Systematic review of social determinants of health associated with HIV testing among Hispanic/Latino gay, bisexual and other men who have sex with men in the United States

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Abstract

This systematic review synthesized published literature (January 2008-October 2021) about the association between social determinants of health (SDOH) and HIV testing among Hispanic/Latino gay, bisexual and other men who have sex with men (HLMSM), a group disproportionately affected by HIV. Having higher education than a high school diploma, health insurance and access to healthcare services, and visiting a healthcare provider in the past 12 months were some of the determinants associated with HIV testing, while limited English proficiency was associated with reduced odds of HIV-testing among HLMSM. More research is needed to understand the relationship of SDOH (especially neighborhood) and HIV testing, how SDOH may affect HIV testing among different HLMSM groups, and how to increase self-testing and use of e-health in this priority population. Additionally, culturally and linguistically appropriate multilevel interventions and health services for HLMSM are urgently needed to diagnose HIV as early as possible after infection.

Keywords

Hispanic/Latino; Men who have sex with men; HIV testing; Social determinants of health

Introduction

Gay, bisexual, and other men who have sex with men (collectively referred to as MSM) are the population most affected by HIV in the United States. In 2019, 66% (23,100/34,800) of new HIV infections were attributed to male-to-male sexual contact, and one in three of those (34%; 7,900/23,100) were among Hispanic/Latino MSM (hereafter referred to as HLMSM) (CDC, 2021). At year-end 2019, an estimated 692,900 MSM aged ≥13 years were living with HIV (prevalence), including an estimated 105,345 (15.2%) MSM whose infection had not been diagnosed (CDC, 2021). It is noteworthy that HLMSM had the largest percentage...
of undiagnosed infection (19.7%), compared with Black/African American MSM (17.4%) and White MSM (10.0%) in 2019 (Centers for Disease Control and Prevention [CDC], 2021). This disparity was consistently observed from 2015 through 2019 (Centers for Disease Control and Prevention [CDC], 2021) and highlights a missed opportunity for HLMSM to fully benefit from early diagnosis and treatment, receive appropriate HIV care, and reduce the risk of HIV transmission (Crepaz, Mullins, Higa, Gunn, & Salabarría-Peña, 2021).

Increasing HIV testing among HLMSM is important in reducing a persistent HIV disparity in awareness of undiagnosed HIV highlighted in the Ending the HIV Epidemic (EHE) initiative (Fauci, Redfield, Sigounas, Weahkee, & Giroir, 2019) and in the National HIV/AIDS Strategy for the United States 2022–2025 (The White House, 2021). Studies have shown that social determinants of health (conditions in the places where people are born, grow, live, learn, work, play, worship and age that affect a wide range of health risks and outcomes) have a major impact on an individual’s health and contribute to many health disparities (Carter, Salabarría-Peña, Fields, & Robinson, 2022; Menza, Hixson, Lipira, & Drach, 2021; U.S. Department of Health and Human Services & Office of Disease Prevention and Health Promotion, 2021). According to the US Department of Health and Human Services (HHS) Healthy People 2030, SDOH factors that affect population health are organized in five domains: economic stability (e.g., income, housing); education (e.g., educational attainment, preferred language); social and community context (e.g., stigma, racism, discrimination, community attachment); healthcare access and quality (e.g., access to health care, insurance); and neighborhood and built environment (e.g., access to public transportation, air and water quality) (U.S. Department of Health and Human Services et al., 2021) (see SDOH description in Table 1). Multifaceted and complex inequities that result from people’s living conditions underline the need to identify and understand SDOH factors affecting HLMSM access to and utilization of HIV prevention services such as HIV testing (U.S. Department of Health and Human of Services et al., 2021).

The interrelationship between SDOH and HIV disparities (De Jesus & Williams, 2018; Dean & Fenton, 2010) has resulted in studies exploring the associations between SDOH and the HIV care continuum, including three published systematic reviews (Aidala et al., 2016; Geter, Sutton, & Hubbard McCree, 2018; Levison, Levinson, & Alegría, 2018). Nevertheless, there is a dearth of published systematic reviews on SDOH and HIV testing among HLMSM. The purpose of this systematic review is to better understand SDOH factors associated with HIV testing among HLMSM. We aimed to identify studies that provide quantitative data on these associations and used the HHS’s Social Determinants of Health framework and Healthy People 2030 framework to synthesize the findings based on 5 domains including economic stability, education, social/community context, healthcare access and quality, and neighborhood and built environment (Office of Disease Prevention and Health Promotion & National Center for Health Statistics [NCHS], 2020; U.S. Department of Health and Human of Services et al., 2021). Additionally, we identified gaps in the literature and suggest future directions for empirical studies and intervention efforts.
Methods

The protocol for this systematic review was registered with the International Prospective Register of Systematic Reviews (PROSPERO) (Crepaz, Higa, Mullins, Salabarría-Peña, & Gunn, 2020). We followed the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) statement to report our review (Moher et al., 2015; Page et al., 2021).

A systematic literature search was developed to broadly identify HIV-related citations focusing on HLMSM. A subject matter expert identified 10 “gold standard” citations. A librarian examined these citations to identify possible keywords and phrases. Search terms were tested to pinpoint essential keywords and proprietary indexing terms (e.g., MeSH, Emtree). The full search was first developed in MEDLINE (OVID) (Appendix 1). The finalized MEDLINE search was tailored to the unique indexing in EMBASE (OVID), PsycINFO (OVID), CINAHL (EBSCOhost), and Sociological Abstracts (ProQuest). Per standard search practice, there were no language restrictions. The search strategy identified citations published from January 2008 to May 2019 by cross-referencing terms used for HIV, Hispanic/Latino populations, and gay and bisexual men/MSM. We initiated the literature search in 2008 to correspond to the WHO call in 2008 to address SDOH factors to improve health equity and the enactment of the Affordable Care Act in 2010 to improve health access for all. Two updated searches were conducted on January 9, 2020 and October 20, 2021 to identify additional reports published in 2019 - 2021. The hand search included checking the Prevention Research Synthesis (PRS) cumulative database of HIV prevention literature, publication alerts and references list checks of relevant articles (Centers for Disease Control and Prevention (CDC), 2022b).

Inclusion criteria for this review were the following: (1) U.S.-based studies; (2) focused on HLMSM currently residing in the U.S. regardless of country of birth; and (3) reported quantitative data for the associations between HIV testing and at least one SDOH factor. Qualitative studies, commentaries, reviews, conference abstracts, and non-peer-reviewed publications were excluded. The primary outcome was HIV testing which was based on a laboratory test result, surveillance data or self-report testing within a certain timeframe defined by the authors of primary studies. We used the aforementioned Healthy People 2030 SDOH Framework with its five domains shown in Table 1.

Using DistillerSR (Evidence Partners, Ottawa, Ontario), a reviewer first screened citations by title and abstract to identify potentially relevant reports and then reviewed full reports of relevant reports for inclusion/exclusion. Excluded citations were confirmed by a second reviewer. Two reviewers independently abstracted the quantitative data on the associations between SDOH factors and HIV testing from eligible citations and grouped the SDOH factors into respective domains as indicated in Table 1. Disagreements in coding were resolved through discussion.

We used the following rules to abstract the quantitative data and synthesize the findings in the results. If more than one citation came from the same study, we linked the citations together, but used the information from citations which provided more information in

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the study description (Table 2) and findings summary (Table 3) and supplemented with information from the linked citations when appropriate. Two studies had linked citations: Eklund et al., 2020 was linked to Dillon et al., 2019 and Painter et al., 2019 was linked to Horridge et al., 2019; both were the primary citations for Tables 2 and 3 and supplemented with the linked reports (Dillon et al., 2019; Eklund, Dillon, & Ebersole, 2020; Horridge et al., 2019; Painter et al., 2019). If a citation reported data from separate studies (i.e., Lee et al., 2021), we counted them as two studies (Washington HIV/STI Prevention Project [WHSPP], Understanding New Infections through Targeted Epidemiology [UNITE]). Most of the included studies reported both univariate and multivariable analysis findings. In many cases, it was difficult to interpret the multivariable results across studies because each multivariable model included a different set of predictor variables in the equation. Conversely, the univariate/bivariate statistics provided an opportunity to detect an association unclouded by other variables. Therefore, we prioritized univariate/bivariate statistics for reporting and calculating effect sizes over multivariable/adjusted statistics (Deepthy, Harichandrakumar, Parameswaran, Kadhiravan, & Sreekumaran Nair, 2022).

Effect sizes were estimated with odds ratios (OR) because most of the studies reported dichotomous outcomes (i.e., HIV testing – yes/no). An OR > 1 indicates increased odds of HIV testing and an OR < 1 indicates reduced odds of HIV testing. For each SDOH factor, there was a small number of studies that examined its association with HIV testing outcome (median = 2; range: 1 to 8 studies). We provided descriptive information for SDOH factors that were examined with one or two studies. For SDOH factors that were examined with three but less than five studies, we reported the median, minimum (min) and maximum (max) of effect sizes. Meta-analyses of combined effect sizes were calculated only for the SDOH factors that had five or more studies (Jackson & Turner, 2017). Random-effects models with two-tailed tests were used to calculate combined effects for HIV testing in meta-analyses. The $I^2$ statistic for each SDOH was reported to indicate the proportion of variance across studies due to heterogeneity. Due to the small number of the studies, publication bias was not examined.

We assessed risk of bias by adapting the Newcastle-Ottawa scale for non-randomized studies (http://www.ohri.ca/programs/clinical_epidemiology/oxford.asp) (Wells et al., 2021). More specifically, we examined study quality on five domains: selection of participants, sample size, comparability of respondents, ascertainment of HIV testing (self-report or laboratory result), and quality of descriptive statistics reporting. Total scores were calculated by counting the number of ‘Yes’ responses. The total possible value was five points (zero to five), with three or more points considered “low risk of bias”.

**Results**

**Study Characteristics**

We screened 3,252 relevant titles and abstracts; 105 were selected for full report review. Eight unique studies from nine citations that provided tests of associations met inclusion criteria for final analysis (Figure 1). Data sources and collection methods varied across studies, ranging from local or national online surveys (Eklund et al., 2020; Lee et al., 2021), baseline data of behavioral intervention studies (Joseph, Belcher, O’Donnell, Fernandez,
Spikes, & Flores, 2014; Painter et al., 2019; Spadafino, Martinez, Levine, Dodge, Muñoz-Laboy, & Fernandez, 2016, and respondent-driven samples (Gilbert & Rhodes, 2013) to the National HIV Behavioral Surveillance System from 21 metropolitan areas based on venue-based, time space sampling (Oster et al., 2013). More than half of the studies (Eklund et al., 2020; Joseph et al., 2014; Lee et al., 2021; Oster et al., 2013; Spadafino et al., 2016) recruited participants from places where HIV prevalence among Hispanic/Latino men is highest in the United States (e.g., such as New York, Miami, Los Angeles, Chicago, Houston); two studies were conducted in North Carolina (Gilbert et al., 2013; Painter et al., 2019); and one was conducted in Washington state (Lee et al., 2021). Most (75%) studies were assessed as having a low risk of bias (see Appendix 2).

As seen in Table 1, sample characteristics were diverse across studies, especially regarding educational level, country of birth, length of time in the U.S., and language preference. The sample size ranged from 190 to 2099 with a median of 409. All studies defined the outcome as HIV testing in the past 12 months except one (Painter et al., 2019) that defined HIV testing in the last 6 months (Table 2). The proportion of study participants tested for HIV ranged from 21% to 78% with a median of 57%.

**Reported Barriers to HIV Testing**

Among studies that reported reasons not to get tested or barriers to HIV testing (Table 2), the most common reasons included: believing oneself to be at low risk (Gilbert et al., 2013; Joseph et al., 2014; Painter et al., 2019; Oster et al., 2013), fear of a positive test (Gilbert et al., 2013; Joseph et al., 2014; Painter et al., 2019; Oster et al., 2013), worry that test results might be reported to the government (Gilbert et al., 2013; Oster et al., 2013), concerns that others might treat them differently if found to be HIV positive (Gilbert et al., 2013), language barrier (e.g., not fluent in English, HIV testing service not offered in Spanish; Spadafino et al., 2016), not knowing where to get tested (Painter et al., 2019), not having health insurance (Painter et al., 2019); not being recommended by providers to get tested (Joseph et al., 2014; Painter et al., 2019), not having the time (Gilbert et al., 2013; Painter et al., 2019), and service providers being discriminatory against being male and gay (Spadafino et al., 2016).

**Social Determinants of Health (SDOH)**

Table 3 shows a total of 29 SDOH factors examined in the eight studies. Most of the factors fall under the social and community context. We did not identify any study that examined the associations between neighborhood and built environment and HIV testing.

**Economic Stability (income, employment)—**Income and employment status were the only two SDOH factors on economic stability reported in included studies. Three studies examined the association of income and HIV testing and the result is mixed with a median OR (min to max) = 1.60 (0.80 to 3.14) (Eklund et al., 2020; Joseph et al., 2014; Oster et al., 2013). Two studies examined the association between employment status and HIV testing (Joseph et al., 2014; Spadafino et al., 2016) and neither found evidence of an association.
Education access and quality (educational attainment and preferred language)—All eight studies included in this review examined the association between education and HIV testing with effect sizes in the favorable direction that shows higher educational attainment (e.g., higher than a high school diploma) was associated with having been tested for HIV. The combined effect size from eight studies was OR = 1.77, 95%CI = 1.35, 2.32, Z = 4.10, p < 0.0001 with high heterogeneity: I² = 70.1).

Among the six studies examining the association between language preference and having been HIV tested, the combined effect showed an association between speaking only Spanish or more frequently Spanish with reduced odds of HIV testing (OR = 0.77, 95%CI = 0.60, 0.99, Z = −2.01, p = 0.044, with high heterogeneity: I² = 78.5).

Social and community context (stigma, discrimination, homonegativity, machismo, caballerismo, country of birth, social support, community attachment)—Social and community context was the most explored category; however, there were few studies per each SDOH factor. One 2013 study showed that higher HIV stigma was associated with increased odds of HIV testing, partially driven by the perceived severity of HIV (Gilbert et al., 2013). Three studies examined the association of adherence to traditional notions of masculinity (machismo that supports traditional gender roles emphasizing the patriarchy via dominance, sexism, reserved emotions) and HIV testing and the result is mixed with a median OR (min to max) = 0.96 (0.71 to 1.72) (Eklund et al., 2020; Gilbert et al., 2013; Painter et al., 2019). On the other hand, caballerismo (a protective aspect of traditional Latino male gender norm about accepting responsibility and protecting the family), was associated with increased odds of HIV testing in one study (Eklund et al., 2020). In addition, two studies showed an association between social support and HIV testing (Eklund et al., 2020; Painter et al., 2019). One study examined various types of social connectedness and found that acculturation (OR = 1.05, 95%CI = 1.02, 1.08) and gay community attachment (OR = 1.73, 95%CI = 1.04, 2.87) were associated with HIV testing with small (or modest) effects (Painter et al., 2019). With regard to negative stereotypes/homonegativity, the results were mixed; Joseph et al, 2014 found internalized homonegativity was associated with reduced odds of HIV testing (OR = 0.78, 95%CI = 0.66, 0.92), while Gilbert et al, 2013 found a null result (OR = 1.22, 95%CI = 0.89, 1.67) (Gilbert et al., 2013). There was no association with HIV testing for the following SDOH factors: discrimination based on ethnicity; sexual orientation/gender identity (Painter et al., 2019); born outside of United States (Joseph et al., 2014; Spadafino et al., 2016); years in the United States (Gilbert et al., 2013; Oster et al., 2013; Painter et al., 2019); social comfort with gay men (Gilbert et al., 2013); social isolation (Joseph et al., 2014); connected to others based on ethnic identity and religion (Painter et al., 2019); ethnic identity search and affirmation/belonging (Joseph et al., 2014); Latino community attachment (Painter et al., 2019); Latino gay community attachment (Joseph et al., 2014; Painter et al., 2019); transgender community attachment (Painter et al., 2019); and Latino transgender community attachment (Painter et al., 2019).

Healthcare Access and Quality—Five SDOH factors were related to the healthcare access and quality category. With regards to having health insurance, the combined effect

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size from five studies (Joseph et al., 2014; Lee et al., 2021; Oster et al., 2013; Spadafino et al., 2016) was positive and greater than 1, but the confidence interval slightly covered 1 (OR = 1.24, 95% CI = 0.98, 1.56, Z = 1.82, p = 0.07, I² = 76.3). Having visited a healthcare provider in the past 12 months was associated with HIV testing (OR = 2.34, 95% CI = 1.37, 4.03; Joseph et al., 2014; OR = 3.40, 95% CI = 2.72, 4.25; Oster et al., 2013). Disclosing one’s sexual identity to a healthcare provider (OR = 2.26, 95% CI = 1.55, 3.30; Joseph et al., 2014) and access to healthcare services (OR = 1.97, 95% CI = 1.33, 2.92; Eklund et al., 2020) were each examined in one study, and both found an association with HIV testing.

**Neighborhood and built environment**—None of the studies included in this review examined any SDOH within this category.

**Discussion**

This systematic review identified several factors associated with HIV testing among HLMSM within four of the five SDOH domains. The majority of SDOH factors were examined with a small number of studies and there was high heterogeneity among studies which might have resulted from diverse HLMSM participants in the included studies and different measurements used for the same SDOH factors. Factors associated with increased HIV testing among HLMSM include more than a high school education, speaking English (vs. Spanish), *caballerismo*, social support, acculturation to American culture, gay community attachment, having health insurance, visited healthcare provider in the past 12 months, disclosed one’s sexual identify to a healthcare provider, and having access to healthcare services. Some of these SDOH factors (e.g., education, English language skills, insurance) were also identified as important in engaging HLMSM in the HIV care continuum in a previously published systematic review (Levison et al., 2018). We found mixed results (e.g., income, internalized negative stereotypes/homonegativity, *machismo*) or null associations for SDOH factors such as employment, discrimination, country of birth, years in the United States. Given that some SDOH factors might be interconnected (e.g., income and access to healthcare services), the associations between SDOH and HIV testing among HLMSM are likely more complex than examining each SDOH in isolation. Additionally, no factors related to neighborhood and built environment were identified in the studies reviewed. The lack of publications may represent a missed opportunity for more in-depth examination of the effects of neighborhood and built environment on HIV testing among HLMSM.

Some limitations warrant comment. First, diverse HLMSM participants were recruited and different measurements of SDOH factors were used across studies, making it challenging to synthesize the findings. We included studies published from 2008 to 2021 in peer-reviewed journals that provided quantitative data on the associations between SDOH factors and HIV testing among HLMSM in the United States. Although the majority of the studies (75%) were assessed as being low risk of bias (i.e., high study quality), most of the studies were conducted prior to 2015. Given the intensified promotion of the “Test, Treat, and Prevent” approach in the recent years, additional relevant SDOH factors associated with HIV testing among HLMSM might not be identified by this systematic review as time to publication often takes two or more years. Third, there were only three SDOH factors (i.e., more than
a high school education, speaking only Spanish or speaking more Spanish than English, and having health insurance) that had data from five or more studies for calculating the combined effect sizes. We encourage more studies to explore the associations between HIV testing and SDOH factors, especially for the factors that have not been tested or only tested with few studies (e.g., income, employment, stigma, discrimination, traditional gender norms, immigration status, acculturation, neighborhood and built environment) and continual synthesizing of the literature when more studies become available.

Several important implications for further research and program efforts can be gleaned from our findings. First, the language barrier is a frequently cited reason for not being HIV tested and those who speak only Spanish or more Spanish than English were less likely to get tested. These findings underscore the need for bilingual staff at HIV testing centers, having HIV testing materials and tools adequately translated in Spanish for non-English proficient Hispanic/Latino persons, and language interpretation services available as needed. In addition, evidence from two studies (Eklund et al., 2020; Painter et al., 2019) suggests that traditional gender norms such as caballerismo might be associated with HIV testing. Given that these preliminary findings were based on a very small number of studies, further understanding and integration of caballerismo in behavioral interventions (including media campaigns) and care delivery may be important for fostering sexual health, including HIV testing (Arciniega, Anderson, Tovar-Blank, & Tracey, 2008; Rivera, Brady, & Blashill, 2021). More culturally and linguistically appropriate HIV campaigns, interventions, service programs, and care delivery are needed for HLMSM to increase HIV testing and awareness of one’s HIV status. The Centers for Disease Control and Prevention (CDC) has developed several resources for media campaigns in Spanish (Centers for Disease Control and Prevention (CDC), 2022a), and provided funding and technical assistance to build the capacity of community based organizations serving HLMSM. Yet, HLMSM-community driven multi-level approaches to ameliorate the effects of structural barriers and close collaboration between communities, service providers, and federal agencies are warranted to achieve the EHE goals (Mann-Jackson et al., 2021).

Second, some evidence suggests that visiting a health care provider and disclosing one’s sexual identity to a health care provider are associated with HIV testing. Regrettably, discrimination against MSM by service providers has been reported as a barrier to HIV testing (Spadafino et al., 2016) and providers with limited HIV-stigma training were more likely to display stigmatizing behaviors toward patients (Geter, Herron, & Sutton, 2018). Some MSM have also reported not having been offered HIV testing when visiting a health care provider (Wejnert, Prejean, Hoots, Hall, McCray, & Mermin, 2018), despite the recommendation from CDC and the U.S. Preventive Service Task Force for performing routine HIV screening for most individuals aged 13-64 years (Branson et al., 2006; Chou, Huffman, Fu, Smits, & Korthuis, 2005). These findings highlight the important role health care providers play in providing access to HIV testing and, in turn, helping individuals know their HIV status. Several clinician barriers to conducting routine HIV testing have been identified including: lack of awareness of HIV testing guidelines; lack of familiarity with HIV test procedures; lack of knowledge about culture, language, sexual orientation, gender, race or age groups; costs and reimbursement; and incompatibility of guidelines with state or local policies (Bagchi & Davis, 2020; Geter, Herron, et al., 2018). Making resources
and training available to providers for overcoming these barriers would likely increase HIV testing among HLMSM.

Third, access to health care services seems to be associated with increased odds of HIV testing. As demonstrated during the COVID-19 pandemic, offering free self-tests, testing services at easy-to-access locations, and utilizing e-health resources (e.g., social media campaigns encouraging HIV testing and providing information on free HIV testing locations) might be helpful tools to increase awareness of HIV status among HLMSM. More implementation research and evaluation to understand how to best promote self-test and culturally and linguistically appropriate e-health, may be key to amplify the impact of prevention efforts.

Fourth, the Hispanic/Latino population is not a monolith; therefore, treating HLMSM as a single group can mask factors affecting HIV testing in such a diverse group. Therefore, tailoring assessments, intervention strategies and evaluations to the distinct contexts and experiences of Hispanic/Latino subpopulations (e.g., U.S. generation, country of birth, indigenous/non-indigenous, U.S. geographical region, length of time in the US, immigration status) can help improve HIV-testing and other HIV-related outcomes (Levison et al., 2018; Zamudio-Haas, Maiorana, Gomez, & Myers, 2019).

In summary, this systematic review synthesized the available published literature on SDOH factors associated with HIV testing among HLMSM, a diverse priority group disproportionately affected by HIV. Our findings indicate the need for more quantitative studies on HLMSM and HIV testing; the need to identify both HIV testing and SDOH experiences among different Hispanic/Latino groups; explore the associations between HIV testing and SDOH factors; design culturally and linguistically appropriate HIV campaigns and other interventions, service programs, and care delivery; make resources and training available to providers to overcome barriers to conducting routine HIV testing; and conduct implementation research to understand how best to promote self-testing and culturally and linguistically appropriate e-health for HLMSM.

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Disclaimer.
The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Appendix 1

Databases and Search Process
- Databases (platform) search years: 2008 – 2021, last searched October 20, 2021
1. MEDLINE (OVID)
2. EMBASE (OVID)
3. PsycINFO (OVID)
4. CINAHL (ESBCOhost)
5. Sociological Abstracts (ProQuest)

- Search Years: 2008 – 2021, last searched October 20, 2021
  2. Search 2: 2018 – 2020, January 9, 2020 (Duplicates from search 1 removed)
  3. Search 3: 2019 – 2021, October 20, 2021 (Duplicates from search 2 removed)

- Search Process
  1. Searches were run individually in each database and platform to employ each databases index system.
  2. Citations were downloaded to EndNote reference manager software. Duplicates between databases were removed.
  3. Citations were uploaded to DistillerSR software for final duplicate check and screening for the review
  4. Search updates were run individually in each database and downloaded to EndNote reference management software. Duplicates were removed between the databases. Duplicates matching the previous search were removed.
  5. Each search update was uploaded to DistillerSR for final duplicate check and screening for the review.

Complete Search Strategies:

MEDLINE (OVID) Search

Intended Population Index and Keywords

1. Hispanic Americans/
2. Mexican Americans/
3. "Emigrants and Immigrants"/
4. Hispanic*.ti,ab
5. Latin*.ti,ab
6. Puerto Rican*.ti,ab
7. Cuban*.ti,ab
8. Mexican*.ti,ab
9. Central American*.ti,ab
10. South American*.ti,ab
11. (Belizean* OR Costa Rican* OR Dominican* OR Salvadoran* OR Guatemalan*
    OR Honduran* OR Nicaraguan* OR Panamanian*).ti,ab
12. (Argentine* OR Argentinian* OR Bolivian* OR Brazilian* OR Chilean* OR
    Colombian* OR Ecuadorian* OR Paraguayan* OR Peruvian* OR Uruguayan*
    or Venezuelan*).ti,ab
13. Boricua*.ti,ab
14. (Spanish adj2 speak*).ti,ab
15. (chicano* or chicana*).ti,ab
16. (Ethnic* adj2 minorit*).ti,ab
17. Emigrant*.ti,ab
18. Immigrant*.ti,ab
19. (color or colour).ti,ab
20. OR/1-19

**MSM Index and Keywords**

21. “Sexual and Gender Minorities”/
22. Homosexuality, Male/
23. Bisexuality/
24. MSM.ti,ab
25. MSMW.ti,ab
26. Men who have sex with men.ti,ab
27. Gay*.ti,ab
28. Queer*.ti,ab
29. Sexual minorit*.ti,ab
30. Gender minorit*.ti,ab
31. Homosexual*.ti,ab
32. Bisexual*.ti,ab
33. Bi-sexual*.ti,ab
34. (transmen* or trans-men*).ti,ab
35. (transman* or trans-man).ti,ab
36. (transmale* or trans-male*).ti,ab
37. (transmasculine or trans-masculine).ti,ab
38. (FTM OR FTMS).ti,ab
39. (Female-to-Male).ti,ab
40. ((men or man) adj4 transaction* sex*).ti,ab
41. (same gender adj2 lov*).ti,ab
42. (sex* adj2 orientation*).ti,ab
43. Pansexual*.ti,ab
44. (down-low or down low).ti,ab
45. (LGBT or GLBT).ti,ab
46. OR/21-45

**HIV Index and Keywords**

47. Exp HIV Infections/
48. HIV*.ti,ab
49. (AIDS not hearing).ti,ab
50. OR/47-49
51. 20 AND 46 AND 50

**EMBASE (OVID)**

**Intended Population Index and Keywords**

1. Hispanic/
2. Mexican Americans/
3. Hispanic*.ti,ab
4. Latin*.ti,ab
5. Puerto Rican*.ti,ab
6. Cuban*.ti,ab
7. Mexican*.ti,ab
8. Central American*.ti,ab
9. South American*.ti,ab
10. (Belizean* OR Costa Rican* OR Dominican* OR Salvadoran* OR Guatemalan* OR Honduran* OR Nicaraguan* OR Panamanian*).ti,ab
11. (Argentine* OR Argentinian* OR Bolivian* OR Brazilian* OR Chilean* OR Colombian* OR Ecuadorian* OR Paraguayan* OR Peruvian* OR Uruguayan* or Venezuelan*).ti,ab
12. Boricua*.ti,ab
13. (Spanish adj2 speak*).ti,ab
14. (chicano* or chicana*).ti,ab
15. (Ethnic* adj2 minorit*).ti,ab
16. Emigrant*.ti,ab
17. Immigrant*.ti,ab
18. (color or colour).ti,ab
19. OR/1-18

**MSM Index and Keywords**

21. Male homosexuality/
22. Bisexuality/
23. MSM.ti,ab
24. MSMW.ti,ab
25. Men who have sex with men.ti,ab
26. Gay*.ti,ab
27. Queer*.ti,ab
28. Sexual minorit*.ti,ab
29. Gender minorit*.ti,ab
30. Homosexual*.ti,ab
31. Bisexual*.ti,ab
32. Bi-sexual*.ti,ab
33. (transmen* or trans-men*).ti,ab
34. (transman* or trans-man).ti,ab
35. (transmale* or trans-male*).ti,ab
36. (transmasculine or trans-masculine).ti,ab
37. (FTM OR FTMS).ti,ab
38. (Female-to-Male).ti,ab
39. ((men or man) adj4 transaction* sex*).ti,ab
40. (same gender adj2 lov*).ti,ab
41. (sex* adj2 orientation*).ti,ab
42. Pansexual*.ti,ab
43. (down-low or down low).ti,ab
44. (LGBT or GLBT).ti,ab
45. OR/20-44

**HIV Index and Keywords**

46. Exp HIV Infections/
47. HIV*.ti,ab
48. (AIDS not hearing).ti,ab
49. OR/46-48
50. 19 AND 45 AND 49

**PsycINFO (OVID)**

**Intended Population Index and Keywords**

1. Latinos/Latinas/
2. Mexican Americans/
3. Hispanic*.ti,ab
4. Latin*.ti,ab
5. Puerto Rican*.ti,ab
6. Cuban*.ti,ab
7. Mexican*.ti,ab
8. Central American*.ti,ab
9. South American*.ti,ab
10. (Belizean* OR Costa Rican* OR Dominican* OR Salvadoran* OR Guatemalan* OR Honduran* OR Nicaraguan* OR Panamanian*).ti,ab
11. (Argentine* OR Argentinian* OR Bolivian* OR Brazilian* OR Chilean* OR Colombian* OR Ecuadorian* OR Paraguayan* OR Peruvian* OR Uruguayan* or Venezuelan*).ti,ab
12. Boricua*.ti,ab
13. (Spanish adj2 speak*).ti,ab
14. (chicano* or chicana*).ti,ab
15. (Ethnic* adj2 minorit*).ti,ab
MSM Index and Keywords

16. Emigrant*.ti,ab
17. Immigrant*.ti,ab
18. (color or colour).ti,ab
19. OR/1-18

20. MALE HOMOSEXUALITY/
21. BISEXUALITY/
22. MSM.ti,ab
23. MSMW.ti,ab
24. Men who have sex with men.ti,ab
25. Gay*.ti,ab
26. Queer*.ti,ab
27. Sexual minorit*.ti,ab
28. Gender minorit*.ti,ab
29. Homosexual*.ti,ab
30. Bisexual*.ti,ab
31. Bi-sexual*.ti,ab
32. (transmen* or trans-men*).ti,ab
33. (transman* or trans-man).ti,ab
34. (transmale* or trans-male*).ti,ab
35. (transmasculine or trans-masculine).ti,ab
36. (FTM OR FTMS).ti,ab
37. (Female-to-Male).ti,ab
38. ((men or man) adj4 transaction* sex*).ti,ab
39. (same gender adj2 lov*).ti,ab
40. (sex* adj2 orientation*).ti,ab
41. Pansexual*.ti,ab
42. (down-low or down low).ti,ab
43. (LGBT or GLBT).ti,ab
44. OR/20-45
HIV Index and Keywords

45. Exp HIV/
46. HIV*.ti,ab
47. (AIDS not hearing).ti,ab
48. OR/47-49
49. 19 AND 44 AND 48

CINAHL (EBSCOhost)

Intended Population Index and Keywords

1. (MH “Hispanics”)
2. (MH “Immigrants”)
3. TI Hispanic* OR TI Latin* OR TI Puerto Rican* OR TI Cuban* OR TI Mexican* OR TI Central American* OR TI South American*
4. AB Hispanic* OR AB Latin* OR AB Puerto Rican* OR AB Cuban* OR AB Mexican* OR AB Central American* OR AB South American*
5. (TI Belizean* OR TI Costa Rican* OR TI Dominican* OR TI Salvadoran* OR TI Guatemalan* OR TI Honduran* OR TI Nicaraguan* OR TI Panamanian*)
6. (AB Belizean* OR AB Costa Rican* OR AB Dominican* OR AB Salvadoran* OR AB Guatemalan* OR AB Honduran* OR AB Nicaraguan* OR AB Panamanian*)
7. (TI Argentine* OR TI Argentinian* OR TI Bolivian* OR TI Brazilian* OR TI Chilean* OR TI Colombian* OR TI Ecuadorian* OR TI Paraguayan* OR TI Peruvian* OR TI Uruguayan* or TI Venezuelan*)
8. (AB Argentine* OR AB Argentinian* OR AB Bolivian* OR AB Brazilian* OR AB Chilean* OR AB Colombian* OR AB Ecuadorian* OR AB Paraguayan* OR AB Peruvian* OR AB Uruguayan* or AB Venezuelan*)
9. TI Boricua* OR TI (Spanish N2 speak*) OR TI (chicano* or chicana*) OR TI (Ethnic* N2 minorit*) OR TI Emigrant* OR TI Immigrant* OR TI (color or colour)
10. AB Boricua* OR AB (Spanish N2 speak*) OR AB (chicano* or chicana*) OR AB (Ethnic* N2 minorit*) OR AB Emigrant* OR AB Immigrant* OR AB (color or colour)
11. OR/1-10

MSM Index and Keywords

12. (MH Homosexuality)
13. (MH “Gay Men”)
14. (MH “Men Who Have Sex With Men”)
15. (MH “Bisexuality”)
16. TI MSM OR TI MSMW OR TI (Men who have sex with men) OR TI gay* OR TI queer* OR TI sexual minorit* OR TI gender minorit* OR TI Homosexual* OR TI Bisexual* OR TI Bi-sexual*
17. AB MSM OR AB MSMW OR AB (Men who have sex with men) OR AB gay* OR AB queer* OR AB sexual minorit* OR AB gender minorit* OR AB Homosexual* OR AB Bisexual* OR AB Bi-sexual*
18. TI (transmen* OR trans-men*) OR TI (transman* OR trans-man*) OR TI (transmale* OR trans-male*) OR TI (transmasculine OR trans-masculine)
19. AB (transmen* OR trans-men*) OR AB (transman* OR trans-man*) OR AB (transmale* OR trans-male*) OR AB (transmasculine OR trans-masculine)
20. TI (FTM OR FTMS) OR TI (Female-to-Male) OR TI ((men or man) N4 transaction* sex*) OR TI (same gender N2 lov*) OR TI (sex* N2 orientation*) OR TI Pansexual* OR TI (down-low or down low) OR TI (LGBT or GLBT)
21. AB (FTM OR FTMS) OR AB (Female-to-Male) OR AB ((men or man) N4 transaction* sex*) OR AB (same gender N2 lov*) OR AB (sex* N2 orientation*) OR AB Pansexual* OR AB (down-low or down low) OR AB (LGBT or GLBT)
22. OR/12-21

HIV Index and Keywords

23. (MH “HIV Infections+”)
24. TI HIV OR TI (AIDS not hearing)
25. AB HIV OR AB (AIDS not hearing)
26. OR/23-26
27. 11 AND 22 AND 26

Sociological Abstracts

Intended Population Index and Keywords

1. SU (“Hispanic Americans”) OR SU (“Mexican Americans”) OR SU (immigrants)
2. TI,AB (Hispanic* OR Latin* OR Puerto Rican* OR Cuban* OR Mexican* OR Central American* OR South American*)
3. TI,AB (Belizean* OR Costa Rican* OR Dominican* OR Salvadoran* OR Guatemalan* OR Honduran* OR Nicaraguan* OR Panamanian*)
4. TI,AB (Argentine* OR Argentinian* OR Bolivian* OR Brazilian* OR Chilean* OR Colombian* OR Ecuadorian* OR Paraguayan* OR Peruvian* OR Uruguayan* OR Venezuelan*)
5. TI,AB(Boricua* OR chicano* or chicana* emigrant* OR immigrant* OR color OR colour)

6. TI,AB(Spanish NEAR/2 speak*)

7. TI,AB(Ethnic* NEAR/2 minorit*)

8. OR/1-7

**MSM Index and Keywords**

9. SU(Homosexuality)

10. SU(Bisexuality)

11. TI,AB(MSM OR MSMW OR Men who have sex with men OR gay* OR queer* OR sexual minorit* OR gender minorit* OR Homosexual* OR bisexual* OR bi-sexual* OR transmen* OR trans-men* OR transman* OR trans-man* OR transmale* OR trans-male* OR transmasculine or trans-masculine OR FTMS OR Female-to-Male OR Pansexual* OR down-low OR down low OR LGBT TO GLBT)

12. TI,AB((men or man) NEAR/4 transaction* sex*)

13. TI,AB(same gender NEAR/2 lov*)

14. TI,AB(sex* NEAR/2 orientation*)

15. OR/9-14

**HIV Index and Keywords**

1. SU(“Acquired Immune Deficiency Syndrome” )

2. TI,AB(HIV*)

3. OR/16-18

4. 8 AND 15 AND 18

**Appendix 2 --: Study Quality Assessment**

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<tbody>
<tr>
<td>Were participants recruited from multiple locations?</td>
<td>1</td>
<td>1</td>
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<td>Was the sample size ≥200?</td>
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<td>0</td>
<td>1</td>
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<td>Does the study control for</td>
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<td>1</td>
<td>1</td>
<td>1</td>
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</table>

*Author Manuscript*
Modified Newcastle-Ottawa Quality Assessment Tool (Wells, et al. 2021) No = 0; Yes = 1

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<tr>
<td>Factor(s) that may affect the comparability of the cohorts or baseline data?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
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<tr>
<td>Was HIV testing reported using a lab test or medical record (not self-report)?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
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<tr>
<td>Does the study report appropriate descriptive statistics with a proper measure of dispersion?</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
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<td>Total</td>
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<td>3</td>
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<tr>
<td>Quality Assessment (^c)</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>

\(^a\)Understanding New Infections through Targeted Epidemiology

\(^b\)Washington HIV/STI Prevention Project

\(^c\)Scores ≥3 indicate low risk of bias; scores <3 indicate high risk of bias

References


AIDS Educ Prev. Author manuscript; available in PMC 2024 February 01.


AIDS Educ Prev. Author manuscript; available in PMC 2024 February 01.
Figure 1.
PRISMA Study Flow Diagram

Records identified through initial database searches in May 2019
N = 4,786

Additional records identified through updated searches in January 2020
and October 2021
N = 1,715

Records after duplicates removed
N = 3,252

Records screened
N = 3,252

Records excluded N = 3,148
------------------------------------------
Not conducted in US (N = 895)
Not HIV focus (N = 256)
No data on Hispanic/Latino (N = 134)
No data on men who have sex with men (N = 82)
Conference abstract, dissertation, news (N = 620)
Qualitative studies (N = 654)
Not correlational studies (N = 505)

Full-text articles assessed for eligibility
N = 105

Full-text articles excluded, with reasons N = 96
------------------------------------------
Data not stratified by Hispanic/Latino MSM (N = 42)
No relevant outcomes (N = 54)

Studies included in qualitative synthesis
N = 9 (8 unique studies)
Table 1.

<table>
<thead>
<tr>
<th>Healthy People 2030 SDOH Category</th>
<th>Background</th>
<th>SDOH Categories Considered for this Systematic Review</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic stability</td>
<td>In the United States, 1 in 10 people live in poverty, and many people can’t afford things like healthy foods, health care, and housing. People with stable employment are less likely to live in poverty and more likely to be healthy, but many people have trouble finding and keeping a job. People with disabilities, injuries, or conditions like arthritis may be especially limited in their ability to work. In addition, many people with steady work still don’t earn enough to afford the things they need to stay healthy. Employment programs, career counseling, and high-quality childcare opportunities can help more people find and keep jobs. In addition, policies to help people pay for food, housing, health care, and education can reduce poverty and improve health and well-being.</td>
<td>Income, employment, housing, homelessness</td>
</tr>
<tr>
<td>Education access and quality</td>
<td>People with higher levels of education are more likely to be healthier and live longer. Children from low-income families, children with disabilities, and children who routinely experience forms of social discrimination — like bullying — are more likely to struggle with math and reading. They’re also less likely to graduate from high school or go to college. This means they're less likely to get safe, high-paying jobs and more likely to have health problems like heart disease, diabetes, and depression. In addition, some children live in places with poorly performing schools, and many families can’t afford to send their children to college. The stress of living in poverty can also affect children’s brain development, making it harder for them to do well in school. Interventions to help children and adolescents do well in school and help families pay for college can have long-term health benefits.</td>
<td>Education, schooling, preferred language (Spanish or English)</td>
</tr>
<tr>
<td>Social or community context</td>
<td>People’s relationships and interactions with family, friends, co-workers, and community members can have a major impact on their health and well-being. Many people face challenges and dangers they can’t control — like unsafe neighborhoods, discrimination, or trouble affording the things they need. This can have a negative impact on health and safety throughout life. Therefore, positive relationships at home, at work, and in the community can help reduce these negative impacts. But some people — like children whose parents are in jail and adolescents who are bullied — often don’t get support from loved ones or others. Interventions to help people get the social and community support they need are critical for improving health and well-being.</td>
<td>Stigma, discrimination, internalized homonegativity, social or community context, machismo, caballerismo, social support, social isolation, connection to Hispanic/Latino gay community, year in the United States, acculturation</td>
</tr>
<tr>
<td>Health care and quality</td>
<td>Many people in the United States don’t get the health care services they need. About 1 in 10 people in the United States don’t have health insurance. People without insurance are less likely to have a primary care provider, and they may not be able to afford the health care services and medications they need. Strategies to increase insurance coverage rates are critical for making sure more people get important health care services, like preventive care and treatment for chronic illnesses. Sometimes people don’t get recommended health care services, like cancer screenings, because they don’t have a primary care provider. Other times, it’s because they live too far away from health care providers who offer them. Interventions to increase access to health care professionals and improve communication — in person or remotely — can help more people get the care they need.</td>
<td>Access to health care (e.g., having a primary healthcare provider, Medicaid expansion), health insurance, health literacy, healthcare provider cultural sensitivity</td>
</tr>
<tr>
<td>Neighborhood and built environment</td>
<td>The neighborhoods people live in have a major impact on their health and well-being. Many people in the United States live in neighborhoods with high rates of violence, unsafe air or water, and other health and safety risks. Racial/ethnic minorities and people with low incomes are more likely to live in places with these risks. In addition, some people are exposed to things at work that can harm their health, like secondhand smoke or loud noises. Interventions and policy changes at the local, state, and federal level can help reduce these health and safety risks and promote health. For example, providing opportunities for people to walk and bike in their communities — like by adding sidewalks and bike lanes — can increase safety and help improve health and quality of life.</td>
<td>Neighborhood or built environment, transportation</td>
</tr>
</tbody>
</table>


Table 2.
Description of studies that examined correlates of HIV testing among Hispanic/Latino gay, bisexual and other men who have sex with men in the United States (8 unique studies from 9 citations)

<table>
<thead>
<tr>
<th>1st author (publication year)</th>
<th>Source of data, Location(s), study date(s)</th>
<th>Study population</th>
<th>Major findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eklund et al. (2020)</td>
<td>Source: Online survey</td>
<td>N = 502 Latinos aged &gt;18 years who reported having had sex with at least one man in past 12 months</td>
<td>21% reported an HIV test in the past year</td>
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<tr>
<td></td>
<td>Location: Internet platform used to recruit HLGBMSM in upstate New York, New York City, Miami, Los Angeles, Chicago and Houston</td>
<td>Mean age: 30.77 years</td>
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<td></td>
<td>Study dates: Not reported</td>
<td>Nationalities: 50.1% Mexican, 17.6% Cuban, 7.8% Puerto Rican, 3.8% Dominican</td>
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<td>Median Education: 58.5% Bachelor’s degree or higher</td>
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<td>Median annual income: $75,000-$99,000</td>
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<td>96% US citizens by birth (91%) or naturalization (5%); 3.6% documented immigrants</td>
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<td>Self-identity: 39.5% exclusively gay, 24.0% mostly gay, 11.4% bisexual, 19.8% mostly heterosexual, 4.2% exclusively heterosexual</td>
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<tr>
<td></td>
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<td>21% reported an HIV test in the past year</td>
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<td>Reasons not to get tested:</td>
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<td>- Fear of a positive test (46%)</td>
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<td>- Previous HIV tests (36%)</td>
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<td>- Worry that test results might be reported to the government (34%)</td>
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<td>- Concern that others might treat the person differently if found to be HIV positive (32%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Concerns that others might treat the person differently if found to be HIV positive (32%)</td>
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<td></td>
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<td>- Not having the time (17%)</td>
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<tr>
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<td></td>
<td>68% reported an HIV test in the past year</td>
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<tr>
<td>Joseph et al. (2014)</td>
<td>Source: Baseline data of participants from two study sites that evaluated HIV prevention interventions for Latino men who have sex with men</td>
<td>N = 608 Latinos aged 18 to 52 years who reported having had sex with at least one man in the past 3 months</td>
<td>50.7% reported an HIV test in the past 12 months</td>
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<tr>
<td></td>
<td>Locations: New York City and Miami-Dade County</td>
<td>Mean age: 34.6 years</td>
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<td></td>
<td>Study dates: May to September 2008</td>
<td>Place of birth: 40.5% United States, 25.5% South America, 11.1% Cuba, 6.8% Central America, 5.9% Mexico, 3.9% Puerto Rico, 6.6% Other</td>
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<td>Education: 49.5% less than high school diploma or GED</td>
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<td>Employment: 59.2% employed full-time or part-time, 40.8% unemployed</td>
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<td></td>
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<td>Income: 43.6% earned &lt;$10,000, 34.3% $10,000 to $29,999, 22.1% $30,000</td>
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<td>Language preference: 29.3% predominantly Spanish speaking</td>
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<td></td>
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<td>Self-identity: 70% gay</td>
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<tr>
<td>1st author (publication year)</td>
<td>Source of data, Location(s), study date(s)</td>
<td>Study population</td>
<td>Major findings</td>
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<tr>
<td>Lee et al. (2021) WHSPP Study</td>
<td>Source: On-line survey Location: Internet platform used to recruit HLGBMSM in Washington State Study dates: January to February 2017, and November 2018 to January 2019</td>
<td>N = 317 Latinos aged ≥16 years who reported ever had sex with a man Mean age: 35 years among those who took the survey in Spanish; 28 years among those who took the survey in English Education: among those who took surveys in Spanish – 9.0% less than high school, 34.8% high school/GED, 24.7% some college, 31.5% college degree or higher; among those who took surveys in English – 4.5% less than high school, 14.9% high school/GED, 38.7% some college, 41.9% college degree or higher Income (annual): among those who took surveys in Spanish – 36.1% less than $20,000, 37.5% $20,000-$49,999, 9.7% $50,000-$99,999, 13.9% 100,000+; among those who took surveys in English – 17.5% less than $20,000, 29.0% $20,000-$49,999, 33.0% 50,000-$99,999, 14.5% 100,000+ Language preference: 28% answered surveys in Spanish, 72% in English Self-identity: among those who took surveys in Spanish – 79.5% gay, 19.3% bisexual, 1.1% heterosexual; among those who took surveys in English – 80.5% gay, 16.8% bisexual, 2.2% queer or other identity, 0.4% heterosexual Health insurance: among those who took surveys in Spanish – 56.5% yes, 41.2% no, 2.4% do not know; among those who took surveys in English – 85.6% yes, 11.7% no, 2.7% do not know</td>
<td>57% reported an HIV test in the past 12 months</td>
</tr>
<tr>
<td>Lee et al. (2021) UNITE Study Understanding New Infections through Targeted Epidemiology (UNITE) Cohort Study</td>
<td>Source: Online survey Location: Internet platform used to recruit HLGBMSM nationally Study dates: November 2017 to September 2018</td>
<td>N = 2099 Latinos aged ≥16 years identified as gay, queer, or bisexual Mean age: 32 years among those who took the survey in Spanish; 27 years among those who took the survey in English Education: among those who took surveys in Spanish – 1.7% less than high school, 13.7% high school/GED, 35.0% some college, 49.6% college degree or higher; among those who took surveys in English – 3.8% less than high school, 12.9% high school/GED, 49.1% some college, 34.2% college degree or higher Income (annual): among those who took surveys in Spanish – 46.2% less than $20,000, 42.7% $20,000-$49,999, 8.5% $50,000-$99,999, 2.6% 100,000+; among those who took surveys in English – 39.6% less than $20,000, 42.3% $20,000-$49,999, 14.9% 50,000-$99,999, 3.3% 100,000+ Language preference: 5.6% answered surveys in Spanish, 94.4% in English Self-identity: among those who took surveys in Spanish – 88.9% gay, 8.5% bisexual, 2.6% queer or other identity; among those who took surveys in English – 81.8% gay, 15.1% bisexual, 3.1% queer or other identity Health insurance: among those who took surveys in Spanish – 67.5% yes, 30.8% no, 1.7% do not know; among those who took surveys in English – 73.1% yes, 23.4% no, 3.5% do not know</td>
<td>78% reported an HIV test in the past 12 months</td>
</tr>
<tr>
<td>1st author (publication year)</td>
<td>Source of data, Location(s), study date(s)</td>
<td>Study population</td>
<td>Major findings</td>
</tr>
<tr>
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<tr>
<td>Painter et al. (2019)</td>
<td>Source: Baseline data of a sample participated in HOLA en Grupos behavioral intervention. Location: North Carolina. Study dates: December 2012 to February 2015.</td>
<td>N = 304 Latinos aged ≥18 years who reported having had sex with a man since age 18. Mean age: 30 years. Place of birth: 62% Mexico, 6% Honduras, 5% El Salvador, 4% Guatemala, 13% other Central American, South American, Caribbean. Education: 45% less than high school diploma or CED. Employment: 74% employed year-round. Income: 80% earned &lt;$2000 per month. Mean length of residence in the United States: 13.5 years. Language preference: 35.5% only Spanish, 28% mostly Spanish, 36.5% both Spanish and English. Self-identity: 65.8% gay, 23.4% bisexual, 5.1% heterosexual.</td>
<td>32% reported an HIV test in the past 6 months. Barriers to HIV testing (subset sample from Horridge et al., 2019): - Not knowing where to get tested (35.6%). - Not having health insurance (33.9%). - Fear of being HIV positive (28.8%). - Practicing safer sex and perceiving not needing to be tested (27.1%). - Not being recommended to get tested (22%). - Not having the time (20.3%).</td>
</tr>
<tr>
<td>Oster et al., 2013</td>
<td>Source: National HIV Behavioral Surveillance System – MSM cycle 2. Locations: 21 metropolitan statistical areas – Atlanta, Georgia; Baltimore, Maryland; Boston, Massachusetts; Chicago, Illinois; Dallas, Texas; Denver, Colorado; Detroit, Michigan; Houston, Texas; Los Angeles, California; Miami, Florida; Nassau, New York; Newark, New Jersey; New Orleans, Louisiana; New York City, New York; Philadelphia, Pennsylvania; San Diego, California; San Francisco, California; San Juan, Puerto Rico; Seattle, Washington; St. Louis, Missouri; and Washington, District of Columbia. Study date: 2008.</td>
<td>N = 1734 Latinos aged ≥18 years who reported at least one male sex partner in the past 12 months. Mean age: 31 years. Place of birth: 12% Mexico, 10% Caribbean, 9% South America, 7% Central America, 5% Puerto Rico, 1% other regions of the world. Education: 11% less than high school diploma; 28% high school diploma/CED; 34% some college or technical college; 27% college or higher education. Employment: 61% full-time; 16% part-time; 14% unemployed; 9% other. Income (annual): 35% 0-$19,999; 30% $20,000-$39,999; 23% $40,000-74,999; 11% $75,000 or more. Self-identity: 78% gay, 22% bisexual or heterosexual.</td>
<td>60% reported an HIV test in the past 12 months. Reasons not to get tested: - Believing oneself to be at low risk (32%). - Being afraid of finding out that one had HIV (31%). - Worry that someone would find out the results; test results might be reported to the government, or would lose job, insurance, or house (13%).</td>
</tr>
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<td>Spadafino et al., 2016</td>
<td>Source: Baseline data of a sample participated in Conectando Latinos en Pareja behavioral intervention. Location: New York City. Study date: not reported.</td>
<td>N = 176 Latino men who have sex with men. Mean age: 33.4 years. Latinx ethnicities: 22.7% Central Americans, 20.5% South Americans, 16.5% Dominicans, 15.9% Puerto Ricans, 2.8% Cubans. Education: varied greatly, ranging from less than a high school diploma to graduate and professional degrees. Employment: 54% unemployed. Self-identity: 84% gay.</td>
<td>57.9% reported an HIV test in the past 12 months. Reasons not to get tested: - Language barriers. - Immigration concerns. - Discrimination (service providers being discriminatory against immigrant male and gay).</td>
</tr>
<tr>
<td>1st author (publication year)</td>
<td>Source of data, Location(s), study date(s)</td>
<td>Study population</td>
<td>Major findings</td>
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<td></td>
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<td>Language preference: 38% only Spanish</td>
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</table>
### Table 3.
Summary of the findings on social determinants of health correlates of HIV testing among Hispanic/Latino gay, bisexual and other men who have sex with men (8 unique studies)

<table>
<thead>
<tr>
<th>Social Determinants of Health</th>
<th># of studies</th>
<th>Evidence from individual studies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Economic Stability</strong></td>
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</tbody>
</table>
| Higher income                                      | 3            | Eklund 2020: OR = 0.80, 95%CI = 0.61, 1.05  
Joseph 2014: OR = 3.14, 95%CI = 2.0, 4.92  
Oster 2013: OR = 1.60, 95%CI = 1.29, 1.99 |
| Being employed                                     | 2            | Joseph 2014: OR = 0.72, 95%CI = 0.50, 1.02  
Spadafino 2016: OR = 1.19, 95%CI = 0.35, 4.07 |
| **Education access and quality**                  | 8            | Joseph 2014: OR = 1.68, 95%CI = 1.18, 2.38  
Gilbert 2013: OR = 14.31, 95%CI = 2.26, 90.65  
Eklund 2020: OR = 1.08, 95%CI = 0.82, 1.42  
Lee 2021 – UNITE survey: OR = 1.38, 95%CI = 1.15, 1.65  
Lee 2021 – WHSSP survey: OR = 2.18, 95%CI = 1.15, 4.16  
Painter 2019: OR = 2.82, 95%CI = 1.67, 4.76  
Spadafino 2016: OR = 6.00, 95%CI = 1.44, 24.99  
Oster 2013: OR = 1.68, 95%CI = 1.32, 1.68 |
| Speaking only Spanish or more Spanish than English | 6            | Joseph 2014: OR = 0.83, 95%CI = 0.72, 0.97  
Gilbert 2013: OR = 0.73, 95%CI = 0.36, 1.49  
Lee 2021 – UNITE survey: OR = 0.83, 95%CI = 0.73, 0.95  
Lee 2021 – WHSSP survey: OR = 1.18, 95%CI = 0.95, 1.46  
Painter 2019: OR = 0.31, 95%CI = 0.16, 0.57  
Spadafino 2016: OR = 0.23, 95%CI = 0.07, 0.84 |
| **Social and community context**                  |              |                                                                                                  |
| Experienced HIV Stigma                            | 1            | Gilbert 2013: OR = 3.51, 95%CI = 1.01, 12.21 |
| Experienced discrimination based on ethnicity     | 1            | Painter 2019: OR = 1.08, 95%CI = 0.97, 1.22 |
| Experienced discrimination based on sexual orientation/gender identity | 1            | Painter 2019: OR = 1.04, 95%CI = 0.94, 1.14 |
| Internalized negative stereotypes (e.g., homonegativity) | 2            | Gilbert 2013: OR = 1.22, 95%CI = 0.89, 1.67  
Joseph 2014: OR = 0.78, 95%CI = 0.66, 0.92 |
| Adherence to risk aspect of traditional Latino male role, i.e., Machismo | 3            | Eklund 2020: OR = 0.71, 95%CI = 0.43, 1.18  
Gilbert 2013: OR = 1.72, 95%CI = 0.81, 3.64  
Painter 2019: OR = 0.96, 95%CI = 0.93, 0.99 |
<p>| Adherence to protective aspect of traditional Latino male gender norm, i.e., caballerismo | 1            | Eklund 2020: OR = 1.80, 95%CI = 1.35, 2.45 |</p>
<table>
<thead>
<tr>
<th>Social Determinants of Health</th>
<th># of studies</th>
<th>Evidence from individual studies</th>
</tr>
</thead>
</table>
| Born outside of US                                                | 2            | Joseph 2014: OR = 0.93, 95% CI = 0.66, 1.33  
Spadafino 2016: OR = 0.18, 95% CI = 0.02, 1.45 |
| Greater number of years in the U.S.                               | 2            | Gilbert 2013: OR = 1.06, 95% CI = 0.95, 1.19  
Painter 2019: OR = 1.00, 95% CI = 0.99, 1.01 |
| Social comfort with gay men                                       | 1            | Gilbert 2013: adjOR = 1.04, 95% CI = 0.69, 1.56 |
| Social support                                                    | 2            | Painter 2019: OR = 1.04, 95% CI = 1.02, 1.05  
Eklund 2020: OR = 1.57, 95% CI = 0.82, 2.99 |
| Social isolation                                                  | 1            | Joseph 2014: OR = 0.82, 95% CI = 0.62, 1.10 |
| Social connectedness – ethnic identity                           | 1            | Painter 2019: OR = 1.02, 95% CI = 0.97, 1.06 |
| Social connectedness – religiosity                                | 1            | Painter 2019: OR = 0.98, 95% CI = 0.95, 1.02 |
| Acculturation (to American culture)                              | 1            | Painter 2019: OR = 1.05, 95% CI = 1.02, 1.08  * |
| Ethnic identity search                                           | 1            | Joseph 2014: OR = 1.11, 95% CI = 0.88, 1.41 |
| Ethnic identity affirmation/belonging                            | 1            | Joseph 2014: OR = 1.27, 95% CI = 0.99, 1.64 |
| Latino community attachment                                      | 1            | Painter 2019: OR = 0.78, 95% CI = 0.48, 1.28 |
| Latino gay community attachment                                  | 2            | Painter 2019: OR = 1.36, 95% CI = 0.82, 2.26  
Joseph 2014: OR = 1.07, 95% CI = 0.97, 1.19 |
| Gay community attachment                                          | 1            | Painter 2019: OR = 1.73, 95% CI = 1.04, 2.87  * |
| Transgender community attachment                                 | 1            | Painter 2019: OR = 0.78, 95% CI = 0.37, 1.64 |
| Latino transgender community attachment                           | 1            | Painter 2019: OR = 0.70, 95% CI = 0.33, 1.51 |
| **Health care and quality**                                       |              |                                                                                               |
| Having a health insurance                                         | 5            | Joseph 2014: OR = 1.11, 95% CI = 0.79, 1.57  
Lee 2021– Unite survey: OR = 1.14, 95% CI = 1.07, 1.21  *  
Lee 2021– WHSPP survey: OR = 0.98, 95% CI = 0.73, 1.31  
Oster 2013: OR = 1.66, 95% CI = 1.35, 2.05  *  
Spadafino 2016: OR = 9.42, 95% CI = 1.17, 76.05  * |
| Having a primary care provider                                    | 1            | Joseph 2014: OR = 1.24, 95% CI = 0.88, 1.76 |
| Visited a health care provider in past 12 months                  | 2            | Joseph 2014: OR = 2.34, 95% CI = 1.37, 4.03  *  
Oster 2013: OR = 3.40, 95% CI = 2.72, 4.25  * |
| Disclosed one’s sexual identity to healthcare provider            | 1            | Joseph 2014: OR = 2.26, 95% CI = 1.55, 3.30  * |
| Access to health care services                                   | 1            | Eklund 2020: OR = 1.97, 95% CI = 1.33, 2.92  * |

* P<0.05