The Lack of Sexual and Gender Minority Curriculum in U.S. Medical Schools

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https://doi.org/10.38126/JSPG200209
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Keywords: sexual and gender minorities; LGBTQ; medical education; inclusive healthcare; medical curriculum; transgender health; health policy; minority healthcare

Executive Summary: Health outcomes of sexual and gender minorities are often disproportionately negative compared to their heterosexual counterparts. One reason is that healthcare providers report low confidence treating SGM patients and a low rate of interaction with this population. The curriculum being taught in U.S. medical schools is largely insufficient in teaching the healthcare needs of SGM individuals. Consequently, physicians are underprepared to treat these patients, leading to large health disparities. Physicians show improved levels of knowledge and confidence treating SGM patients after additional educational efforts, showing that adding SGM healthcare modules to medical schools will better prepare physicians to treat these patients. This would decrease health disparities and improve patient experiences and health outcomes. Additional curriculum should be multi-modal and include SGM individuals in their creation and implementation. This method has been shown to encourage the greatest improvement in physician knowledge and confidence working with patients. This paper also includes policy recommendations geared towards policymakers and stakeholders to guide future initiatives to improve the health outcomes of SGM patients. It is crucial that this conversation around social determinants of health leads to policy and structural changes. Future research in this area is needed and future policy changes or initiatives should be studied for their effectiveness.

I. Introduction

Sexual and Gender Minority (SGM) populations often report more negative health outcomes than their cisgender or heterosexual counterparts. This health inequality is the result of several factors including insufficient access to healthcare, fear of discrimination, and inadequate training for healthcare providers. Furthermore, mistrust of medical professionals stemming from prior negative experiences or internalized stigma can prevent marginalized individuals from receiving proper health care, widening health disparities. The curriculum taught in medical schools often does not include proper training in SGM health, leading to underprepared physicians and improper patient care. Future physicians should be well-versed in minority stress and its physiological and mental effects on health.

Adding or enhancing the existing SGM-focused curriculum would increase awareness of the specific healthcare needs of this community. A more comprehensive SGM education would also highlight the existing health disparities faced by SGM communities. This literature review will serve to compile the available information on what Sexual and Gender Minority (SGM) curriculum is being taught in medical schools, how comprehensive these modules are, and how this translates to physician readiness and patient experiences.

II. Methodology

A search for relevant literature, limited to studies in English, was completed using the databases MEDLINE, Embase, MedEdPortal, and Sociology Source. The search included literature with the following keywords in the title or abstract: transgender, transsexual, sexual

minority/minorities, gender minority/minorities, LGBT, LGBTQ, LGBTQIA, homosexual/s, non-heterosexual/s, queer, gay/s, or lesbian/s combined with one of the following: teach/ing, training/s, curriculum/s, curricula/r, pedagogy/pedagogies/pedagogical, instruction/instructional, workshop/s, course/s, lecture/s, module/s.

In addition, the Medical Subject Headings (MeSH) was searched for literature that included the terms "sexual and gender minorities", "bisexuality", "homosexuality", "transgender persons", or "health services for transgender persons" accompanied by "curriculum", "medical education", "teaching", or "educational models".

This search yielded 5,841 results. Removing the 2,101 duplicated studies narrowed the pool to 3,740 studies to be manually screened. Upon viewing the title and abstract, 2,951 studies were deemed irrelevant, and 789 studies moved onto full-text review. Studies only pertaining to one specialty of medicine, or conversely, one identity within SGM populations, were excluded in order to make the review more generalizable. This removed 212 studies. Next, 183 studies were excluded because they were not focused on physicians or medical school curriculum interventions. This category encompasses studies that may have been focused on other areas of medicine, such as dental or veterinary professionals or studies not relevant to a discussion on education during medical school years. The next largest category is a broad exclusion of 124 studies on the basis of being less relevant to the review as a whole, which encompasses any studies that did not provide pertinent information to add to the purpose of this paper. Literature was included only if it discussed modules in medical school specific to SGM healthcare, how this information is best taught or received, or the efficacy of these efforts.

The field of SGM health and its inclusion in medical school curriculum is rapidly evolving. To analyze the most current state of the field, only studies published during or after 2010 were included. This excluded 102 studies. There were eighty-three studies outside of the United States and sixteen additional duplicate studies that were also removed from consideration. Studies on SGM-identifying physicians or medical school students that did not include information on SGM education in medical school or potential patient outcomes were removed. This excluded fifteen studies. The last exclusion criteria eliminated twenty-four studies that were solely focused on HIV and AIDS. While a very important area of research, these studies were deemed too specified to be indicative of the field as a whole. At the end of this process, thirty studies remained to be analyzed.

i. Categories
For the purpose of this paper, the literature has been grouped into four categories. The first category "Student Attitudes and Current Curriculum", consists of studies reporting on attitudes and biases of medical students and physicians without any educational intervention, and have been grouped together with evaluations of current medical school curriculum. The second category, "Patient Experiences and Recommendations" focusses on two studies which discuss SGM patient experiences and their recommendations for healthcare providers. The third and largest category "Effectiveness of Additional Curriculum", examines the addition of SGM modules to medical school curriculum and assesses the effectiveness of this additional education. This section largely informs the following policy recommendations presented in this review.

The remaining studies form the final category "Implementing Curriculum", and provide suggestions for implementing inclusive criteria across schools and disseminating existing resources to reach a broader population.

III. Student attitudes and current curriculum

i. Physicians self-report low confidence in ability to provide care for SGM populations.
Honigberg (2017) looked at first-year and second-year postgraduate resident physicians at several Massachusetts hospitals. The residents went to medical schools in thirty-three different states and reported on their experience with SGM patients. The median hours of SGM education was twenty-two, focused mainly on HIV, disorders of sex development, and safe-sex practices. On average, there was no mandatory education on disclosure of sexual identity, chronic disease, body image, or substance use among SGM patients. Almost half (40%) of the respondents did not care for any

transgender patients throughout their medical education, and one-third did not care for any SGM patients at all. Consequently, participants recorded higher levels of confidence caring for lesbian, gay, and bisexual patients than transgender patients. Considering that 5.6% of adults in the U.S. identify as lesbian, gay, bisexual, or transgender, there are estimated to be 14,460,000 Americans that physicians are not comprehensively taught to treat (Jones 2021; Ogunwole 2021). Positive associations were found between both curricular hours and patient exposure and future provider comfort (Honigberg 2017). Thus, adding curriculum hours and patient exposure into medical school would better prepare physicians to care for SGM patients.

Zelin (2018) studied 658 students across ten New England medical schools and found that most respondents did not feel confident in their ability to treat SGM patients. The majority of the medical students (55.9%) did not feel their curriculum prepared them to care for these patients, and 31.6% did not feel comfortable discussing gender identity or gender minority health topics (Zelin 2018).

Similarly, DeVita (2018) evaluated the medical school curriculum at Georgetown University against learning objectives developed by the American Association of Medical Colleges (AAMC) and areas of knowledge established by Vanderbilt University. The existing curriculum was found to be lacking on both scales. Twenty-three AAMC competencies were not fully covered throughout the curriculum, with only seven being completely covered. Only twelve learning objectives set by Vanderbilt were met, with twenty unmet areas of knowledge (DeVita 2018).

Phelan (2017) and White (2015) both evaluated and characterized medical school curricula. White assessed 4,262 respondents from 170 different medical schools and found that 67.3% of participants rated their school's SGM-based curriculum as fair or worse. HIV and other STIs were the topics students felt most comfortable discussing because much of SGM-related education has historically pertained only to gay men, HIV, and the spread of STIs. Physicians were least comfortable with topics relating to transgender health care. White's study found that education on these topics helped 62.6% of students feel more prepared for future clinical interactions with SGM patients.

Student feedback noted that preclinical training with SGM patients and personal experiences increased comfort in caring for SGM patients. Despite this importance, one-third of students reported having no required instruction on SGM health. Even if students had a desire to have such experiences, only 14% of schools in both the U.S. and Canada offered any teaching on SGM health topics (White 2015).

ii. Increased contact with SGM peers and patients decreases explicit biases
Nowaskie (2020) used the seven-point Likert LGBT Development of Clinical Skills Scale (LGBT-DOCSS) to evaluate medical students and their history with SGM patients to find trends between time spent with SGM patients and score. Students who cared for thirty-five or more SGM patients and reported thirty-five hours of work with SGM patients were found to have higher levels of preparedness in caring for SGM patients and better knowledge of their health needs (Nowaskie 2020).

Warner's study (2018) evaluated students' knowledge on SGM health using six categories: sexual function and dysfunction; fertility and reproduction; sexuality across the lifespan; sexual minority health; society, culture, and behavior; and safety and prevention. Overall, students did not pass the knowledge assessment and the average score was 66%. Scores for questions pertaining to safety and prevention had an average score of 49%, showing an under-preparedness among medical students. The students that reported taking a human sexuality course in medical school had higher scores, pointing to the positive impact that education can have on physicians' treatment of SGM patients. Furthermore, Warner found higher scores on average between fourth-year students than first-year students, and each additional year of medical school was associated with a $3.22\pm0.37\%$ increase in score. This further supports the power of medical education to improve sexual health knowledge, and as a result, patient interactions (Warner 2018).

A study by Fallin-Bennett (2015) ties together these ideas to describe the cyclic nature of implicit bias in healthcare settings. It is well documented that implicit and explicit racial bias results in differential treatment of patients. This raises the question of whether the same relationship exists between physician biases against SGM populations and the

care they provide. Negative attitudes towards SGM individuals (or complacency towards this discrimination) by other healthcare workers discourages physicians from disclosing their SGM identities. This also prevents SGM-identifying healthcare workers from educating others in the workplace. In this way, a self-perpetuating cycle of bias and discrimination can affect the climate of the healthcare industry, including the institutions responsible for training future physicians (Fallin-Bennett 2015).

Phelan (2017) showed that increased contact with SGM peers and patients decreased explicit biases among medical students, potentially disrupting this cycle of biases. The perceived quality of these interactions also had an impact on decreasing levels of bias. Increased contact was observed to increase perceived skill and preparedness treating SGM patients. Conversely, working in an environment with coworkers who exhibit discriminatory behavior, such as making derogatory and discriminatory comments in reference to an SGM-identifying patient, was associated with greater levels of implicit biases. Phelan argued that lower levels of bias are associated with higher feelings of preparedness working with sexual minority patients, higher levels of skill providing safe sex counseling, and more favorable interactions with SGM patients and peers. Therefore, education that lowers these biases will translate to better patient care and a more inclusive work environment (Phelan 2017).

Mandatory SGM education in medical schools would decrease biases among future physicians. Gessner (2020) discusses the fact that even physicians who are accepting of their patients' SGM identity may simultaneously be perceived by the patient as discriminating against these identities. This could be because of internalized stigma associated with the entire healthcare industry. A physician may feel uncomfortable approaching discussions about sexual or gender identity due to a lack of training. This discomfort can be perceived as stigmatizing by the patient. This highlights the need for diverse training including affirmative care practices for all SGM identities. Education must also include those with multiple marginalized identities and how they intersect.

Recognizing that the health of their patients is a combination of these factors allows physicians to implement structural interventions to improve access to care. It then becomes possible to address the structural discrimination faced by SGM individuals. The studies by Bi (2020) and Kutscher (2016) supported this idea by providing evidence that studying SGM health in the context of other marginalized identities is an effective way to make medical students more comfortable having discussions surrounding these topics.

IV. Patient experiences and recommendations

Gessner (2020) used the minority stress theory to illuminate health disparities acting on SGM individuals and took inventory of their perspectives on healthcare. The minority stress theory posits that health disparities are caused by stressors induced by discrimination throughout one's life. The Gessner study included fifty-eight participants and identified four key stressors: erasure, enacted stigma, felt stigma, and affirmative care. Erasure, physicians ignoring or dismissing the sexual identity of their patients, was reported most frequently by women, bisexual, and genderqueer participants. Gay and lesbian participants reported much lower levels of erasure. Enacted stigma refers to discriminatory treatment by others, in this context by the provider. People identifying as queer, pansexual, or Two-Spirit documented higher levels of enacted stigma than lesbian and gay participants. It is closely related to felt stigma, which is often internalized stigma and anticipation of discrimination based on past experience. Felt stigma was commonly reported in men as hyper-awareness of their sexuality or gender identity. Affirmative care, defined as acceptance or attentiveness to sexual minority identity, was occasionally felt in conjunction with stigma or erasure (Gessner 2020).

Alpert (2017) also conducted a study to collect information on the experiences of SGM participants in healthcare settings and report their recommendations. Five recurring suggestions for physicians were: be comfortable with SGM patients, share medical decision-making, avoid assumptions, apply SGM-related knowledge, and address the social context of health disparities. Of the participants, 20% reported being excluded from medical decisions and felt that their preferences and perspective was left out of their own care. For

example, a straight, white, transgender male was experiencing pressure from his counselor to cut his long hair because the counselor believed that this would show he was more serious about his transition. Despite his preference for long hair, the patient believed that he needed to cut his hair and present in accordance with gender stereotypes to receive the medical care he needed. A staggering 25% reported being treated differently after disclosing their sexual or gender identity. Several others were misgendered or denied care. One common sentiment observed was a desire for healthcare providers to be actually comfortable with SGM patients, rather than just seeming comfortable. Avoiding assumptions, using the correct pronouns, and providing physical exams and sexual histories that respect one's gender identity were other recommendations.

Alpert's suggestions include adding community-identified competencies into the curriculum to fill gaps in physician knowledge (Alpert 2017). Community-identified competencies are established through collaboration with SGM patients to determine the skills a physician needs to be competent in SGM patient care. Identifying these competencies through collaboration between the medical field and the SGM community promotes understanding between the two and disrupts historical power imbalances between physicians and patients. This practice also has the potential to include the needs of marginalized subpopulations more so than general guidelines. Examples of the competencies identified in the Alpert (2017) study are: sharing medical decisions, being comfortable with patients, avoiding assumptions, and acknowledging social determinants of health.

V. Effectiveness of additional curriculum
To evaluate the effectiveness of efforts to increase SGM health education, Encandela (2019) first compared Yale Medical School curriculum to the thirty SGM competencies provided by the AAMC and found seventeen of these competencies to be left out of the curriculum entirely. The lacking areas were across five domains: patient care, knowledge for practice, interprofessional and communication skills, systems-based practice, and personal and professional development. Encandela then pitched additions to the curriculum to fill these gaps. After these gaps were addressed by developing a

curriculum to promote student knowledge of SGM health topics, a clear improvement in student's feelings of comfort in treating SGM patients was observed. This exemplifies the importance of evaluating existing curriculum and working to address places in which it is lacking. Encandela (2019) also suggested that SGM content should be viewed through a lens of intersectionality, respecting the diversity within the SGM community.

Two other studies, Bi (2020) and Kutscher (2018), looked at curriculum that included SGM populations in conjunction with other disadvantaged identities such as race and socioeconomic status to support the need for an intersectional curriculum. Both programs spanned several weeks. Bi analyzed an 8-week mandatory course for first-year medical students at The University of Chicago. The percentage of respondents who felt "somewhat" to "completely" comfortable identifying barriers to SGM patient care increased from 62% to 92% after participation in the course. There was also an increase in the percentage of students comfortable asking patients about SGM identities and connecting these patients to useful resources (33% to 81%). The course utilized a mixed-media format and included videos from community members, though, no role-playing practice was included. Students responded well to the involvement of community members and found their stories to be illuminating (Bi 2020).

Kutscher evaluated an elective five-week course for first-year medical students at Weill Cornell Medical College. This course also included community-based organizations followed by discussions. Student feedback was very positive, with all respondents agreeing that taking the course during their first year was excellent timing, with 50% additionally responding that the course should be required for all students (Kutscher 2018).

i. Members of the SGM community should be included in medical training
Much like the Bi and Kutscher studies, several other studies showed that it is beneficial to include community organizations in the planning and implementation of SGM health courses. Minturn (2021) evaluated a ten-hour lecture at the University of Colorado that included small-group discussions and patient role-play. Before taking the course,

almost all students did not feel capable of meeting any of the course objectives (terminology, inclusive sexual history taking, primary care, and health maintenance, and transition-related care). After the course, students almost unanimously felt capable of meeting these objectives and reported benefits from completing the course even if they had previous training in SGM healthcare. It is difficult to attribute the increase in student knowledge to one specific aspect of the course, but student feedback suggests that community involvement and role-playing scenarios are beneficial factors (Minturn 2021).

To further this point, Pratt-Chapman (2020) looked at an eight-hour symposium developed by George Washington University. The symposium was taught by SGM community members and included small discussion sections, a panel with SGM people, and role-playing scenarios. All learning objectives, including clinical preparedness to care for SGM patients and knowledge about SGM health, showed statistically significant improvements after the symposium. A control group that did not attend the symposium scored lower on the post-test in all categories, providing evidence that the symposium increased participant knowledge (Pratt-Chapman 2020).

It is key to determine what qualities increase the effectiveness of educational courses on SGM health. The studies by Bi (2020), Kutscher (2016), Minturn (2021), and Pratt-Chapman (2020) all deemed SGM health training led by community organizations to be an effective way to increase knowledge and comfort. The interventions in these studies utilized a mixed-media approach, combining lectures with smaller group activities. The studies were also a large time-commitment (eight hours or over.) It is unclear which of these aspects is responsible for the success of the programs.

Variably, several other studies assessed whether a shorter, one-hour lecture would also be effective in increasing student knowledge and comfort surrounding topics of SGM health. Cooper (2018) developed a one-hour lecture that was found to be effective. Students reported increases in their knowledge of the lecture objectives after attending. There were especially large improvements in knowledge of unique health risks encountered by SGM patients, underlying health disparities, and

providing supportive resources to SGM patients (Cooper 2018).

Evidence provided by Wahlen (2020) further suggests that a one-hour lecture is sufficient to provide students with important information pertaining to SGM health. Fourth-year medical students who attended the lecture reported higher levels of knowledge of SGM health issues one month after attending the lecture. The majority of students improved in all categories of the lecture objectives: attitudes, knowledge, judgment, and experience (Wahlen 2020). While not ideal, this provides a good option for schools with large time constraints.

ii. A multi-modal approach has been shown to be the most effective
Four other studies evaluated programs that used a mixed-media approach. Haghiri-Visch (2020) performed a quasi-experimental study using a three-hour course approaching SGM health through a human rights framework. Role-playing, videos, small discussions, and reflection exercises were all included in the session. Even without community involvement, all participants reported higher levels of knowledge and comfort communicating with SGM patients after the training session (Haghiri-Visch 2020).

Potter (2016) analyzed a two-hour session that included role-play and small discussion groups. Similar to the course studied by Kutscher, Potter's session included work that participants were expected to complete prior to attending. Potter observed an increased awareness of health impact of identities, as well as the role of physicians in establishing rapport with their patients through affirming care. Participant feedback was positive, and the role-playing portion was especially valued. Students felt comfortable and supported practicing their skills in a way that would directly translate to patient interactions (Potter 2016).

Roth (2020) also structured their session to include group work but took a different approach. Students were put into small groups to research case-based scenarios and present their findings to the larger group. This learning strategy proved effective. Students noted that they were engaged in the session due to its interactive nature and reported learning more about terminology, history-taking,

knowledge of safe-sex practices, disparities, and gender-affirming care (Roth 2020).

Desrosiers (2016) evaluated available literature to deduce the most beneficial ways to implement additional curriculum. Allowing students time to process the ideas presented in a lecture, and using multi-modal strategies were among Desrosiers' recommendations. Exercises that encouraged students to reflect on their own beliefs were found to be constructive. Desrosiers adds to the findings of Cooper and Wahlen to claim that discrete sessions should be paired with multi-modal approaches to achieve significant changes in physician attitude, skills, and knowledge. Desrosiers notes that pairing discrete lectures with small-group conversations has a positive effect on student attitudes. Using role-playing scenarios helped students internalize messages through interactions more successfully than ones taught through explicit lecturing. Explicit lecturing, if necessary, should be used in conjunction with multi-modal strategies such as video learning. Desrosiers also notes that in order for the curriculum to be implemented in the most effective way, support is needed within the student body, staff, and stakeholders (Desrosiers 2016).

Khalili (2015) did a broader analysis to assess current procedures in place to identify physicians trained in SGM health issues. Through speaking with 138 liaison committees on medical education, it was found that only 9% had procedures to identify SGM-competent physicians, and only 4% had policies in place to do so. Comparing these groups by region, type of funding, and the existence (or absence of) nearby SGM health centers did not have any impact on these conclusions. 52% of surveyed individuals reported having no SGM competency training (Khalili 2015). Moreover, Yang (2019) proposed using game-based teaching as an effective way to teach students information about SGM patients. Games resulted in better knowledge and increased student engagement. Game-based SGM education facilitated discussion and students reported being more comfortable discussing content because they were not afraid of giving incorrect answers. This can promote an open dialogue around SGM healthcare to reinforce the information taught throughout the session. In addition, Yang argued that current medical students were raised in a digital era and will respond best to interactive and immediate learning methods. Therefore, game-based teaching has benefits for future generations of medical students (Yang 2019).

VI. Policy recommendations

Sexual and gender minority individuals often experience discrimination by healthcare providers and report negative health outcomes. This discrimination can manifest in many ways due to implicit and explicit biases held by providers. Negative experiences with healthcare professionals can discourage SGM patients from seeking medical treatment in the future, leading to undiagnosed conditions and worsened health outcomes. This exacerbates pre-existing health inequalities already acting on SGM populations. The relationship between experience with SGM patients and comfort treating them provides compelling evidence supporting the need for increased levels of inclusive medical curriculum to increase quality of care.

White (2015) and Phelan (2017) both provided useful tips for future consideration when changing policy to increase education on SGM healthcare. and advocate for the development of a standardized list of SGM-based topics to be required at all medical schools to create consistent expectations. They couple this with a suggestion to develop updated SGM-related materials and institute additional support for faculty development. White also calls for the creation of a standardized evaluation of medical students' knowledge and centralized curricular content tracking to facilitate future developments (White 2015). Phelan recommends that interventions include policies to recruit diverse students and faculty into medical schools. Collecting more information on the identity of patients in order to increase student awareness is also suggested (Phelan 2017).

Creating an environment that both affirms the identities of SGM patients and responds to their specific healthcare needs is the responsibility of the entire healthcare community and extends beyond the capabilities of the individual physician. Individual change is important, but systemic change is needed to optimize SGM patients' access to quality health care. This large shift starts with individuals advocating for more education and publicizing their efforts to inspire change across larger platforms.

I propose the following recommendations for the creation and implementation of medical school curriculum focused on SGM health topics:

- All medical schools need a universal required curriculum on the health of sexual and gender minorities.
  - Ideally, this would be extended to all healthcare professionals and workers.
- This curriculum should include members of the SGM community in its creation and implementation. It should include physician-patient role play and small group discussions.
- Patients with SGM identities should be represented throughout the entire medical school education.
- Healthcare institutions should adopt policies condemning discriminatory behavior that include clear consequences of such behaviors.

Members of the SGM community are commonly discriminated against, leading to poor health outcomes when experienced in healthcare settings. Health inequalities acting on SGM individuals are amplified by potential biases held by physicians. Counteracting these biases requires education. Positioning this intervention within medical school ensures that by the time physicians are treating patients they are properly equipped with the information needed to provide adequate care. Physicians should be required to display sufficient knowledge of SGM health topics and proper care techniques for SGM patients prior to residency and patient interaction.

The lack of national standards regarding SGM curriculum leads to expansive gaps in knowledge on the healthcare of SGM patients. These gaps are often left unmet due to the lack of methods to evaluate knowledge. Universal evaluation tools are needed to assess both the content of any existing curriculum and student knowledge. The development of a universal standard to consistently fill gaps around SGM healthcare is necessary to ensure equal and complete education for all physicians. An outside organization needs to be responsible for making sure that all necessary changes are made and maintained.

Studies with SGM community members have illuminated ways in which providers can improve their quality of care. Common threads were avoiding assumptions and being comfortable discussing sexual and gender identities. All the mentioned areas could be improved through education, and the examined studies found this to be effective. The inclusion of community members in these discussions is important to ensure that interventions are focused on the necessary areas and are properly informed. Practicing patient scenarios was another aspect of successful interventions.

It is evident that cultural competency training in SGM health is needed in medical school to properly prepare physicians for the treatment of SGM patients. Successfully incorporating additional training modules should include collaboration with institutions that have already begun this process, or successfully completed it. Support from faculty, administration, and the student body to create a culture of acceptance not only serves to break the cycle of implicit bias but has also been shown to improve the efficacy of added medical school curriculum.

A particular gap was observed in knowledge pertaining to the treatment of transgender patients, with both medical students and physicians reporting higher levels of comfort in treating lesbian, gay, and bisexual patients. Overall, physicians felt more prepared to treat sexual minorities than gender minorities. I believe this can be attributed to the fact that gender minorities remain more stigmatized in modern society.

VII. Implementing curriculum

It is vital for physicians to be well-versed in the structural components affecting their patients such as identities, social networks, status, institutions, and culture (Solotke 2019). In their study, Donald (2017) identified five required themes for structural competence: recognition that structures shape clinical interactions, development of an extra clinical language of structure, rearticulation of "cultural" formations in structural terms, ability to observe and imagine structural interventions, and cultivation of structural humility (Donald 2017). These changes are possible, and evidence supports their effectiveness. The most effective interventions were found to combine student and faculty engagement.

Four studies discussed tips for adding medical school curriculum or implementing existing resources across additional schools. Pratt-Chapman (2020) investigated factors that allow for better implementation of SGM curriculum. The authors suggested building on the existing curriculum and defining a group of individuals with roles dedicated to overseeing the implementation of the new curriculum. These individuals should garner support by showing the necessity for the content. Reported barriers for adding additional curriculum to medical school agendas included a lack of support among fellow students and physicians, as well as time constraints (Pratt-Chapman 2020).

To counter these, Solotke (2019) provided tips for incorporating SGM health into medical school curriculum while overcoming barriers such as a lack of resources. Solotke recommended distributing SGM health content across the existing curriculum and incorporating intersectionality into other medical school topics. Making sure curriculum avoids stereotyping, empowers allies, and looks at the health needs of SGM subpopulations were additional recommendations. Solotke specifically called for looking at SGM identities through a developmental lens and exploring their complexities as they relate to health.

Additionally, Fakhoury (2020) said that the primary goals while developing SGM curriculum should be to enact curricular modifications as well as larger institutional changes (Fakhoury 2020). Systematic changes demand the use of resources, but change can be made by broadly implementing generalized educational programs across a wide range of schools, thus saving resources. Utilizing curriculum developed by another institution can be successfully implemented to educate students around the world and decrease barriers to receiving education without the need for each institution to invest the time and resources to create their own.

Educational tools created by one medical school have been shown to be effective when implemented at other medical schools. The University of Louisville created a free, online integrated education model to teach SGM health across establishments. The University of Louisville first created an elective certificate program offered to students and faculty during lunch hours. This program was successful because it did not require additional resources as it was offered during already scheduled lunch hours. The school then went on to develop eQuality and add over fifty hours of SGM training into their required curriculum. The program, eQuality, has been studied at several other schools and shown to be effective.

Leslie (2018) looked at the results of eQuality among first and second-year medical students. Implicit biases against SGM identities were shown to decrease post-intervention (Leslie 2018). Sawning (2017) drew the same conclusion by looking at its effects across students of all four years in medical school. Total knowledge scores increased after using eQuality. The baseline knowledge scores showed great variability, indicating that students went into the program with varying levels of knowledge. Nevertheless, eQuality was shown to be effective for students of all experience levels (Sawning 2017).

O'Leary (2021) looked at the eQuality program alongside two other medical schools: Baylor College of Medicine and Columbia University Vagelos College of Physicians and Surgeons. Looking at how these schools have incorporated SGM health education into their curriculum can provide a blueprint for other schools. Baylor incorporated SGM health into a larger course on social determinants of health for first-year medical students. Columbia University implemented a one-hour lecture, followed by a one-hour panel with SGM individuals. Though short in duration, pre-session readings were required (O'Leary 2021).

This cross-institution implementation provides a way for schools to increase SGM education with minimal disruption to existing curriculum while saving resources. Moreover, I suggest that SGM health be included throughout existing modules, with patient practice including patients with SGM-specific health needs. This would increase hours of practice with SGM patients and eliminate the need for additional time and resources. Recognizing the stigma faced by these communities, all SGM participants acting as patients should be recruited strictly on a volunteer basis and should be compensated for their time. Additionally, any written patient-provider practice throughout medical school should include examples of SGM health topics and be representative of the diversity within the SGM community.

Inclusive care requires more than the absence of discrimination. A provider must be aware of the specific needs of different SGM identities and know how to properly provide the needed care. It is recommended to include community organizations in both the planning and teaching of such courses. This may be difficult for certain institutions located in areas with less access to SGM community organizations. Medical schools located in rural areas were not represented well across the studies analyzed, so these potential effects are unclear. However, I would like to note that the recent COVID-19 pandemic has forced us to find new ways to connect and learn virtually. These new tools, although unstudied, have the potential to eliminate some of these barriers related to location.

Qualitative student feedback points to the success of programs being linked to community involvement and role-play scenarios in which students are able to practice their clinical skills in an educational environment. Both one-day information sessions and weekly courses proved to be effective, but the long-term effects of these have not been studied. It is, therefore, possible that longer or more spread-out courses are more beneficial for long-term change in attitudes and knowledge. More studies are needed to accurately determine the components that make a course more or less successful in order to best prepare modules for students. However, there is promising evidence that universal modules can be made and implemented at other teaching institutions. One such case is eQuality, which can be made available to all medical students on the internet for accessible and consistent education.

The healthcare industry is larger than just practicing physicians and it is important to provide a unified and accepting front. All professions within the healthcare industry must be trained on how to best work with SGM patients. This includes everyone working in a healthcare setting and extends to things such as patient intake forms providing adequate options for reporting sexual and gender identities.

VIII. Conclusion
Medical students are largely underprepared to treat SGM patients. Providing some form of SGM health education did work to teach physicians about caring for patients within this community and made them more comfortable and prepared to do so. All

assessed interventions showed improvements in these areas, suggesting that any education regarding SGM health is helpful, however, it is unclear if having longer courses is more beneficial.

This body of literature is rapidly evolving. Still, there are sufficient studies to draw conclusions from and start to enact real systemic change on the basis of this information. One strength of this body of research is that there does not seem to be any conflicting ideas within the field. There is a common goal to increase SGM health education and lessen health disparities through more comprehensive care. No major inconsistencies existed between the evaluated studies. All of the studies are largely in agreement with the notion that medical students are not prepared to enter the workforce and treat patients who identify as sexual or gender minorities. There is no universal requirement for such information to be taught in medical schools, and no unified way to assess if the current medical school curriculum meets these needs. The literature is also in agreement that providers feel they are more prepared and better able to treat sexual minority patients than gender minority patients. The evidence across studies concluded that adding SGM health education did improve levels of knowledge and comfort across participants. Implementing these interventions at schools other than the one that created it is also understood to be effective.

The commonalities between the studies also resulted in common weaknesses. The large majority of studies examining the effectiveness of additional curriculum employed pre- and post-education surveys as their measurement technique. In most cases, the survey was completed immediately after the student was taught the information. These results may therefore not be indicative of any long-term change in attitudes and may not be translated into future care. Additionally, in all cases, the participants were aware of the study they were participating in. This could result in pressure to put the "correct" answer or answer the survey questions in a way that they perceived the organizers wanted.

Another possible source of imperfect data is the use of self-reported measures. Overestimating or underestimating one's comfort or knowledge levels is very possible and would result in skewed data. There were also several methodological flaws within

studies. All of the studies that included demographic data on the participants reported an overrepresentation of SGM identifying physicians in the participant pool. These physicians are likely to have more extensive knowledge on and comfort discussing topics relating to SGM health. Likewise, the studies evaluating the efficacy of optional resources may have imperfect findings due to the population drawn to these opportunities. Students who are already aware of the health disparities acting on the SGM community may be more inclined to attend a seminar discussing SGM health. Students who are most uncomfortable discussing these topics may choose to avoid the seminar altogether. This self-selection results in a potentially biased population which could artificially inflate the success rate of the module. That being said, results from mandatory training show the same success. It is therefore unlikely that the success of optional interventions can be solely attributed to the population taking them. Additionally, many of these population flaws are corrected because the pre-and post-survey research design compares students' scores to their own previous score, equalizing for pre-existing knowledge. It should be noted that only studies written in English were included in this literature review. It is possible that certain studies examining US medical school curriculum were written in another language and were not analyzed. Further investigation is needed to understand the intricacies of this field, namely its implications for physician practice in the future. Long-term effects must be studied to determine the efficacy of educational programs. These studies would also determine whether training in medical school is sufficient to ensure proficient knowledge of SGM health topics, or if repeated assessments and learning are required throughout one's career. Further research is needed to investigate the impact of this on patient care and establish a relationship between knowledge of SGM health topics and better patient experiences.

This research is part of a larger movement to include social determinants of health in medical education. Informing healthcare professionals on social determinants of health will open the door to policy changes that have wide reaching effects. Proper education on the systems that create inequalities and the lived experience they impose on patients is essential. Only once healthcare providers understand these social determinants can they properly and effectively treat patients and larger communities. Systematic problems require systematic solutions, and systematic solutions start with educating those who have the power to create change.

References

Alpert, Alison B., Eileen M. CichoskiKelly, and Aaron D. Fox. 2017. "What Lesbian, Gay, Bisexual, Transgender, Queer, and Intersex Patients Say Doctors Should Know and Do: A Qualitative Study." *Journal of Homosexuality* 64 (10): 1368–89. https://doi.org/10.1080/00918369.2017.1321376.

Bi, Stephanie, Monica B. Vela, Aviva G. Nathan, Kathryn E. Gunter, Scott C. Cook, Fanny Y. López, Robert S. Nocon, and Marshall H. Chin. 2020. "Teaching Intersectionality of Sexual Orientation, Gender Identity, and Race/Ethnicity in a Health Disparities Course." *MedEdPORTAL.* https://doi.org/10.15766/mep_2374-8265.10970.

Bureau, US Census. 2022. "Population under Age 18 Declined Last Decade." Census.gov. April 22. https://www.census.gov/library/stories/2021/08/united-states-adult-population-grew-faster-than-nations-total-population-from-2010-to-2020.

Cooper, M. Brett, Mariam Chacko, and Jennifer Christner. 2018. "Incorporating LGBT Health in an Undergraduate Medical Education Curriculum through the Construct of Social Determinants of Health." *MedEdPORTAL.* https://doi.org/10.15766/mep_2374-8265.10781.

Desrosiers, Jennifer, Tim J Wilkinson, Gillian Abel, and Suzanne Pitama. 2016. "Curricular Initiatives That Enhance Student Knowledge and Perceptions of Sexual and Gender Minority Groups: A Critical Interpretive Synthesis." *Canadian Medical Education Journal* 7 (2). https://doi.org/10.36834/cmej.36644.

DeVita, Timothy, Casey Bishop, and Michael Plankey. 2018. "Queering Medical Education: Systematically Assessing LGBTQI Health Competency and Implementing Reform." *Medical Education Online* 23 (1): 1510703. https://doi.org/10.1080/10872981.2018.1510703.

Donald, Cameron A., Sayantani DasGupta, Jonathan M. Metzl, and Kristen L. Eckstrand. 2017. "Queer Frontiers in Medicine." *Academic Medicine* 92 (3): 345–50. doi.org/10.1097/acm.0000000000001533.

Encandela, John, Nicole S. Zelin, Michael Solotke, and Michael L. Schwartz. 2019. "Principles and Practices for Developing an Integrated Medical School Curricular Sequence about Sexual and Gender Minority Health." *Teaching and Learning in Medicine* 31 (3): 319–34. https://doi.org/10.1080/10401334.2018.1559167.

Fakhoury, Joseph W., and Steven Daveluy. 2020. "Incorporating Lesbian, Gay, Bisexual, and Transgender Training into a Residency Program." *Dermatologic Clinics* 38 (2): 285–92. https://doi.org/10.1016/j.det.2019.10.013.

Fallin-Bennett, Keisa. 2015. "Implicit Bias against Sexual Minorities in Medicine." *Academic Medicine* 90 (5): 549–52. doi.org/10.1097/acm.0000000000000662.

Gessner, McKenna, Meg D. Bishop, Alexander Martos, Bianca D. Wilson, and Stephen T. Russell. 2019. "Sexual Minority People's Perspectives of Sexual Health Care: Understanding Minority Stress in Sexual Health Settings." *Sexuality Research and Social Policy* 17 (4): 607–18. https://doi.org/10.1007/s13178-019-00418-9.

Haghiri-Vijeh, Roya, Tara McCulloch, Lynda Atack, and Gabriel Bedard. 2019. "The Impact of Positive Space Training on Students' Communication with LGBTTQ+ Communities." *Nursing Education Perspectives* 41 (2): 115–16. https://doi.org/10.1097/01.nep.0000000000000474.

Honigberg, Michael C., Neir Eshel, Marlise R. Luskin, Shimon Shaykevich, Stuart R. Lipsitz, and Joel T. Katz. 2017. "Curricular Time, Patient Exposure, and Comfort Caring for Lesbian, Gay, Bisexual, and Transgender Patients among Recent Medical Graduates." *LGBT Health* 4 (3): 237–39. https://doi.org/10.1089/lgbt.2017.0029.

Jones, Jeffrey M. 2021. "LGBT Identification Rises to 5.6% in Latest U.S. Estimate." Gallup.com. Gallup. November 20. https://news.gallup.com/poll/329708/lgbt-identification-rises-latest-estimate.aspx.

Khalili, Joshua, Lucinda B. Leung, and Allison L. Diamant. 2015. "Finding the Perfect Doctor: Identifying Lesbian, Gay, Bisexual, and Transgender–Competent Physicians." *American Journal of Public Health* 105 (6): 1114–19. https://doi.org/10.2105/ajph.2014.302448.

Kutscher, Eric, and Carla Boutin-Foster. 2016. "Community Perspectives in Medicine: Elective for First-Year Medical Students." *MedEdPORTAL*. https://doi.org/10.15766/mep_2374-8265.10501.

Leslie, Katie F., Susan Sawning, M. Ann Shaw, Leslee J. Martin, Ryan C. Simpson, Jennifer E. Stephens, and V. Faye Jones. 2017. "Changes in Medical Student Implicit Attitudes Following a Health Equity Curricular Intervention." *Medical Teacher* 40 (4): 372–78. doi.org/10.1080/0142159x.2017.1403014.

Minturn, Matthew S., Erica I. Martinez, Thien Le, Natalie Nokoff, Louis Fitch, Carley E. Little, and Rita S. Lee. 2021. "Early Intervention for LGBTQ Health: A 10-Hour Curriculum for Preclinical Health Professions Students." *MedEdPORTAL*. https://doi.org/10.15766/mep_2374-8265.11072.

Nowaskie, Dustin Z., and Anuj U. Patel. 2020. "How Much Is Needed? Patient Exposure and Curricular Education on Medical Students' LGBT Cultural Competency." *BMC Medical Education* 20 (1). https://doi.org/10.1186/s12909-020-02381-1.

O'Leary, Kerry B., and George H. Kunkel. 2021. "Restructuring LGBTQ Curriculum in Medical Schools." *Academic Psychiatry* 45 (4): 487–90. https://doi.org/10.1007/s40596-021-01414-1.

Phelan, Sean M., Sara E. Burke, Rachel R. Hardeman, Richard O. White, Julia Przedworski, John F. Dovidio, Sylvia P. Perry, et al. 2017. "Medical School Factors Associated with Changes in Implicit and Explicit Bias against Gay and Lesbian People among 3492 Graduating Medical Students." *Journal of General Internal Medicine* 32 (11): 1193–1201. https://doi.org/10.1007/s11606-017-4127-6.

Potter, Laura A., Sherri-Ann M. Burnett-Bowie, and Jennifer Potter. 2016. "Teaching Medical Students How to Ask Patients Questions about Identity, Intersectionality, and Resilience." *MedEdPORTAL*. https://doi.org/10.15766/mep_2374-8265.10422.

Pratt-Chapman, Mandi L. 2020. "Implementation of Sexual and Gender Minority Health Curricula in Health Care Professional Schools: A Qualitative Study." *BMC Medical Education* 20. https://doi.org/10.21203/rs.2.18264/v3.

Pratt-Chapman, Mandi L., and Serena Phillips. 2019. "Health Professional Student Preparedness to Care for Sexual and Gender Minorities: Efficacy of an Elective Interprofessional Educational Intervention." *Journal of Interprofessional Care* 34 (3): 418–21. https://doi.org/10.1080/13561820.2019.1665502.

Roth, Lauren T., Suzanne Friedman, Rachel Gordon, and Marina Catallozzi. 2020. "Rainbows and 'Ready for Residency': Integrating LGBTQ Health into Medical Education." *MedEdPORTAL*. https://doi.org/10.15766/mep_2374-8265.11013.

Sawning, Susan, Stacie Steinbock, Rachel Croley, Ryan Combs, Ann Shaw, and Toni Ganzel. 2017. "A First Step in Addressing Medical Education Curriculum Gaps in Lesbian-, Gay-, Bisexual-, and Transgender-Related Content: The University of Louisville Lesbian, Gay, Bisexual, and Transgender Health Certificate Program." *Education for Health* 30 (2): 108. https://doi.org/10.4103/efh.efh_78_16.

Schweiger-Whalen, Lindsey, Shelly Noe, Stephanie Lynch, Linda Summers, and Eve Adams. 2018. "Converging Cultures: Partnering in Affirmative and Inclusive Health Care for Members of the Lesbian, Gay, Bisexual, and Transgender Community." *Journal of the American Psychiatric Nurses Association* 25 (6): 453–66. https://doi.org/10.1177/1078390318820127.

Solotke, Michael, Nicole A. Sitkin, Michael L. Schwartz, and John A. Encandela. 2017. "Twelve Tips for Incorporating and Teaching Sexual and Gender Minority Health in Medical School Curricula." *Medical Teacher* 41 (2): 141–46. https://doi.org/10.1080/0142159x.2017.1407867.

Wahlen, Raphaël, Raphaël Bize, Jen Wang, Arnaud Merglen, and Anne-Emmanuelle Ambresin. 2020. "Medical Students' Knowledge of and Attitudes towards LGBT People and Their Health Care Needs: Impact of a Lecture on LGBT Health." *PLOS ONE* 15 (7). https://doi.org/10.1371/journal.pone.0234743.

Warner, Christina, Samantha Carlson, Renee Crichlow, and Michael W. Ross. 2018. "Sexual Health Knowledge of U.S. Medical Students: A National Survey." *The Journal of Sexual Medicine* 15 (8): 1093–1102. https://doi.org/10.1016/j.jsxm.2018.05.019.

White, William, Stephanie Brenman, Elise Paradis, Elizabeth S. Goldsmith, Mitchell R. Lunn, Juno Obedin-Maliver, Leslie Stewart, et al. 2015. "Lesbian, Gay, Bisexual, and Transgender Patient Care: Medical Students' Preparedness and Comfort." *Teaching and Learning in Medicine* 27 (3): 254–63. https://doi.org/10.1080/10401334.2015.1044656.

Yang, Hsing-Chen. 2019. "Education First: Promoting LGBT+ Friendly Healthcare with a Competency-Based Course and Game-Based Teaching." *International Journal of Environmental Research and Public Health* 17 (1): 107. https://doi.org/10.3390/ijerph17010107.

Zelin, Nicole Sitkin, Charlotte Hastings, Brendin R. Beaulieu-Jones, Caroline Scott, Ana Rodriguez-Villa, Cassandra Duarte, Christopher Calahan, and Alexander J. Adami. 2018. "Sexual and Gender Minority Health in Medical Curricula in New England: A Pilot Study of Medical Student Comfort, Competence and Perception of Curricula*.*" *Medical Education On fetline* 23 (1): 1461513. https://doi.org/10.1080/10872981.2018.1461513.

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process. This paper is dedicated to those who have suffered unnecessarily due to their identities or other social factors. I vow to continue working towards a more equal and just world, in the healthcare field and beyond.

Disclaimer
This work represents the state of literature available at the time of writing and is not meant to be static. This piece is a review of existing literature and is not meant to replace the need for new research, but rather to illuminate gaps in the existing literature and call for change.