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The Value of a Longitudinal Human Immunodeficiency Virus Track for Medical Students: 10-Year Program Evaluation

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We surveyed graduates of a longitudinal medical school human immunodeficiency virus curriculum to evaluate its impact. Respondents felt comfortable caring for people with human immunodeficiency virus (PWH) and found value from the curriculum regardless of ultimate career path. Programs like this contribute to the development of culturally sensitive clinicians comfortable caring for PWH.

Keywords. Enhanced Medical Education Track; HIV care; longitudinal academic track; medical student education.

As the life expectancy for people with human immunodeficiency virus (PWH) increases with effective antiretroviral therapy, the overall prevalence of human immunodeficiency virus (HIV) in the United States is increasing [1, 2]. Furthermore, PWH experience a significant burden of chronic illnesses [3] and are increasingly cared for by physicians across all specialties and subspecialties. Despite the increasing prevalence of HIV, the number of physicians with expertise in HIV care is decreasing as many experienced health professionals are retiring from practice while newer clinicians are choosing medical fields outside of HIV [4, 5].

In addition, the field of Infectious Diseases (ID) has faced significant recruitment challenges over the past decade [4, 6]. There have been some modest gains in recruitment since instituting an “all-in” position for ID fellowships in the match, but the specialty continues to struggle to fill available slots [7]. These recruitment

challenges are multifactorial including comparatively lower pay in ID with longer training time, competing with more lucrative hospitalist positions, fewer visas for international applicants, among other challenges [4, 8, 9]. Some residencies have developed HIV training pathways that have been successful in adding physicians to the HIV workforce [10]. Bonura et al [9] reported that most graduating Internal Medicine residents develop their ultimate career interest before residency and that type of medical school exposures to ID as well as factors such as a mentor and/or scholarship in the field of ID influenced ultimate interest in ID as a potential career. This suggests that cultivating interest in ID in medical school is important to provide increased numbers of ID-/HIV-trained physicians.

Comprehensive HIV Enhanced Medical Education Track

In 2009, our team at the University of Nebraska Medical Center developed the Comprehensive HIV Enhanced Medical Education Track (EMET) (<https://www.unmc.edu/com/education/md-enrichment/emet.html>) to educate and mentor medical students interested in the field. Students apply for the program in the winter of their first year of medical school, and 2 students are accepted each year through a competitive application process. Accepted students participate in a mix of didactic, clinical, community, and interprofessional experiences (see [Supplementary Material Appendix 1](#) for additional details including an overview, curricular objectives, and educational activities) alongside their traditional medical school curricula. In addition, all students are paired with a mentor and complete a capstone project. As of 2019, 14 students had graduated from the program.

METHODS

Survey

The 14 HIV EMET graduates as of October 2019 received emails to complete an anonymous web-based survey ([Supplementary Material Appendix 2](#)) and consented to anonymous use of their comments. Survey data were collected and managed using the REDCap electronic data capture tools hosted at the University of Nebraska Medical Center (UNMC). The study was granted exempt review status by the UNMC Institutional Review Board.

The survey tool included 23 multiple choice, Likert scale, and free response questions regarding graduate demographics, clinical and research activities, interest in and comfort with caring for patients with and at risk for HIV, current and anticipated career paths, and suggestions for program improvement. J.R.M. and S.H.B. coded language in free responses and assigned themes using an inductive thematic analysis [11]. The analysis is largely descriptive using frequencies/percentages to

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describe categorical data and means/standard deviations (SDs) for continuous data.

RESULTS

All 14 HIV EMET program graduates completed the survey (100% response rate). The mean age of the respondents was 32.21 ± 3.64 SD. Eight graduates were women and 6 were men. Twelve graduates identified as white, and 2 identified as Asian. Eight graduates received additional postgraduate degrees: 1 Masters in Business Administration, 3 Masters in Public Health, and 4 Masters of Science. The factors influencing graduates' initial interest and decision to apply for the HIV EMET in descending order included interest in HIV (14 of 14), interest in underserved populations (10 of 14), interest in lesbian, gay, transgender, bisexual, queer and other (LGBTBQ+) health (8 of 14), interest in ID (7 of 14), and interest in microbiology (3 of 14).

Career Choices

Upon graduation, only 3 of 14 students (21%) applied to Internal Medicine residency. It is notable that 2 of 3 of the Internal Medicine graduates are pursuing ID fellowship (66%). Other graduates chose surgical specialties (4 of 14), Pediatrics (3 of 14), Anesthesiology (2 of 14), Emergency Medicine (1 of 14), Obstetrics and Gynecology (1 of 14), and Pathology (1 of 14). Of all 14 EMET graduates, 8 are still residents, 1 is a fellow, 3 are assistant professors, 1 is a professor, and 1 works as a private practice physician. When reflecting on reasons to not pursue ID, graduates indicated the lack of procedures in ID (4 of 12), the desire to be a generalist (3 of 12), and a lack of interest in ID from the beginning (3 of 12). Salary, job availability, work-life balance, length of training, or level of intellectual stimulation did not factor into their decisions. For the 2 graduates pursuing ID, interest in HIV (2 of 2), interest in serving underserved populations (2 of

2), and the level of intellectual stimulation (2 of 2) were their main attractants.

Academic Productivity

Ten of fourteen HIV EMET graduates (71%) completed at least 1 abstract, and 9 of 14 (64%) completed at least 1 publication during their participation in the EMET. Currently, 9 of the 14 participate in research, ranging from 5% to 50% of research time.

Clinical Exposure to People With Human Immunodeficiency Virus

Thirteen of the fourteen graduates spend greater than 50% of their time devoted to direct patient care. Moreover, 8 of 14 HIV EMET graduates provide direct patient care to PWH, spending approximately 5%–10% of their time caring for 1–50 PWH annually. Two of the fourteen graduates have prescribed HIV pre-exposure prophylaxis (PrEP), and 4 more graduates intend to prescribe HIV PrEP in the future.

Overall Influence of HIV Enhanced Medical Education Track

All HIV EMET graduates agreed or strongly agreed that participation in the EMET program increased their comfort in caring for patients with and at risk for HIV as well as their awareness of the barriers that PWH encounter (Figure 1). All 14 graduates would recommend the EMET to future medical students, and all agreed or strongly agreed that it strengthened their residency applications (Figure 1). Graduates also provided optional comments and Table 1 describes thematic analysis, with common themes including impactful clinical and mentoring experiences.

DISCUSSION

Even now, in the midst of a pandemic, interest in ID careers remains low [12]. With an increasing community of PWH needing medical care, ongoing HIV-related stigma within the

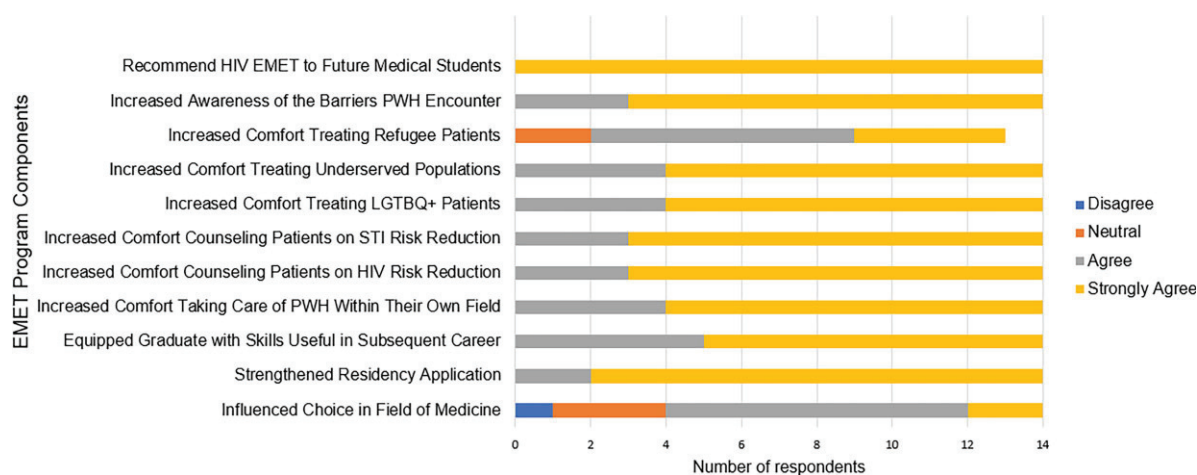


Figure 1. Evaluation of HIV Enhanced Medical Education Track (EMET) by graduates 2009–2019. Abbreviations: HIV, human immunodeficiency virus; LGBTQ+, lesbian, gay, transgender, bisexual, queer and other; PWH, people with HIV; STI, sexually transmitted infection.

Table 1. Qualitative Analysis of Graduate Responses Regarding Their EMET Experiences

Theme	Representative Comment(s)
Highlighted understanding of structural determinants of health	'As an Emergency physician, the HIV EMET has helped me extensively with my practice from Chicago and Boston to Kenya and Tanzania. It showed me the barriers to care that underserved patients face at an essential point in my training.' (Graduate 1)
Impactful clinical experiences	'Enjoyed my time in the outpatient clinic as well.' (Graduate 2)
	'Overall a great experience. Wonderful clinicians to get to learn from.' (Graduate 7)
	'While I did not ultimately elect to pursue a medical specialty, the time spent working with (Dr. ABC) and (Dr. XYZ) were absolutely formative to the way I interact with patients, my values as a clinician, and the way I communicate with other specialties.' (Graduate 4)
	'Working with the clinic staff, patients, and social workers from first year made me feel like I had a "home" within Medicine. The extra clinical experience and research opportunities were exceptional.' (Graduate 6)
Positive mentoring experience	'While I ended up going into OB, HIV medicine always remained interesting to me, and I strongly believe that ability to match into my current fellowship program was a result of my experiences with the HIV EMET (my fellowship program has a specialized, multidisciplinary HIV clinic for pregnant women ...).' (Graduate 6)
	'The experiences and mentorship I received as a part of my HIV EMET opportunity left a lasting positive impact on both my medical education and training but also on how I developed as a person. I feel very fortunate to have had the opportunity I was afforded.' (Graduate 3)
	'The faculty were very approachable.' (Graduate 2)
Access to scholarly activities	'One of the really exceptional parts of the EMET that goes under highlighted in this survey is the role of mentorship and longitudinal clinical experiences that the EMET provided. This was absolutely formative to the way I interact with patients, my values as a clinician, and the way I communicate with other specialties. In addition, their mentorship provided the backbone for my medical education, and I couldn't be more glad to have participated even though HIV is essentially an incidental part of my daily clinical experience.' (Graduate 4)
	'Because of the EMET, I was able to publish as a first author by med school graduation.' (Graduate 6)
Enhanced medical school experience	'It was a while ago, but this was one of the highlights of medical school.' (Graduate 5)
	'My experience with the EMET was THE major highlight of my medical school experience. The HIV EMET is a true gem and I am incredibly fortunate to have been one of the students/mentees.' (Graduate 6)

Abbreviations: HIV, human immunodeficiency virus; EMET, Enhanced Medical Education Track.

healthcare setting, and anemic trends in ID fellowship applications, we must commit to (1) attracting promising medical students to HIV medicine and (2) increasing HIV medical knowledge in those choosing other specialties [13, 14]. The exposure to people from diverse backgrounds lays the foundation for competent, empathetic, and holistic healthcare, important clinician qualities as the demographics of PWH evolve, disproportionately affecting individuals from minoritized communities [1]. Therefore, caring for patients from these communities is increasingly valuable as a student and healthcare professional. We present the long-term results from a cohort of medical student graduates who participated in a longitudinal Comprehensive HIV EMET program.

Only 3 of the graduates decided to pursue Internal Medicine and only 2 graduates pursued ID fellowship. This was surprising given the curriculum was initially developed to expose students to the field of HIV medicine with the hopes that some would choose to specialize in HIV; however, this was not a formal curricular objective. Salary, job availability, work-life balance, length of training, and level of intellectual stimulation were not given as reasons for lack of interest in ID in our cohort; however, Barsoumian et al [8] and Bonura et al [9] both cited salary-to-training length mismatch as deterrents to choosing ID careers.

Prior studies have reported on increased interest in ID as a potential career after exposure to ID and HIV electives in

medical school and residency, but these studies did not provide longitudinal outcomes regarding actual career choices [15–17]. To our knowledge, this is the first long-term assessment of a longitudinal medical school HIV care curriculum. Although a minority of graduates decided to pursue ID (2 of 14), current practice patterns of HIV EMET graduates within their specialties offer insight into the impact of this program on patient care. All 14 graduates either strongly agreed or agreed that they better understood the barriers that PWH face in both their lives and their illnesses. People with HIV often face significant HIV-related healthcare stigma and have complex healthcare requirements. Having specialists in diverse fields who can provide person-first, trauma-informed care and who have a solid understanding of the complexities of HIV care is critical. All the graduates agreed that they felt competent taking care of PWH in their own field. This was an important finding because longitudinal HIV curricula like this may be a way to enhance the HIV workforce by providing learning opportunities regardless of future career paths while we also look for other ways to engage trainees to specialize in HIV.

Furthermore, the program was beneficial for the graduates' residency applications, provided them with skills applicable and useful to their current position, and contributed to initiation of scholarly activity, which is ongoing for 9 of 14 graduates. Graduates note additional benefits including exceptional mentorship, longitudinal care experience, and development of

effective communication skills. Programs like the HIV EMET contribute to the development of culturally sensitive clinicians who are comfortable caring for PWH.

CONCLUSIONS

This study was a convenience sample restricted to graduates of the Comprehensive HIV EMET program who participated in the program between 2009 and 2019 and therefore self-selected for students interested in the field of HIV. Because the program only takes 1–2 students per year, the sample size is small. In addition, the survey relied on self-assessments occurring at least 6 months and up to 10 years after completion of the program and is therefore subject to recall bias. Furthermore, we do not have a comparison cohort of students who did not participate in the EMET or who participated in other EMETs to assess their comfort caring for PWH or evaluate career choices. Finally, aside from scholarly productivity as measured by abstracts and publications, we were not able to assess Level 3 and 4 Kirkpatrick learning outcomes.

Supplementary Data

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

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editors consider relevant to the content of the manuscript have been disclosed.

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