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

Date received: 23 August 2020; revised: 28 September 2020; accepted: 13 October 2020.

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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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 immigrants 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 whose HIV test result in the ED was negative were subsequently assessed for the first part of the study.

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 ≥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. |
|---------------------------------------------------------------|

| Gender (% (95% CI)) | Latino immigrants | Blacks | |
|---------------------|-------------------|--------|---|
| Male                | 51 (46, 55)       | 44 (35, 53) | 38 (28, 50) |
| Female              | 49 (45, 54)       | 56 (47, 65) | 62 (50, 72) |

| Age (mean (95% CI)) | Latino immigrants | Blacks | |
|---------------------|-------------------|--------|---|
| Never tested        | 18 (15, 22)       | 12 (8, 19) | 22 (15, 30) |
| Ever tested         | 23 (20, 26)       | 12 (7, 15) | 20 (17, 23) |

| Insurance (% (95% CI)) | Latino immigrants | Blacks | |
|------------------------|-------------------|--------|---|
| Private                | 5 (3, 8)          | 22 (15, 30) | 27 (18, 38) |
| Governmental           | 44 (40, 49)       | 44 (35, 53) | 33 (23, 45) |
| None                   | 50 (45, 55)       | 57 (51, 63) | 40 (29, 51) |

| Education (% (95% CI)) | Latino immigrants | Blacks | |
|------------------------|-------------------|--------|---|
| Some high school or less | 71 (66, 75) | 74 (69, 79) | 19 (13, 27) |
| Grade 12 or GED        | 20 (17, 24)       | 45 (36, 54) | 37 (27, 48) |
| Some college           | 7 (5, 10)         | 9 (6, 13) | 26 (18, 34) |
| Completed college or more | 2 (1, 3) | 10 (6, 17) | 14 (7, 23) |

| Health Literacy (% (95% CI)) | Latino immigrants | Blacks | |
|-----------------------------|-------------------|--------|---|
| Lower                       | 47 (42, 51)       | 41 (35, 53) | 38 (28, 50) |
| Higher                      | 53 (49, 58)       | 53 (47, 59) | 62 (50, 72) |
| SASH Score (mean (95% CI)) | 21 (20, 22)       | 22 (22, 23) | 33 (23, 45) |

| Time in the US | Latino immigrants | Blacks | |
|----------------|-------------------|--------|---|
| Less than 10 years | 18 (15, 22) | 12 (9, 17) | 33 (23, 45) |
| 10 years or more  | 81 (77, 85)      | 88 (83, 92) | 67 (55, 77) |

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

154 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.

| Site                          | Latino immigrants (n = 1500), OR (95% CI) | Blacks (n = 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    | 1.70 (1.32, 2.18)                        | 0.87 (0.57, 1.32)              |
| high health literacy          |                                          |                                 |
| Site                          |                                          |                                 |
| University of Alabama-Birmingham | 2.01 (1.29, 3.09)           |                                 |
| University of Cincinnati      |                                          | Reference                       |
| Olive View-UCLA               | 2.89 (2.20, 3.79)                       |                                 |
| Medical Center                |                                          |                                 |
| Rhode Island Hospital         |                                          |                                 |
| SASH Score                    | 1.00 (0.98, 1.01)                       |                                 |

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

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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 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, this investigation supports the call for continued HIV testing efforts in this setting.

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.

| Gender (% (95% CI)) | Latino immigrants | Blacks |
|---------------------|-------------------|--------|
| Male                | Rhode Island Hospital | Olive View—UCLA Medical Center | All | University of Alabama-Birmingham | University of Cincinnati |
|                     | (n = 464) | (n = 105) | (n = 235) | (n = 413) | (n = 87) | (n = 187) | (n = 31) | (n = 226) | (n = 56) |
| Male                | 39 (34, 43) | 36 (30, 42) | 42 (35, 48) | 35 (30, 40) | 35 (28, 42) | 35 (29, 42) |
| Female              | 61 (57, 66) | 64 (58, 70) | 58 (52, 65) | 65 (60, 70) | 65 (58, 72) | 65 (58, 71) |
| Age (mean (95% CI)) | 42 (41, 43) | 44 (44, 46) | 46 (44, 47) | 45 (44, 46) | 45 (44, 46) | 45 (38, 42) |
| Private             | 5 (3, 7) | 7 (4, 11) | 2 (1, 5) | 21 (17, 25) | 21 (17, 25) | 12 (8, 17) |
| Governmental        | 53 (48, 58) | 67 (61, 73) | 39 (33, 46) | 60 (55, 65) | 60 (55, 65) | 76 (70, 82) |
| None                | 42 (38, 47) | 26 (20, 32) | 59 (52, 65) | 19 (16, 24) | 19 (16, 24) | 12 (8, 16) |
| Education (% (95% CI)) | 61 (56, 65) | 56 (50, 63) | 65 (59, 71) | 21 (17, 25) | 21 (17, 25) | 23 (17, 29) |
| Some high school or less | 26 (22, 30) | 21 (16, 33) | 21 (16, 27) | 21 (16, 27) | 21 (16, 27) | 21 (17, 25) |
| Grade 12 or GED     | 10 (7, 13) | 11 (8, 16) | 3 (0, 10) | 2 (1, 5) | 2 (1, 5) | 19 (14, 26) |
| Some college        | 4 (2, 6) | 5 (3, 9) | 2 (1, 5) | 5 (3, 7) | 5 (3, 7) | 5 (3, 10) |
| Completed college or more | 18 (16, 23) | 29 (22, 37) | 11 (7, 16) | 23 (22, 24) | 23 (22, 24) | 23 (22, 24) |
| Health Literacy (% (95% CI)) | 46 (41, 50) | 45 (38, 51) | 47 (40, 53) | 47 (40, 53) | 47 (40, 53) | 47 (36, 51) |
| Lower               | 54 (50, 59) | 55 (49, 62) | 53 (47, 60) | 53 (47, 60) | 53 (47, 60) | 53 (47, 60) |
| Higher              | 21 (20, 22) | 19 (18, 20) | 19 (18, 20) | 23 (22, 24) | 23 (22, 24) | 41 (36, 46) |
| SASH Score (mean (95% CI)) | 18 (16, 23) | 29 (22, 37) | 11 (7, 16) | 23 (22, 24) | 23 (22, 24) | 41 (36, 46) |
| Time in the US      | 10 years or more | 10 (4, 19) | 80 (76, 84) | 89 (84, 93) | 90 (81, 96) | 89 (84, 93) |

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

1 SASH scores were imputed with the mean average of answered for participants who were missing 4 or fewer items.
|                    | Latino immigrants | Black | Olive View—UCLA Medical Center | All             | University of Alabama-Birmingham | University of Cincinnati |
|--------------------|-------------------|-------|--------------------------------|----------------|----------------------------------|-------------------------|
|                    | Never tested      | Ever  | Never tested                  | Ever tested    | Never tested                     | Ever tested             |
|                    | \(n = 197\)       | \(n = 444\) | \(n = 68\)                  | \(n = 266\)    | \(n = 76\)                       | \(n = 424\)             | \(n = 31\)             | \(n = 251\)             |
| Any risk factor    | 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 | 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)                |
| Casual 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)             |
| Exchange 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)                |
| Any MSM CAI        | 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)            |
| IDU (%(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     | 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.

1 Any risk factor includes any of the factors listed in the table.
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). However, 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 might not be similar to other EDs. It should also be noted that the RCT sample underrepresents the true risk profile of participants in light of previous 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.

Despite a falling incidence of HIV/AIDS in the US, it continues to disproportionately impact Latino immigrants and Blacks. As demonstrated here, and elsewhere, Latino immigrant and Black patients seek care in the ED. Although rates of testing in the ED are lower than CDC guidelines, 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 argue 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).

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

|                        | Latino immigrants (n = 651) | Blacks (n = 500) |
|------------------------|----------------------------|-----------------|
| **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 reference  | 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 | Reference | Reference             |
| University of Cincinnati | Reference     | Reference  |
| Olive View—UCLA        | 2.90 (1.92, 4.37)           | Reference       |
| Medical Center         | Reference                   |                 |
| Rhode Island Hospital  | 0.99 (0.96, 1.03)           |                 |

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

65 Latino immigrants missing SASH score.
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.

Authors’ Note
Prior Presentations: This work was presented at the Society for Academic Emergency Medicine’s 2020 conference. 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.

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

Funding
The author(s) received no financial support for the research, authorship, and/or publication of this article.

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Supplemental Material
Supplemental material for this article is available online.

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