



Factors Associated with Lack of HIV Testing among Latino Immigrant and Black Patients at 4 Geographically and Demographically Diverse Emergency Departments

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Abstract

The need for HIV testing in US emergency departments (EDs) has not been assessed, particularly among Latino immigrants and Blacks. We surveyed Latino immigrant and Black 18 to 64-year-old patients at 4 EDs about demographic characteristics, HIV testing history, and health literacy. A subset of patients was further surveyed on HIV risk-taking behaviors. Of the 2,265 participants, 24% had never been tested for HIV. Latino immigrants were more likely than Blacks never to have been tested for HIV (28% vs. 16%). In multivariable logistic regression, for Latino immigrants, male gender and lower health literacy were associated with no previous HIV testing. Among the 1,141-participant subset providing HIV risk-taking behavior data, 23% reported at least one risk factor and of those with at least one risk factor, 23% had never been tested for HIV. There remains a need for HIV testing among adult Latino immigrant and Black patients in US EDs.

Keywords

HIV/AIDS testing, HIV/AIDS research, HIV/AIDS transmission &/or risk, sexual risk-taking

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Introduction

In the United States (US), HIV/AIDS disproportionately affects Black/African American and Hispanic/Latino individuals,¹ notably Latino immigrants.²⁻⁴ Of the more than 1.1 million Americans living with HIV/AIDS, 14% are unaware of their infection.^{5,6} Undiagnosed HIV infections are an important public health concern, since those unknowingly infected serve as a reservoir for the ongoing transmission of HIV.^{1,6} Many of those infected with HIV—either diagnosed or undiagnosed—seek care in US EDs.^{7,8} Latino immigrants and Blacks also frequently receive care in US EDs,⁹⁻¹¹ which suggests that there are an unknown number of Latino immigrant and Black patients seeking care in US EDs who have undiagnosed HIV infections. In response to this clear need to reach those individuals who are not being tested, but should be, the Centers for Disease Control and Prevention (CDC) has explicitly recommended since 2006 that US EDs routinely conduct HIV testing.¹² Many US EDs have recognized this need to test for

HIV, followed this call for HIV testing, and instituted HIV testing through different types of programs.¹³⁻¹⁸

Because HIV testing is available in many US EDs, as well as in many other healthcare and non-healthcare settings, and

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What Do We Already Know about This Topic?

Latino immigrants and Blacks are disproportionately impacted by HIV/AIDS but the unmet need for HIV testing in US emergency departments (EDs) for these populations has not been assessed.

How Does Your Research Contribute to the Field?

This study assessed recent HIV risk-taking and lack of prior HIV testing among Latino immigrant and Black patients and the extent to which need for testing varied across geographically dispersed US EDs.

What Are Your Research's Implications toward Theory, Practice, or Policy?

Study results indicate that HIV testing efforts in US EDs vary by location but, in all cases, testing should be enhanced, particularly for Latino immigrant and Black patients.

given the falling HIV incidence in the US,^{19,20} it is valuable to reconsider if US EDs should continue to provide this clinical and public health service. If current ED HIV testing is not meeting need, then efforts could be expanded to decrease the burden of undiagnosed HIV infections and help slow the spread of HIV. To better clarify the magnitude of the need for HIV testing in US EDs, particularly among Latino immigrants and Black ED patients, we conducted a secondary analysis of data from a study of HIV testing at 4 geographically dispersed, safety net EDs. Our primary objective was to assess the prevalence of lack of prior HIV testing among adult Latino immigrant and Black patients at these EDs, as well as the reported HIV risk-taking behaviors among these patients. We additionally aimed to determine if there were variations in lack of HIV testing and HIV risk-taking behaviors across these EDs and whether there were patients more likely not to have been tested for HIV who might be at greater risk for HIV acquisition, based on their reported HIV risk-taking behaviors.

Methods

Study Setting and Population

This investigation is a secondary analysis of a multi-center study that recruited 18-64-year-old English- or primarily Spanish-speaking patients from April 2015 to December 2018 at 4 geographically-dispersed EDs in Birmingham (University of Alabama at Birmingham Hospital), Cincinnati (University of Cincinnati Medical Center), Los Angeles (Olive View/University of California Los Angeles Medical Center), and Providence (Rhode Island Hospital).²¹ These sites were chosen due to (1) their established experience in previous

successful research studies conducting HIV testing, (2) their geographic and demographic diversity, and (3) their heterogeneity of HIV prevalence in their catchment area communities.²¹ Spanish speakers (Latino immigrants) were recruited at the Los Angeles and Providence sites while English speakers (Blacks) were recruited at the Birmingham and Cincinnati sites. Each of the 4 hospitals are safety-net institutions with emergency medicine residency programs.²²

As reported previously,²¹ a random sample of patients present in the ED during data collection periods and who were potentially study eligible based on electronic health record (EHR) review were evaluated by study staff for possible inclusion in the study. Those who met eligibility criteria were invited to participate. The first part of the study involved a larger group of patients for whom HIV testing histories were obtained and their health literacy skills were assessed. The second part of the study included a randomized, controlled trial (RCT) for which a subset of participants from the first part of the study were enrolled. This subset of participants for the RCT were enrolled according to a quota based on study site, language spoken (English or Spanish), and health literacy (lower or higher). Health literacy was measured by the Short Assessment of Health Literacy-English and Spanish (SAHL-S&E).²¹

For the entire study, ED patients were study eligible if they were 18-64 years-old; English or Spanish speaking; able to provide consent and participate in the study; and were not incarcerated; did not have a cognitive impairment or other disability that prevented study participation; and were not intoxicated, critically ill, HIV infected, or taking pre-exposure prophylaxis (PrEP), or enrolled in other HIV studies. Further, English and Spanish-speaking patients who were unable to read at a second-grade level in English or Spanish per the IPTII Spanish or English Oral Test (Ballard & Tighe Publishers, Brea, CA) were excluded. These patients were excluded because they would not be able to complete some of the study tasks. Latino immigrants were defined as individuals who indicated that they primarily spoke Spanish, preferred to receive their medical care in Spanish, and were currently living in the US but were born outside the continental US. Of the 1,520 primarily Spanish-speaking, Latino participants considered for study enrollment, 20 (1.3%) were excluded because of US nativity. All Black participants were born and living in the US.

Data Collection Procedures

After enrollment, participants in the first part of the study completed questionnaires about their demographic characteristics, and HIV testing history. Determining whether patients had ever been tested for HIV was a 2-step approach. The first part asked participants about blood donation, "Have you ever donated blood." For those who responded "yes," these participants were presented with follow-up questions about blood donation ("when was the last time you donated blood" and "except for the times when you donated blood, have you ever been tested for HIV before today? Please do not include the times you have donated blood for someone else to use"). Participants who

answered “no” to donating blood were asked “before today, have you ever been tested for HIV.” These were validated questions and previously used in our research on HIV testing. We performed cognitive-based assessments of participants in prior research to confirm that participants understood the meaning of the questions and could respond accurately.

Spanish-speaking participants were asked about their nativity and also completed the Short Acculturation Scale for Hispanics (SASH), which assessed their US acculturation; information on length of time in the US was also obtained.²¹ Participant health literacy was later evaluated using the SAHL-S&E. Patients with SAHL-S&E scores ≤ 14 (on an 18-point scale) were classified as having lower health literacy. These instruments comprised the assessments for the first part of the study.

A subset of participants who met study quota based on health literacy (lower or higher) and language (English or Spanish) and whose HIV test result in the ED was negative were subsequently enrolled in the RCT. The RCT involved testing an intervention designed to increase HIV/AIDS and HIV testing knowledge and HIV testing motivation and behavioral skills.^{21,23} At the terminal portion of their involvement in the ED portion of the trial, these participants completed an audio-assisted self-interview about whether they had engaged in any HIV risk-taking behaviors in the prior 3 months. These HIV risk-taking behaviors included: (1) two or more main partners, (2) casual partners, (3) exchange partners, (4) condomless anal intercourse (CAI), and (5) intravenous drug use.

Primary Data Analysis

Patients were stratified by ED, race (Black), and ethnicity (Latino immigrants); characteristics were further stratified by HIV testing status (ever tested versus never tested) and self-reported HIV risk-taking behaviors. Proportions with corresponding 95% confidence intervals (CIs) were computed. Multivariable logistic regression models were constructed to identify factors associated with lack of HIV testing and HIV risk-taking behaviors; odds ratios (ORs) with 95% CIs were estimated.

Informed Consent

This study was approved by the institutional review boards at the University of Alabama at Birmingham Hospital (approval number X150318003), the University of Cincinnati Medical Center (approval number 2014-7851), the Olive View/University of California Los Angeles Medical Center (approval number 14H-593308), and the Rhode Island Hospital (approval number 595955). All patients provided written informed consent prior to enrollment in the study.

Results

Study Participants

There were 2,265 participants in the first part of the study and a subset of those (1,141) were enrolled in the second part of the

study, the RCT. Demographic characteristics for participants in the first part of the study and the subset enrolled in the subsequent RCT are presented in Supplemental Table 1. Among the Black participants from Birmingham and Cincinnati in the first part of the study, the median age was 41 years old (interquartile range (IQR) 29-52); the majority were female, had governmental insurance, and were classified as having higher health literacy. Among the Latino immigrant participants from Los Angeles and Providence in the first part of the study, the median age was 46 years old (IQR 37-54), the majority were female, and most were classified as having higher health literacy.

Latino immigrants in the first part of the study, as compared to Black participants, more often had no healthcare insurance and had completed some high school or less, but were more frequently classified as having higher health literacy. The demographic characteristics of Black participants in the first part of the study and the RCT part were similar except that more lower health literacy participants were included in the RCT (Supplemental Table 1). There were more higher health literacy Latino immigrants in the first part of the study than in the RCT.

Country of birth among the Latino immigrant participants in the first and second part of the study was similar. The breakdowns for countries that represented $\geq 10\%$ of participants were (for the first part and second parts of the study respectively): Providence [Dominican Republic (45% and 44%), Guatemala (23% and 24%), Puerto Rico (19% and 18%)], Los Angeles [Mexico (61% and 64%), El Salvador (20% and 17%), Guatemala (13% and 14%)], and Overall [Mexico (29% and 32%), Dominican Republic (25% and 23%), Guatemala (19% and 19%), Puerto Rico (10% and 9%) and El Salvador (10% and 9%)]. However, Latino immigrants from Los Angeles (in both parts of the study) more often reported being in the US for 10 years or more compared to those at Providence.

Lack of HIV Testing

Of the 2,265 participants from across the 4 EDs in the first part of the study, 550 (24%, 95% CI 23-26%) had never been tested previously for HIV. There were more Latino immigrants ($n = 1,500$) than Black participants ($n = 765$) who had never been tested for HIV (28% vs. 16%; $p < 0.0001$). The Los Angeles ED ($n = 672$) had the highest proportion of participants never previously tested for HIV (40%, 95% CI 36-44), as compared to Birmingham ($n = 362$) (22%, 95% CI 18-27), Providence ($n = 828$) (18%, 95% CI 16-22), and Cincinnati ($n = 403$) (11%, 95% CI 8-14).

Table 1 provides the demographic characteristics of participants by race and ethnicity, ED site, and HIV testing status (never tested versus ever tested) for the first part of the study. Among Latino immigrants, those never tested (versus ever tested) were more often male, uninsured, had completed some high school or less, and had lower health literacy. Among Latino immigrants never tested for HIV, those in Los Angeles

Table 1. Characteristics of Participants in the First Part of the Study by Study Site and HIV Testing Status.

	Latino immigrants						Blacks					
	All		Rhode Island Hospital		Olive View—UCLA Medical Center		All		University of Alabama-Birmingham		University of Cincinnati	
	Never tested (n = 425)	Ever tested (n = 1075)	Never tested (n = 153)	Ever tested (n = 675)	Never tested (n = 272)	Ever tested (n = 400)	Never tested (n = 125)	Ever tested (n = 640)	Never tested (n = 81)	Ever tested (n = 281)	Never tested (n = 44)	Ever tested (n = 359)
Gender (%(95% CI))												
Male	51 (46, 55)	33 (30, 36)	56 (48, 64)	34 (30, 38)	47 (41, 54)	31 (27, 36)	44 (35, 53)	37 (33, 41)	38 (28, 50)	40 (34, 45)	55 (39, 70)	35 (30, 40)
Female	49 (45, 54)	67 (64, 70)	44 (36, 52)	66 (62, 70)	53 (46, 59)	69 (64, 73)	56 (47, 65)	63 (59, 67)	62 (50, 72)	60 (55, 66)	45 (30, 61)	65 (60, 70)
Age (mean (95% CI))	45 (44, 46)	45 (45, 46)	43 (41, 45)	45 (44, 46)	47 (45, 48)	45 (44, 46)	42 (39, 44)	41 (40, 42)	44 (40, 47)	43 (41, 44)	38 (34, 42)	40 (38, 41)
Insurance (%(95% CI))												
Private	5 (3, 8)	6 (5, 8)	12 (8, 19)	9 (7, 12)	1 (0, 3)	2 (1, 3)	22 (15, 30)	20 (17, 23)	27 (18, 38)	31 (25, 36)	11 (4, 25)	12 (9, 16)
Governmental	44 (40, 49)	55 (52, 58)	49 (41, 57)	65 (62, 69)	42 (36, 48)	38 (33, 43)	44 (35, 53)	62 (58, 66)	33 (23, 45)	42 (36, 48)	64 (48, 78)	77 (72, 81)
None	50 (45, 55)	38 (35, 41)	39 (31, 47)	25 (22, 29)	57 (51, 63)	60 (55, 65)	34 (26, 43)	18 (15, 21)	40 (29, 51)	27 (22, 33)	25 (13, 40)	11 (8, 15)
Education (%(95% CI))												
Some high school or less	71 (66, 75)	56 (53, 59)	65 (57, 72)	50 (46, 54)	74 (69, 79)	65 (60, 70)	19 (13, 27)	21 (18, 24)	19 (11, 29)	17 (13, 22)	20 (10, 35)	24 (20, 29)
Grade 12 or GED	20 (17, 24)	29 (27, 32)	29 (22, 37)	34 (30, 38)	15 (11, 20)	22 (18, 26)	45 (36, 54)	43 (40, 47)	37 (27, 48)	40 (34, 46)	59 (43, 74)	46 (41, 51)
Some college	7 (5, 10)	9 (8, 11)	5 (2, 9)	9 (7, 11)	9 (6, 13)	11 (8, 14)	26 (18, 34)	29 (26, 33)	31 (21, 42)	35 (29, 41)	16 (7, 30)	25 (20, 29)
Completed college or more	2 (1, 3)	6 (4, 7)	2 (0, 6)	7 (6, 10)	1 (0, 4)	3 (1, 5)	10 (6, 17)	7 (5, 9)	14 (7, 23)	8 (5, 12)	5 (1, 15)	6 (3, 8)
Health Literacy (%(95% CI))												
Lower	47 (42, 51)	30 (27, 33)	46 (38, 55)	26 (23, 30)	47 (41, 53)	36 (32, 41)	41 (32, 50)	46 (42, 50)	33 (23, 45)	40 (34, 45)	55 (39, 70)	50 (45, 56)
Higher	53 (49, 58)	70 (67, 73)	54 (45, 62)	74 (70, 77)	53 (47, 59)	64 (59, 68)	59 (50, 68)	54 (50, 58)	67 (55, 77)	60 (55, 66)	45 (30, 61)	50 (44, 55)
SASH Score (mean (95% CI)) ¹	21 (20, 22)	20 (20, 21)	19 (18, 20)	19 (19, 20)	22 (22, 23)	22 (22, 23)						
Time in the US												
Less than 10 years	18 (15, 22)	23 (21, 26)	29 (22, 37)	32 (28, 35)	12 (9, 17)	10 (7, 13)						
10 years or more	81 (77, 85)	76 (74, 79)	70 (62, 77)	68 (64, 72)	88 (83, 92)	91 (87, 93)						

CI: Confidence Interval; SASH: Short Acculturation Scale for Hispanics; GED: General Equivalency Diploma.
¹154 SASH scores were imputed with the mean average of answered items for participants who were missing 4 or fewer items.

Table 2. Multivariate Logistic Model of Factors Associated with Never Having Previously Been Tested for HIV among Participants in the First Part of the Study.

	Latino immigrants (<i>n</i> = 1500), OR (95% CI)	Blacks (<i>n</i> = 765), OR (95% CI)
Male vs. female	2.15 (1.68, 2.75)	1.26 (0.84, 1.90)
Age	1.00 (0.99, 1.01)	1.01 (0.99, 1.02)
Health Insurance		
Private	Reference	Reference
Government	0.73 (0.43, 1.25)	0.91 (0.53, 1.55)
None	0.80 (0.46, 1.41)	1.83 (1.04, 3.24)
Education		
Some high school or less	Reference	Reference
Grade 12 or GED	0.71 (0.53, 0.96)	1.03 (0.60, 1.76)
Some college	0.75 (0.47, 1.18)	0.84 (0.46, 1.54)
Finished college or more	0.43 (0.19, 0.97)	1.42 (0.64, 3.19)
Low health literacy versus high health literacy	1.70 (1.32, 2.18)	0.87 (0.57, 1.32)
Site		
University of Alabama-Birmingham		2.01 (1.29, 3.09)
University of Cincinnati		Reference
Olive View-UCLA Medical Center	2.89 (2.20, 3.79)	
Rhode Island Hospital	Reference	
SASH Score	1.00 (0.98, 1.01)	

SASH: Short Acculturation Scale for Hispanics; OR: Odds Ratio; CI: Confidence Interval; GED: General Equivalency Diploma.

(compared to Providence) more often lacked healthcare insurance (57% vs. 39%; $p < 0.0003$), less often had completed 12 years of formal education (or equivalent) (65% vs 74%; $p < 0.004$), and more often had higher US acculturation (SASH) scores (22 vs.19, $p < 0.0001$).

Among Black participants never tested previously for HIV, there were more participants from Cincinnati who had healthcare from governmental sources (e.g., Medicare, Medicaid) than those from Birmingham (64% vs. 33%; $p < 0.0014$). In the multivariable logistic models, among Black participants, no previous HIV testing was associated with lack of healthcare insurance and being from the Birmingham site whereas among Latino immigrant participants, no previous HIV testing was associated with male gender, lower health literacy, and being from the Los Angeles site (Table 2).

HIV Risk-Taking Behaviors

Of the $n = 1,141$ RCT participants in the second part of the study, 23% (95% CI 20-26) reported having engaged in any HIV risk-taking behaviors in the prior 3 months. Of those who reported past 3-month HIV risk-taking, 23% (95% CI 17-27) had not previously been tested for HIV. There were more Latino immigrants ($n = 641$) than Black participants ($n = 500$) who reported any past 3-month HIV risk-taking behavior (28% vs 17%; $p < 0.0001$). The Providence site

($n = 334$) had the highest proportion of participants with any previous 3-month HIV risk-taking behaviors (31%, 95% CI 26-37), followed by Los Angeles ($n = 307$) (23%, 95% CI 19-29), Birmingham ($n = 218$) (14%, 95% CI 10-20) and Cincinnati ($n = 282$) (20%, 95% CI 15-25).

Table 3 provides the demographic characteristics of participants according to any versus no reported past 3-month risk-taking behaviors by race/ethnicity and ED. When comparing the demographic characteristics of Latino immigrant participants who reported any past 3-month HIV risk-taking behaviors by ED site, Los Angeles as compared to Providence participants more often lacked healthcare insurance (64% vs. 31%; $p < 0.0001$) and had higher US acculturation (SASH) scores (21 vs. 19; $p < 0.01$). Likewise, among Black participants, Cincinnati participants who reported any past 3-month HIV risk-taking behaviors more frequently had healthcare insurance from governmental sources (e.g., Medicare, Medicaid) (79% vs. 39%; $p < 0.0004$) than those from Birmingham. As shown in Supplemental Table 2, the median number of main, casual and exchange partners was similar across EDs regardless of prior HIV testing history.

Table 4 depicts HIV risk-taking behaviors according to previous HIV testing by race/ethnicity and ED site. Among both all Black and Latino immigrants never tested for HIV, the proportions reporting any past 3-month HIV risk-taking behaviors were similar. In the multivariable logistic regression model (Table 5), any past 3-month HIV risk-taking was not associated with previously having been tested for HIV but for Latino immigrants being male and those from the Los Angeles ED site (compared to Providence) was associated with lack of prior HIV testing.

Discussion

Based on this investigation from these 4 geographically dispersed US EDs, about a quarter of Latino immigrant and Black ED patients had not previously been tested for HIV. In addition, 23% of these patients had engaged in HIV risk-taking behaviors (primarily condomless sexual intercourse) in the past 3 months, of whom 23% had not previously been tested for HIV. These findings support that at least these EDs still have adult Latino immigrant and Black patients who would benefit from HIV testing. Given that previous research also demonstrated that there are patients in selected US EDs who had not been tested previously for HIV,^{24,25} this investigation supports the call for continued HIV testing efforts in this setting.²⁶

However, the results also illustrate that lack of ever having been tested for HIV, as well as HIV risk-taking behaviors, are not uniform across the 4 sites studied. As such, the need for HIV testing across EDs is not “one-size-fits-all,” just as EDs are not similar. The need for HIV testing at a given ED instead reflects the uniqueness of the community it serves, including its demographic diversity, HIV prevalence, culture, social networks, and healthcare access. The dissimilarity of EDs also illustrates that solely considering race/ethnicity as a primary indicator of HIV testing need at an ED can lead to incorrect

Table 3. Characteristics of the Randomized, Controlled Trial Participants by Having Reported Any versus No HIV Risk-Taking Behaviors by Study Site.

	Latino immigrants						Blacks					
	All		Rhode Island Hospital		Olive View—UCLA Medical Center		All		Alabama-Birmingham		University of Cincinnati	
	No risk (n = 464)	Any risk (n = 177)	No risk (n = 229)	Any risk (n = 105)	No risk (n = 235)	Any risk (n = 72)	No risk (n = 413)	Any risk (n = 87)	No risk (n = 187)	Any risk (n = 31)	No risk (n = 226)	Any risk (n = 56)
Gender (%(95% CI))												
Male	39 (34, 43)	36 (29, 44)	36 (30, 42)	39 (30, 49)	42 (35, 48)	32 (21, 44)	35 (30, 40)	31 (22, 42)	35 (28, 42)	42 (25, 61)	35 (29, 42)	25 (14, 38)
Female	61 (57, 66)	64 (56, 71)	64 (58, 70)	61 (51, 70)	58 (52, 65)	68 (56, 79)	65 (60, 70)	69 (58, 78)	65 (58, 72)	58 (39, 75)	65 (58, 71)	75 (62, 86)
Age (mean (95% CI))	42 (41, 43)	37 (34, 40)	45 (44, 46)	44 (42, 46)	46 (44, 47)	44 (42, 47)	45 (44, 46)	44 (42, 46)	44 (42, 46)	39 (33, 44)	40 (38, 42)	36 (33, 39)
Insurance (%(95% CI))												
Private	5 (3, 7)	6 (3, 10)	7 (4, 11)	10 (5, 17)	2 (1, 5)	–	21 (17, 25)	14 (7, 23)	31 (24, 38)	26 (12, 45)	12 (8, 17)	7 (2, 17)
Governmental	53 (48, 58)	50 (42, 57)	67 (61, 73)	59 (49, 69)	39 (33, 46)	36 (25, 48)	60 (55, 65)	64 (53, 74)	40 (33, 48)	39 (22, 58)	76 (70, 82)	79 (66, 88)
None	42 (38, 47)	45 (37, 52)	26 (20, 32)	31 (23, 41)	59 (52, 65)	64 (52, 75)	19 (16, 24)	22 (14, 32)	29 (23, 36)	35 (19, 55)	12 (8, 16)	14 (6, 26)
Education (%(95% CI))												
Some high school or less	61 (56, 65)	71 (63, 77)	56 (50, 63)	68 (58, 76)	65 (59, 71)	75 (63, 84)	21 (17, 25)	29 (20, 39)	19 (14, 26)	32 (17, 51)	23 (17, 29)	27 (16, 40)
Grade 12 or GED	26 (22, 30)	22 (16, 29)	31 (25, 37)	24 (16, 33)	21 (16, 27)	19 (11, 30)	47 (42, 52)	40 (30, 51)	43 (36, 51)	35 (19, 55)	50 (43, 56)	43 (30, 57)
Some college	10 (7, 13)	3 (1, 7)	8 (5, 12)	4 (1, 9)	11 (8, 16)	3 (0, 10)	27 (23, 32)	24 (16, 35)	32 (25, 39)	26 (12, 45)	23 (18, 30)	23 (13, 36)
Completed college or more	4 (2, 6)	4 (2, 8)	5 (3, 9)	5 (2, 11)	2 (1, 5)	3 (0, 10)	5 (3, 7)	7 (3, 14)	5 (3, 10)	6 (1, 21)	4 (2, 8)	7 (2, 17)
Health Literacy (%(95% CI))												
Lower	46 (41, 50)	61 (53, 68)	45 (38, 51)	64 (54, 73)	47 (40, 53)	57 (45, 69)	59 (54, 64)	53 (42, 64)	57 (49, 64)	55 (36, 73)	61 (54, 67)	52 (38, 65)
Higher	54 (50, 59)	39 (32, 47)	55 (49, 62)	36 (27, 46)	53 (47, 60)	43 (31, 55)	41 (36, 46)	47 (36, 58)	43 (36, 51)	45 (27, 64)	39 (33, 46)	48 (35, 62)
SASH Score (mean (95% CI)) ¹	21 (20, 22)	20 (19, 21)	19 (18, 20)	19 (18, 20)	23 (22, 24)	21 (20, 23)						
Time in the US												
Less than 10 years	18 (16, 23)	21 (15, 28)	29 (22, 37)	29 (20, 38)	11 (7, 16)	10 (4, 19)						
10 years or more	80 (76, 84)	79 (76, 83)	71 (64, 77)	70 (61, 79)	89 (84, 93)	90 (81, 96)						

CI: Confidence Interval; SASH: Short Acculturation Scale for Hispanics; GED: General Equivalency Diploma.

¹154 SASH scores were imputed with the mean average of answered for participants who were missing 4 or fewer items.

Table 4. HIV Risk-Taking Behaviors in the Previous 3 Months for Randomized, Controlled Trial Participants by Site and HIV Testing Status.

	Blacks											
	Latino immigrants						Blacks					
	All		Rhode Island Hospital		Olive View—UCLA Medical Center		All		Alabama-Birmingham		University of Cincinnati	
Never tested (n = 197)	Ever tested (n = 444)	Never tested (n = 68)	Ever tested (n = 266)	Never tested (n = 129)	Ever tested (n = 178)	Never tested (n = 76)	Ever tested (n = 424)	Never tested (n = 45)	Ever tested (n = 173)	Never tested (n = 31)	Ever tested (n = 251)	
Any risk factor ¹ (%(95% CI))	26 (20, 33)	28 (24, 33)	38 (27, 51)	30 (24, 36)	20 (14, 28)	26 (20, 33)	11 (5, 20)	19 (15, 23)	9 (2, 21)	16 (11, 21)	13 (4, 30)	21 (16, 27)
Heterosexual partners (%(95% CI))	3 (1, 7)	2 (1, 4)	3 (0.4, 10)	2 (1, 4)	3 (1, 8)	3 (1, 7)	3 (0.3, 9)	3 (2, 5)	0	5 (2, 9)	6 (1, 21)	2 (1, 5)
Two or more main partners	13 (9, 19)	19 (15, 23)	12 (5, 22)	20 (15, 25)	14 (8, 21)	18 (13, 24)	11 (5, 20)	13 (10, 16)	9 (2, 21)	9 (2, 8)	13 (4, 30)	16 (11, 21)
Casual partners	6 (3, 10)	8 (6, 11)	7 (2, 16)	9 (6, 13)	5 (2, 11)	7 (4, 11)	3 (0.3, 9)	4 (3, 7)	4 (1, 15)	4 (2, 8)	0	5 (2, 8)
Exchange partners	1 (0.1, 4)	0.5 (0.1, 2)	3 (0.4, 10)	0.4 (0.01, 2)	0	0.6 (0.01, 3)	0	1 (0.4, 2)	0	1 (0.1, 4)	0	0.8 (0.1, 3)
Any MSM CAI (%(95% CI))	12 (8, 18)	10 (7, 13)	25 (15, 37)	12 (8, 16)	5 (2, 11)	8 (4, 13)	0	3 (1, 5)	0	3 (1, 7)	0	3 (1, 6)
Any IDU	6 (3, 10)	5 (3, 7)	15 (7, 25)	6 (4, 10)	2 (0.2, 5)	3 (1, 6)	0	1 (0.2, 2)	0	0.6 (0.01, 3)	0	0.8 (0.1, 3)
Shared needles or cookers	6 (3, 10)	4 (3, 7)	13 (6, 24)	6 (3, 9)	2 (0.2, 5)	2 (0.6, 6)	0	1 (0.2, 2)	0	0.6 (0.01, 3)	0	0.8 (0.1, 3)
Share cookers	3 (1, 6)	3 (2, 5)	7 (2, 16)	4 (2, 8)	0	1 (0.1, 4)	0	1 (0.2, 2)	0	0.6 (0.01, 3)	0	0.8 (0.1, 3)

MSM: Men who have sex with men; CAI: Condomless anal intercourse; CI: Confidence Intervals; IDU: Intravenous Drug Use.

¹Any risk factor includes any of the factors listed in the table.

Table 5. Multivariate Logistic Model of Factors Associated with Never Having Been Tested for HIV among Randomized, Controlled Trial Participants.

	Latino immigrants (<i>n</i> = 651) ¹ , OR (95% CI)	Blacks (<i>n</i> = 500), OR (95% CI)
Female vs. male	2.72 (1.88, 3.94)	1.26 (0.74, 2.13)
Age	1.00 (0.99, 1.03)	1.01 (0.99, 1.03)
Health Insurance		
Private	Reference	Reference
Government	0.78 (0.31, 1.92)	0.75 (0.38, 1.51)
None	0.91 (0.36, 2.33)	1.89 (0.91, 3.93)
Education		
Some high school or less	Reference	Reference
Grade 12 or GED	0.67 (0.42, 1.06)	0.85 (0.45, 1.61)
Some college	0.91 (0.45, 1.83)	0.88 (0.43, 1.84)
Finished college or more	0.89 (0.30, 2.65)	1.04 (0.30, 3.55)
Low health literacy versus high health literacy	1.47 (1.002, 2.15)	0.98 (0.57, 1.67)
Any risk factor versus no risk factors	0.96 (0.64, 1.46)	0.54 (0.24, 1.20)
Site		
University of Alabama-Birmingham		1.58 (0.90, 2.73)
University of Cincinnati		Reference
Olive View—UCLA Medical Center	2.90 (1.92, 4.37)	
Rhode Island Hospital	Reference	
SASH Score	0.99 (0.96, 1.03)	

SASH: Short Acculturation Scale for Hispanics; OR: Odds Ratio; CI: Confidence Interval.

¹65 Latino immigrants missing SASH score.

assumptions, as evidenced by the differences in HIV testing and risk-taking among Black patients between Birmingham and Cincinnati, and among Latino immigrant patients between Los Angeles and Providence. Although our results indicate that US EDs should continue to test patients for HIV, each ED should assess their own HIV testing needs and design testing programs commensurate with them.

We are aware of previous CDC data from the National Health Interview Survey that estimated, among all adults aged 18 or over, Blacks (61.8%) and Latinos (47.6%) have different rates of ever being tested for HIV; estimates that were stable in a 2017 update (61.1% of Blacks had ever tested for HIV while only 47.2% of Latinos had ever been tested for HIV).^{27,28} We are also aware of parallel work stemming from this same dataset that reported comparable levels of prior HIV testing (46.7%) among Latino (white) immigrants.²⁹ However, to our knowledge, there is an absence of work that specifically focuses on assessing the prevalence of lack of prior HIV testing among adult Blacks and Latino immigrants in EDs and exploring these populations' reported HIV risk taking behaviors.

Previous studies have explored HIV testing in EDs, but many are single center studies^{13,27-29} (as compared to the multi-center approach used here) and/or they do not focus on populations known to be disproportionately impacted by

HIV/AIDs (as compared to the specific focus on Latino immigrants and Blacks in this current study).^{13,15,30,31} However, the findings from these studies corroborate the ongoing need for HIV testing in the ED. They also demonstrate a population of patients (including the populations studied here) who should be tested but have not been tested, particularly patients seeking care in the ED without any prior HIV testing and those engaging in HIV risk taking behaviors without recent HIV testing. Further, these studies substantiate the findings of this current work and demonstrate ED site variability in both HIV risk and HIV testing history. This finding is further supported by data that demonstrate more than half of new HIV diagnoses are made in a minority of US states and communities.³²

Despite a falling incidence of HIV/AIDs in the US, it continues to disproportionately impact Latino immigrants and Blacks.^{1,33-35} As demonstrated here, and elsewhere, Latino immigrant and Black patients seek care in the ED.⁹⁻¹¹ Although rates of testing in the ED are lower than CDC guidelines,¹² and the need for HIV testing in the ED is likely site-specific, these results demonstrate an ongoing need for HIV testing in the ED and confirm that the ED remains a viable avenue for such testing—notably the at-risk Latino immigrant and Black patients reflected in this study. The differences in HIV testing history and risk-taking behaviors identified here suggest that research needs to clarify HIV testing needs in other US EDs. Risk behaviors, and the number of individuals who reported them here, also argues for culturally targeted interventions that can reach different populations of at-risk patients; interventions that should be able to reach both English- and Spanish-speaking patients with both higher and lower health literacy.

Limitations

We acknowledge several limitations. First, this work is a secondary analysis of a larger study; we are therefore limited by the data available for review. Second, although the first part of the study involved random sampling of ED patients, which increases the external validity of the estimates on the lack of prior HIV testing in these EDs, the subset of patients from the RCT portion of the study were selected according to a quota by language and health literacy. Consequently, the RCT sample might not be representative of patients who present to these EDs. However, overall demographic characteristics of the larger and smaller samples studied here are similar. As expected, given the diversity of EDs across the US, our results might not be similar to other EDs. It should also be noted that we only had data on HIV risk factors in the previous 3 months. This time period for risk behaviors is a brief one and likely underrepresents the true risk profile of participants in light of previous HIV testing. Further, we are unable to account for the possibility of underreporting prior HIV testing by participants; patients may have forgotten that they were tested or not been aware that they were tested (e.g. pregnant women are routinely tested for HIV but may not be aware of this testing).

Conclusion

In this study we demonstrate that there are Latino immigrant and Black patients in these 4 US EDs who have never been tested for HIV, that a number are at risk for HIV, and that among those never tested for HIV there is a subset who report HIV risk-taking behaviors. These data confirm the need for continued efforts to test patients in these and most US EDs; however, the need for HIV testing varies across EDs, regardless of Latino ethnicity and Black race. Further, there are Latino immigrant and Black patients who are less likely to have been tested previously and have recent HIV risk-taking behaviors that include multiple sexual partners, condomless intercourse, and intravenous drug use. Based on these findings, we recommend that HIV testing programs should strive to meet the needs of the communities they serve.

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Supplemental Material

Supplemental material for this article is available online.

References

- Center for Disease Control and Prevention. HIV Surveillance Report. 2018. Accessed September 24, 2020. <https://www.cdc.gov/hiv/library/reports/hiv-surveillance/vol-31/index.html>
- Dennis AM, Hué S, Pasquale D, et al. HIV transmission patterns among immigrant latinos illuminated by the integration of phylogenetic and migration data. *AIDS Res Hum Retroviruses*. 2015; 31(10):973–980.
- Guilamo-Ramos V, Thimm-Kaiser M, Benzekri A, et al. The invisible US Hispanic/Latino HIV crisis: addressing gaps in the national response. *Am J Public Health*. 2020;110(1):27–31.
- Valverde EE, Oster AM, Xu S, Wertheim JO, Hernandez AL. HIV transmission dynamics among foreign-born persons in the United States. *J Acquir Immune Defic Syndr*. 2017;76(5): 445–452.
- Harris NS, Johnson AS, Huang YA, et al. Vital signs: status of human immunodeficiency virus testing, viral suppression, and HIV preexposure prophylaxis—United States, 2013–2018. *MMWR Morb Mortal Wkly Rep*. 2019;68(48):1117–1123.
- Singh S, Song R, Johnson AS, McCray E, Hall HI. HIV incidence, prevalence, and undiagnosed infections in U.S. men who have sex with men. *Ann Intern Med*. 2018;168(10):685–694.
- Rothman RE, Merchant RC. Update on emerging infections from the centers for disease control and prevention. Revised recommendations for HIV testing of adults, adolescents, and pregnant women in health-care settings. *Ann Emerg Med*. 2007;49(5): 575–579.
- Rothman RE, Lyons MS, Haukoos JS. Uncovering HIV infection in the emergency department: a broader perspective. *Acad Emerg Med*. 2007;14(7):653–657.
- Tang N, Stein J, Hsia RY, Maselli JH, Gonzales R. Trends and characteristics of US emergency department visits, 1997-2007. *JAMA*. 2010;304(6):664–670.
- Tarraf W, Vega W, González HM. Emergency department services use among immigrant and non-immigrant groups in the United States. *J Immigr Minor Health*. 2014;16(4):595–606.
- Ortega AN, Fang H, Perez VH, et al. Health care access, use of services, and experiences among undocumented Mexicans and other Latinos. *Arch Intern Med*. 2007;167(21):2354–2360.
- Branson BM, Handsfield HH, Lampe MA, et al. Revised recommendations for HIV testing of adults, adolescents, and pregnant women in health-care settings. *MMWR Morb Mortal Wkly Rep*. 2006;55(14):1–17.
- Sha BE, Kniuksta R, Exner K, et al. Evolution of an electronic health record based-human immunodeficiency virus (HIV) screening program in an urban emergency department for diagnosing acute and chronic HIV infection. *J Emerg Med*. 2019; 57(5):732–739.
- Leblanc J, Hejblum G, Costagliola D, et al. Targeted HIV screening in eight emergency departments: The DICI-VIH cluster randomized two-period crossover trial. *Ann Emerg Med*. 2018;72(1): 41–53.
- White DA, Giordano TP, Pasalar S, et al. Acute HIV discovered during routine HIV screening with HIV antigen-antibody combination tests in 9 US emergency departments. *Ann Emerg Med*. 2018;72(1):29–40.
- Tai M, Merchant RC. HIV testing in US emergency departments, outpatient ambulatory medical departments, and physician offices, 1992-2010. *AIDS Care*. 2014;26(9):1105–1108.
- Coil C, Haukoos JS, Witt MD, Wallace RC, Lewis RJ. Evaluation of an emergency department referral system for outpatient HIV testing. *J Acquir Immune Defic Syndr*. 2004;35(1):52–55.
- Wilson SR, Mitchell C, Bradbury DR, et al. Testing for HIV: current practices in the academic ED. *Am J Emerg Med*. 1999; 17(4):354–356.
- Hall HI, Song R, Rhodes P, et al. Estimation of HIV incidence in the United States. *JAMA*. 2008;300(5):520–529.

20. Center for Disease Control and Prevention. HIV Incidence: Estimated Annual Infections in the U.S., 2014-2018. Accessed September 24, 2020. https://www.cdc.gov/nchhstp/newsroom/docs/factsheets/hiv-incidence-fact-sheet_508.pdf
21. Merchant RC, Liu T, Clark MA, Carey MP. Facilitating HIV/AIDS and HIV testing literacy for emergency department patients: a randomized, controlled, trial. *BMC Emerg Med.* 2018; 18(1):21.
22. Andrews RM; Agency for Healthcare Research and Quality. *Serving the Uninsured: Safety-Net Hospitals, 2003.* Agency for Healthcare Research & Quality; 2007.
23. Merchant RC, Marks SJ, Clark MA, Carey MP, Liu T. Limited ability of three health literacy screening items to identify adult English- and Spanish speaking emergency department patients with lower health literacy. *Ann Emerg Med.* 2020;75(6):691–703.
24. Centers for Disease Control and Prevention (CDC). Rapid HIV testing in emergency departments—three U.S. sites, January 2005-March 2006. *MMWR Morb Mortal Wkly Rep.* 2007; 56(24):597–601.
25. Ehrenkranz PD, Ahn CJ, Metlay JP, Camargo CA Jr, Holmes WC, Rothman R. Availability of rapid human immunodeficiency virus testing in academic emergency departments. *Acad Emerg Med.* 2008;15(2):144–150.
26. Center for Disease Control and Prevention. Ending the HIV Epidemic. Accessed September 24, 2020. <https://www.cdc.gov/endinghiv/treat.html>
27. Centers for Disease Control and Prevention (CDC). Vital signs: HIV testing and diagnosis among adults—United States, 2001-2009. *MMWR Morb Mortal Wkly Rep.* 2010;59(47):1550–1555.
28. Schiller JS, Clarke TC, Norris T. Early release of selected estimates based on data from the January–September 2017 National Health Interview Survey. National Center for Health Statistics. March 2018. Accessed September 24, 2020. <https://www.cdc.gov/nchs/nhis.htm>
29. Ojikutu BO, Mazzola E, Fullem A, et al. HIV testing among black and Hispanic immigrants in the United States. *AIDS Patient Care STDS.* 2016;30(7):307–314. doi:10.1089/apc.2016.0120
30. White DA, Scribner AN, Schulden JD, Branson BM, Heffelfinger JD. Results of a rapid HIV screening and diagnostic testing program in an urban emergency department. *Ann Emerg Med.* 2009; 54(1):56–64.
31. Silva A, Glick NR, Lyss SB, et al. Implementing an HIV and sexually transmitted disease screening program in an emergency department. *Ann Emerg Med.* 2007;49(5):564–572.
32. Jain S, Lowman ES, Kessler A, et al. Seroprevalence study using oral rapid HIV testing in a large urban emergency department [published correction appears in *J Emerg Med.* 2013 Jun;44(6):1212]. *J Emerg Med.* 2012;43(5):e269–e275.
33. Center for Disease Control and Prevention. First year geographic focus ending the HIV epidemic: a plan for America. Accessed September 24, 2020. <https://www.cdc.gov/endinghiv/docs/Ending-HIV-geographic-focus-508.pdf>
34. Essuon AD, Zhao H, Wang G, Collins N, Karch D, Rao S. HIV testing outcomes among Blacks or African Americans—50 Local U.S. Jurisdictions accounting for the majority of new HIV diagnoses and seven states with disproportionate occurrences of HIV in rural areas, 2017. *MMWR Morb Mortal Wkly Rep.* 2020;69(4): 97–102.
35. Sheehan DM, Trepka MJ, Dillon FR. Latinos in the United States on the HIV/AIDS care continuum by birth country/region: a systematic review of the literature. *Int J STD AIDS.* 2015;26(1):1–12.