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HIV Testing, Diagnosis of HIV Infection, Linkage to Medical Care, and Interview for Partner Services Among Transgender Persons—United States, 2012–2017

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Abstract

Background: Transgender persons are at high risk for HIV infection. Testing is a key component of the national effort to end the HIV epidemic in the United States.

Setting: Sixty-one local and state health departments and 150 community-based organizations funded by the Centers for Disease Control and Prevention to conduct HIV testing programs.

Methods: We analyzed HIV testing data submitted to the Centers for Disease Control and Prevention by funded health departments and community-based organizations during 2012–2017. Descriptive analysis examined patterns of HIV testing and key outcomes (diagnosis of HIV infection, linkage to HIV medical care, and interview for partner services) among transgender persons. Multivariate robust Poisson regression was used to assess associations between HIV testing outcomes and demographic characteristics, census region, and test setting.

Results: A total of 82,818 HIV tests were provided to transgender persons. Of these, 2280 (2.8%) transgender persons were diagnosed with HIV infection; 1556 (1.9%) received a new and 724 (0.9%) a previous diagnosis with HIV infection. The highest percentage of new HIV diagnosis was found among persons tested in correctional settings (4.6%), non-Hispanic Blacks (3.5%) and transgender women (2.4%). Among newly diagnosed persons, 85.0% were linked to HIV medical care 90 days after diagnosis and 63.5% were interviewed for partner services.

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Conclusions: HIV positivity was high, and the delivery of partner services was low, among transgender persons. HIV testing outcomes among transgender persons varied significantly by demographic characteristics and test setting. HIV prevention programs that are responsive to the needs of transgender persons may address gender-related disparities in HIV testing outcomes.

Keywords

transgender persons; HIV testing; diagnosis of HIV infection; linkage to HIV medical care; partner services

INTRODUCTION

At the end of 2018, an estimated 1,173,900 persons 13 years old were living with HIV infection in the United States.¹ Transgender persons (ie, persons whose current gender identity does not conform or match to their sex assigned at birth) are at higher risk for HIV infection than the general population.^{2–4} Although transgender persons constitute about 0.4% of the US population,⁵ they accounted for approximately 2% of new diagnoses of HIV in 2018.⁶ Meta-analyses of 88 US studies indicate an estimated laboratory-confirmed HIV infection rate of 9.2% among transgender persons overall, 14.1% among transgender women and 3.2% among transgender men,² although studies with large and diverse samples reported an HIV prevalence of 1.4%–2.4% among transgender persons overall, 2.7%–3.4% among transgender women and 0.3%–0.5% among transgender men.^{7,8}

Several sociostructural and individual-level factors interact to increase the vulnerability of transgender persons to HIV infection.^{9–12} At the sociostructural level, HIV vulnerability among transgender persons is driven by the physical, social, and economic consequences of stigma and discrimination.^{8,11,12} The most pervasive consequences include verbal, physical, and sexual assault; loss of job, homelessness, and poverty; substance abuse and mental health problems; and pressure to sell drugs or engage in sex work for survival.⁸ At the individual level, HIV vulnerability among transgender persons is associated with elevated risk behaviors, including sex without condoms, sex with multiple partners, and substance use.^{2–4}

The US Department of Health and Human Services' *Ending the HIV Epidemic Initiative* aims to reduce new HIV infections in the United States by 90% by 2030 by implementing 4 strategies: (1) diagnosing individuals with HIV as early as possible; (2) treating individuals with HIV infection rapidly and effectively; (3) preventing new HIV infections through effective interventions, including preexposure prophylaxis and syringe services programs; and (4) rapidly responding to emerging HIV outbreaks.¹³ HIV testing is the foundation for diagnosis, linkage to treatment and prevention services, and outbreak response. The Centers for Disease Control and Prevention (CDC) has been supporting expanded HIV testing in communities that are disproportionately affected by HIV, including transgender persons.^{12,14}

HIV testing data are important to monitor progress toward the national HIV prevention goals. However, there are limited national level assessments of the patterns of HIV testing and testing outcomes among transgender persons. This study explores HIV testing,

diagnoses of HIV infection, and linkage to services among transgender persons who were tested at CDC-funded sites across the United States.

METHODS

Setting and Data Source

The CDC-funded 61 health departments (50 states; the District of Columbia; 8 directly funded Metropolitan Statistical Areas or Divisions: Baltimore, Chicago, Fulton County [Atlanta], Houston, Los Angeles County, New York City, Philadelphia, San Francisco; and 2 US dependent areas: Puerto Rico and US Virgin Islands) and 150 community-based organizations to implement HIV prevention programs, including HIV testing. We analyzed HIV test-level data submitted by funded health departments and community-based organizations during 2012–2017. Analyses were restricted to valid HIV tests (ie, tests with a positive or negative result) among transgender persons.

Data were reported to the CDC without any personal identifiers. The CDC determined that data collection and analysis for this project constituted routine program monitoring activities; therefore, institutional review board approval was not required.

Measures

HIV Tests and Testing Outcomes—An “HIV test” is defined as the performance of 1 tests to determine a person’s HIV infection status. We included 3 HIV testing outcome measures: diagnosis of HIV infection, linkage to HIV medical care, and interview for partner services. Persons who tested HIV-positive in the current test were considered “newly diagnosed” if they did not self-report a previous HIV-positive test; they were considered “previously diagnosed” if they self-reported a previous HIV-positive test. HIV-positive persons were considered “linked to HIV medical care” if they attended their first medical care appointment 90 days after a positive test. Similarly, HIV-positive persons were considered “interviewed for partner services” if they were contacted by health department or trained designated staff to obtain information about their sex or drug-injecting partners for public health follow-up.

Demographic Characteristics, Region, and Test Setting—We included transgender identity, age, race/ethnicity, census region, and test setting in the analysis. Transgender identity was grouped into 3: *transgender women*—persons who identified themselves as “male-to-female transgender” or reported “male” as their assigned sex and “female” as their current gender; *transgender men*—persons who identified themselves as “female-to-male transgender” or reported “female” as their assigned sex and “male” as their current gender; or *gender nonbinary*—persons who identified themselves as “transgender—unspecified” or “other” as their current gender and provided a preferred gender identity (eg, “two-spirited” and “gender queer”). Age was divided into 3 groups: 13–24, 25–34, and 35 years. Race/ethnicity was categorized as non-Hispanic White (hereafter White), non-Hispanic Black/African American (hereafter Black), Hispanic/Latino, or non-Hispanic other (hereafter other race). Census regions were defined based on the US Census Bureau’s categorization: Northeast, Midwest, South, West, or dependent areas.¹⁵ HIV test settings were categorized

into 3 groups: *health care*—facilities that provided both medical diagnostic and treatment services (eg, inpatient clinics), *nonhealth care*—facilities that did not provide both medical diagnostic and treatment services (eg, community testing sites), and *correctional*—facilities that included jails and prisons with or without medical diagnostic and treatment services.

Statistical Analyses

We conducted descriptive analysis to summarize the patterns of HIV testing and HIV testing outcomes by demographic characteristics, census region, and test setting. Multivariate robust Poisson regression was used to assess the association of demographic characteristics, census region, and test setting with HIV testing outcomes. Adjusted prevalence ratio (aPR) and 95% confidence interval (CI) were used to evaluate the significance of the associations. Analysis was conducted using SAS (version 9.4).

RESULTS

During 2012–2017, a total of 19,739,857 CDC-funded HIV tests were conducted in the United States. Of those HIV tests, 82,818 (0.4%) were conducted among transgender persons who could have been either first-time or repeat testers. The highest percentages of tests were provided to transgender women (71.1%) and persons testing in health care settings (50.8%) (Table 1). Overall, 2280 (2.8%) transgender persons were diagnosed with HIV infection; 1556 (1.9%) of persons tested received a new and 724 (0.9%) a previous diagnosis with HIV infection.

New HIV diagnosis was lower among transgender men (0.4%; aPR = 0.21, 95% CI: 0.17 to 0.26) and gender nonbinary persons (1.6%; aPR = 0.56, 95% CI: 0.39 to 0.79) compared with transgender women (2.4%). New HIV diagnosis was also higher among transgender persons aged 25–34 (2.2%; aPR = 1.33, 95% CI: 1.17 to 1.48) years and 35 (1.8%; aPR = 1.15, 95% CI: 1.01 to 1.32) years compared with 13–24 (1.7%) years; among Black (3.5%; aPR = 6.01, 95% CI: 4.88 to 7.40), Hispanic/Latino (1.5%; aPR = 2.44, 95% CI: 1.94 to 1.3.07), and other race (1.3%; aPR = 2.16, 95% CI: 1.64 to 2.85) transgender persons compared with White transgender persons (0.5%); among persons tested in the South (2.3%; aPR = 1.57, 95% CI: 1.34 to 1.84), Midwest (2.1%; aPR = 1.65, 95% CI: 1.37 to 1.97), and West (1.6%; aPR = 1.30, 95% CI: 1.09 to 1.56) compared with those tested in the Northeast (1.3%); and among persons tested in nonhealth care (2.1%; aPR = 1.24, 95% CI: 1.12 to 1.38) and correctional facilities (4.6%; aPR = 2.28, 95% CI: 1.78 to 2.93) compared with persons tested in health care facilities (1.5%) (Table 1).

Among transgender persons who received a new diagnosis, 85% were linked to HIV medical care 90 days after diagnosis. Persons tested in nonhealth care (81.8%; aPR = 0.92, 95% CI: 0.87 to 0.98) and correctional facilities (72.1%; aPR = 0.82, 95% CI: 0.68 to 0.98) were less likely to be linked to care when compared with persons tested in health care facilities (89.2%). Almost two-thirds (63.5%) of persons who received a new diagnosis were interviewed for partner services. Percent interviewed was lower among gender nonbinary persons (15.4%; aPR = 0.28, 95% CI: 0.12 to 0.67) compared with transgender women (64.2%); among Blacks (58.8%; aPR = 0.82, 95% CI: 0.70 to 0.96) compared with Whites (74.0%); among persons who resided in the Midwest (46.3%; aPR = 0.76, 95% CI: 0.62

to 0.92) compared with persons in the Northeast (65.5%); and among persons tested in nonhealth care (60.8%; aPR = 0.86, 95% CI: 0.79 to 0.94) and correctional facilities (30.0%; aPR = 0.42, 95% CI: 0.27 to 0.64) compared with persons tested in health care facilities (70.1%) (Table 2).

Four in 5 (81%; 586/724) transgender persons previously diagnosed with HIV infection did not report being in HIV medical care at the time of retesting. Of 421 persons with follow-up information, 381 (90.5%) were linked to HIV medical care 90 days after retesting (data not shown).

DISCUSSION

Studies show that transgender persons are more likely to be diagnosed with HIV infection than the general population.^{2–4} In this analysis, the percent of newly diagnosed HIV infections (1.9%) was approximately 4 times as high among transgender persons as it was among all persons tested during 2012–2017 (0.5%)¹⁶ or the surveillance-based national estimate of less than 0.5%.¹ Overall, HIV prevalence in this study was also more consistent with large sample studies^{7,8} than it was with meta-analytic studies that reported a much higher HIV prevalence,^{2,4} presumably because results of meta-analytic studies tend to be skewed by small convenience samples drawn from major urban sites that over-represent potentially more at-risk transgender populations.¹⁷ HIV positivity was particularly higher among transgender persons tested in correctional settings (4.5%), persons who were Black (3.5%), transgender women (2.4%), and persons tested in the South (2.3%). Higher percentages among these transgender groups may reflect the multiple co-occurring factors that compound the vulnerability of transgender persons to HIV infection, including stigma, discrimination, violence on the basis of gender or race/ethnicity,^{9–11} and high-risk behaviors including sex work and drug use.^{2–4}

Consistent with the national HIV goals set for the years 2010–2015,¹⁸ 85% of transgender persons newly diagnosed with HIV infection were linked to HIV medical care 90 days after diagnosis. The national strategy updated for the years 2015–2020 called for an expedited linkage of 85% of persons 30 days after diagnosis of HIV infection.¹⁹ Unfortunately, our testing data did not capture linkage 30 days after diagnosis. Surveillance data show that approximately 80% of transgender and nontransgender persons diagnosed with HIV infection in 2018 were linked to HIV medical care 30 days after diagnosis.²⁰ These findings highlight the need to expand tailored approaches to expedite linkage to care to achieve the revised national goals. Our analysis also revealed that most transgender persons with a previous HIV diagnosis did not report being in HIV medical care at the time of retesting, suggesting the need to support continuous engagement in HIV medical care. Nevertheless, the high level of linkage to HIV medical care (91%) after retesting demonstrates that HIV testing programs create opportunities to engage HIV-positive transgender persons who are not in care.

Approximately two-thirds (64%) of persons who received new HIV diagnoses were interviewed for partner services, which falls short of CDC's recommendation that all persons newly diagnosed with HIV infection receive partner services.²¹ It is unclear

why interview for partner services is low among transgender persons; however, studies have documented that the lack of gender-sensitive services and mistrust of the health care system along with broader social and structural barriers (eg, stigma, discrimination, and homelessness) impede transgender persons from engaging with HIV prevention and care.^{3,11,22} Limited engagement of transgender persons in partner services undermines efforts to reduce the onward transmission of HIV to their partners and exacerbates HIV risk in their network.

The findings in this report are subject to the following limitations. First, CDC's HIV testing data requirements are standardized; however, data collection approaches are not uniform. Some health departments and testing providers allow clients to complete an intake form on their own while others require staff to conduct interviews with clients. This variability may influence responses to sensitive questions, including gender identity. Second, the findings describe CDC-funded HIV tests only and are not generalizable to all tests provided to transgender persons nationally. Third, the number of tests reported likely includes persons who have tested more than once in CDC-funded sites. Fourth, records with missing data were excluded from the calculation of the percent of HIV diagnosed persons linked to HIV medical care and interviewed for partner services. This exclusion may have resulted in the overestimation of the percentages. A sensitivity analysis indicates that those excluded because of missing data were more likely than those included in our analysis to be gender nonbinary, reside in the Midwest, and tested in nonhealth care settings. Our data may have underrepresented these groups. Fifth, the findings for transgender men and gender nonbinary persons should be interpreted cautiously because of small sample sizes. Finally, the number of newly diagnosed HIV-positive results might be overestimated if clients inaccurately report a previous negative HIV status.

In conclusion, our analyses show that HIV positivity was high and the delivery of partner services was low, among transgender persons. Although linkage to HIV care among newly diagnosed transgender persons was comparable with the general population, there is a room for improvement to achieve the national goal of expedited linkage and treatment. In addition, HIV testing outcomes among transgender persons varied by demographic characteristics, census region, and test setting. Comprehensive HIV prevention programs that are responsive to the needs of transgender persons may help address the structural, social, and individual factors that increase their vulnerability to HIV infection, increase their access to appropriate services, improve their health outcomes, and contribute to ending the HIV epidemic in the United States.

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TABLE 1. HIV Tests and Newly Diagnosed HIV Infections Among Transgender Persons—United States, * 2012–2017

	HIV Tests Among Transgender Persons [†]	Newly Diagnosed HIV Infections Among Transgender Persons [‡]	
	N (Col. %)	N (Col. %)	aPR (95% CI)
Total	82,818 (100.0)	1556 (100.0)	1.9
Transgender identity			Referent
Transgender women	58,917 (71.1)	1420 (91.2)	2.4
Transgender men	21,182 (25.6)	93 (6.0)	0.4
Gender nonbinary	2719 (3.3)	43 (2.8)	1.6
Age group, yrs			Referent
13–24	27,354 (33.0)	455 (29.2)	1.7
25–34	31,364 (37.9)	676 (43.4)	2.2
35	23,713 (28.6)	423 (27.2)	1.8
Race/ethnicity			Referent
White, non-Hispanic	21,309 (25.7)	102 (6.6)	0.5
Black, non-Hispanic	26,998 (32.6)	954 (61.3)	3.5
Hispanic/Latino	24,573 (29.7)	375 (24.1)	1.5
Other, non-Hispanic	9898 (12.0)	124 (8.0)	1.3
US census region			Referent
Northeast	17,967 (21.7)	238 (15.3)	1.3
Midwest	13,633 (16.5)	289 (18.6)	2.1
South	27,863 (33.6)	652 (41.9)	2.3
West	22,737 (27.5)	370 (23.8)	1.6
US dependent areas	618 (0.7)	7 (0.4)	1.1
HIV test setting			Referent
Health care facilities	42,103 (50.8)	641 (41.2)	1.5
Nonhealth care facilities	36,197 (43.7)	755 (48.5)	2.1
Correctional facilities	1362 (1.6)	63 (4.0)	4.6

* United States includes the US dependent area of Puerto Rico and US Virgin Islands.

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Missing/invalid data were excluded from the column "HIV tests among transgender persons": 387 (0.5%) from the age group category, 40 (<0.1%) from the race/ethnicity category, and 3156 (3.8%) from HIV test setting category.

Missing/invalid data were excluded from the column "Persons newly diagnosed with HIV infections": 2 (0.1%) from the age group category, 1 (0.1%) from race/ethnicity category, and 97 (6.2%) from HIV test setting category.

§ $P < 0.0001$.

¶ $P < 0.05$.

TABLE 2. Linkage to HIV Medical Care and Interview for Partner Services Among Transgender Persons Newly Diagnosed With HIV Infection—United States*, 2012–2017

	Linkage to HIV Medical Care 90 d After Diagnosis [‡]			Interview for Partner Services [§]			
	Persons Newly Diagnosed With HIV Infection, [†] No. (Col. %)	Denominator, No. (Col. %)	Linked, No. (Row %)	aPR (95% CI)	Denominator, No. (Col. %)	Interviewed, No. (Row %)	aPR (95% CI)
Total	1556 (100.0)	1003 (100.0)	853 (85.0)	N/A	1113 (100)	707 (63.5)	—
Transgender identity							
Transgender women	1420 (91.3)	938 (93.5)	800 (85.3)	Referent	1037 (93.2)	666 (64.2)	Referent
Transgender men	93 (6.0)	56 (5.6)	48 (85.7)	0.94 (0.84 to 1.06)	50 (4.5)	37 (74.0)	1.11 (0.92 to 1.34)
Gender nonbinary	43 (2.8)	9 (0.9)	5 (55.6)	0.68 (0.38 to 1.22)	26 (2.3)	4 (15.4)	0.28 (0.12 to 0.67) [¶]
Age group (yrs)							
13–24	455 (29.2)	281 (28.0)	231 (82.2)	Referent	310 (27.9)	202 (65.2)	Referent
25–34	676 (43.4)	446 (44.5)	384 (86.1)	1.07 (1.00 to 1.15) [¶]	496 (44.6)	315 (63.5)	0.97 (0.88 to 1.08)
35	423 (27.2)	276 (27.5)	238 (86.2)	1.06 (0.98 to 1.14)	306 (27.5)	189 (61.8)	0.88 (0.78 to 1.00) [¶]
Race/ethnicity							
White, non-Hispanic	102 (6.6)	68 (6.8)	62 (91.2)	Referent	73 (6.6)	54 (74.0)	Referent
Black, non-Hispanic	954 (61.3)	598 (59.6)	502 (85.9)	0.91 (0.84 to 1.00) [¶]	672 (60.4)	395 (58.8)	0.82 (0.70 to 0.96) [‡]
Hispanic/Latino	375 (24.1)	248 (24.7)	216 (87.1)	0.94 (0.85 to 1.04)	283 (25.4)	200 (70.7)	0.97 (0.82 to 1.14)
Other, non-Hispanic	124 (8)	88 (8.8)	72 (81.8)	0.92 (0.81 to 1.04)	85 (7.6)	58 (68.2)	0.94 (0.77 to 1.14)
US census region							
Northeast	238 (15.3)	173 (17.2)	155 (89.6)	Referent	145 (13.0)	95 (65.5)	Referent
Midwest	289 (18.6)	152 (15.2)	137 (90.1)	1.01 (0.94 to 1.10)	175 (15.7)	81 (46.3)	0.76 (0.62 to 0.92) [¶]
South	652 (41.9)	442 (44.1)	361 (81.7)	0.94 (0.87 to 1.01)	489 (43.9)	326 (66.7)	1.11 (0.97 to 1.28)
West	370 (23.8)	231 (23.0)	196 (84.8)	0.95 (0.87 to 1.01)	299 (26.9)	202 (67.6)	1.06 (0.91 to 1.23)
US dependent areas	7 (0.4)	5 (0.5)	4 (80.0)	0.90 (0.57 to 1.42)	5 (0.4)	3 (60.0)	0.80 (0.37 to 1.75)
HIV test setting							
Health care facilities	641 (41.2)	452 (45.1)	403 (89.2)	Referent	462 (41.5)	324 (70.1)	Referent
Nonhealth care facilities	755 (48.5)	451 (45.0)	369 (81.8)	0.92 (0.87 to 0.98) [¶]	541 (48.6)	329 (60.8)	0.86 (0.79 to 0.94) [¶]

	Linkage to HIV Medical Care 90 d After Diagnosis [‡]			Interview for Partner Services [§]			
	Persons Newly Diagnosed With HIV Infection, [†] No. (Col. %)	Denominator, No. (Col. %)	Linked, No. (Row %)	aPR (95% CI)	Denominator, No. (Col. %)	Interviewed, No. (Row %)	aPR (95% CI)
Correctional facilities	63 (4.0)	43 (4.3)	31 (72.1)	0.82 (0.68 to 0.98) [¶]	50 (4.5)	15 (30.0)	0.42 (0.27 to 0.64) ^{¶¶}

* United States includes the US dependent area of Puerto Rico and US Virgin Islands.

[†]Records with missing/invalid data were excluded from the column “Persons newly diagnosed with HIV infection”: 2 (0.1%) records were excluded from the age group, 1 (0.1%) from race/ethnicity, and 97 (6.2%) from HIV test setting categories.

[‡]The “Denominator” column for “Linkage to HIV medical care” excludes newly HIV diagnosed transgender persons for whom follow-up information to determine their linkage to care status was unknown. In addition, of those included in the analysis, records were excluded because of missing/invalid data on some variables: 1 (0.1%) from the age group and 57 (5.7%) from HIV test setting categories. Missing/invalid records were also excluded from the column “Linked”: 1 (0.1%) from the age group and 50 (5.8%) from HIV test setting categories.

[§]The “Denominator” column for “Interview for partner services” excludes newly HIV diagnosed transgender persons for whom follow-up information to determine their partner services interview status was unknown. In addition, of those included in the analysis, records were excluded because of missing/invalid data on some variables: 1 (0.1%) from the age group and 60 (5.4%) from HIV test setting categories. Missing/invalid records were also excluded from the column “Interviewed”: 1 (0.1%) from the age group and 39 (5.5%) from HIV test setting categories.

[¶] $P < 0.05$.

^{¶¶} $P < 0.001$.