

Emily Moore, BS¹, Sean Kelly, MD², Leah Alexander, MPH, PhD³, Patrick Luther, MHS⁴, Robert Cooper, PhD³, Peter Rebeiro, PhD², Autumn Zuckerman, PharmD⁵, Margaret Hargreaves, PhD³, Kassem Bourgi, MD⁶, David Schlundt, PhD⁷, Kemberlee Bonnet, MA⁷, April C. Pettit, MD, MPH²

¹Vanderbilt University School of Medicine, Nashville, TN, ²Vanderbilt University Medical Center, Division of Infectious Diseases, Nashville, TN, ³Meharry Medical College, Nashville, TN, ⁴Nashville CARES, Nashville TN, ⁵Vanderbilt University Medical Center, Specialty Pharmacy Clinic Services, Nashville, TN, ⁶Indiana University School of Medicine, Indianapolis, IN, ⁷Vanderbilt University, Psychological Sciences, Nashville, TN

INTRODUCTION

- Pre-exposure prophylaxis (PrEP) effectively prevents HIV acquisition.
- In the Southern US, HIV prevalence is disproportionately high and PrEP use is disproportionately low.
- Most existing provider surveys about PrEP prescribing:
 - Occurred before recent guideline updates
 - Did not use theoretical behavioral framework or validation
 - Are not primarily focused on the South

OBJECTIVES

- Assess Tennessee (TN) primary care providers' current PrEP knowledge, attitudes, and prescribing practices
- Determine barriers to PrEP provision specific to TN providers

METHODS

Study Population

- Cross-sectional de-identified survey of TN primary care providers (PCPs) from March-August 2019
- Exclusion criteria: non-prescribers, providers who practice primarily in inpatient or urgent-care settings

Survey Development

- Guided by literature review of known provider facilitators/barriers to prescription, COM-B framework

Data Collection

- Validation: pilot survey and cognitive interviews
- Final survey: 56 questions, sent as REDCap link

Statistical Analysis

- Between prescribers and non-prescribers:
 - Wilcoxon rank sum test compared knowledge scores
 - Fisher's exact tests compared categorical variables
- Study exempted by Vanderbilt's Institutional Review Board

Table 1. Survey topics by COM-B framework

Component (n)*	Topic
Physical capability (3)	PrEP prescription, needed resources, implementation
Psychological capability (21)	Practice characteristics, PrEP knowledge, sexual history ability, needed training
Physical opportunity (4)	Percentage high-risk patients, sexual history frequency, healthcare center difficulties
Social opportunity (9)	Patient inquiry, discussing or offering PrEP, referral for PrEP, majority of PrEP recipients, obligation to give information/refer/prescribe, sense of pressure to prescribe
Reflective motivation (5)	PrEP beliefs: risk compensation, adverse effects, moral opposition, cost, adherence
Automatic motivation (7)	Sexual history comfort, action if PrEP requested

*n=number of questions. Demographics not included (7)

RESULTS

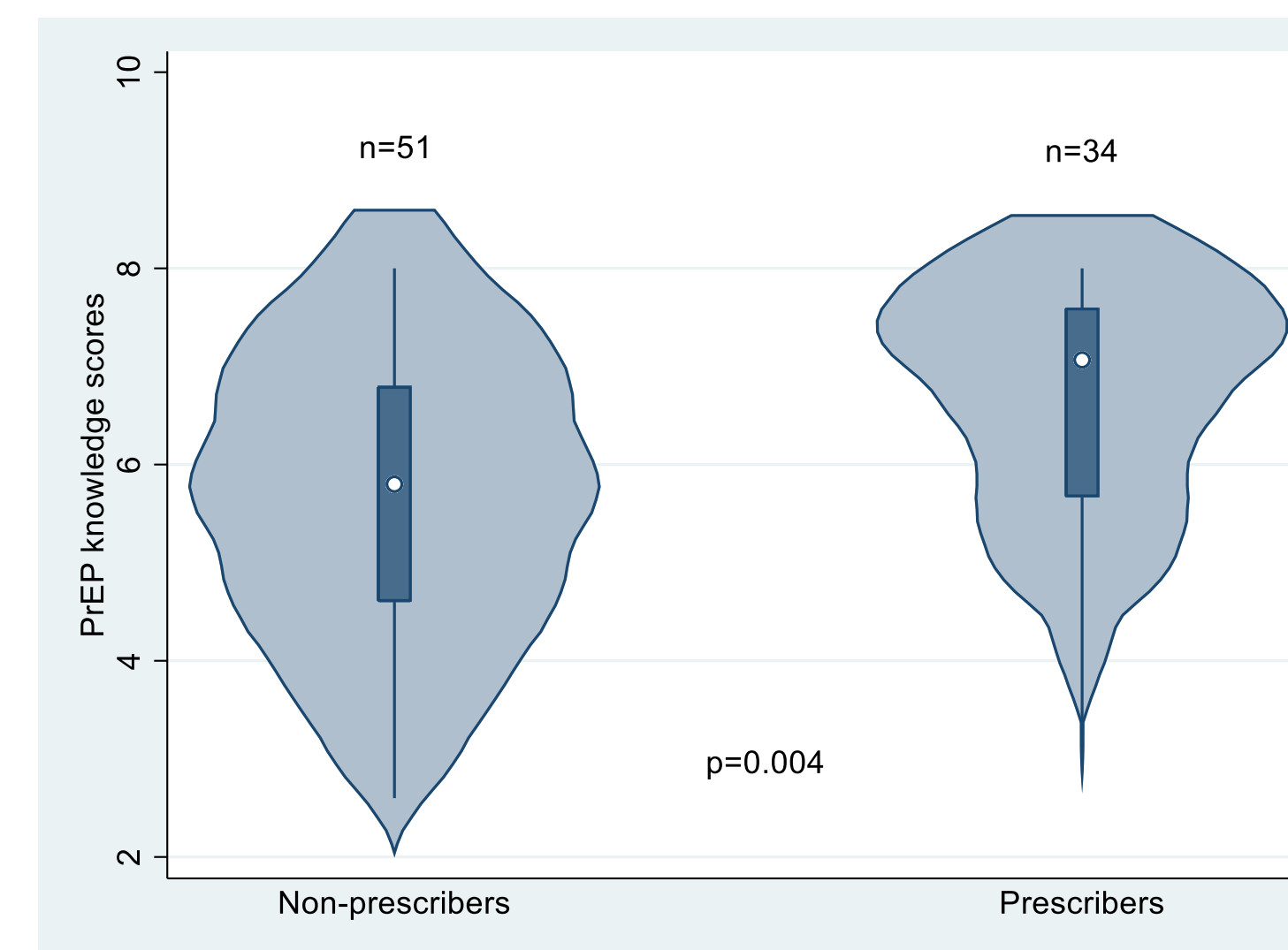
Table 2. Provider characteristics by PrEP prescriber status

Characteristic, N (%)	% who have NOT prescribed PrEP in the past 12 months (n)	% who HAVE prescribed PrEP in the past 12 months (n)	p-value
Total N=99			
Total	60 (61)	39 (39)	
Provider position			
Physician (MD/DO)	35 (52)	32 (48)	0.016
Nurse practitioner (NP)	18 (86)	3 (14)	0.011
Other	7 (64)	4 (36)	1.000
Prevention specialist, physician assistant (PA), nurse, pharmacist			
Provider specialty			
General Internal Medicine	16 (42)	22 (58)	0.006
Internal Medicine-Pediatrics	4 (67)	2 (33)	1.000
Family Medicine	23 (68)	11 (32)	0.387
Infectious Diseases	2 (50)	2 (50)	0.645
Obstetrics-Gynecology (OB-gyn)	9 (100)	-	0.011
Other	6 (75)	2 (18)	0.474
Pediatrics, Public health, Specialty pharmacy			

Table 3. PrEP-related beliefs by PrEP prescriber status

Characteristic, N (%)	% who have NOT prescribed PrEP in the past 12 months (n)	% who HAVE prescribed PrEP in the past 12 months (n)	p-value
Likelihood of sexual risk compensation			
Unlikely, Very unlikely	27 (66)	14 (34)	0.497
Don't know/unsure	9 (50)	9 (50)	0.290
Likely, Very likely	14 (61)	9 (39)	1.000
Likelihood of optimal PrEP adherence			
Unlikely, Very unlikely	14 (82)	3 (18)	0.053
Don't know/unsure	13 (50)	13 (50)	0.224
Likely, Very likely	23 (59)	16 (41)	0.822
Likelihood of serious adverse effect of PrEP			
Unlikely, Very unlikely	38 (56)	30 (44)	0.068
Don't know/unsure	8 (80)	2 (20)	0.302
Likely, Very likely	4 (100)	-	0.152
Likelihood of difficulty paying for PrEP			
Unlikely, Very unlikely	8 (40)	12 (60)	0.036
Don't know/unsure	10 (63)	6 (38)	1.000
Likely, Very likely	32 (70)	14 (30)	0.110
Not morally opposed to PrEP	49 (61)	31 (39)	1.000
Provider feels obligated to prescribe PrEP			
Disagree, Strongly disagree	7 (100)	-	0.038
Neutral	8 (73)	3 (27)	0.513
Agree, Strongly agree	33 (54)	28 (46)	0.030
Patient has inquired about PrEP	17 (31)	38 (69)	<0.001

Figure 1. Distribution of PrEP knowledge scores by PrEP prescriber status



- Median (IQR):
 - Overall knowledge score distribution: 6.1 (2.5)*
 - Non-prescribers: 5.8 (2.2)
 - Prescribers: 7.1 (1.9)

*Out of 8 possible total points

Table 4. Most frequently self-identified PrEP provision barriers and needs

N (%)	PrEP Non-prescribers	PrEP Prescribers
Health center barriers	<ul style="list-style-type: none"> • Cost of PrEP: 25 (76) • Admin support: 23 (74) • Counseling time constraints: 14 (70) 	<ul style="list-style-type: none"> • None: 22 (67) • Cost of PrEP: 8 (24) • Admin support: 8 (26)
Resources needed for PrEP provision	<ul style="list-style-type: none"> • Online training: 28 (76) • Education event: 26 (65) • Knowledgeable providers in practice: 23 (77) 	<ul style="list-style-type: none"> • Education event: 14 (35) • Nursing assistance: 13 (43) • Social work assistance: 12 (38)
Training topics needed	<ul style="list-style-type: none"> • Contraindications: 34 (79) • Eligibility: 28 (76) • Lab monitoring: 26 (76) • Adverse effects: 27 (79) 	<ul style="list-style-type: none"> • None: 25 (81) • Contraindications: 9 (21) • Eligibility: 9 (24)

SUMMARY

- Physicians and general internists were significantly more likely to prescribe PrEP when compared to their counterparts.
- NPs and OB-gyns were significantly less likely to prescribe PrEP when compared to their counterparts.
- PrEP prescribers were more likely to have been asked by a patient about PrEP than non-prescribers.
- PrEP-related beliefs were mostly similar between prescribers and non-prescribers, but non-prescribers were more likely to feel no obligation to prescribe PrEP than prescribers.
- Non-prescribers had significantly lower knowledge scores than prescribers.

CONCLUSIONS

- Provider training and education is critical to facilitating PrEP provision.
- Interventions to increase PrEP provision among primary care providers are crucial to improve HIV prevention in TN, particularly among NPs, OB-gyns, family medicine specialists, and medicine-pediatrics specialists.
- Community-based efforts to improve patient awareness of PrEP may help prompt PrEP discussions with their physicians and increase PrEP prescription
- Limitations: response bias/social desirability, participant may respond to questions to look favorable to researchers
- Future directions: Utilize results to design an educational intervention to improve PrEP uptake among PCPs in TN

REFERENCES

- Centers for Disease Control and Prevention. HIV Surveillance Report, 2017; vol. 29. <http://www.cdc.gov/hiv/library/reports/hiv-surveillance.html>. Published November 2018. Accessed 4/25/2019.
- Sullivan PS, Giler RM, Mouhanna F, et al. Trends in the use of oral emtricitabine/tenofovir disoproxil fumarate for pre-exposure prophylaxis against HIV infection, United States, 2012-2017. *Ann Epidemiol.* June 2018.
- Anderson PL, Glidden D V, Liu A, et al. Emtricitabine-tenofovir concentrations and pre-exposure prophylaxis efficacy in men who have sex with men. *Sci Transl Med.* 2012;4(151):151ra125.

ACKNOWLEDGEMENTS

- The TN Center for AIDS Research (P30 AI110527)
- The National Institutes of Health grant for REDCap (UL1 TR000445) and Dr. Pettit (R01MH113438)