



Original article

Are State-Level HIV Testing Policies for Minors Associated With HIV Testing Behavior and Awareness of Home-Based HIV Testing in Young Men Who Have Sex With Men?



Evette Cordoba, Ph.D., M.P.H.^{a,*}, Carmelle M. Kuizon, M.P.H.^b, Robert Garofalo, M.D., M.P.H.^{c,d}, Lisa M. Kuhns, Ph.D., M.P.H.^{c,d}, Cynthia Pearson, Ph.D.^e, D. Scott Batey, Ph.D.^f, Josh Bruce, M.P.H.^g, Asa Radix, M.D., Ph.D., M.P.H.^{b,h}, Uri Belkind, M.D.^h, Marco A. Hidalgo, Ph.D.^{i,j}, Sabina Hirshfield, Ph.D.^k, Haomiao Jia, Ph.D.^{a,b}, and Rebecca Schnall, Ph.D., M.P.H., R.N.-B.C., FAAN^{a,b}

^a School of Nursing, Columbia University, New York, New York

^b Mailman School of Public Health, Columbia University, New York, New York

^c Division of Adolescent and Young Adult Medicine, Ann & Robert H. Lurie Children's Hospital of Chicago, Chicago, Illinois

^d Department of Pediatrics, Feinberg School of Medicine, Northwestern University, Chicago, Illinois

^e Indigenous Wellness Research Institute, School of Social Work, University of Washington, Seattle, Washington

^f Department of Social Work, University of Alabama at Birmingham, Birmingham, Alabama

^g Birmingham AIDS Outreach, Birmingham, Alabama

^h Callen-Lorde Community Health Center, New York, New York

ⁱ Children's Hospital Los Angeles, The Saban Research Institute, Los Angeles, California

^j Keck School of Medicine, University of Southern California, Los Angeles, California

^k STAR Program, SUNY Downstate Health Sciences University, Brooklyn, New York

Article history: Received May 21, 2021; Accepted December 22, 2021

Keywords: HIV; Testing; Young men who have sex with men; Adolescent health services; Parental consent; Confidentiality; Health policy

 A B S T R A C T

Purpose: The objective of this study was to determine whether state-level policies that restrict minors' access to confidential HIV testing without parental consent may suppress HIV testing in young men who have sex with men (YMSM) in the United States.

Methods: Secondary data from a national HIV prevention trial among YMSM aged 13–17 years (N= 612) were analyzed to evaluate the association between living in a state with restrictive HIV testing policies for minors and HIV testing behavior, awareness of home-based HIV testing, and confidential interactions with a physician. Multilevel logistic regression models were adjusted for age, parents' education level, race, ethnicity, sexual orientation, being sexually experienced, and health literacy of medical forms and controlled for clustering by state. Age-stratified models by state-level age of consent for HIV testing and a subanalysis (including only sexually experienced participants) were also conducted.

Results: Residing in a state with restrictive HIV testing policies was associated with the lack of awareness of home-based HIV testing (adjusted odds ratio [aOR]: 3.06; 95% confidence intervals [CI]: 1.49, 6.28). No significant associations were found for HIV testing behavior (aOR: 1.81; 95% CI: 0.85, 3.84), speaking privately with a physician (aOR: 1.00; 95% CI: 0.56, 1.79), or discussing

IMPLICATIONS AND CONTRIBUTION

This study examined the impact of state-level minor consent laws for HIV testing among a sample of young men who have sex with men (YMSM). These findings—that minor consent laws were associated with awareness of home-based HIV testing—signal the need for interventions to increase HIV testing awareness and access to home-based HIV testing among YMSM.

Conflicts of interest: The authors declare no conflicts of interest or competing interest.

Disclaimer: The findings and conclusions in this article are those of the authors and do not necessarily represent the official position of the Columbia University.

Trial Registration: ClinicalTrials.gov number, NCT03167606, registered May 30, 2017.

* Address correspondence to: Evette Cordoba, Ph.D., M.P.H., School of Nursing, Columbia University, 560 W. 168th Street, New York, NY 10032.

E-mail address: ec2678@cumc.columbia.edu (E. Cordoba).

confidentiality with a physician (aOR: 0.95; 95% CI: 0.52, 1.71) and HIV testing policies for minors. These results were consistent in both the age-stratified models and subanalysis.

Discussion: HIV testing proportions among YMSM did not differ by state-level minor consent laws. However, YMSM living in states with restrictive policies on HIV testing for minors were less likely to be aware of home-based HIV testing.

© 2021 Society for Adolescent Health and Medicine. All rights reserved.

HIV affects more than one million persons living in the United States each year, with gay, bisexual, and other men who have sex with men (MSM) being disproportionately affected [1]. Young MSM (YMSM) are especially vulnerable to acquiring HIV infection, accounting for 93% of the newly diagnosed cases among adolescent males (aged 13–19 years) in 2018 [2]. For this reason, the Centers for Disease Control and Prevention (CDC) recommends annual HIV testing or more frequent testing (every 3–6 months) for sexually experienced MSM [3]. Yet, HIV testing among YMSM remain relatively low, with evidence suggesting that only 15% of sexually experienced YMSM (aged 13–19 years) have ever been tested for HIV infection [2]. Such low percentage of HIV testing may contribute to sustained high HIV incidence in this population, highlighting the importance of identifying barriers to HIV testing.

Although HIV testing is critical for primary and secondary prevention of HIV infection [4], barriers impeding YMSM's access to HIV testing have been identified, such as requiring minors to obtain parental consent for health care services [5]. Currently, there are state-level policies that govern minors' access to confidential HIV testing and services [6]. These

policies vary by state, with age-specific restrictions that determine the age at which minors can consent to HIV testing without parental consent [7]. To date, only 32 of the 50 states explicitly allow minors to consent to HIV testing without parental consent [8]. The remaining 18 states do not guarantee confidentiality or leave it up to the health care provider's discretion to inform the minor's parents or legal guardians of their HIV test. One state (Iowa) requires health care providers to inform parents or legal guardians of positive HIV test results [9]. Among the states that allow minors to consent to HIV testing without parental consent, 17 states specify age for consenting (Figure 1) [8]. Consequently, minor consent laws may discourage minors from seeking HIV-related services if they must be accompanied by a parent or legal guardian, and they may forego HIV testing until they reach the age of majority (the age of legal adulthood, which is 18 years of age in most states, except in Alabama [19 years], Nebraska [19 years], and Mississippi [21 years]) [10], leaving them unaware of their HIV status [11]. In addition, these policies may drive down the awareness of other HIV testing options and confidential interactions with health care providers or physicians.

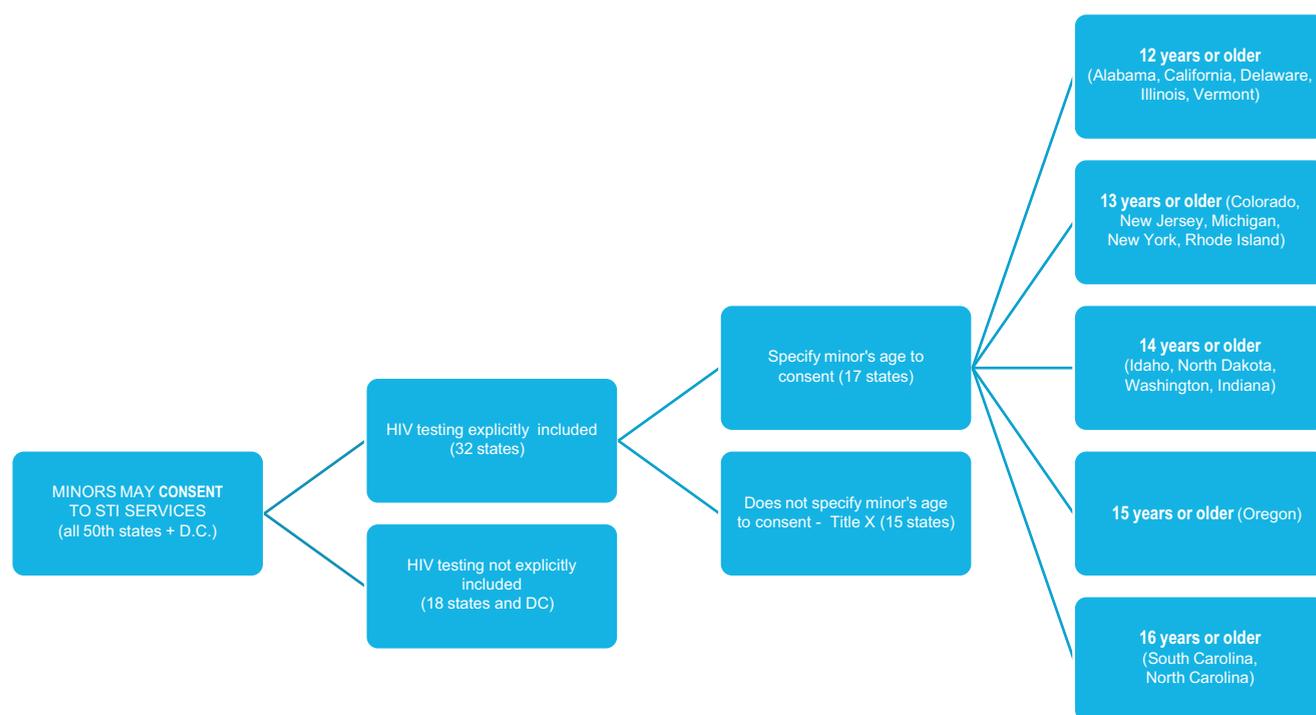


Figure 1. State-level policies governing minors' consent to HIV testing in the United States. This includes 50 states and the District of Columbia (DC). STI = sexually transmitted infection.

Identifying and understanding barriers to HIV testing are critical for directing policy change that will increase access to HIV prevention services and ultimately reducing the incidence of new HIV infections among YMSM. To better characterize the effects of state-level policies governing HIV testing for minors, we conducted a cross-sectional analysis evaluating the association between these policies and HIV testing, awareness of home-based HIV testing, and confidential interactions with a physician among a national sample of YMSM aged 13–17 years. For our analysis, we aimed to understand whether living in a state with restrictive HIV testing policies for minors was associated with YMSM (1) ever been tested for HIV; (2) awareness of home-based HIV testing; (3) speaking privately with a physician without parents; and (4) discussing confidentiality with a physician. We hypothesized that restrictive HIV testing policies for minors would discourage HIV testing, lessen awareness of home-based HIV testing, and lessen confidential interactions with a physician among YMSM.

Methods

A secondary analysis was conducted using baseline data from a randomized control trial (RCT) conducted from 2018 to 2020 among YMSM to test the efficacy of the MyPEEPS Mobile intervention, an mHealth HIV prevention intervention, on HIV risk behaviors (NCT03167606). Participants were enrolled into the RCT by local outreach (including both active recruitment in community organizations/events and passive recruitment using flyers) or nationwide internet-based outreach via paid and targeted advertisements on social media platforms frequently used by adolescents (e.g., Instagram, Facebook, Snapchat). Eligible participants for the RCT were YMSM aged 13–18 years, assigned male at birth, self-identified as male or nonbinary, sexually attracted to males, self-reported HIV-negative (either through previous testing in their lifetime or because they never engaged in sexual activities), and resided in the United States or Puerto Rico. More detailed information on the RCT can be found in previously published literature [12–15]. The current analysis used data from study participants enrolled in the RCT who completed the baseline questionnaire (including questions on self-identity, health, and sexual risk behaviors) and were <18 years of age at the time of enrollment (N = 612). All participants provided written informed assent with a waiver of parental permission or consent, and the study was approved by the Columbia University Institutional Review Board (IRB-AAAR1305).

Statistical analysis

The exposure variable of interest was 'residing in a state with restrictive HIV testing policies for minors.' For this analysis, 'restrictive HIV testing policies' were defined as minors needing to obtain parental consent to access HIV testing at health care facilities, which were determined by state-level policies governing minors' consent to HIV testing presented in the Guttmacher Institute 2020 report [9,16]. For the descriptive analysis, 'residing in a state with restrictive HIV testing policies for minors' was coded as a binary variable (yes/no), and all participants were categorized by their state of residence (including DC and Puerto Rico). For example, if a state policy explicitly included HIV testing among sexually transmitted infection services available to minors without parental consent, we

categorized the participant as 'no' because they lived in a state without restrictive HIV testing policies. Because the age at which minors can consent to HIV testing without parental consent differed by state [8], we also stratified the exposure variable by age (continuous variable) for additional analyses.

We assessed four binary outcome variables (yes/no): 1. ever been tested for HIV, 2. aware of home-based HIV testing, 3. spoke privately with a physician without parents present in the past 12 months, and 4. discussed confidentiality with a physician in the past 12 months. For participants who have never been tested for HIV (N = 439), we conducted an exploratory analysis, described below, to assess their reasons for not getting tested.

Covariates were selected a priori and included age, mother's education level, father's education level, race, ethnicity, sexual orientation, being sexually experienced, and health literacy of medical forms. Participants' age was assessed as a continuous variable in the analysis. All other variables were categorized as follows: mother's and father's education level (advanced graduate degree, graduated 4-year college, some college/technical training, or high school graduate/GED/did not finish high school), race (American Indian/Alaskan Native, Asian American, Black/African-American, Native Hawaiian/Asian Pacific Islander, White/Caucasian, Multiracial, or unknown/not reported), ethnicity (Hispanic/Latino/Latinx or non-Hispanic/Latino/Latinx), sexual orientation (bisexual, mostly or only gay/homosexual, mostly or only heterosexual, or something else), and being sexually experienced (yes or no). Health literacy of medical forms was determined by asking participants their level of confidence when filling out medical forms by themselves; this was categorized as 'not at all/little bit', 'somewhat', or 'quite a bit/extremely'. All covariates were measured at baseline.

The frequency and percentage of participants' characteristics were calculated by the exposure variable (i.e., residing in a state with restrictive HIV testing policies for minors). We conducted univariate analyses to estimate the prevalence of ever been tested for HIV, awareness of home-based HIV testing, speaking privately with a physician without parents, and discussing confidentiality with a physician in the past 12 months. Multilevel logistic regression models were used to assess independent associations between the exposure variable stratified by age and four outcome variables, accounting for clustering by state using an exchangeable working correlation matrix. The multivariable regression models used a random intercept and adjusted for all covariates. We also calculated the intraclass correlation coefficient to estimate the proportion of variance in the outcome variable explained by state clustering (intraclass correlation coefficient for HIV testing = 7%, awareness of home-based testing = 2%, spoke to a doctor = 6%, and discussed confidentiality = 5%). Participants with missing data on covariates were dropped from the multivariable regression models. A subanalysis using only data from participants who reported being sexually experienced was conducted to test the models under more restrictive assumptions (Supplementary Tables). Odds ratios (ORs), 95% confidence intervals (CIs), and *p* values were calculated, and all analyses were performed using SAS 9.4 software (SAS Institute, Cary, NC).

In the exploratory analysis, reasons why participants did not get tested for HIV were assessed. Among study participants who reported never getting tested for HIV in their lifetime (N = 439), open-ended responses were obtained to explain why they did not get tested. Participants had the option to state one or more reasons for not testing for HIV, as reasons were not mutually

exclusive. Responses were coded and categorized using the 10 most frequent reasons; all other reasons were categorized as 'other'. The frequency and percentage of each reason were calculated. This information was used to identify barriers to HIV testing among participants regardless of their state of residence.

Results

There were 612 participants from the MyPEEPS Mobile Trial, of which eight participants (1.3%) had missing data on all outcome variables and were excluded from the regression analyses. As indicated in Table 1, most study participants were between 16–17 years of age (65%), identified as mostly or only gay/homosexual (75%), were sexually experienced (69%), were extremely comfortable with reading medical forms (53%), identified as part of a racial minority group (51%), and had parents who received some college education or more (66% of mothers and 60% of fathers).

Across the United States, 18 states and DC had restrictive HIV policies for minors: Alaska, Arizona, Arkansas, Hawaii, Indiana, Kansas, Louisiana, Maine, Maryland, Massachusetts, Minnesota, Missouri, Nebraska, New Hampshire, South Dakota, Utah, West Virginia, and Wisconsin. All other states ($N = 32$) and Puerto Rico guarantee minors access to HIV testing without parental consent. Participants lived in 47 states, DC, and Puerto Rico; there were no participants residing in Alaska, North Dakota, and Vermont. Eighty-five percent of participants lived in a state without restrictive HIV testing policies for minors (Table 2).

Over half of the participants (73%) had never been tested for HIV in their lifetime. Among participants who resided in states with restrictions to HIV testing for minors, a large percentage had never been tested (80%). When compared with participants living in states with no HIV-testing restrictions, the percent never tested for HIV was not significantly different (71%). Overall, most participants (74%) were unaware of home-based HIV testing. However, a greater proportion of participants unaware of home-based HIV testing resided in states that required minors to obtain parental consent to access HIV testing (87%) compared with those who did not live in those states (71%). Approximately 58% of participants reported speaking with a physician privately without their parents and discussed confidentiality during their health care visit in the past 12 months, and no difference was found by state of residence (Table 3).

A statistically significant association was found between residing in a state that restricted minors' access to HIV testing and participants being unaware of home-based HIV testing, while controlling for covariates (adjusted OR [aOR]: 3.06; 95% CI: 1.49, 6.28) (Table 4). Table 5 shows the bivariate logistic regressions stratified by age in which state-level policies allow minors' access to HIV testing and its associations with HIV testing and interaction with physician. Adjusted models indicate that in states where minors can consent to HIV testing at 13 (aOR: 0.42; p value: .0190) years of age, participants were more likely to know about home-based HIV testing compared to those living in states that required parental consent for HIV testing (Table 6). No significant associations were found between participants residing in states that required minors to obtain parental consent to access HIV testing and never being tested for HIV (aOR: 1.81; 95% CIs: 0.85, 3.84), not speaking privately with a physician (aOR: 1.00; 95% CI: 0.56, 1.79), or not discussing confidentiality with a physician (aOR: 0.95; 95% CI: 0.52, 1.71) in the past 12 months (Table 4). However, in age-stratified models, states that required

Table 1

Characteristics of study participants by US states or territories where access to HIV testing for minors is restricted

Characteristics	Total sample N = 612 (%)	Reside in state that restricts access to HIV testing for minors	
		No N = 519 (85%)	Yes N = 93 (15%)
Age at baseline			
13	23 (3.8)	19 (3.7)	4 (4.3)
14	82 (13.4)	62 (12.0)	20 (21.5)
15	111 (18.1)	90 (17.3)	21 (22.6)
16	187 (30.6)	164 (31.6)	23 (24.7)
17	209 (34.2)	184 (35.5)	25 (26.9)
Mother's education level			
Advanced graduate degree	76 (13.7)	70 (14.8)	6 (7.2)
Graduated 4-year college	144 (25.9)	124 (26.2)	20 (24.1)
Some college/technical training	149 (26.8)	124 (26.2)	25 (30.1)
High school graduate/GED	112 (20.1)	92 (19.5)	20 (24.1)
Did not finish high school	75 (13.5)	63 (13.3)	12 (14.5)
Missing	56		
Father's education level			
Advanced graduate degree	71 (14.7)	64 (15.6)	7 (9.7)
Graduated 4-year college	104 (21.6)	93 (22.7)	11 (15.3)
Some college/technical training	114 (23.7)	90 (22.0)	24 (33.3)
High school graduate/GED	118 (24.5)	98 (23.9)	20 (27.8)
Did not finish high school	75 (15.6)	65 (15.9)	10 (13.9)
Missing	130		
Sexual orientation			
Bisexual	131 (21.4)	117 (22.5)	14 (15.1)
Mostly or only gay/homosexual	458 (74.8)	382 (73.6)	76 (81.7)
Mostly or only heterosexual	4 (0.7)	4 (0.8)	0 (0.0)
Something else	19 (3.1)	16 (3.1)	3 (3.2)
Sexually active			
No	189 (31.3)	152 (29.8)	37 (39.8)
Yes	415 (68.7)	359 (70.3)	56 (60.2)
Missing	8		
Health literacy			
Not at all or a little bit	137 (22.5)	110 (21.3)	27 (29.0)
Somewhat	148 (24.3)	124 (24.0)	24 (25.8)
Quite a bit or extreme	325 (53.3)	283 (54.7)	42 (45.2)
Missing	2		
Race			
American Indian/Alaskan Native	36 (5.9)	29 (5.6)	7 (7.5)
Asian American	59 (9.6)	47 (9.1)	12 (12.9)
Black/African-American	127 (20.8)	116 (22.4)	11 (11.8)
Native Hawaiian or Asian Pacific Islander	10 (1.6)	7 (1.4)	3 (3.2)
White/Caucasian	223 (36.4)	188 (36.2)	35 (37.6)
Multiracial	79 (12.9)	64 (12.3)	15 (16.1)
Unknown/not reported	78 (12.8)	68 (13.1)	10 (10.8)
Ethnicity			
Non-Hispanic/Latino/Latinx	367 (60.0)	305 (58.8)	62 (66.7)
Hispanic/Latino/Latinx	245 (40.0)	214 (41.2)	31 (33.3)

minors to be at least 15 years of age to consent to HIV testing had significantly higher odds of participants not speaking with a doctor privately (aOR: 2.92; p value: <.0001) and not discussing confidentiality during health care visit (aOR: 2.65; p value: <.0001) in the past 12 months compared to those living in states with restrictive HIV testing policies for all minors (Table 6). In the subanalysis, which included only sexually experienced participants, 34% of participants had been tested for HIV, 30% were aware of home-based HIV testing, and approximately 60% had spoken with a doctor in private or discussed confidentiality during their health care visit in the past 12 months (Supplementary Table 1). The results from the bivariate and

Table 2
US states or territories where access to HIV testing for minors is restricted

States that restrict access to HIV testing for minors, regardless of age			
No		Yes	
States	Number of participants N = 519	States	Number of participants N = 93
Alabama	20	Alaska	0
California	63	Arizona	10
Colorado	11	Arkansas	2
Connecticut	12	DC ^a	2
Delaware	3	Hawaii	8
Florida	36	Indiana	9
Georgia	18	Kansas	3
Idaho	3	Louisiana	2
Illinois	27	Maine	2
Iowa	2	Maryland	12
Kentucky	6	Massachusetts	4
Michigan	9	Minnesota	9
Mississippi	4	Missouri	12
Montana	3	Nebraska	3
Nevada	3	New Hampshire	2
New Jersey	17	South Dakota	3
New Mexico	1	Utah	2
New York	98	West Virginia	4
North Carolina	13	Wisconsin	6
North Dakota	0		
Ohio	12		
Oklahoma	7		
Oregon	11		
Pennsylvania	22		
Rhode Island	3		
South Carolina	7		
Tennessee	10		
Texas	53		
Vermont	0		
Virginia	14		
Washington	29		
Wyoming	1		
Puerto Rico ^b	1		

^a District of Columbia.

^b US territory.

multivariable models in the subanalysis were consistent with the main findings of the study (Supplementary Tables 2 and 3).

Among participants who have never been tested for HIV, the most common reason for not testing was “I think I’m low risk for HIV” (29%). Other frequently stated reasons were “I didn’t know where to go for a test” (18%) and “I didn’t want other people to know that I got a test” (11%). There were 8% of participants who stated “other” as their reason for never being tested for HIV. Of these “other” reasons, 12% cited concerns related to obtaining parental consent for HIV testing (Table 7).

Discussion

We found that YMSM residing in states that required parental consent for HIV testing had slightly higher odds of never testing than those living in states with no restrictions to HIV testing for minors, although the difference was not significant. We also found that participants residing in states with younger age to consent (12, 13, 14 years of age) for HIV testing were more likely to test than those living in states requiring parental consent for all minors. These findings were consistent in our subanalysis,

Table 3
HIV testing and interactions with physicians by US states or territories where access to HIV testing for minors is restricted

	Total sample N = 612 (%)	Reside in state that restricts access to HIV testing for minors	
		No N = 519 (85%)	Yes N = 93 (15%)
HIV tested in lifetime			
Yes	165 (27.3)	146 (28.6)	19 (20.4)
No	439 (72.7)	365 (71.4)	74 (79.6)
Missing	8		
Awareness of home-based HIV testing			
Yes	158 (26.2)	146 (28.6)	12 (12.9)
No	446 (73.8)	365 (71.4)	81 (87.1)
Missing	8		
Spoke to a doctor privately (past 12 months)			
Yes	353 (58.4)	301 (58.9)	52 (55.9)
No	251 (41.6)	210 (41.1)	41 (44.1)
Missing	8		
The doctor discussed confidentiality during visit (past 12 months)			
Yes	352 (58.3)	298 (58.3)	54 (58.1)
No	252 (41.7)	213 (41.7)	39 (41.9)
Missing	8		

where data were restricted to participants who were sexually experienced.

Some participants expressed their concern about obtaining parental consent for HIV testing. Previous literature has shown that youth may forgo sexual health–related services if parental consent is required, acting as a barrier to HIV testing [5,17]. However, we found that the primary reason YMSM did not test was because of their low perceived risk of acquiring HIV. This reason has been documented among other youth who engaged in behaviors that increased their risk, yet they did not think that they were at risk for HIV despite being sexually experienced [16,17]. Other research focused on YMSM found that a lack of awareness or knowledge about HIV testing was another common reason for not testing [5]. Some researchers suggest that knowledge of a disease and disease prevention strategies is essential for individuals to adopt preventive behaviors [5,18,19]. In fact, a low level of HIV knowledge has been demonstrated to decrease HIV-related service utilization [5,20]. Our findings point to the importance of educating YMSM about HIV testing and their risk of HIV infection through effective educational interventions that increase their overall knowledge base on HIV. Such interventions should include, but are not limited to, information on HIV testing sites, the importance of HIV testing to prevent onward transmission, and the recommended frequency of HIV testing for YMSM based on their risk factors [5].

When considering HIV testing among youth, patient confidentiality may be an important factor to consider. Patient-physician discussion on confidentiality policies may help YMSM better understand their rights when accessing HIV services and the parameters of patient confidentiality in their state [5,21]. A large proportion of our participants spoke privately with a physician without their parents and discussed confidentiality during their health care visits within the last 12 months, with no difference found by state. Our research suggests that private discussions with a physician during health care visits may create a safe space for YMSM to discuss HIV risk reduction behaviors,

Table 4

Logistic regressions modeling the associations between residing in US states or territories where access to HIV testing for minors is restricted and HIV testing, awareness of home-based HIV testing, and interactions with physicians

	Reside in states that restrict access to HIV testing for minors				
	Bivariate OR (95% CI)	Multivariable ^a aOR (95% CI)	Multivariable ^a aOR (95% CI)	Multivariable ^a aOR (95% CI)	Multivariable ^a aOR (95% CI)
Never been tested for HIV in lifetime	1.54 (0.84, 2.82)	1.81 (0.85, 3.84)			
Unaware of home-based HIV testing	1.05 (0.53, 1.58)		3.06 (1.49, 6.28)		
Did not speak to a doctor privately (past 12 months)	1.08 (0.63, 1.85)			1.00 (0.56, 1.79)	
Did not discuss confidentiality during visit with a doctor (past 12 months)	0.97 (0.58, 1.61)				0.95 (0.52, 1.71)

aOR = adjusted odds ratio; CI = confidence interval.

^a Multivariable models were adjusted for age, sexual orientation, mother's education level, father's education level, health literacy of medical form, race, ethnicity, and being sexually active; all models accounted for clustering by the state of residence.

counseling, testing, or referrals to additional health care services [5], and help leverage HIV testing among YMSM [22].

Although we did not find evidence to support our hypothesis that minor consent laws governing HIV services were a significant barrier for YMSM to access HIV testing at health care facilities, other deterrents have been previously identified [5]. To circumvent barriers to HIV testing at health care facilities, alternative options for testing have been developed. In 2012, the US Food and Drug Administration approved the over-the-counter home-based OraQuick HIV testing kit (OraSure Technologies, Bethlehem, PA) [23,24]. The goal of the home-based testing kit was to increase availability and convenience for HIV testing among individuals 17 years or older [23,24]. However, even with this testing option widely available, only 26% of our participants were aware of the home-based HIV testing kit. This lack of awareness points to the underutilization of a key HIV prevention tool, especially in states with restrictive access to HIV testing for minors. We found that states with minor consent laws requiring parental consent to access HIV testing at health care facilities had significantly higher odds of YMSM being unaware of home-based HIV testing kits. This underscores an important opportunity to develop targeted public health initiatives to heighten awareness and further promote HIV testing with home-based HIV testing kits [2,25–27]. Promoting home-based HIV testing among YMSM may also help to increase testing among their sexual partners, given that previous studies demonstrated the distribution of home-based HIV testing among adult MSM partners or social networks [26].

Currently, the home-based OraQuick HIV testing kit can only be purchased by individuals aged 17 years or older, restricting the purchase of this tool from many sexually experienced YMSM that would largely benefit from home-based testing [2,27]. By lifting the purchasing age on home-based testing, we may observe an increase in HIV testing among sexually experienced youth younger than 17 years of age [26]; 45% of sexually active participants in our sample were less than 17 years of age (data not shown). Frequent HIV testing among YMSM may also increase the likelihood of early detection of infection, allowing for prompt intervention of antiretroviral therapy and reduction of HIV transmission [28,29]. However, there is currently no evidence to indicate that an increase in awareness of home-based HIV testing kits and a lower purchasing age of the kit would impact testing rates among YMSM, and future studies are needed. Although home-based HIV testing kits have many benefits, some limitations are warranted, especially among youth. Without in-person contact with a health care provider at the time of testing, there is a missed opportunity for patient-physician discussion about HIV risks and prevention [30]. In addition, in the case of a positive test result at home, the absence of emotional and social support by a trained HIV counselor or health care provider is concerning [26]. Finally, home-based HIV testing may result in delayed linkage to care for individuals who test positive [30]. Future research should explore the implementation of a robust counseling and linkage to care program associated with home-based HIV testing for youth.

Table 5

Bivariate logistic regressions stratified by age in which state-level policies grant minors' access to HIV testing and its associations with HIV testing, awareness of home-based HIV testing, and interactions with physicians

State-specified age to access HIV testing	Never tested for HIV		Unaware of home-based HIV testing		Did not speak to a doctor privately (past 12 months)		Did not discuss confidentiality during visit with a doctor (past 12 months)	
	OR	p value	OR	p value	OR	p value	OR	p value
12	0.63	.2624	0.56	.0995	0.68	.1567	0.66	.1736
13	0.65	.2445	0.44	.0086	0.55	.0072	0.59	.0308
14	0.74	.4811	0.35	.0079	0.56	.0083	0.56	.0408
15	0.74	.2480	0.77	.4070	2.84	<.0001	2.83	<.0001
16	0.78	.6157	0.62	.2712	1.52	.0546	2.42	.0005
No age specified	1.20	.5835	0.48	.0234	1.25	.4158	1.17	.5427
No access to HIV testing without parental consent	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref

All models accounted for clustering by the state of residence.

OR = odds ratio; Ref = reference.

Table 6

Multivariable^a logistic regressions stratified by age in which state-level policies grant minors' access to HIV testing and its associations with HIV testing, awareness of home-based HIV testing, and interactions with physicians

State-specified age to access HIV testing	Never tested for HIV		Unaware of home-based HIV testing		Did not speak to a doctor privately (past 12 months)		Did not discuss confidentiality during visit with a doctor (past 12 months)	
	aOR	p value	aOR	p value	aOR	p value	aOR	p value
12	0.78	.6907	0.62	.1915	0.83	.5281	0.87	.6389
13	0.58	.2692	0.42	.0190	0.72	.1634	0.57	.0162
14	0.67	.4333	0.48	.0862	0.97	.9013	0.76	.2973
15	1.33	.5490	0.79	.5028	2.92	<.0001	2.65	<.0001
16	0.91	.8427	1.01	.9792	1.96	.0066	3.98	<.0001
No age specified	1.18	.7346	0.47	.0571	1.49	.1922	1.21	.4907
No access to HIV testing without parental consent	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref

aOR = adjusted odds ratio; Ref = reference.

^a Adjusting for age, sex orientation, mother's educational level, father's educational level, health literacy of medical forms, race, ethnicity, and being sexually active; all models accounted for clustering by the state of residence.

There were several limitations in our analysis that should be noted. First, we were unable to draw causal inferences or establish temporality of the associations because of the cross-sectional study design; therefore, results should be interpreted with caution. Second, we did not specify the date on which each state law governing minors' access to confidential HIV testing became effective, and we assumed that the exposure was stable over the study period. Third, among the states that permit minors to consent to HIV testing without parental consent, 15 states did not specify the age at which minors could consent to testing. Instead, these 15 states complied with Title X regulations, which require health care workers to provide comprehensive family planning and preventive health services to all persons, including adolescents regardless of age, in accordance with the federal Public Health Service Act in 1970 [31]. As a result, participants residing in one of these 15 states were not included in the age-stratified analysis and may have biased the study results. In addition, although minor consent laws for HIV testing were not explicitly stated in some state policies, this does not indicate its exclusion. Our analysis was limited by information currently available for each state. Next, all outcome variables and covariates were self-reported

and subjected to recall bias [32]. Moreover, private patient-physician discussions did not specify whether HIV prevention and/or testing was discussed. Finally, we were unable to elucidate the mechanism through which residing in a state with restrictive HIV testing policies for minors can impact awareness of home-based HIV testing, and future research is needed.

This study also had some notable strengths. It was a natural experiment created by geographic variation in state-level policies focused on minor consent laws for HIV testing, HIV testing behavior, awareness of home-based HIV testing, and confidential interactions with a physician. Our main finding that the lack of awareness of home-based HIV testing among YMSM was associated with state-level minor consent laws for HIV testing is an important contribution to the literature, presenting opportunities for future investigation or intervention. Furthermore, our work helped to expand the literature by including data from a nationwide study of very young MSM (13–17 years), data which are often difficult to obtain. Finally, this study included both an age-stratified analysis and subanalysis that presented consistent results with the main findings.

In summary, we provided empirical evidence of an association between state-level minor consent laws for HIV testing and YMSM's awareness of home-based HIV testing. As states continue to grapple with the HIV epidemic among YMSM, public health and policy interventions are urgently needed to increase testing rates. Accessibility to confidential testing is critical for the uptake of HIV testing [4,5], and our results support the promotion or expansion of home-based HIV testing, particularly in states that limit minors' access to confidential HIV testing without parental consent.

Funding Sources

This work was supported by the National Institutes of Health (NIH) [U01MD011279, K24NR018621, and R01MH118151]. The funding source has no role in the original design of this study, analysis and interpretation of data, or decision to submit results. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

Table 7

Reasons for never testing for HIV (not mutually exclusive)

Reasons ^a	N = 1,118 (%)
I think I am low risk for HIV	324 (29.0)
I did not know where to go for a test	204 (18.2)
I did not want other people to know that I got a test	120 (10.7)
I did not have time to do it	95 (8.5)
If I test positive, I am afraid I will be rejected by my friends or family	89 (8.0)
I am afraid to find out if I have HIV	88 (7.9)
I did not have enough money or insurance for a test	83 (7.4)
I do not want the health department to find out the results	23 (2.1)
I do not want Immigration and Customs Enforcement (ICE) to find out the results	6 (0.5)
I had a bad experience the last time I got tested	2 (0.2)
Other	84 (7.5)

Among the reasons for "other," participants who cited parental consent N = 10 (11.9%).

^a Participants can list more than one reason for never being tested for HIV.

Supplementary Data

Supplementary data related to this article can be found at <http://doi.org/10.1016/j.jadohealth.2021.12.023>.

References

- [1] HIV.gov. U.S. statistics. Available at: <https://www.hiv.gov/hiv-basics/overview/data-and-trends/statistics>. Accessed December 17, 2020.
- [2] Centers for Disease Control and Prevention (CDC) #1. HIV youth. Available at: <https://www.cdc.gov/hiv/group/age/youth/index.html>. Accessed December 17, 2020.
- [3] Centers for Disease Control and Prevention (CDC) #2. Screening in clinical settings. Available at: <https://www.cdc.gov/hiv/clinicians/screening/clinical-settings.html>. Accessed December 17, 2020.
- [4] Kurth AE, Lally MA, Choko AT, et al. HIV testing and linkage to services for youth. *J Int AIDS Soc* 2015;18:19433.
- [5] Pharr JR, Lough NL, Ezeanolue EE. Barriers to HIV testing among young men who have sex with men (MSM): Experiences from Clark County, Nevada. *Glob J Health Sci* 2016;8:9.
- [6] Centers for Disease Control and Prevention (CDC) #3. Minors' consent laws for HIV and STD services. Available at: <https://www.cdc.gov/hiv/policies/law/states/minors.html>. Accessed December 18, 2020.
- [7] Centers for Disease Control and Prevention (CDC) #4. State HIV testing laws: Consent and counseling requirements. Available at: <https://www.cdc.gov/hiv/policies/law/states/testing.html>. Accessed December 18, 2020.
- [8] State policies in brief: Minors' access to STI services. The Center for HIV Law and Policy. Available at: <https://www.hivlawandpolicy.org/resources/state-policies-brief-minors-access-sti-services-guttmacher-institute#:~:text=Thirty%2Done%20states%20explicitly%20include,of%20a%20positive%20HIV%20test>. Accessed December 18, 2020.
- [9] Guttmacher Institute. Available at: <https://www.guttmacher.org/state-policy/explore/minors-access-sti-services>. Accessed December 18, 2020.
- [10] World Population Review. Age of majority by state. 2021. Available at: <https://worldpopulationreview.com/state-rankings/age-of-majority-by-state>. Accessed April 14, 2020.
- [11] Fisher CB, Fried AL, Macapagal K, Mustanski B. Patient–provider communication barriers and facilitators to HIV and STI preventive services for adolescent MSM. *AIDS Behav* 2018;22:3417–28.
- [12] Hidalgo MA, Kuhns LM, Hotton AL, et al. The MyPEEPS randomized controlled trial: A pilot of preliminary efficacy, feasibility, and acceptability of a group-level, HIV risk reduction intervention for young men who have sex with men. *Arch Sex Behav* 2015;44:475–85.
- [13] Kuhns LM, Garofalo R, Hidalgo M, et al. A randomized controlled efficacy trial of an mHealth HIV prevention intervention for sexual minority young men: MyPEEPS mobile study protocol. *BMC Public Health* 2020;20:1–6.
- [14] Ignacio M, Garofalo R, Pearson C, et al. Pilot feasibility trial of the MyPEEPS mobile app to reduce sexual risk among young men in 4 cities. *JAMIA Open* 2019;2:272–9.
- [15] Schnell R, Kuhns L, Hidalgo M, et al. Development of MyPEEPS mobile: A behavioral health intervention for young men. *Stud Health Technol Inform* 2018;250:31.
- [16] Peralta L, Deeds BG, Hipszer S, Ghalib K. Barriers and facilitators to adolescent HIV testing. *AIDS Patient Care STDs* 2007;21:400–8.
- [17] Committee on Pediatric AIDS; Emmanuel PJ, Martinez J. Adolescents and HIV infection: The pediatrician's role in promoting routine testing. *Pediatrics* 2011;128:1023–9.
- [18] Fishbein M. The role of theory in HIV prevention. *AIDS Care* 2000;12:273–8.
- [19] Albarracín D, Durantini MR, Earl A. Empirical and theoretical conclusions of an analysis of outcomes of HIV-prevention interventions. *Curr Dir Psychol Sci* 2006;15:73–8.
- [20] Schunter BT, Cheng W-S, Kendall M, Marais H. Lessons learned from a review of interventions for adolescent and young key populations in Asia Pacific and opportunities for programming. *J Acquir Immune Defic Syndr* 2014;66:S186–92.
- [21] Lehrer JA, Pantell R, Tebb K, Shafer M-A. Forgone health care among US adolescents: Associations between risk characteristics and confidentiality concern. *J Adolesc Health* 2007;40:218–26.
- [22] Meanley S, Gale A, Harmell C, et al. The role of provider interactions on comprehensive sexual healthcare among young men who have sex with men. *AIDS Educ Prev* 2015;27:15–26.
- [23] The Food and Drug Administration. Facts about in-home HIV testing. Available at: <https://www.fda.gov/consumers/consumer-updates/facts-about-home-hiv-testing>. Accessed December 18, 2020.
- [24] Merchant R, Clark M, Liu T, et al. Preferences for oral fluid rapid HIV self-testing among social media-using young Black, Hispanic, and White men-who-have-sex-with-men (YMSM): Implications for future interventions. *Public Health* 2017;145:7–19.
- [25] Futterman DC, Peralta L, Rudy BJ, et al. The ACCESS (adolescents connected to care, evaluation, and special services) project: Social marketing to promote HIV testing to adolescents, methods and first year results from a six city campaign. *J Adolesc Health* 2001;29:19–29.
- [26] Freeman AE, Sullivan P, Higa D, et al. Perceptions of HIV self-testing among men who have sex with men in the United States: A qualitative analysis. *AIDS Educ Prev* 2018;30:47–62.
- [27] LeGrand S, Muessig KE, Horvath KJ, et al. Using technology to support HIV self-testing among men who have sex with men. *Curr Opin HIV AIDS* 2017;12:425.
- [28] Centers for Disease Control and Prevention (CDC) #5. HIV testing. Available at: <https://www.cdc.gov/hiv/testing/index.html>. Accessed December 22, 2020.
- [29] Rutstein SE, Ananworanich J, Fidler S, et al. Clinical and public health implications of acute and early HIV detection and treatment: A scoping review. *J Int AIDS Soc* 2017;20:21579.
- [30] Wood BR, Ballenger C, Stekler JD. Arguments for and against HIV self-testing. *HIV AIDS (Auckl)* 2014;6:117.
- [31] The Federal Title X Family Planning Program: Privacy and access rules for adolescents. Available at: <https://youthlaw.org/publication/the-federal-title-x-family-planning-program-privacy-and-access-rules-for-adolescents1/>. Accessed March 3, 2021.
- [32] Coughlin SS. Recall bias in epidemiologic studies. *J Clin Epidemiol* 1990;43:87–91.