

# Pre-Exposure Prophylaxis Training among Medical Schools in the United States

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## Abstract

Pre-Exposure Prophylaxis (PrEP) has been shown to be an effective method of HIV prevention for men who have sex with-men (MSM) and -transgender women (MSTGWs), serodiscordant couples, and injection drug users; however fewer than 50 000 individuals currently take this regimen. Knowledge of PrEP is low among healthcare providers and much of this lack of knowledge stems from the lack of exposure to PrEP in medical school. We conducted a cross sectional survey of medical schools in the United States to assess the degree to which PrEP for HIV prevention is taught. The survey consisted Likert scale questions assessing how well the students were prepared to perform each skill associated with PrEP delivery, as well as how PrEP education was delivered to students. We contacted 141 medical schools and 71 responded to the survey (50.4%). PrEP education was only reported to be offered at 38% of schools, and only 15.4% reported specific training for Lesbian, Gay, Bisexual, and Transgender (LGBT) patients. The most common delivery methods of PrEP content were didactic sessions with 11 schools reporting this method followed by problem-based learning, direct patient contact, workshops, and small group discussions. Students were more prepared to provide PrEP to MSM compared to other high-risk patients. Few medical schools are preparing their students to prescribe PrEP upon graduation. Further, there is a need to increase the number of direct patient contacts or simulations for students to be better prepared.

## Keywords

HIV, pre-exposure prophylaxis, medical education and training, United States

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## Introduction

Annually, approximately 50 000 new cases of HIV are diagnosed in the United States (US).<sup>1</sup> Pre-Exposure Prophylaxis (PrEP), a once-daily combination antiretroviral medication (tenofovir and emtricitabine) has been reported to reduce the risk of HIV infection by between 44% and 86%<sup>2</sup> and, with greater adherence, reduction rates are even higher.<sup>3,4</sup> While PrEP is most commonly prescribed to men who have sex with-men (MSM) and -transgender women (MSTGWs), it has shown efficacy in many populations including, serodiscordant couples, and people who inject drugs (PWID).<sup>5,6</sup> While it is estimated that 1.2 million people could benefit from PrEP, currently only 49 000 are taking this regimen.<sup>7</sup>

Compared to their heterosexual counterparts, MSM have higher rates of HIV infection in the US.<sup>8–12</sup> Despite accounting for only 2% of the US population, MSM make up 58% of people living with HIV/AIDS (PLWHA) nationwide, and trends demonstrate that while infection rates are declining

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among heterosexual populations, they continue to increase among the MSM sub-population.<sup>13</sup> While little data is available on HIV disparities among transgender women who have sex with men, 2 available studies have reported higher rates among the male to female transgender population than among heterosexual men or women.<sup>11,12</sup> In the US, while women account for only 19% of all new HIV infections, Black women are second only to MSM in incidence rate.<sup>14</sup> Additionally, 8% of new HIV infections in the US are attributable to injection drug use.<sup>15</sup> All of the abovementioned populations could benefit from PrEP and should be addressed in any curriculum designed to effectively implement PrEP.

Overall knowledge of PrEP among medical providers is alarmingly low.<sup>15,16</sup> Increased knowledge of PrEP has been attributed to familiarity with antiretroviral drugs and past experience in prescribing these drugs to HIV patients and willingness to prescribe PrEP to PWID.<sup>17,18</sup> Stigma surrounding HIV is still abundant among healthcare providers (students, residents, and physicians)<sup>19</sup> with 1 study showing that over 22% of students were uncomfortable touching a patient with HIV.<sup>20</sup> To increase knowledge of this critical tool and to decrease stigma surrounding HIV in efforts to reduce HIV infection, PrEP content must be included in medical school curricula.<sup>21-23</sup> To assess the degree to which requisite PrEP prescribing skills are currently being taught, we conducted a survey of representatives of the schools of medicine in the United States.

## Methods

### Sample

The research team assembled a list of all medical schools in the United States ( $n=141$ ). Administrators identified as overseeing the curricula in each respective school were sent emails with a link to the survey which was developed in Research Electronic Data Capture (REDCap) portal.<sup>24</sup> In the case that the email was no longer available, or a response from the administrator was received indicating they were not the appropriate contact, the school was contacted to determine the appropriate individual. Typically, the contacts were deans or associate deans of the schools of medicine. The REDCap data collection system was automated to send reminder emails to all potential participants who had not completed surveys at 2-week intervals over a total 6-week data collection period, and 71 (~50%) of the 141 schools surveyed responded.

### Measures

We developed a survey that queried whether PrEP content was taught in the medical school, and whether there was a focus on delivering PrEP to MSM and transgender (TG) patients

(already referred to as MSM/TG). The survey also asked the extent to which students were prepared to perform each skill associated with PrEP delivery. These questions utilized a 5-point Likert scale, which include “not at all prepared,” “slightly prepared,” “moderately prepared,” “very prepared,” and “extremely prepared.” We utilized a series of dichotomous questions posed to respondents (the administrators of respective medical schools) regarding the methods by which the content was taught to students as well. The questions are given concentrating on where in the curriculum the content was delivered (eg, direct patient care experiences, practice-based learning, and improvement), training methods used (lecture, conferences and workshops, problem-based learning, small group discussion, simulations, or standardized patients), names of training courses, number of hours devoted to PrEP training in the year of medical school the PrEP content was taught.

### Statistical Analysis

Our analysis plan included generating descriptive statistics to elucidate the degree to which content necessary to deliver PrEP to the general public as well as specifically to LGBT patients was present in medical school curricula. Further, we generated charts to graphically represent these findings. Central to the analysis was the use of the Wilcoxon signed ranks test to compare the degree of preparedness to deliver each element of effective PrEP delivery comparing preparedness to deliver the service to the general population of appropriate PrEP patients to LGBT patients.

## Results

Of the 71 schools sampled, 28 (38%) reported offering any PrEP content at all. Eleven schools (15.4%) reported specific training regarding PrEP particularly for LGBT patients. Table 1 indicates the methods used to teach PrEP; note these were not mutually exclusive, a school could have utilized multiple instructional strategies. Eleven (15.7%) schools reported using didactic lecture training; 4 (5.6%) reported workshops and conferences; 8 (11.3%) reported problem based learning; 3 (4.2%) reported small group discussion; no schools reported the use of simulated or standardized patients; and 4 (5.6%) reported direct patient experiences as a method of teaching. In terms of years during which PrEP content was taught, 7 (9.9%) reported year 1; 8 (11.3%) reported year 2; 10 (14.1%) reported year 3; and 3 (4.2%) reported year 4.

Table 2 exhibits the frequencies with which the schools reported degree of preparedness to provide each aspect of effective PrEP delivery. The most frequent response was moderately prepared in all aspects of PrEP delivery.

There were no significant differences in student readiness to: conduct HIV risk assessment ( $Z=-1.18$ ;  $P=.24$ ); prescribe PrEP, ( $Z=-.91$ ;  $P=.37$ ); monitor treatment

retention ( $Z=-1.67$ ;  $P=.17$ ); or monitor adherence to PrEP ( $Z=-.816$ ;  $P=.41$ ). Significant differences were noted in readiness to provide PrEP to MSM patients compared to other high-risk patients in discussing sexually transmitted infection prevention ( $Z=-2.31$ ;  $P=.02$ ).

### Discussion

To meet the goal of ending the HIV epidemic, PrEP content should be taught in all medical schools.<sup>25</sup> We found in our survey that only 38% taught PrEP content at all. Further, given the disproportionate burden of HIV experienced by MSM, bi-sexual, and transgender populations, content should include this population prominently, and in our sample even fewer schools, 15.4%, reported teaching this content. A scoping review recently conducted by us identified lack of PrEP training in medical schools as one of the barriers to PrEP prescribing among physicians.<sup>25</sup>

Lecture was reported as the most frequent method of teaching this content. Given our previous work on implicit bias,<sup>26</sup> it is clear that direct patient contact and simulations are needed to improve outcomes in work with LGBT patients. Finally, it was reported that students were perceived to be more prepared to counsel LGBT patients on STI risks, while significant, the difference was minor.

This report is a first step in assessing the degree to which PrEP content is being taught to medical students, however more study in this area is needed. There are some limitations to this study, a relatively small sample is one, but when considering the entire population of medical schools more than half responded. We have employed passive surveillance (email) rather than active surveillance (on site data collection in person) for data gathering. This approach may have missed some responders for us not being able to proactively pursue them in person thus contributing to loss of some data points, which otherwise would have increased the number of responses. Another limitation was the distal measure of content, data was collected from administrators, collecting data directly from medical students to get a more proximal measure of the curricular content would address this limitation. Additionally, including both the actual/real training receivers (students) and trainers (faculty members) as our study participants could have yielded more robust data. The above-mentioned limitations of this study pave the way for directions for future research.

Future research in this area might include obtaining a qualitative knowledge of newly licensed physicians regarding use of antiretrovirals for HIV prevention. Going further,

**Table 1.** Methods Used to Teach Pre-Exposure Prophylaxis in Medical Schools in the United States, 2018.

Method used	Frequency	Percent
Lectures	11	14.3
Conferences and workshops	4	5.2
Problem based learning	8	10.3
Small group discussions	3	3.9
Simulations or standardized patients	0	0
Patient care experiences	4	5.2

**Table 2.** Degree of Preparedness of Medical Schools to Deliver Pre-Exposure Prophylaxis-Related Curriculum Content in the United States, 2018.

	Not at all prepared (%)	Slightly prepared (%)	Moderately prepared (%)	Very prepared (%)	Extremely prepared (%)
Take sexual history	0 (0)	2 (2.6)	10 (13.0)	8 (10.4)	4 (5.2)
Take a sexual history with MSM patients	2 (2.6)	5 (6.5)	14 (18.2)	4 (5.2)	3 (3.9)
Discuss gender identity	2 (2.6)	3 (3.9)	13 (16.9)	3 (3.9)	3 (3.9)
Discuss sexual orientation	3 (3.9)	2 (2.6)	14 (18.2)	4 (5.2)	1 (1.3)
Discuss sexual behavior	1 (1.3)	3 (3.9)	15 (19.5)	2 (2.6)	2 (2.6)
Discuss STI prevention	1 (1.3)	4 (5.2)	15 (19.5)	1 (1.3)	3 (3.9)
Discuss STI prevention with MSM patients	0 (0)	4 (5.2)	12 (15.6)	8 (10.4)	2 (2.6)
Conduct HIV risk assessment	6 (7.8)	2 (2.6)	9 (11.7)	5 (6.5)	1 (1.3)
Conduct HIV risk assessment with MSM patients	2 (2.6)	6 (7.8)	13 (16.9)	5 (6.5)	1 (1.3)
Prescribe PrEP	6 (7.8)	6 (7.8)	9 (11.7)	0 (0)	2 (2.6)
Prescribe PrEP to MSM patients	4 (5.2)	7 (9.1)	11 (14.3)	2 (2.6)	1 (1.3)
Aware or PrEP medicine assist program	7 (9.1)	4 (5.2)	9 (11.7)	1 (1.3)	2 (2.6)
Ensure PrEP retention	7 (9.1)	8 (10.4)	6 (7.8)	2 (2.6)	0 (0)
Ensure PrEP retention with MSM patients	6 (7.8)	10 (13.0)	8 (10.4)	2 (2.6)	1 (1.3)
Monitor PrEP adherence	4 (5.2)	9 (11.7)	7 (9.1)	3 (3.9)	0 (0)
Monitor PrEP adherence with MSM patients	5 (6.5)	11 (14.3)	8 (10.4)	2 (2.6)	0 (0)
Aware of group differences in PrEP retention and adherence	9 (11.7)	6 (7.8)	6 (7.8)	2 (2.6)	0 (0)

analysis of the number of patients counseled on and subsequently prescribed PrEP by rising residents would give a more accurate measure of the degree to which they are prepared to deliver PrEP services. Our survey findings could also be used for canvassing about the implementation of PrEP education and training in other allied health professions such as dentistry, nursing, midwifery, public health etc.

## Conclusion

The medical school survey responses revealed that PrEP is not comprehensively covered in medical education. Recommendations are made for American Association of Medical Colleges (AAMC) and the Liaison Committee on Medical Education (LCME) for incorporating and enhancing the PrEP usage in medical student training.

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## Authors' Contribution

PDJ and PMJ conceived the study and provided administrative, material support and oversight for the study. RLC, MCM, and PDJ designed the survey instrument. AR collected and compiled the data. MT analyzed the data. RLC, AR, and PDJ drafted the manuscript. TAA, ES, LM, KYB, and PMJ participated in the review and interpretation of study results. All the authors have gone through the various iterations and approved the final version of the manuscript.

## Availability of Data and Materials

Available upon request.

## Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Ethics and Consent to Participate

All procedures involving human participants were in accordance with the ethical standards of the Meharry Medical College Institutional Review Board, which had oversight for this study. Additionally, the procedures used in this study were in compliance with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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## Supplemental Material

Supplemental material for this article is available online.

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