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HIV Testing and Linkage to Care Among Transgender Women Who Have Sex with Men: 23 U.S. Cities

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Abstract

Transgender women face unique barriers to HIV testing and linkage to care. This article describes the results of a national testing initiative conducted by 36 community-based and other organizations using a variety of recruitment and linkage-to-care strategies. A total of 2191 HIV tests were conducted with an estimated 1877 unique transgender women, and 4.6% of the transgender women had confirmed positive results. Two thirds (66.3%) were linked to care within approximately three months of follow-up, and the median time to linkage was 7 days. Transgender women tested at clinical sites were linked to care faster than those tested at non-clinical sites (median: 0 vs. 12 days; $P = .003$). Despite the use of a variety of linkage-to-care strategies, the proportion of transgender women successfully linked to care was below national goals. Tailored programs and interventions are needed to increase HIV testing and improve timely linkage to care in this population.

Resumen

Las mujeres transgénero enfrentan barreras únicas para hacerse la prueba del VIH y vincularse con atención médica. Este artículo describe los resultados de una iniciativa nacional que promueve la realización de la prueba del VIH y que fue llevada a cabo por 36 organizaciones utilizando una variedad de estrategias de reclutamiento y de vinculación a la atención médica. Durante esta iniciativa, se realizaron 2,191 pruebas del VIH en aproximadamente 1,877 mujeres transgénero únicas. El 4.6% de las mujeres transgénero tuvieron resultados positivos confirmados. Dos tercios (66.3%) de ellas se vincularon a la atención médica en aproximadamente tres meses de seguimiento, y el tiempo mediano de esta vinculación fue de 7 días. Las mujeres transgénero evaluadas en sitios clínicos se vincularon a la atención médica más rápidamente que las que fueron evaluadas en sitios no clínicos (mediana: 0 vs. 12 días; P = .003). A pesar del uso de una variedad de estrategias de vinculación a la atención médica, la proporción de mujeres transgénero que

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fueron vinculadas con éxito a la atención medica estaba por debajo de los objetivos nacionales. Se necesitan programas e intervenciones que respondan a las necesidades únicas de las mujeres transgénero para incrementar el que se hagan la prueba del VIH y disminuir el tiempo que se toma en vincularlas a la atención medica que necesitan.

Keywords

Transgender; HIV; Testing; Linkage to care

Introduction

Transgender women are disproportionately affected by HIV infection. In the United States, HIV prevalence has been estimated to be more than 34 times as high among transgender women compared with all other persons aged 15 to 49 years [1]. Substantial racial/ethnic disparities in HIV infection also persist in this population [2]. National surveillance data demonstrate that more than half of newly diagnosed HIV infections among transgender women reported to the Centers for Disease Control and Prevention (CDC) during a five-year period were among non-Hispanic black or African American (hereafter referred to as black) transgender women, and nearly one-third were among Hispanic or Latina transgender women [3].

HIV testing provides opportunities to engage with HIV prevention and treatment services that can improve health outcomes and prevent HIV transmission. Despite high HIV prevalence and the benefits of early diagnosis, HIV testing among transgender women remains low. As few as 1 in 10 transgender women have been tested in the past year, and transgender women are no more likely to be tested than cisgender populations [4]. In particular, a high proportion of black transgender women may have previously undiagnosed infection [5]. Efforts to increase HIV testing uptake among transgender women are complicated by numerous transgender-specific barriers to testing. Many transgender women are socioeconomically marginalized, including high rates of poverty, unemployment, and homelessness relative to the general population [6]. These factors can reduce access to health care, as reflected in the finding that transgender women are more likely than cisgender women to lack health insurance [7]. Among those with access to care, barriers such as gender-related stigma, discrimination, and other negative experiences in health care settings [6, 8–11], lack of culturally competent and gender-affirming care [12–15], and concerns about HIV test confidentiality or HIV-related stigma in transgender peer networks [12, 16, 17] can discourage utilization of care and routine HIV testing.

These barriers have the potential to hinder progress at each stage of the HIV care continuum and prevent transgender women with diagnosed HIV infection from entering HIV care and maintaining viral suppression. Previous studies have found lower retention in care [18], adherence to antiretroviral therapy (ART) [19–22], and viral suppression [20, 21, 23] among transgender women compared with cisgender populations, although no differences were observed in rates of linkage to care [20, 23] which is essential to realizing the prevention and treatment benefits of early ART initiation [24]. Qualitative studies have identified potential

barriers and facilitators of HIV testing and linkage to care among transgender women [12, 13, 17, 25], but strategies to improve testing and linkage remain under studied despite observed gender disparities at most steps of the HIV care continuum.

We report the results of HIV testing and linkage-to-care services provided to transgender women recruited for a large-scale, national HIV testing initiative conducted in 25 U.S. cities. These findings can help characterize the early stages of the HIV care continuum among transgender women. They may also inform the planning and implementation of programs seeking to recruit transgender women at high risk for HIV infection and improve the delivery of testing, linkage-to-care, and other HIV prevention and treatment services to this population.

Methods

Data used in this study are from the Men Who Have Sex with Men (MSM) Testing Initiative (MTI), conducted in 2012–2015 with the goals of identifying at least 3000 cisgender MSM with previously undiagnosed HIV infection, at least 50% of whom would be black or Hispanic or Latino, and linking at least 85% of all MSM with newly diagnosed HIV to care [26, 27]. The initiative was conducted by 36 organizations with a history of providing services to cisgender MSM populations, including academic research centers, community-based organizations, AIDS service organizations, and clinical providers in 25 U.S. cities. Transgender women were eligible to participate in the MTI project because they are also vulnerable to HIV infection, and some transgender women and cisgender MSM might have overlapping social or sexual networks or receive HIV prevention services from the same organizations.

Partner organizations recruited participants for HIV testing using a variety of strategies intended to reach persons at high risk for HIV infection. Venue-based testing (VBT) involved testing at clinical venues (e.g., storefront clinics and community health centers) and non-clinical venues (e.g., HIV counseling and testing sites, gay-identified bars and clubs, public areas, and community settings). Other strategies, described elsewhere [26, 27] included (1) testing at large-scale episodic events (e.g., circuit parties and gay pride events); (2) social network strategy (i.e., persons testing positive or those testing negative but found to be at high risk identify and recruit persons at risk from their social, sexual, or drug-using networks for testing) [28]; (3) couples' voluntary counseling and testing (i.e., persons who are in or planning to be in a sexual relationship receive HIV counseling and test results together); and (4) internet-based self-testing (i.e., participants recruited from social network and music streaming websites receive a free HIV test kit at a mailing address provided by the participant). Initial HIV testing was performed using rapid tests with oral or blood specimens. All preliminary positive results were confirmed with Western blot (oral, serum/plasma, or dried blood spots) or nucleic acid tests (serum/plasma). Most participants received small incentives for testing, which included cash or cash-equivalent incentives or items such as condoms or lube. A standardized form was administered by project staff during the initial HIV test to collect participant demographic and behavioral information. Partner organizations implemented linkage-to-care strategies for participants with positive test results for up to 104 days after the initial test. This 104-day period was designed to

allow up to 90 days from partner organization receipt of confirmatory test results, which was estimated to require up to 14 days. In some instances, linkage-to-care efforts were initiated presumptively before confirmatory testing was performed. However, this information was not documented completely or systematically throughout the project, so we were unable to compare presumptive linkage of persons with preliminary positive test results versus linkage initiated after confirmatory test results became available. Linkage-to-care strategies included case management and health navigation services, use of integrated electronic health records to facilitate client intake and appointment scheduling at the time of the positive test, and partnerships with clinical providers to facilitate referrals to care. This study was reviewed and approved by institutional review boards at the CDC and implementing organizations. Informed consent procedures varied by site but included either verbal or written consent from participants for HIV testing in accordance with local laws and regulations.

Eligible participants were assigned male sex at birth, reported ever having oral or anal sex with a man, and reported no previous HIV diagnosis. All confirmed positive test results were considered to be new diagnoses. To record the current gender identity of eligible participants, project staff used an encounter form with the options “male,” “transgender male-to-female,” “transgender unspecified,” or “additional” (with a request to specify). Project staff read these options aloud and recorded the option selected by the participant. Participants were classified as transgender women in this analysis if their current gender identity was recorded by staff as “transgender male-to-female” at the time of the initial test. Participants assigned male sex at birth with a current gender identity other than cisgender male or transgender female were also eligible to participate in the project.

Some participants may have been tested more than once within the project. We classified HIV tests as repeated tests of the same individual if they were conducted by the same partner organization with participants reporting matching birthdates [26]. We created a deduplicated, person-level dataset by retaining each participant’s most recent test and removing repeated tests. Using this deduplicated dataset, we estimated person-level prevalence of confirmed positive results and unadjusted prevalence ratios (PR) and corresponding 95% confidence intervals (CI) with log-binomial models to assess differences in confirmed positive test results by demographic and behavioral characteristics. To assess the impact of using only deduplicated test results, we conducted the same analyses with all tests and used generalized estimating equations to account for potential non-independence of responses from repeated tests of the same participant.

Among transgender women with confirmed positive test results, we used the Kaplan–Meier product-limit method to describe the distribution of time to linkage to care, defined for all participants as the number of days from the date of specimen collection for the first positive test to the date of first provider-confirmed or participant-reported HIV medical appointment, regardless of when linkage-to-care efforts were initiated. We calculated the percentage of transgender women with positive test results who were linked to care within 104 days and compared these percentages by demographic characteristics, recruitment and venue type, and linkage-to-care strategies using Pearson’s chi-square or Fisher’s exact tests. We calculated the median and interquartile range (IQR) of days to linkage and compared by selected characteristics using Kruskal–Wallis tests.

Results

Of 71,325 HIV tests conducted during the MTI project, 2191 (3.1%) were among transgender women (i.e., participants designated as “transgender male-to-female”) (Table 1). Tests among transgender women were conducted by 32 of 36 partner organizations in 23 of 25 cities (Supplemental Table 1), with a median of 17 tests with transgender women at each partner organization (IQR 4–90) (data not shown). Of all tests among transgender women, 314 (14.3%) were considered to be repeated tests based on matching participant birthdate and partner organization. Demographic and behavioral characteristics, HIV testing history, and HIV test results remained similar after excluding repeated tests. Most of the unique transgender women were black (40.4%) or Hispanic or Latina (36.6%), < 30 years of age (66.6%), reported sex with male partners only in the past 12 months (85.3%), reported sex without a condom in the past 12 months (72.7%), and had previously tested for HIV prior to the MTI project (90.0%) (Table 1). Nearly all transgender women were recruited and tested via VBT (94.7%), and most of these participants were tested in non-clinical settings (89.8%).

Test-level positivity was 4.0% (Supplemental Table 2). After excluding tests that were considered to be repeated tests of the same participant, the person-level prevalence of confirmed positive results (based on participants’ most recent test) was 4.6% (Table 2). The proportion with confirmed positive results was higher among black transgender women (PR = 3.13; CI 1.45–6.78) than their white counterparts and among those who reported past-year sex with a person with HIV (PWH) (PR = 3.57; CI 2.08–6.13) and past-year sex without a condom (PR = 2.19; CI 1.20–4.00) compared with those who did not report these behaviors. Confirmed positive results did not vary by reported past-year injection drug use (PR = 2.26; CI 0.96–5.34) or sex with a person who injects drugs (PWID) (PR = 1.08; CI 0.40–2.88). Estimates remained similar in the analysis of all 2191 tests (Supplemental Table 2).

Of the 86 transgender women with confirmed positive test results, 57 (66.3%) were linked to care within 104 days (Table 3). Of these, 21 (36.8%) were linked to care on the same day as the first positive test. The median number of days from the first positive test to first HIV medical appointment was 7 days (IQR 0–18). A higher proportion of transgender women recruited through VBT and tested at clinical sites were linked to care (91.3%) compared with those recruited through other strategies or tested at other sites (50.0–85.7%; $P = 0.003$). Among transgender women recruited through VBT, those who were tested at clinical sites were linked faster than those tested at non-clinical sites (median 0 vs. 12 days; p = 0.003) (Fig. 1). Most (60.9%) of the transgender women recruited through VBT and tested and linked at clinical sites were linked to care on the same day as the first positive test; however, all of these particular transgender women were tested and linked by the same AIDS service organization. The proportion of transgender women successfully linked to care and the median days to linkage did not differ by primary linkage strategy, race/ethnicity, or age.

An additional 69 tests were conducted with participants assigned male sex at birth with a documented current gender identity other than “male” or “transgender male-to-female.” Fifty-five of these tests were among individuals designated as “transgender unspecified”; of the 14 that provided additional specification for gender identity, most self-identified as either

"gender queer" or "queer" (n = 5), "gender fluid" (n = 1), "non binary" (n = 1), or "neutral" (n = 1). Of these 69 tests, 3 (4.3%) were confirmed positive, representing 3 unique participants. All 3 of these participants were successfully linked to care.

Discussion

This large-scale, national testing initiative found a comparatively high percentage of confirmed positive test results among transgender women who reported ever having a male sex partner. Test-level positivity (4.0%) was higher than estimates from CDC-funded tests in 61 state and local jurisdictions conducted among transgender women in 2009–2011 (2.7%) [29] and in CDC-funded tests conducted outside of healthcare settings in 2017 among all transgender persons (1.4%), cisgender MSM (1.7%), and the overall population (0.6%) [30]. The higher positivity could reflect high underlying HIV prevalence among black and Hispanic or Latino populations, the geographic focus on cities with high HIV prevalence, or the payment structure of the MTI project, which incentivized partner organizations to identify as many HIV-infected participants as possible. Nevertheless, these findings reiterate the unique vulnerability of transgender women to HIV infection [1].

Consistent with previously observed racial/ethnic disparities [2, 3] black transgender women had a higher prevalence of confirmed positive results than their white counterparts. Additionally, more than 3 times as many transgender women who reported past-year sex with a PWH had a confirmed positive test result compared with those who did not. Although this study did not assess serosorting behaviors or the direction or timing of HIV transmission, this finding suggests missed opportunities for prevention of HIV transmission with pre-exposure prophylaxis (PrEP). Transgender women likely face substantial barriers to PrEP uptake, as with other HIV prevention and treatment services, and may have lower PrEP adherence than cisgender MSM independent of HIV-related risk behaviors [31]. Efforts to improve PrEP awareness, uptake, and adherence among transgender women at risk for HIV are needed. Such efforts could be incorporated into gender-affirming healthcare services, providing the opportunity to address barriers unique to transgender populations, such as concerns about interactions between PrEP and hormone therapy [15, 32]. Furthermore, additional efforts are needed to ensure that HIV-positive cisgender male partners of transgender women achieve and maintain viral suppression, particularly given reports suggesting prevalent sexual risk behaviors among cisgender partners of transgender people [33, 34].

Fewer than two-thirds of the transgender women with confirmed positive test results were linked to care within approximately 3 months of follow up. This is lower than estimates from national surveillance data (85.2%) [35] and CDC-funded HIV tests in the population at large (82.8%) [30], as well as current and previous national goals of 85% linked within one or three months, respectively [36]. However, when linkage was successful, it generally occurred quickly. A substantial proportion (36.8%) was linked on the same day as the first positive test. Most of the transgender women who were linked on the same day were tested and linked by a large AIDS service organization that provides a wide array of intensive case management services, which likely facilitated linkage.

Although we observed no differences in linkage to care by linkage strategy (e.g., case management), the proportion successfully linked and median days to linkage were most favorable among those tested in clinical settings. This finding is consistent with evidence suggesting that efforts to link adults with newly diagnosed infection to care might be more successful when testing is conducted in clinical settings or co-located with HIV primary medical care services [37]. Effective interventions are needed to mitigate barriers that might prevent transgender women from accessing care and benefiting from integrated testing and treatment services in clinical settings. Gender-affirming care that is free of stigma and discrimination and responsive to the needs of transgender patients (e.g., integration of hormone therapy and ART) may facilitate engagement in HIV testing and treatment in clinical settings [12, 13]. Additionally, psychosocial support and ancillary services may help address barriers related to socioeconomic marginalization or competing life circumstances [12, 17, 25].

Though linkage to care might be facilitated in clinical settings, the prominence of multiple stigmas and negative experiences in clinical settings may result in transgender women seeking testing at nonclinical sites [29] or self-testing [16], which could further complicate linkage-to-care efforts. For transgender women who do receive a diagnosis of HIV outside of clinical settings, more research is needed to determine the best approaches to facilitate linkage to care. Strategies that leverage community strengths and the support of transgender women peers who are living with HIV (e.g., peer health navigation or peer support groups) might help overcome barriers to advancement along the continuum of care [38–41].

Limitations

This analysis has limitations. First, several factors might limit the generalizability of our findings. Since eligibility criteria included male sex assignment at birth, some transgender women who self-identify simply as women could have been incorrectly screened as ineligible to participate in the project. Among eligible participants, documentation of gender identity was also limited by the categories listed on the staff encounter form (e.g., “transgender male-to-female,” “additional”). However, many transgender women might be reluctant or unwilling to select these options on the encounter form. Additionally, the transgender women in our sample had a history of sex with men, reported predominantly male sex partners in the past year, and were in large part recruited from gay-identified venues or HIV prevention services tailored for cisgender MSM. Our results are not generalizable to transgender women who do not have sex with men or do not frequent these venues or services. Notably, lifetime HIV testing was more than twice as high among transgender women participating in the MTI project (90.8%) compared with a nationally representative estimate among transgender women (35.6%) [4], suggesting that MTI participants and the broader population of transgender women in the United States may be epidemiologically distinct groups with respect to HIV risk, testing history, or other characteristics. Programs designed for cisgender MSM may not be able to effectively deliver HIV testing or other services to transgender women, especially those who have not previously tested for HIV. Second, the number of transgender women with confirmed positive test results was small (n = 86), and information about linkage-to-care strategies was seldom collected for participants lost to follow-up or otherwise not linked to care. We were

also unable to examine the potential benefits of presumptive linkage-to-care efforts initiated immediately after the first preliminary positive test, as opposed to efforts initiated after confirmatory testing. Therefore, our analysis could not identify the most promising linkage strategy for transgender women, which could inform development of much-needed interventions. Third, most partner organizations were unable to confirm new HIV diagnoses through linkage to surveillance registries. Although eligibility criteria were intended to exclude persons with a previous HIV diagnosis, it is possible that some participants, including those with a previous HIV diagnosis, may have participated despite the eligibility criteria due to the provision of incentives, thus potentially overestimating HIV test positivity or person-level prevalence. Fourth, we may have underestimated the proportion linked to care if some participants were linked to care after follow-up ended. Fifth, we might have over- or underestimated the person-level prevalence of confirmed positive test results to the extent that tests classified as repeated tests of the same individual were actually tests of unique individuals. Finally, our estimation of the number of repeated tests did not account for potential changes in gender identity over time (e.g., from cisgender male at the first test encounter to transgender female at the next). To the extent that any such gender identity changes occurred during the project, we might have misclassified or excluded some tests of transgender women whose gender identity was recorded as cisgender male at their initial or subsequent test encounters.

Conclusions

HIV prevention services are often planned for and directed to a variety of sexual and gender minority populations in tandem, but this approach risks missing the hardest-to-reach groups or those with unique needs. This large-scale testing initiative designed to recruit at-risk black and Hispanic or Latino cisgender MSM for HIV testing and linkage to care was able to successfully recruit for HIV testing a large number of transgender women who have sex with men. Many of these transgender women were young, black or Hispanic or Latina, and reported condomless sex in the past year; some had never previously tested for HIV. However, the proportion linked to care was below national goals [36] and estimates in the U.S. general population [30, 35], suggesting that tailored programs and interventions are needed to improve linkage to care in this population, especially when testing occurs in non-clinical settings. Improving the timely diagnosis of HIV infection among transgender women will enable them to reap the benefits of early treatment and prevent HIV transmission in transgender and adjacent sexual networks. The development of effective testing and linkage-to-care interventions specifically designed for transgender women and responsive to their needs may help reduce disparities in HIV diagnosis and viral suppression in this population.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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References

1. Baral S, Poteat T, Stromdahl S, et al. Worldwide burden of HIV in transgender women: a systematic review and meta-analysis. Lancet Infect Dis. 2013;13(3):214–22. [PubMed: 23260128]
2. Becasen J, Denard C, Mullins M, et al. Estimating the prevalence of HIV and sexual behaviors among the US transgender population: a systematic review and meta-analysis, 2006–2017. Am J Public Health. 2018 10.2105/AJPH.2018.304727.
3. Clark H, Babu A, Wiewel E, et al. Diagnosed HIV infection in transgender adults and adolescents: results from the National HIV Surveillance System, 2009–2014. AIDS Behav. 2017;21(9):2774–833. [PubMed: 28035497]
4. Pitasi M, Oraka E, Clark H, et al. HIV testing among transgender women and men—27 states and Guam, 2014–2015. MMWR Morb Mortal Wkly Rep. 2017;66(33):883–7. [PubMed: 28837547]
5. Bukowski L, Chandler C, Creasy S, et al. Characterizing the HIV care continuum and identifying barriers and facilitators to HIV diagnosis and viral suppression among black transgender women in the United States. J Acquir Immune Defic Syndr. 2018;79(4):413–20. [PubMed: 30080750]
6. National Center for Transgender Equality. The report of the 2015 U.S. Transgender Survey. https://transequality.org/sites/default/files/docs/usts/USTS-Full-Report-Dec17.pdf. Accessed 11 July 2019.
7. Gonzales G, Henning-Smith C. Barriers to care among transgender and gender nonconforming adults. Milbank Q. 2018;95(4):726–48.
8. Poteat T, Reisner S, Radix A. HIV epidemics among transgender women. Curr Opin HIV AIDS. 2014;9(2):168–73. [PubMed: 24322537]
9. Kosenko K, Rintamaki L, Raney S, Maness K. Transgender patient perceptions of stigma in health care contexts. Med Care. 2013;51(9):819–22. [PubMed: 23929399]
10. White Hughto J, Reisner S, Pachankis J. Transgender stigma and health: a critical review of stigma determinants, mechanisms, and interventions. Soc Sci Med. 2015;147:222–31. [PubMed: 26599625]
11. Bradford J, Reisner SL, Honnold JA, Xavier J. Experiences of transgender-related discrimination and implications for health: results from the Virginia Transgender Health Initiative Study. Am J Public Health. 2013;103(10):1820–9. [PubMed: 23153142]
12. Sevelius JM, Patouhas E, Keatley JG, Johnson MO. Barriers and facilitators to engagement and retention in care among transgender women living with Human Immunodeficiency Virus. Ann Behav Med. 2014;47(1):5–16. [PubMed: 24317955]
13. Reback C, Ferlito D, Kisler KA, Fletcher JB. Recruiting, linking, and retaining high-risk transgender women into HIV prevention and care services: an overview of barriers, strategies, and lessons learned. Int J Transgenderism. 2015;16(4):209–21.
14. Radix A, Lelutiu-Weinberger C, Gamarel K. Satisfaction and healthcare utilization of transgender and gender non-conforming individuals in NYC: a community-based participatory study. LGBT Health. 2014;1(4):302–8. [PubMed: 26789858]
15. Reisner S, Radix A, Deutsch M. Integrated and gender-affirming transgender clinical care and research. J Acquir Immune Defic Syndr. 2016;72(Suppl 3):S235–S242242. [PubMed: 27429189]
16. Lippman SA, Moran L, Sevelius J, et al. Acceptability and feasibility of HIV self-testing among transgender women in San Francisco: a mixed methods pilot study. AIDS Behav. 2016;20(4):928–38. [PubMed: 26511864]
17. Hines DD, Draucker CB, Habermann B. HIV testing and entry to care among trans women in Indiana. J Assoc Nurses AIDS Care. 2017;28(5):723–36. [PubMed: 28652131]
18. Poteat T, Hanna DB, Rebeiro PF, et al. Characterizing the HIV care continuum among transgender women and cisgender women and men in clinical care: a retrospective time-series analysis. Clin Infect Dis. 2019 10.1093/cid/ciz322.
19. Baguso GN, Gay CL, Lee KA. Medication adherence among transgender women living with HIV. AIDS Care. 2016;28(8):976–81. [PubMed: 26908228]

20. Kalichman SC, Hernandez D, Finneran S, et al. Transgender women and HIV-related health disparities: falling off the HIV treatment cascade. Sex Health. 2017;14(5):469–76. [PubMed: 28870282]
21. Mizuno Y, Frazier EL, Huang P, Skarbinski J. Characteristics of transgender women living with HIV receiving medical care in the United States. LGBT Health. 2015;2(3):228–34. [PubMed: 26788671]
22. Sevelius JM, Carrico A, Johnson MO. Antiretroviral therapy adherence among transgender women living with HIV. J Assoc Nurses AIDS Care. 2010;21(3):256–64. [PubMed: 20347342]
23. Wiewel EW, Torian LV, Merchant P, et al. HIV diagnoses and care among transgender persons and comparison with men who have sex with men: New York City, 2006–2011. Am J Public Health. 2015;106(3):497–502. [PubMed: 26691124]
24. Cohen M, Chen Y, McCauley M, et al. Antiretroviral therapy for the prevention of HIV-1 transmission. N Engl J Med. 2016;375(9):830–9. [PubMed: 27424812]
25. Lacombe-Duncan A, Bauer GR, Logie CH, et al. The HIV care cascade among transgender women with HIV in Canada: a mixed-methods study. AIDS Patient Care STDS. 2019;33(7):308–22. [PubMed: 31260342]
26. Clark HA, Oraka E, Dinenno EA, et al. Men who have sex with men (MSM) who have not previously tested for HIV—results from the MSM Testing Initiative, United States (2012–2015). AIDS Behav. 2019;23(2):359–65. [PubMed: 30173345]
27. Zulliger R, Maulsby C, Solomon L, et al. Cost-utility of HIV testing programs among men who have sex with men in the United States. AIDS Behav. 2016;21(3):619–25.
28. Kimbrough LW, Fisher HE, Jones KT, et al. Assessing social networks with high rates of undiagnosed HIV infection: the Social Networks Demonstration Project. Am J Public Health. 2009;99(6):1093–9. [PubMed: 19372521]
29. Habarta N, Wang G, Mulatu MS, Larish N. HIV testing by transgender status at Centers for Disease Control and Prevention-funded sites in the United States, Puerto Rico, and US Virgin Islands, 2009–2011. Am J Public Health. 2015;105(9):1917–25. [PubMed: 26180964]
30. Centers for Disease Control and Prevention. CDC-Funded HIV Testing: United States, Puerto Rico and the U.S. Virgin Islands. 2017 https://www.cdc.gov/hiv/pdf/library/reports/cdc-hiv-funded-hiv-testing-report-2017.pdf. Accessed 28 June 2019.
31. Deutsch MB, Glidden DV, Sevelius J, et al. HIV pre-exposure prophylaxis in transgender women: a subgroup analysis of the iPrEx trial. Lancet HIV. 2015;2(12):e512–e519519. [PubMed: 26614965]
32. Sevelius JM, Deutsch MB, Grant R. The future of PrEP among transgender women: the critical role of gender affirmation in research and clinical practices. J Int AIDS Soc. 2016;19(7(Suppl 6)):21105. [PubMed: 27760683]
33. Operario D, Nemoto T, Iwamoto M, Moore T. Risk for HIV and unprotected sexual behavior in male primary partners of transgender women. Arch Sex Behav. 2011;40(6):1255–61. [PubMed: 21604064]
34. Wilson EC, Chen YH, Raad N, et al. Who are the sexual partners of transgender individuals? Differences in demographic characteristics and risk behaviours of San Francisco HIV testing clients with transgender sexual partners compared with overall testers. Sex Health. 2014;11(4):319–23. [PubMed: 25099989]
35. Centers for Disease Control and Prevention. Monitoring selected national HIV prevention and care objectives by using HIV surveillance data—United States and 6 dependent areas, 2016. HIV Surveillance Supplemental Report 2018;23(No. 4). https://www.cdc.gov/hiv/library/reports/hiv-surveillance.html. 2018 Accessed 28 June 2019.
36. White House Office of National HIV/AIDS Policy. The National HIV/AIDS Strategy. 2015 Updated 2020. https://files.hiv.gov/s3fs-public/nhas-update.pdf. Accssed 9 April 2019.
37. Yehia BR, Ketner E, Momplaisir F, et al. Location of HIV diagnosis impacts linkage to medical care. J Acquir Immune Defic Syndr. 2015;68(3):304–9. [PubMed: 25469529]
38. Poteat T, Wirtz AL, Reisner S. Strategies for engaging transgender populations in HIV prevention and care. Curr Opin HIV AIDS. 2019;14(5):393–400. [PubMed: 31219887]

39. Reback CJ, Kisler KA, Fletcher JB. A novel adaptation of peer health navigation and contingency management for advancement along the HIV care continuum among transgender women of color. AIDS Behav. 2019 10.1007/s10461-019-02554-0.

40. Wilson EC, Turner C, Arayasirikul S, et al. HIV care engagement among trans women of color in San Francisco Bay Area demonstration projects: findings from the Brandy Martell Project and TransAccess. AIDS Behav. 2019 10.1007/s10461-019-02697-0.

41. Hirshfield S, Contreras J, Luebe RQ, et al. Engagement in HIV care among New York City transgender women of color: findings from the peer-led, TWEET intervention, a SPNS trans women of color initiative. AIDS Behav. 2019 10.1007/s10461-019-02667-6.

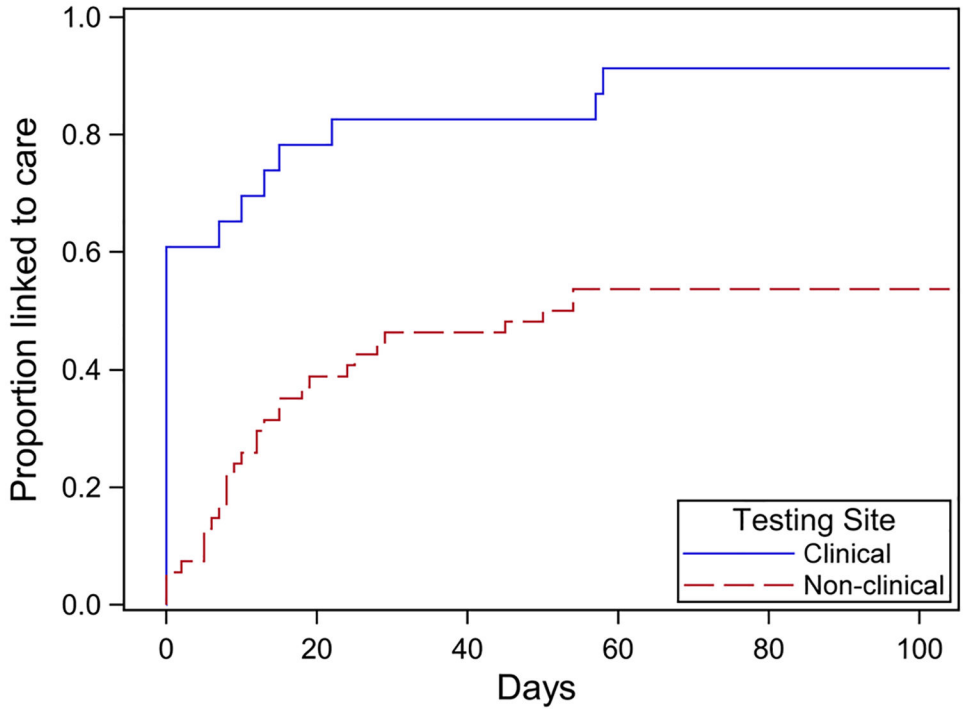

Fig. 1.

Distribution of days from positive test to first HIV medical care appointment among transgender women recruited for venue-based testing at clinical and non-clinical testing sites in 23 U.S. cities, 2012–2015

Table 1

Demographic and behavioral characteristics, HIV testing history, and HIV test results among transgender women tested in 23 U.S. cities, 2012–2015

	Total tests		Unique participants[a]	
	n	%	n	%
Total	2191	100	1877	100
Race/ethnicity				
Non-Hispanic black	895	41.3	748	40.4
Non-Hispanic white	311	14.4	277	15.0
Hispanic or Latina	782	36.1	679	36.6
Non-Hispanic other	177	8.2	149	8.0
Age (years)				
< 18	40	1.8	33	1.8
18–24	883	40.4	733	39.2
25–29	540	24.7	479	25.6
30–39	474	21.7	403	21.5
40–49	185	8.5	164	8.8
≥ 50	63	2.9	60	3.2
Recruitment strategy and test setting				
VBT, clinical testing site	254	11.6	181	9.6
VBT, non-clinical testing site	1827	83.4	1598	85.1
Large-scale episodic events	75	3.4	69	3.7
Social network strategy[b]	20	0.9	15	0.8
Couples' voluntary counseling and testing	14	0.6	13	0.7
Internet-based self-testing	1	0.1	1	0.1
Sex with PWH[c]				
Yes	126	6.1	101	5.7
No	1938	93.9	1679	94.3
Sex with PWID[c]				
Yes	102	4.9	85	4.8
No	1977	95.1	1706	95.3
Sex without a condom[c]				
Yes	1576	72.7	1349	72.7
No	591	27.3	507	27.3
Injected drugs[c]				
Yes	57	2.7	51	2.8
No	2080	97.3	1778	97.2
Gender of sex partners[c]				
No partners	81	3.7	77	4.2
Male partners only	1854	85.5	1584	85.3

	Total tests		Unique participants[a]	
	n	%	n	%
Female partners only	19	0.9	17	0.9
Male and female partners	94	4.3	76	4.1
Transgender partners[d]	121	5.6	102	5.5
Previously tested for HIV				
Yes	1967	90.8	1667	90.0
No	200	9.2	186	10.0
Confirmed positive test result				
Yes	87	4.0	86	4.6
No	2104	96.0	1791	95.4

VBT venue-based testing, *PWH* person with HIV, *PWID* person who injects drugs

[a]Tests were classified as repeated tests of the same participant if they were conducted by the same partner organization with participants reporting the same date of birth. Participants' most recent tests were retained in analyses of unique participants

[b]Persons testing positive or those testing negative but found to be at high risk identified and recruited persons at risk from their social, sexual, or drug-using networks for testing

[c]During the past 12 months

[d]Includes participants who reported having transgender partners regardless of reporting male or female partners

Table 2

Confirmed HIV-positive test results by demographic and behavioral characteristics and HIV testing history among 1877 transgender women tested in 23 U.S. cities, 2012–2015

	HIV prevalence (%)	PR	95% CI	*P*
Total	4.6	-	-	-
Race/ethnicity				
Non-Hispanic black	7.9	**3.13**	**(1.45–6.78)**	**0.004**
Non-Hispanic white	2.5	Ref	-	-
Hispanic or Latina	2.1	0.82	(0.33-2.00)	0.656
Non-Hispanic other	2.0	0.81	(0.21-3.08)	0.754
Age (years)				
< 18	3.0	1.49	(0.82-2.72)	0.191
18–24	5.2	1.20	(0.62-2.35)	0.591
25–29	4.2	1.76	(0.80-3.87)	0.163
30–39	3.5	Ref	-	-
40–49	6.1	1.44	(0.43-4.86)	0.558
≥ 50	5.0	0.87	(0.12-6.43)	0.893
Recruitment strategy and test setting				
VBT, clinical testing site	12.7	**3.94**	**(1.06–14.68)**	**0.041**
VBT, non-clinical testing site	3.4	Ref	-	-
Large-scale episodic events	10.1	**2.99**	**(1.42–6.34)**	**0.004**
Social network strategy[a]	13.3	**3.77**	**(2.37–5.99)**	**< 0.001**
Couples' voluntary counseling and testing	0	-	-	-
Internet-based self-testing	0	-	-	-
Sex with PWH in past 12 months				
Yes	13.9	**3.57**	**(2.08–6.13)**	**< 0.001**
No	3.9	Ref	-	-
Sex with PWID in past 12 months				
Yes	4.7	1.08	(0.40-2.88)	0.877
No	4.4	Ref	-	-
Sex without a condom during past 12 months				

	HIV prevalence (%)	PR	95% CI	*P*
Yes	5.2	**2.19**	**(1.20–4.00)**	**0.011**
No	2.4	Ref	-	-
Injected drugs during past 12 months				
Yes	9.8	2.26	(0.96-5.34)	0.064
No	4.3	Ref	-	-
Gender of sex partners during past 12 months				
No partners	1.3	0.88	(0.33-2.36)	0.802
Male partners only	4.5	Ref	-	-
Female partners only	5.9	1.31	(0.19-8.88)	0.783
Male and female partners	5.3	1.17	(0.44-3.12)	0.752
Transgender partners[b]	3.9	0.29	(0.04-2.05)	0.215
Previously tested for HIV				
Yes	4.7	Ref	-	-
No	1.6	0.34	(0.11-1.08)	0.067

Bold text indicates statistically significant association at $p < 0.05$. Analyses were conducted after removing tests classified as repeated tests of the same participant. Tests were classified as repeated tests if they were conducted by the same partner organization with participants reporting the same date of birth. Participants' most recent tests were retained in analyses of unique participants

PR unadjusted prevalence ratio, *CI* confidence interval, *VBT* venue-based testing, *PWH* person with HIV, *PWID* person who injects drugs

[a] Persons testing positive or those testing negative but found to be at high risk identified and recruited persons at risk from their social, sexual, or drug-using networks for testing

[b] Includes participants who reported having transgender partners regardless of reporting male or female partners

Table 3

Percentage linked to care and median days to linkage by demographic characteristics, recruitment and venue type, and linkage strategy among 86 transgender women with confirmed positive test results in 23 U.S. cities, 2012–2015

	Transgender women with confirmed positive test results (n)	Linked to HIV medical care[a] (%)	*P*[b]	Median days to linkage	IQR	*P*[c]
Total	86	66.3	-	7	0–18	
Race/ethnicity			0.244			0.469
Non-Hispanic black	59	59.3		8	0–18	
Non-Hispanic white	7	85.7		0	0–25	
Hispanic or Latina	14	78.6		6	0–19	
Non-Hispanic other	3	100		12	9–54	
Age (years)			0.496			0.293
≤ 24	39	64.1		0	0–15	
25–29	20	60.0		11	8–25.5	
30–39	14	64.3		5	0–7	
≥ 40	13	84.6		7	1–19	
Recruitment and venue type			0.003			0.023
VBT, clinical testing site	23	91.3		0	0–10	
VBT, non-clinical testing site	54	53.7		12	6–24	
Large-scale episodic events	7	85.7		0	0–35	
Social network strategy[d]	2	50.0		1	-	
Primary linkage strategy used[e]			0.516			0.197
Case management, health navigator, escort	44	90.9		5	0–14	
Integrated testing clinic	17	82.4		14	6–25	
Provider partnerships	2	100		6	2–10	

IQR interquartile range, *VBT* venue-based testing

[a]Percent linked to HIV medical care (defined as self-reported or provider-confirmed attendance at HIV medical care appointment) within 104 days from date of initial test

[b]Pearson's chi-square or Fisher's exact test

[c]Kruskal–Wallis test

[d]Persons testing positive or those testing negative but found to be at high risk identified and recruited persons at risk from their social, sexual, or drug-using networks for testing

[e]Primary linkage strategy was unknown for 23 (26.7%) participants