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Updated Data on Linkage to Human Immunodeficiency Virus Care and Antiretroviral Treatment Among Men Who Have Sex With Men—20 Cities, United States

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Abstract

We examined differences in prevalence of linkage to care and antiretroviral (ARV) treatment among human immunodeficiency virus (HIV)–positive men who have sex with men (MSM) between 2008 and 2014 in National HIV Behavioral Surveillance. Prevalence of linkage to care increased from 79% in 2008 to 87% in 2014 (prevalence ratio [PR], 1.05; 95% confidence interval [CI], 1.03–1.07). ARV treatment increased from 69% in 2008 to 88% in 2014 (adjusted PR, 1.15; 95% CI, 1.12–1.18). Despite these increases, a large disparity in ARV treatment between white and black MSM remains. Increased resources are needed to support immediate referrals for ARV treatment for all MSM newly diagnosed with HIV.

Keywords

HIV; MSM; linkage to care; antiretroviral; United States

The southern region of the United States is disproportionately affected by human immunodeficiency virus (HIV) [1]. In 2014, the rate of diagnoses of HIV infection was 18.5 per 100 000 persons in the South compared with 14.2 in the Northeast, 11.2 in the West, and 8.2 in the Midwest [2]. Deaths among persons living with an HIV diagnosis are also higher in the South compared to the West and Midwest [2]. The reasons for the increased HIV burden in the South are complex, but include the racial disparities in HIV in the United States, with higher rates among blacks or African Americans (hereafter referred to as blacks) compared with whites [2], and the higher proportions of blacks in southern states' populations [3]. Men who have sex with men (MSM), particularly black MSM, also comprise a disproportionate share of HIV infections [2]. HIV is hyper-endemic among MSM in many areas of the United States, but especially in the South [4]. The National HIV/AIDS Strategy (NHAS), originally released in 2010 and updated in 2015, prioritizes

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prevention and care among individuals who live in the South and MSM to reduce the extent of the disparities in these populations [5, 6].

The 2010 NHAS was a comprehensive plan with measurable HIV targets to be achieved by 2015 [5]. These targets included increasing the proportion of newly diagnosed persons linked to care within 3 months of HIV diagnosis from 65% to 85%. The 2015 updated NHAS provides targets through 2020 and changed the linkage-to-care indicator to increase the percentage of newly diagnosed persons linked to care within *1 month* of diagnosis to at least 85% by 2020 (emphasis added) [6]. The plan also calls for an increase in the number of HIV-diagnosed persons who are virally suppressed as a result of antiretroviral (ARV) treatment.

The Centers for Disease Control and Prevention's National HIV Behavioral Surveillance (NHBS) monitors HIV-associated behaviors, including linkage to care and ARV treatment, in MSM and other populations at high risk of HIV infection in cities across the United States. We previously published data on prevalence of linkage to care and ARV treatment from HIV-positive MSM from 2 cycles of NHBS (2008 and 2011) [7]. To further monitor progress toward the NHAS targets, we analyzed data from HIV-positive MSM with an additional cycle year of NHBS (2008, 2011, and 2014) to determine if there was a difference in prevalence of (1) linkage to care and (2) current ARV treatment between study years. We also examined differences between the study years by demographic characteristics, including region.

METHODS

NHBS and venue-based sampling procedures used in NHBS MSM cycles have been described elsewhere [8]. Cross-sectional demographic and behavioral data used in this analysis are from MSM recruited for interviews in 2008, 2011, and 2014. Eligible MSM were aged ≥ 18 years, lived in a participating city, able to complete the interview in English or Spanish, and willing and able to provide informed consent.

The 2 main outcomes in this analysis were linkage to care and current ARV treatment. Linkage to care was first defined as a reported clinic visit for HIV care within 3 months of HIV diagnosis. We then examined linkage to care defined as a visit within 1 month of HIV diagnosis to examine progress toward the updated NHAS indicator. Analyses for linkage to care were restricted to MSM diagnosed with HIV 3 or more months (1 or more months for the second definition) prior to NHBS interview. Linkage to care analyses were further restricted to those diagnosed with HIV in the 3 years prior to the study year (2006–2008 for the 2008 sample, 2009–2011 for the 2011 sample, and 2012–2014 for the 2014 sample). Because only individuals diagnosed after 2008 can contribute to a difference in linkage to care between 2008 and 2011 and after 2011 to a difference between 2011 and 2014, data from all 3 years were restricted to the 3 years prior to the study year to create comparable samples. There were no statistically significant demographic differences between the excluded and restricted samples. Current ARV treatment was defined as self-reported use at the time of NHBS interview. Self-reported HIV-positive MSM with complete and valid interview data were included in the analysis. Data came from the 20 cities that contributed

NHBS data in all 3 study years. A map of the 20 cities is available in a previously published infographic [9].

We compared the prevalence of MSM reporting linkage to care and ARV use in 2008, 2011, and 2014. To determine if these outcomes changed over time, we used Poisson models with generalized estimating equations to calculate prevalence ratios (PRs) and 95% confidence intervals (CIs). Year was included in the model as an ordinal variable. Individual interaction terms for each covariate by year were included in models to examine changes over time by subgroup. Each PR measures change in the outcome for a 3-year increase in interview year (ie, 2008–2011 or 2011–2014). Adjusted models for linkage to care did not differ from unadjusted models and are not shown. ARV treatment models are adjusted for age, race, current insurance, and the interaction between age and year.

RESULTS

The analysis sample included 1144 HIV-positive MSM from 2008, 1338 from 2011, and 1716 from 2014. MSM differed by race between the 3 study years. While the proportion of white MSM decreased 14 percentage points between 2008 and 2014, the proportion of black MSM increased 13 percentage points (data not shown). MSM were also younger with each subsequent cycle. Education, income, and region of recruitment were similar between study years. Current insurance increased from 75% in 2008 to 79% in 2011, and to 86% in 2014.

For the linkage-to-care analysis, 72 MSM in 2008, 74 in 2011, and 85 in 2014 were excluded because they were diagnosed with HIV in the 3 months prior to the NHBS interview or were diagnosed in the same year as the interview and had an unknown month of diagnosis. Two additional men (1 in 2008 and 1 in 2014) were missing data on first visit for HIV care. Finally, after excluding an additional 834 diagnosed before 2006 in 2008, 973 diagnosed before 2009 in 2011, and 1272 diagnosed before 2012 in 2014, 236 men in 2008, 291 men in 2011, and 358 men in 2014 were included in the analyses (Table 1). In all years, linkage to care was more likely among those with higher education and income and with current insurance. There was no difference in prevalence of linkage to care in 2014 by region. Overall, prevalence of linkage to care increased from 79% in 2008 to 87% in 2014 (PR, 1.05; 95% CI, 1.03–1.07), a relative percent change of 5% per 3-year increase. A change of similar magnitude was observed for most subgroups. When the definition of linkage to care was changed to linkage within 1 month of diagnosis, prevalence of linkage to care increased from 75% in 2008 to 78% in 2014 (PR, 1.04; 95% CI, 1.02–1.07) (data not shown).

For the current ARV treatment analysis, 2 men in each study year were missing data on current ARV use, leaving 1142 in 2008, 1336 in 2011, and 1714 in 2014 for analysis (Table 2). In all years, a higher percentage of ARV treatment was observed among whites, older age groups, MSM with higher education and income, and those with health insurance. There was a difference in ARV treatment by region, with the South having the lowest prevalence of ARV use compared to the other regions in 2011 and 2014. When we adjusted the association between region and ARV treatment by race/ethnicity, the difference by region was no longer present. A racial disparity in ARV treatment remained in 2014, with whites reporting a

prevalence of ARV treatment 9 percentage points higher than blacks. Overall, prevalence of ARV treatment increased from 69% in 2008 to 88% in 2014 (adjusted PR, 1.15; 95% CI, 1.12–1.18), a relative percentage change of 15% per 3-year increase. ARV treatment also increased among all subgroups.

DISCUSSION

Prevalence of both linkage to care and ARV treatment among MSM increased overall and among most subgroups between 2008 and 2014. The prevalence of linkage to care within 3 months of diagnosis in 2014 was 87%, and met the 2015 NHAS target of 85%. The 2014 estimate of 78% of MSM linked to care within 1 month of diagnosis suggests that the NHAS 2020 goal of 85% is feasible.

There was no difference in linkage to care by region. While we initially observed a difference in ARV treatment by region, with the South having lower levels of treatment, the difference went away after controlling for race (ie, the higher proportion of black MSM residing in the South). The large disparity in ARV treatment between black and white MSM that we previously described in NHBS remained in 2014; after adjustment, the change in current ARV treatment per 3-year increase in year for blacks and whites was similar in magnitude, suggesting a widening of the disparity between 2011 and 2014. Despite similar prevalences in linkage to care, blacks continue to be less likely to be prescribed ARV treatment [10].

While it is encouraging that there is no difference in our sample by region in linkage to care and ARV treatment after accounting for race, it is important to note that our data are from MSM in urban areas, where care is more readily available [11]. The HIV epidemic in the South is unique in that high HIV rates are concentrated not only in urban areas, but in rural areas as well [12]. The high proportion of the population in the South living in rural areas often experiences difficulty in acquiring quality healthcare and experiences greater stigma related to HIV infection [13]. This complicates efforts to provide HIV prevention and treatment in rural areas, and disparities in HIV burden may therefore remain by region when rural areas are included in analyses [4].

Most insurance plans now cover ARV treatment. Under the Affordable Care Act, many HIV-infected MSM are newly eligible for Medicaid coverage and others are eligible to purchase private insurance [14]. However, many HIV-infected MSM in the South will remain uninsured because many southern states did not expand Medicaid coverage [15]. In addition, subsidies for private coverage are not available to people with incomes above the federal poverty level, so many HIV-infected MSM may not qualify for these subsidies [15].

Our analyses are subject to several limitations. First, NHBS is not a nationally representative sample, so results may not be generalizable to all cities or to all MSM in participating cities. Second, our data are collected through face-to-face interviews and our measures of linkage to care and ARV treatment are based on self-reported data and might be subject to social desirability bias, which would lead to overestimation of prevalence estimates. HIV-infected individuals who did not disclose their status during the interview would have been excluded

from our analysis. If these individuals were different with respect to linkage to care or ARV use compared to those who disclosed their status, our results could also be biased. However, our results are based on differences over time and are less likely to be affected by these biases than the point estimates themselves, provided the biases remained consistent over time. The analysis is limited to 3 time points and cannot be interpreted as a trend nor as resulting from changes to policy or practices that occurred between these time points. Data on CD4 count were not available to determine who would have been eligible for ARV treatment in 2008 and 2011 based on the guidelines. Finally, our analysis also did not include data on ARV adherence or viral load suppression; we therefore do not have viral suppression data to compare to the NHAS goals for MSM. In summary, our analysis demonstrated increases in linkage to care and ARV treatment among HIV-positive MSM. Despite these increases, a large disparity in ARV provision between white and black MSM remains, particularly in the South, where the population density of black MSM is greater.

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Table 1
Prevalence of Linkage to HIV Care and Prevalence Ratios Comparing Linkage to Care^a per 3-Year Increase in Year Among Self-reported HIV-Infected Men Who Have Sex with Men—National HIV Behavioral Surveillance

Characteristic	2008		2011		2014		Unadjusted PR ^b (95% CI)
	No. in Sample	No. (%)	No. in Sample	No. (%)	No. in Sample	No. (%)	
Overall	236	187 (79.2)	291	241 (82.8)	358	312 (87.2)	1.05 (1.03–1.07)
Race/ethnicity							
Black	72	52 (72.2)	119	99 (83.2)	160	142 (88.8)	1.07 (1.02–1.11)
Hispanic/Latino ^c	53	42 (79.3)	61	54 (88.5)	87	74 (85.1)	1.06 (1.02–1.11)
White	90	77 (85.6)	91	74 (81.3)	84	75 (89.3)	1.04 (1.01–1.07)
Other ^d	21	16 (76.2)	19	13 (68.4)	25	20 (80.0)	1.05 (.96–1.15)
Age at HIV diagnosis, y							
24	61	48 (78.7)	116	95 (81.9)	138	116 (84.1)	1.04 (.99–1.09)
25–29	50	37 (74.0)	52	43 (82.7)	85	78 (91.8)	1.05 (1.01–1.09)
30–39	74	56 (75.7)	72	62 (86.1)	81	72 (88.9)	1.05 (1.02–1.09)
40	51	46 (90.2)	51	41 (80.4)	54	46 (85.2)	1.04 (.99–1.09)
Education							
High school or less	85	66 (77.7)	105	81 (77.1)	115	97 (84.4)	1.05 (1.01–1.09)
More than high school	151	121 (80.1)	186	160 (86.0)	243	215 (88.5)	1.05 (1.02–1.07)
Income							
\$0–\$19999	92	70 (76.1)	147	119 (81.0)	156	127 (81.4)	1.07 (1.03–1.11)
\$20000	143	117 (81.1)	142	120 (84.5)	197	181 (91.9)	1.03 (1.01–1.06)
Current insurance							
No	85	64 (75.3)	86	62 (72.1)	77	63 (81.8)	1.02 (.97–1.07)
Yes	151	123 (81.5)	205	179 (87.3)	281	249 (88.6)	1.05 (1.03–1.07)
Region							
Midwest	30	26 (86.7)	47	35 (74.5)	49	43 (87.8)	1.03 (.98–1.08)
Northeast	27	17 (63.0)	38	32 (84.2)	80	68 (85.0)	1.08 (1.02–1.15)

Characteristic	2008		2011		2014		Unadjusted PR ^b (95% CI)
	No. in Sample	No. (%)	No. in Sample	No. (%)	No. in Sample	No. (%)	
South and Territories	106	84 (79.3)	130	110 (84.6)	162	143 (88.3)	1.03 (1.00–1.06)
West	73	60 (82.2)	76	64 (84.2)	67	58 (86.6)	1.06 (1.02–1.10)

Abbreviations: CI, confidence interval; HIV, human immunodeficiency virus; MSM, men who have sex with men; PR, prevalence ratio.

^aDefined as a self-reported clinic visit for HIV care within 3 months of HIV diagnosis, restricted to those diagnosed with HIV in the 3 years prior to the study year (2006–2008 for the 2008 study year, 2009–2011 for the 2011 study year, and 2012–2014 for the 2014 study year).

^bPR corresponds to the increase in linkage to care for each 3-year increase in interview year (ie, 2008–2011 or 2011–2014).

^cHispanic/Latinos can be of any race.

^dIncludes MSM reporting American Indian or Alaska Native, Asian, Native Hawaiian or Pacific Islander, other race, or multiple race.

Table 2

Prevalence of Current Antiretroviral (ARV) Treatment and Prevalence Ratios Comparing Current ARV Treatment per 3-Year Increase in Year Among Self-reported HIV-Infected Men Who Have Sex with Men—National HIV Behavioral Surveillance

Characteristic	2008		2011		2014		Unadjusted PR ^a (95% CI)	Adjusted PR ^b (95% CI)
	No. in Sample	No. (%)	No. in Sample	No. (%)	No. in Sample	No. (%)		
Overall	1142	790 (69.2)	1336	1049 (78.5)	1714	1499 (87.5)	1.12 (1.10–1.15)	1.15 (1.12–1.18)
Race/ethnicity								
Black	291	177 (60.8)	444	315 (71.0)	658	548 (83.3)	1.17 (1.12–1.22)	1.17 (1.13–1.21)
Hispanic/Latino ^c	243	170 (70.0)	278	220 (79.1)	355	315 (88.7)	1.13 (1.08–1.18)	1.14 (1.10–1.19)
White	542	400 (73.8)	528	453 (85.8)	581	535 (92.1)	1.11 (1.09–1.15)	1.16 (1.12–1.19)
Other ^d	66	43 (65.2)	80	56 (70.0)	115	96 (83.5)	1.14 (1.04–1.25)	1.11 (1.01–1.21)
Current age, y								
18–29	205	78 (38.1)	323	185 (57.3)	454	354 (78)	1.41 (1.32–1.52)	1.38 (1.29–1.48)
30–39	325	205 (63.1)	328	258 (78.7)	432	371 (85.9)	1.16 (1.11–1.21)	1.15 (1.10–1.19)
40–49	405	334 (82.5)	442	386 (87.3)	450	417 (92.7)	1.06 (1.03–1.09)	1.05 (1.03–1.08)
50	207	173 (83.6)	243	220 (90.5)	378	357 (94.4)	1.06 (1.03–1.09)	1.05 (1.02–1.09)
Education								
High school or less	364	238 (65.4)	395	285 (72.2)	513	437 (85.2)	1.15 (1.10–1.19)	1.16 (1.11–1.20)
More than high school	778	552 (71.0)	940	763 (81.2)	1201	1062 (88.4)	1.11 (1.09–1.14)	1.15 (1.12–1.18)
Annual household income								
\$0–\$19999	437	290 (66.4)	524	384 (73.3)	689	580 (84.2)	1.13 (1.09–1.17)	1.15 (1.12–1.18)
\$20000	699	495 (70.8)	796	652 (81.9)	1013	909 (89.7)	1.12 (1.09–1.15)	1.16 (1.13–1.19)
Current insurance								
No	281	142 (50.5)	277	167 (60.3)	244	172 (70.5)	1.18 (1.10–1.27)	1.19 (1.11–1.27)
Yes	861	648 (75.3)	1058	881 (83.3)	1469	1327 (90.3)	1.09 (1.07–1.12)	1.15 (1.12–1.18)
Region								
Midwest	97	61 (62.9)	138	110 (79.7)	168	148 (88.1)	1.17 (1.09–1.26)	1.16 (1.11–1.22)
Northeast	168	115 (68.5)	211	164 (77.7)	287	247 (86.1)	1.12 (1.06–1.18)	1.18 (1.13–1.23)

Characteristic	2008		2011		2014		Unadjusted PR ^a (95% CI)	Adjusted PR ^b (95% CI)
	No. in Sample	No. (%)	No. in Sample	No. (%)	No. in Sample	No. (%)		
South and Territories	476	320 (67.2)	574	430 (74.9)	794	678 (85.4)	1.13 (1.09–1.17)	1.17 (1.14–1.22)
West	401	294 (73.3)	413	345 (83.5)	465	426 (91.6)	1.12 (1.08–1.15)	1.16 (1.12–1.20)

Abbreviations: ARV, antiretroviral; CI, confidence interval; HIV, human immunodeficiency virus; MSM, men who have sex with men; PR, prevalence ratio.

^aPR corresponds to the increase in ARV treatment for each 3-year increase in interview year (ie, 2008–2011 or 2011–2014).

^bAdjusted model includes year, race/ethnicity, current age, current insurance, the interaction between age and year, and the interaction between year and the covariate in question.

^cHispanic/Latinos can be of any race.

^dIncludes MSM reporting American Indian or Alaska Native, Asian, Native Hawaiian or Pacific Islander, other race, or multiple race.