dialogue with the medical community
- In the Midwest I don't think people are as open to LGBT folks so I just don't talk to many people about it. In fact many people are Christian, even many of my friends and they are just not okay with it.
- The administration at my school has been welcoming and tried to make it a safe doace. However, the instructors often express bias in their lectures and many students are ignorant, hostile or unaware of how to interact and be respectful of LGB peers.
- My medical school classmates range from blatantly homophobic (few) to 100% queer-affirming (more).
- The few blatantly homophobic classmates that I have are self-segregating, actively resent having LGBTQ issues taught in the curriculum, and are basically impossible to reach despite being the people who need to be reached the most. I feel like nothing can reach these people except visibility.

inadequate LGBT health-specific training (7 quotes)

- My medical school, and the medical schools my friends attend, are often resistant to integrate LGBT health issues into the curriculum not because they do not want to, but because there is simply no time to fit it in
- There was no LGBT content in the
- And I don't think there is enough talked about to address the specific needs of both LGB and transgendered patients.
- Little to no clinical education on LGBT-specific preventative screenings/health issues to be discussed in a primary care setting.
- The administration at my school has been welcoming and tried to make it a safe doace. However, the instructors often express bias in their lectures and many students are ignorant, hostile or unaware of how to interact and be respectful of LGB peers.
- My school did very little to truly discuss issues that LGB people face. There was an effort made to have students treat all patients with respect, but beyond that, very little specific instruction was provided about how to do that for LGBTQ patients.
- Every medical school should have at minimum one hour of lecture covering LGBT healthcare issues. It is a significant number of people, enough for several successful primary care practices I know of to have nothing but gay clientele, even in [state]. My school barely acknowledged this patient group.

intersectionality (4 quotes)

- I am not only openly bisexual, but I am openly liberal and atheist in an extremely conservative city. Most of the faculty and preceptors I have had over the four years have been conservative and religious and have openly voiced negative attitudes towards LGBTQ individuals/patients/students, women's reproductive choice, democrats, atheists, and others, and have contributed overall to a judgmental, prejudicial environment that does not allow medical students to express themselves freely without professional repercussions
- I felt that by disclosing my sexual orientation in the Deep South, where I was put in offices where staff openly voiced their bigotism on minorities of all creeds, would make my work environment even more hostile. I had enough trouble with stereotypes as a Black female

- It was an interesting experience being LGBT person of color in the Deep South. I felt that our school went out of their way to promote the LGBT community for publicity - it was a very nondiverse school in terms of race and socioeconomic status, but administrators would highlight the LGBT community as their outlet for diversity (which us underrepresented minorities found offensive). That being said, the school did a good job supporting LGBT student group efforts (albeit while ignoring the programming efforts of underrepresented minority groups - it seems that they were unable to support both and chose to put all their efforts into the LGBT community, which seems to be the new minority group to support. I found it offensive as a member of both groups that they could somehow only support one)
- I'm a double minority and there was absolutely no need to rock the boat.

irrelevant/personal information (9 quotes)

- It's best to remain as socially neutral as possible in most scenarios. For the most part sexual orientation didn't really come up often and it would be irrelevant to mention it.
- We also just didn't talk much about partners--I like to keep my personal life personal in the medical world, it's a bit if a fishbowl and I don't like lots if people thinking they need to be in my business
- I don't feel that my sexual orientation should have any affect on my professional relationships.
- I try my best to avoid awkward situations with preceptors and other staff- you never know who's completely safe and what recriminations that might follow disclosure. I had no intention of putting myself out on a ledge to find out- either with getting excluded from clinical experience or instigating negative reactions with preceptors. And I had no intention of screwing myself over this early in life in terms of funding. I'm a private person and a pragmatist- not everyone needs to know.
- Admin: I have never had the need to discuss relationships with admin. Preceptors: our focus is on patients on the floor. So, personal preferences do not come into discussion.However, as you gel as a team, folks know about you and who you are dating. As I have been in medicine, my personal life has never come into question as to my abilities to care for any patient.
- With preceptors, it was more that I was keeping my personal life personal
- I just don't want most people knowing. I don't want it to be a factor others consider during work
- Low evaluations, judgement of my character, stereotypes, irrelavnce to my medical studies.
- It was mostly that I didn't feel it appropriate to share details of my personal life with preceptors I barely knew, in the same way that I would never ask them about their personal lives when first working with them. This happened mostly during rotations, where I'd work on a different service every week or so.
- I am not fearful of faculty treating me differently. I have never really had to 'hide' it with faculty, admin, or preceptors, it was never a topic of conversation.

less competitive residency application (1 quotes)

- I feel very supported. I have never been personally discriminated against. I just have feared for my competitiveness as a residency applicant due to my sexual orientation. I have struggled whether or not I should be out on my application, even though I have been very active in organizations and research projects that deal heavily with sexual orientation and health. Also, in other environments, I have heard disparaging comments against LGBT people that have made the working environment in the hospital or clinic difficult.

negative experiences of out peers (2 quotes)

- It seems half the people I know who are GLBT are in the closet, or have gone back into the closet during medical school. It seems that the state you practice medicine in has a big impact on this decision. Living in Arizona, many of the physicians here are very vocal about their opinions against homosexuality. And while there is a lot of support for it amongst faculty, there are also others that are clearly against it. And I have known a few students to be surprised to find out that one of their esteemed professors they thought was open-minded was in fact, not. Thus leading to them not getting to help as much during a rotation or receiving lower grades on things (patient care, etc) they other professors thought the performed well in.
- I had heard from students in classes above mine that after coming out to some faculty it hurt their education, either it cooled the relationship with attending, or they weren't invited to interesting cases, or generally received less teaching/attention.

negative impact on future career (unspecified) (5 quotes)

- Different treatment, unrealized/unconscious homophobic actions, gossip spread and limitation on future career potential
- I was also worried that it might somehow jeopardize my future career.

- limitation of career choices
- I fear that people in a position of power above me (attending physicians, residents, etc) may harbor negative views regarding homosexuals. These people are grading and evaluating me, so I would not want to make myself stand out in any way that would be detrimental to my career advancement.
- I was open with my sexuality to close friends, but I made significant efforts to separate my personal/dating life from my work life. I did not want to risk any potential career advancement by my sexual orientation. I do not believe there is anything wrong with being gay, but I think there are some attending physicians (particularly older) who harbor negative feelings toward gay people. I did not want it to even be an issue.

negative judgement of professional character (14 quotes)

- Change in how I'm viewed on the work project
- Judgement. Different treatment - grading in the clinical years is SO. SUBJECTIVE. and so anything that might cause anyone to think less of me made me wary.
- Social exclusion, judgmental attitudes, and making people feel uncomfortable
- Weakness is a vulnerability amongst competitive people. Ignorance regarding sexual orientation leads some to view homosexuality as a weakness of character.
- I would fear judgments about my professionalism and assumptions about how I spend my recreational time
- Changes in their perception of who I am, potential for mistreatment
- Judgement, different treatment
- I was afraid I would be judged and discriminated against because of my sexual orientation.
- I'm afraid I'd be judged and possibly mistreated. Mostly I don't think other people understand what being bisexual means.
- Low evaluations, judgement of my character, stereotypes, irrelavnce to my medical studies.
- Discrimination or judgement. Different treatment or being thought of differently in a negative light.
- Changes in opinions/impressions of me that might affect the way they perceive my efforts on the wards or evaluate my work
- Fear of judgement from faculty or preceptors which may or may not affect my evaluations of performance.
- I worried I would be treated differently from other students or that their impression of me would have changed (and changed to something more negative)

personal feelings about sexual minority status (8 quotes)

- i have been out for many many years so it is largely a non-issue for me
- I am older than most students (I was 35 when I started, and I had been out for 20 years). I think this made it much easier for me to be comfortable.
- not being completely comfortable with myself
- I am newly "out" since 3 months and still feel uncomfortable around friends from med school. I still have not told any faculty/staff/advisers
- My discomfort with my sexual orientation is my own; I believe I would have had support had I sought it
- I'm not sure. I just felt uncomfortable disclosing that information.
- Embarrassement at discussing personal issues. Or worries that it would affect an evaluation
- It's probably in my head. I know most people at my school didnt care either way

pressure to hide sexual orientation (10 quotes)

- It seems half the people I know who are GLBT are in the closet, or have gone back into the closet during medical school
- I am not only openly bisexual, but I am openly liberal and atheist in an extremely conservative city. Most of the faculty and preceptors I have had over the four years have been conservative and religious and have openly voiced negative attitudes towards LGBTQ individuals/patients/students, women's reproductive choice, democrats, atheists, and others, and have contributed overall to a judgmental, prejudicial environment that does not allow medical students to express themselves freely without professional repercussions
- I felt that by disclosing my sexual orientation in the Deep South, where I was put in offices where staff openly voiced their bigotism on minorities of all creeds, would make my work environment even more hostile. I had enough trouble with stereotypes as a Black female
- Personally, I only shared my sexual orientation with my classmates and hid it from everyone else
- Years after, I know now that both of these reactions kept other LGBT classmates in the closet while on campus, which suggests an unsafe professional environment

- I just don't want most people knowing. I don't want it to be a factor others consider during work
- Overall I felt like I was in a safe environment to be who I wanted to be in medical school. However, due to our society's persisting negative view of same-sex relationships, I still felt a need to remain very private about my sexual orientation and only felt comfortable revealing my preferences to close friends
- I remember bringing my partner at that time to our "medical school prom" as my date and feeling like I was being judged. It started to affect not just me but her too because she felt like she was going back in the closet when around my colleagues.
- I worked with some older attendings at the start of my clinical rotations who made derogatory comments about HIV and LGBT patients or homosexuality in general and afterwards I made a point to never divulge my sexuality in that setting.
- Several of my classmates came out to me and some of the other openly gay students, but chose to overall remain quiet about it because of societal and familial pressures. There were maybe 10 gay students in my class of 190, 5 of whole were closeted. There were also several bisexual students

presumption of heterosexuality (2 quotes)

- A lot of preceptors and faculty assume I am straight, however, and ask about my "boyfriend" or "husband." It would make me feel more welcome if they used inclusive language.
- The most pervasive negative thing I've noticed is how heterosexuality (and cisgender status) are routinely assumed of everyone.

queer invisibility (passing as straight) (12 quotes)

- A lot of preceptors and faculty assume I am straight, however, and ask about my "boyfriend" or "husband." It would make me feel more welcome if they used inclusive language.
- I think that my experience may be skewed by the fact that--while I have dated women in the past, I did not date any women while in medical school.
- I am a bisexual woman, and I have never experienced any hardships on account of my sexual orientation. However, I am in a steady relationship with a male during the course of my med school experience, and since this is aligned with the social norm, I do not feel that I am a true representative of the LGBTQ students that are currently experiencing any problems that may be associated with their personal life
- I find my medical school very supportive of LGBT students. I am personally married to an opposite-sex partner, so my own experiences with my sexual orientation have not come up a lot.
- I didn't make it known, so I never experienced any repercussions
- It's not so much that I concealed it, but rather didn't go out of my way to correct faculty, administrators, or preceptors when they assumed that I was heterosexual. For example, when making small talk during brief encounters with faculty I didn't know well, I didn't always explain myself when I'd answer "no" to whether or not I had a girlfriend, or that I was couples matching with my (male) partner when asked what "she" was specializing in.
- Never had any problems as a gay medical student. I only avoided/skipped around the question when faculty/preceptors asked about relationships. Ex) Do you have a girlfriend? - Technically, no. (because I have a boyfriend).
- I am married to an opposite-gender spouse, so questions about my sexuality were almost never brought up. / Everyone assumes you are straight
- Being bisexual I have the privilege of "hiding" my true orientation if I happen to be dating a man but for several years I was in a very serious relationship with a woman and I felt I could not be as honest about our relationship with faculty and sometimes other students as I could if I were dating a man.
- In the Midwest I don't think people are as open to LGBT folks so I just don't talk to many people about it. In fact many people are Christian, even many of my friends and they are just not okay with it. It would be different if I had a significant other because then It would be more significant and come up, but I did not throughout most of med school.
- This was only true on away rotations in rural [state], not at my actual school [redacted]. All I did was not mention it, it is fairly hard for most people to tell I am gay.
- I worried I would be treated differently from other students or that their impression of me would have changed (and changed to something more negative). Also, during medical school I was not dating anyone, so there was no need to disclose anything about my old relationships (some of which were with members of the same sex). It gave me an easy out...

queer underrepresentation (13 quotes)

- There were only 3 out students in my class of 175. The lgbt community is not represented well in my class.
- Many medical schools are LGBT friendly, but that does not mean all med schools have large LGBT communities. It's one thing if a school promotes a culture of acceptance, but if the school does not attract LGBT students, faculty, and staff, the medical schools can still seem unfriendly to LGBT students
- Very difficult time finding any faculty or preceptors who identified as LGBT or were knowledgable about lgbt health issues.
- There were only 2 other students in my class who identified as LGBT so it felt difficult to find a community while in medical school
- Because we were all working so hard all the time, and almost all of my classmates were straight, it was hard to find other gay friends and/or potential relationships.
- It appears that gay/lesbian/straight students are fairly open but I don't know anyone else who feels they are bisexual. It is not talked about and I am part of the problem as I don't talk about it myself.
- While there's a small number of LGBT folks at my medical school, I was never made to feel unwelcome or weird by our institution. In this way, our institution stands out among the several that had made strides to negate any homophobic attitudes toward students like me. They take these actions very seriously. And while slow and small, they are making strides to include LGBT-oriented themes into the curriculum.
- I was the only queer person out in my class for the first two years but treated respectfully by classmates and formed great supportive relationships with close friends
- A couple guys were out at school. Good for them. But one guy was older and came with a partner. He's cool.
- I knew one students who came out in medical school. He was the only one I knew who was openly gay. He wasn't ostracized but it really seems like not the most inviting atmosphere to come out of the closet.
- Difficult to find LGBT faculty, let alone administrators. No out LGBT mentors at my medical school, and few LGBT students.
- Part of the problem was that none of the lecturing faculty were gay. There were very few openly gay attendings.
- Several of my classmates came out to me and some of the other openly gay students, but chose to overall remain quiet about it because of societal and familial pressures. There were maybe 10 gay students in my class of 190, 5 of whole were closeted. There were also several bisexual students

resigned to their fate (2 quotes)

- It is no different than being a lesbian, gay, or bisexual person in general. Living the life of a minority class that is the subject of divisive cultural, religious, and personal conjectures has its pitfalls.
- It's no different than any other path in life. Mostly, no one cares. There are still a few throwaway comments that people don't realize they are saying, but even they don't really care.

same-sex partners unwelcome (4 quotes)

- I was very envious of heterosexual students who would openly talk about their engagements or whatever during small talk on the wards, and I did not feel like I had that luxury because I could not be sure if I would be judged or discriminated against for dating someone of the same sex, even though I was in just as loving, stable, healthy relationship as the straight people. Even with people who you know to be progressive, you still wonder if they're going to treat you differently even unconsciously since it is not the majority orientation. I remember bringing my partner at that time to our "medical school prom" as my date and feeling like I was being judged. It started to affect not just me but her too because she felt like she was going back in the closet when around my colleagues.
- Being gay and having an SO made things difficult. I worked with some older attendings at the start of my clinical rotations who made derogatory comments about HIV and LGBT patients or homosexuality in general and afterwards I made a point to never divulge my sexuality in that setting. The topic of SOs would come up on teams and I would never feel comfortable sharing about mine because I didn't know if it would negatively impact my evaluation or educational experience.
- Bringing my partner to faculty events was out of the question. It took me a solid 2 years to get comfortable to go to student events with her and actually stay for the length of hte even rather than just make a short appearance.
- It's just an awkward thing to being up. When everyone is talking about their hetrosexual partners , I'm wary of making the mood awkward by mentioning a same sex awkward. Not really afraid of consequences as I am of making other people feel odd.

some people will never be accepting (2 quotes)

- Once people reach a level of acceptance of other people, differences stop being the things that are noticed and instead the similarities dominate conscious thought. I believe many who choose medicine reach this level of maturity, and it was certainly reflected in my class. Unfortunately, like any sphere in the world, some do not
- The few blatantly homophobic classmates that I have are self-segregating, actively resent having LGBTQ issues taught in the curriculum, and are basically impossible to reach despite being the people who need to be reached the most. I feel like nothing can reach these people except visibility.

uncertainty about response to disclosing (7 quotes)

- You never know what to expect from people, so I chose not to share to avoid any conflict
- In my first two years I certainly felt more uncomfortable disclosing my sexual orientation and my relationship with another man.w Without knowing any of my classmates or faculty before entering medical school, I worried that I would be viewed as an outsider and be ostracized.
- I try my best to avoid awkward situations with preceptors and other staff- you never know who's completely safe and what recriminations that might follow disclosure. I had no intention of putting myself out on a ledge to find out- either with getting excluded from clinical experience or instigating negative reactions with preceptors. And I had no intention of screwing myself over this early in life in terms of funding. I'm a private person and a pragmatist- not everyone needs to know.
- I was also worried I would be graded differently. While unlikely it seems that every encounter and experience can influence how one is graded so I chose to keep this confidential.
- I was very envious of heterosexual students who would openly talk about their engagements or whatever during small talk on the wards, and I did not feel like I had that luxury because I could not be sure if I would be judged or discriminated against for dating someone of the same sex, even though I was in just as loving, stable, healthy relationship as the straight people. Even with people who you know to be progressive, you still wonder if they're going to treat you differently even unconsciously since it is not the majority orientation.
- Being gay and having an SO made things difficult. I worked with some older attendings at the start of my clinical rotations who made derogatory comments about HIV and LGBT patients or homosexuality in general and afterwards I made a point to never divulge my sexuality in that setting. The topic of SOs would come up on teams and I would never feel comfortable sharing about mine because I didn't know if it would negatively impact my evaluation or educational experience.
- I was open with my sexuality to close friends, but I made significant efforts to separate my personal/dating life from my work life. I did not want to risk any potential career advancement by my sexual orientation. I do not believe there is anything wrong with being gay, but I think there are some attending physicians (particularly older) who harbor negative feelings toward gay people. I did not want it to even be an issue.

won't get letters of recommendation (1 quotes)

- I was afraid I would get lower grades than I deserved and that I would not get letters of recommendations I wanted. treated differently in regards to not getting to participate as much with patients.

APPENDIX E: QUALITATIVE CODE REDUCTION CROSSWALKS

***Appendix Table F.1**: Stage 1 code reduction*

Stage 1 codes	Matched to stage 2 codes
barriers to mentorship	barriers to mentorship
fear of "outsider" status fear of being treated/seen differently othered because was out	being othered (seen/treated differently)
fear of being respected less/looked down on fear of being seen as weak fear of judgement	being respected less/looked down on
being out made it difficult to be part of the class harder to fit in isolation/loneliness lack of community negative impact on peer relationships social exclusion	being socially ostracized/isolated
avoiding gossip fear of ridicule	being subject of gossip/ridicule
fear of discrimination/bias given a hard time implicit bias silently discriminated against tolerance vs. acceptance	being target of bias/ microaggressions
"not something I want to be known by" asked to speak for entire queer community expected to know about LGBTQ health fear of being ostracized fear of being tokenized/stereotyped	being tokenized/stereotyped
bias in awarding honors/funds	bias in awarding honors/funds
biexuality is misunderstood bisexual double-stigma	bisexual double-stigma
bi invisibility	bisexual invisibility
avoiding conflict/tension	causing conflict/tension
avoiding discomfort/awkwardness	causing discomfort/awkwardness
climate important in choosing med school	climate important in choosing med school
disclosure diminished exposure to heterosexism, but not completely it's a risk to 'find out' if it's safe to disclose	concealment as risk-aversion
contact with LGBT people predicts better comfort	contact with LGBT people predicts better comfort
conservative disclosing is situation/person specific decision ignoring heterosexism because time-limited interactions impact of religion selectively out with faculty	context (situation/person)
derogatory comments made by patients	derogatory comments made by patients
didn't actively conceal, but...	didn't actively conceal, but...

Stage 1 codes	Matched to stage 2 codes
discrimination in evaluations	discrimination in evaluations
discrimination in outside/affiliated hospitals discrimination in rotations	discrimination in outside/affiliated hospitals
everyone is assumed straight and cis lack of inclusive language presumed straight	everyone is assumed straight and cis
faculty afraid to ask	faculty afraid to ask
lack of acceptance in personal life made disclosure more risky in professional life not out to family threat to family funding medical school if outed	family-related considerations
fewer opportunities limiting engagement with evaluators negative impact on professional relationships	fewer/worse training opportunities
discrimination is legal in the state geographic impact	geographic factors
good LGB curricular content school efforts to improve LGBT education	good LGB curricular content
did find some non-judgemental faculty/staff/preceptors good queer representation good representation	good queer representation
happy about survey	happy about survey
attending physicians hold negative views derogatory comments about patients derogatory comments resulted in concealment faculty and preceptors create hostile environment indirect vs. direct discrimination openly homophobic faculty/staff/preceptors witnessing heterosexism because was presumed straight	heterosexist behavior from faculty/attendings/preceptors
derogatory comments heterosexist language witnessed heterosexism witnessed heterosexism affected environment	heterosexist behavior from faculty/attendings/preceptors OR heterosexist behaviors of other students and the institutional response
addressing beliefs of heterosexist students wasn't adequate heterosexual students are ignorant/hostile/unaware openly homophobic students	heterosexist behaviors of other students and the institutional response
hiding strategies	hiding strategies
bias in faculty lectures inadequate LGBT-specific training inadequate, though improving, LGBT health curriculum lack of trans exposure LGBT care is not a priority LGBT health curriculum - resistance because not enough time trans care	inadequate LGBT-specific training
institutional efforts inadequate institutional efforts limited to first 2 years/ignoring challenges in rotations lack of LGBT-specific resources/groups lack of marriage benefit parity/non-discrimination policies	institutional efforts inadequate

Stage 1 codes	Matched to stage 2 codes
intersectionality pressure to hide other important identities	intersectionality
abilities to care for patients more important than sexual orientation in other's perceptions didn't come up effort to separate personal from professional life irrelevant, but... personal life is personal sexual identity irrelevant	irrelevant/personal information
less competitive residency application	less competitive residency application
older students as source of information on heterosexism in school witnessed/experienced repercussions of disclosing	negative experiences of out peers
negative impact on future career	negative impact on future career (unspecified)
negative impact on patients	negative impact on patients
not a safe space sexual orientation became a complication in medical school	not a safe space
people unkind in general	people unkind in general
came out in medical school newly out out for years - nonissue/more comfortable personal discomfort with sexual minority status	personal feelings about sexual minority status
medical school both supportive and discriminatory polar reactions to being out	polar reactions to being out
getting better institution ignoring other oppressed groups institution successfully addressing heterosexism it gets better with time it was good in hindsight nondiscrimination policy in place positive experience safe, but... wouldn't have concealed now	positive experience
pressure to hide sexual orientation	pressure to hide sexual orientation
didn't have problems because I passed as straight no same-sex partner, so less need to come out passing as straight	queer invisibility
queer students experience a lot of stress and turmoil	queer students experience a lot of stress and turmoil
queerness is med school is as complicated as queerness everywhere else	queerness is med school is as complicated as queerness everywhere else
:::shrug:: some people will never be accepting	resigned to their fate
attending events with partner "out of the question" couldn't share information about same-sex partner hiding queerness had negative impact on partner and their relationship	same-sex partners unwelcome
signaled queerness	signaled queerness
social sanctions of heterosexist leaders	social sanctions of heterosexist leaders

Stage 1 codes	Matched to stage 2 codes
uncertainty about response to disclosing	uncertainty about response to disclosing
unpredictable reactions	
difficulty finding faculty with knowledge of LGBT health	underrepresentation/lack of community
difficulty identifying LGBT faculty	
underrepresentation	
change needs to happen from the top	what it will take to get better
education helps	
heterosexual students/faculty/staff need to change opinions	
importance of contact with LGBT person to change opinions	
importance of LGBT groups/faculty	
LGBT students push through change	
medical field still has a long way to go	
suggested solutions	
won't get letters of recommendation	won't get letters of recommendation

***Appendix Table F.2**: Stage 2 code reduction*

Stage 2 codes	Matched to stage 3 codes
barriers to mentorship	barriers to mentorship
being othered (seen/treated differently)	being othered (seen/treated differently)
being respected less/looked down on	being respected less/looked down on
being socially ostracized/isolated	being socially ostracized/isolated
being subject of gossip/ridicule	being subject of gossip/ridicule
being target of bias/ microaggressions	being target of bias/ microaggressions
being tokenized/stereotyped	being tokenized/stereotyped
bias in awarding honors/funds	bias in awarding honors/funds
bisexual double-stigma	bisexual double-stigma
bisexual invisibility	bisexual invisibility
causing conflict/tension	causing conflict/tension
causing discomfort/awkwardness	causing discomfort/awkwardness
concealment as risk-aversion	concealment as risk-aversion
context (situation/person)	context (situation/person)
discrimination in outside/affiliated hospitals	
geographic factors	
religious/conservative factors	
discrimination in evaluations	discrimination in evaluations
family-related considerations	family-related considerations
fewer/worse training opportunities	fewer/worse training opportunities
heterosexist behavior from faculty/attendings/preceptors	heterosexist behavior from faculty/attendings/preceptors
witnessing heterosexism because was presumed straight	
exposure to heterosexist students	heterosexist behaviors of other students and the institutional response
institutional efforts inadequate	
inadequate LGBT-specific training	inadequate LGBT health-specific training
inadequate, though improving, LGBT health curriculum	
lack of trans-specific education	
intersectionality	intersectionality
irrelevant, but...	irrelevant/personal information
irrelevant/personal information	
less competitive residency application	less competitive residency application
negative experiences of out peers	negative experiences of out peers
negative impact on future career (unspecified)	negative impact on future career (unspecified)
negative judgement of professional character	negative judgement of professional character
personal feelings about sexual minority status	personal feelings about sexual minority status
everyone is assumed straight and cis	presumption of heterosexuality
queer invisibility	queer invisibility
underrepresentation/lack of community	queer underrepresentation
same-sex partners unwelcome	same-sex partners unwelcome
polar reactions to being out	uncertainty about response to disclosing
uncertainty about response to disclosing	
won't get letters of recommendation	won't get letters of recommendation

***Appendix Table F.3**: Codes dropped at stage two*

queerness is med school is as complicated as queerness everywhere else
climate important in choosing med school
contact with LGBT people predicts better comfort
derogatory comments made by patients
didn't actively conceal, but...
faculty afraid to ask
good LGB curricular content
good queer representation
happy about survey
hiding strategies
importance of LGBT groups/faculty
institution successfully addressing heterosexism
it was good in hindsight
negative impact on patients
nondiscrimination policy in place
people unkind in general
positive experience
queer students experience a lot of stress and turmoil
resigned to their fate
safe, but...
school efforts to improve LGBT education
self-selection into LGBT-friendly school
signalled queerness
social sanctions of heterosexist leaders
some people will never be accepting
what it will take to get better
not a safe space
pressure to hide sexual orientation

Appendix Table F.4: Stage 3 codes mapped onto themes

Stage 3 codes	Themes
inadequate LGBT health-specific training	Formal curriculum
institutional response to heterosexist behaviors	Hidden curriculum
presumption of heterosexuality	Hidden curriculum
queer underrepresentation	Hidden curriculum
same-sex partners unwelcome	Hidden curriculum
family-related considerations	Personal factors influencing decision to conceal
irrelevant/personal information	Personal factors influencing decision to conceal
personal feelings about sexual minority status	Personal factors influencing decision to conceal
barriers to mentorship	Professional/educational repercussions of disclosure
bias in awarding honors/funds	Professional/educational repercussions of disclosure
discrimination in evaluations	Professional/educational repercussions of disclosure
fewer/worse training opportunities	Professional/educational repercussions of disclosure
less competitive residency application	Professional/educational repercussions of disclosure
negative impact on future career (unspecified)	Professional/educational repercussions of disclosure
negative judgement of professional character	Professional/educational repercussions of disclosure
won't get letters of recommendation	Professional/educational repercussions of disclosure
being othered (seen/treated differently)	Social/interpersonal repercussions of disclosure
being respected less/looked down on	Social/interpersonal repercussions of disclosure
being socially ostracized/isolated	Social/interpersonal repercussions of disclosure
being subject of gossip/ridicule	Social/interpersonal repercussions of disclosure
being target of bias/ microaggressions	Social/interpersonal repercussions of disclosure
being tokenized/stereotyped	Social/interpersonal repercussions of disclosure
causing conflict/tension	Social/interpersonal repercussions of disclosure
causing discomfort/awkwardness	Social/interpersonal repercussions of disclosure
concealment as risk-aversion	Social/structural factors influencing decision to conceal
context (situation/person)	Social/structural factors influencing decision to conceal
negative experiences of out peers	Social/structural factors influencing decision to conceal
uncertainty about response to disclosing	Social/structural factors influencing decision to conceal
heterosexist behavior from faculty/attendings/preceptors	Social/structural factors influencing decision to conceal in medical school AND Informal curriculum