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Racial/Ethnic Disparities in Failure to Initiate HIV Care: Role of HIV Testing Site, Individual Factors, and Neighborhood Factors, Florida, 2014–2015

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Abstract

Delayed initiation of human immunodeficiency virus (HIV) care affects disease progression. To determine the role of HIV testing site and neighborhood- and individual-level factors in racial/

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ethnic disparities in initiation of care, we examined Florida population-based HIV/AIDS surveillance system records. We performed multilevel Poisson regression to calculate adjusted prevalence ratios (APR) for non-initiation of care by race/ethnicity adjusting for HIV testing site type and individual- and neighborhood-level characteristics. Of 8,913 people diagnosed with HIV during 2014-2015 in the final dataset, 18.3% were not in care within three months of diagnosis. The APR for non-initiation of care for non-Hispanic Blacks relative to non-Hispanic Whites was 1.57 (95% confidence interval [CI] 1.38-1.78) and for those tested in plasma/donation centers relative to outpatient clinics was 2.45 (95% CI 2.19-2.74). Testing site and individual variables contribute to racial/ethnic disparities in non-initiation of HIV care. Linkage procedures, particularly at plasma/blood donation centers, warrant improvement.

Keywords

Neighborhood; HIV testing site; HIV care linkage; poverty; social determinants

In 2014, the human immunodeficiency virus (HIV) mortality rate for non-Hispanic Blacks (NHBs) was eight and a half times that for non-Hispanic Whites (NHWs) in the United States (U.S.) (8.5 vs. 1.0 deaths per 100,000 population).[1] Lower survival among NHBs living with HIV infection relative to NHWs has been noted in multiple studies.[2–4] Early diagnosis and treatment with antiretroviral therapy among people living with HIV infection results in life expectancies similar to those of the general population.[5,6] However, successful treatment depends on success of each stage of "engagement in HIV care," from diagnosis to viral suppression,[7] including initiation of HIV care, which remains a challenge in the United States. During 2015 in 37 states and the District of Columbia, only 84.3% of people aged ≥ 13 years had evidence of care initiation (at least one CD4 or viral load test) within three months of HIV diagnosis, and care initiation was lower among NHBs than NHWs (81.1% vs. 88.7% respectively).[8]

The social ecologic framework, which has been used to understand HIV risk,[9,10] considers individual, social, and structural factors that may influence a health outcome. Previous studies indicate that there are many individual-level psychosocial factors associated with delayed initiation of care such as denial of HIV infection, not feeling sick, unemployment, lack of insurance, and current substance use.[11–14] The results of studies examining neighborhood-level factors have been mixed.[15–18] A study in 2007-2011 in Philadelphia found that census tracts with high unemployment had lower care initiation, but census tract education, income, and poverty were not related to care initiation.[15] Surveillance data from 32 states and the District of Columbia during 2014 indicate little difference in delayed initiation of care (at three months) for either men or women by poverty level of county of residence, but counties with more than 20% of people who did not complete high school tended to have a higher percentage of delayed initiation of care.[16] In 2006–2010 in Atlanta in high poverty zip code tabulation areas (ZCTAs), increased vehicle ownership in a ZCTA was associated with improved care initiation.[17] Finally, in a New York City study, non-initiation within three months was more common in high-poverty relative to low-poverty zip codes if the person was tested at a medical facility that was not a designated AIDS center but was slightly less common if the person was tested at a designated AIDS center.[18] In

addition, despite the key role that testing plays in care initiation, there have been few studies that have examined the role of the particular type of HIV testing site on the time between a positive HIV test and HIV care.[18–21] Previous work has demonstrated racial/ethnic differences in use of different types of testing sites in the United States[20] and racial/ethnic disparities in social determinants among people diagnosed with HIV infection.[22] Previous studies also have shown rural/urban status, poverty, and residential segregation to be associated with lower HIV survival in Florida.[4,23,24] Therefore, the objective of this study was to determine the extent to which the following factors clarify and account for racial/ethnic disparities in initiation of HIV care: individual characteristics, type of HIV testing site, and neighborhood-level measures of socioeconomic status (SES), racial/ethnic composition, and rural/urban status.

Methods

Study population.

De-identified records were obtained for all Florida residents age 13 and older whose case met the Centers for Disease Control and Prevention HIV surveillance case definition,[25] who were diagnosed during 2014 or 2015, and who were reported to the Florida Department of Health (DOH) Enhanced HIV/AIDS (Acquired Immunodeficiency Syndrome) Reporting System (eHARS). Reporting was likely complete because in addition to health care provider reporting, all laboratories are required to report all repeatedly reactive HIV immunoassays that have been confirmed, all positive HIV virologic tests, and all viral load results;[26] furthermore, most report electronically. The records of the following groups were excluded: diagnosed HIV cases with missing or non-existing postal codes because neighborhood-level variables could not be examined; people diagnosed in a correctional facility because inmate care is unrelated to the surrounding neighborhood; people who died within three months of HIV diagnosis because they would not have had three months to obtain care (see initiation of care definition below); and people who were not NHB, NHW, or Hispanic because of small numbers (95 Asians, 14 American Indians/Alaskan Natives, 15 Native Hawaiians/Pacific Islanders, and 88 multiracial people).

Individual characteristics.

Individual-level variables were obtained from eHARS and included month and year of HIV diagnosis, AIDS diagnosis (if applicable),[25] and death (if applicable); age at HIV diagnosis; sex at birth; race/ethnicity; country of birth; mode of HIV acquisition; and type of facility where the HIV test was conducted. Race/ethnicity data were classified into three groups: NHBs, NHWs, and Hispanics.

Initiation of care.

National reports usually define *linkage to care* (what we have called *initiation of care*) using laboratory test dates only. However, to provide more comprehensive data on first date of HIV care, we linked Florida surveillance data for 2014 and 2015 to Florida databases used to track state and federally funded (e.g. Ryan White) HIV services. To utilize all available data, we defined initiation of care as having a documented laboratory result (CD4 or viral load), medical visit, or antiretroviral prescription within three months of the HIV diagnosis date

(hereafter referred to as the “comprehensive” initiation of care definition). The eHARS system, AIDS Drug Assistance Program (ADAP), and Ryan White Part B databases were linked at a time when the national objective was for 85% of people to initiate care within three months of HIV diagnosis,[27] prior to the publication of the updated National HIV/AIDS Strategy in 2015, in which linkage was redefined as 85% of people initiating care within one month.[28]

HIV testing site type and neighborhood-level variables.

HIV test site types were grouped as follows: outpatient clinics which included HIV specialty care, any primary care, and public clinics such as sexually transmitted disease and tuberculosis clinics; hospitals which included any testing in a hospital department (it was not possible to differentiate emergency department from inpatient testing); HIV case management and HIV counseling and testing sites; blood banks/plasma centers; and other, which included laboratories, drug treatment site, and unknown test site types.

Postal (ZIP) codes were used as a proxy for neighborhoods because census tract information was not available in the eHARS surveillance dataset. Thirteen neighborhood-level SES indicators were obtained from the 2009–2013 five-year estimate of the American Community Survey for all Florida ZIP code tabulation areas (ZCTA).[29] The Census Bureau reports data by ZCTAs, which approximate ZIP codes, by aggregating Census Bureau blocks based on the ZIP code of addresses in these blocks.[30] The 13 variables included percent of households without access to a car, percent of households with ≥1 person per room, percent of population living below the poverty line, percent of owner-occupied homes worth ≥ $300,000, median household income, percent of households with annual income <$15,000, percent of households with annual income ≥$150,000, income disparity (derived from percent of households with annual income <$10,000 and percent of households with annual income ≥$50,000), percent of population aged ≥25 with less than a 12th grade education, percent of population aged ≥25 with a graduate professional degree, percent of households living in rented housing, percent of population aged ≥16 who were unemployed, and percent of population aged ≥16 employed in high working class occupation (ACS occupation group: “managerial, business, science, and arts occupations”). The procedure for creating the index is described in detail elsewhere.[31] In brief, all neighborhood-level indicators were coded so that higher scores corresponded with lower SES and were standardized. Then a reliability analysis was conducted, and we selected seven indicators based on the correlation of the indicator with the total index (high correlation), and the Cronbach’s alpha if the item was deleted (low alpha). The seven indicators selected were percent below poverty, median household income, percent of households with annual income <$15,000, percent of households with annual income ≥$150,000, income disparity, percent of population age ≥25 with less than a 12th grade education, and high-class work. Then we conducted a principal component analysis (PCA) with and without varimax rotation. The PCA revealed one component which accounted for 73.5% of the variability in the indicators. Because all the original variables were highly correlated with the component (factor loadings between 0.80 and 0.93), we retained all seven indicators. Finally, we added the standardized scores for the seven variables to create the index. The SES index of Florida neighborhoods (ZCTAs) were linked to each record in eHARS by the ZCTA of the residence at the time of HIV diagnosis

and categorized into quartiles based on SES index scores of all Florida ZCTAs. The percentage of NHB population within each ZCTA was used as a proxy for racial segregation.[32–34] It was categorized into three groups: less than 25%, 25–49%, and 50% or more.[35] Segregation indices could not be used because they were available only for metropolitan statistical areas. Rural/urban status of the ZCTAs was based on categorization C of Version 2.0 Rural-Urban Commuting Area (RUCA) data codes.[36,37]

Analyses.

The association between initiation of care within three months of HIV diagnosis and each of the individual level variables was assessed with the Cochran-Mantel-Haenszel statistic controlling for ZCTA, and the chi-square test was used for neighborhood-level variables. The GENMOD procedure in SAS was used to estimate crude and adjusted prevalence ratios and their confidence intervals. Because of convergence problems with the binomial distribution and logarithm link function (or log-binomial regression model), Poisson regression model was used with robust error variance estimation provided by the generalized estimating equations (GEE) approach.[38] The exchangeable working correlation of the empty model, which approximates the intraclass correlation, was 0.0322. Therefore, the repeated statement with “subject = ZCTA” was used to account for the clustering of individuals within ZCTAs for all models. Four regression models were performed. The first included only race/ethnicity. The second included race/ethnicity and all other individual variables except HIV testing site type. The third included the variables in the second model and HIV testing site type. The fourth included those variables in the third model and neighborhood (ZCTA)-level variables. All variables in Table 1 were chosen for the models because they were associated with retention in care in Florida in a previous study.[39] Two-way interactions between race/ethnicity and all area-level variables and HIV testing site type were assessed. We conducted all analyses using SAS 9.4.[40] The Florida International University Institutional Review Board approved the study protocol, and the Florida Department of Health Institutional Review Board deemed the study as non-human subjects research.

Results

There were 9,469 people diagnosed with HIV in Florida during 2014–2015. Of these, 28 (0.3%) were younger than 13 years, 183 (1.9%) were diagnosed in prison, 144 (1.5%) had no valid residential ZIP code (including 28 homeless), two (0.02%) were missing month of HIV diagnosis, 395 (4.2%) died within three months of HIV diagnosis, and 212 (2.2%) were not in the NHB, NHW or Hispanic groups. People could be in more than one category. All people who were in at least one of these categories were excluded, leaving 8,913 in the final data set for analysis.

Of the 8,913 people in the final dataset, 1,628 (18.3%) did not initiate care within three months of the HIV diagnosis date. This percentage was higher among NHBs (23.8%) than Hispanics (15.0%) and NHWs (12.9%) ($p<.0001$) (Table 1). Non-initiation of care was also higher among people younger than 40, those who were U.S.-born, those with an other/unknown mode of HIV transmission, and those who were not diagnosed with AIDS within 3 months of the HIV diagnosis. The majority of people (58.2%) who tested at a blood bank

did not initiate care within the three months. Non-initiation was also common (24.7%) among people tested at a HIV case management or HIV counseling and testing site. Non-initiation was lowest among people tested in a hospital (9.3%), or an outpatient clinical site (14.5%). Non-initiation of care increased as the ZCTA-level poverty index increased and as the ZCTA-level density of NHBs increased. There was no significant difference between rural and urban areas.

There were several significant demographic differences between people tested at the various HIV testing site types (Table 2). In particular, only 0.6% of people with an AIDS diagnosis within three months of an HIV diagnosis were tested at a blood bank compared with 5.8% of people without an AIDS diagnosis. There was also a higher proportion of testing at blood banks among people living in low socioeconomic status neighborhoods (6.0%) than in the highest socioeconomic status neighborhoods (3.4%) and among people living in high NHB density neighborhoods (7.0%) relative to lower NHB density neighborhoods (3.4%).

The crude prevalence ratio (PR) for non-initiation of care was significantly higher for NHBs (1.75; 95% confidence interval [CI] 1.55-1.97), but not Hispanics (1.16; 95% CI 1.00-1.33) relative to NHWs (Table 3). The PR for NHBs relative to NHWs decreased to 1.57 (95% CI 1.38-1.78) after adjusting for individual level factors, HIV testing site type and neighborhood variables and remained non-significant for Hispanics. In the final model, being male (adjusted PR 1.31; 95% CI 1.15-1.48), being US born (adjusted PR 1.21; 95% CI 1.08-1.34), having other/unknown compared with heterosexual mode of HIV transmission (adjusted PR 1.58; 95% CI 1.41-1.77), and not having an AIDS diagnosis within three months of HIV diagnosis (adjusted PR 33.05; 95% CI 18.98-57.54) were significantly associated with non-initiation of care, while male-to-male sexual contact was significantly associated with higher initiation of care (adjusted PR 0.73; 95% CI 0.65-0.82). Relative to being tested in an outpatient clinic, there was a significantly higher adjusted PR for non-initiation if tested in blood bank/plasma center (2.45; 95% CI 2.18-2.74), and HIV case management or HIV counseling and testing site (1.62; 95% CI 1.44-1.81). None of the ZCTA-level variables was significantly associated with initiation of care (Table 3); in fact, the model fit was slightly worse with model four than model three (Quasilikelihood under the Independence Model Criterion 9,531.12 vs. 9,524.39). There was no significant interaction between race/ethnicity and any of the neighborhood level factors or testing sites (data not shown in table).

Discussion

Considering all people diagnosed with HIV infection in Florida during 2014-2015 who met the study criteria, 81.7% were linked to care within three months. This indicates that progress needs to be made to reach the new national objective of at least 85% in care within one month of HIV diagnosis.[28] The percentage, however, was very similar to that of 84.3% in care within three months for 37 states and the District of Columbia during 2015.[8]

The overall percentage of people not initiating care in Florida masks some significant differences by race/ethnicity, with 23.8% of NHBs, 15.0% of Hispanics, and 12.9% of NHWs not initiating care within three months. These disparities are slightly larger than those

reported in a study of 37 states and the District of Columbia which found that 18.9% of NHBs, 15.4% of Hispanics, and 11.3% of NHWs did not initiative care within three months.[8] The slightly larger NHB to NHW disparity in Florida suggests that there may be greater barriers in initiation of care in Florida for NHBs than in other states. There may be regional differences in culture, services, or other barriers or enablers driving racial/ethnic disparities.

The addition of both individual and neighborhood level factors and HIV testing site attenuated but did not eliminate the racial disparities in non-initiation of care, suggesting that there are factors that are responsible for these disparities that were not available in this dataset. Potentially predictive factors include individual-level SES and structural barriers such as transportation problems,[17,41,42] lack of housing,[42] and lack of insurance.[13,43–46] Other unmeasured factors may include fear related to stigma,[44] not wanting to disclose HIV status,[43] being in denial,[12,43,44,47] not having symptoms,[43] mental health issues,[43] and substance abuse.[11,48]

The current study's finding that males were less likely to initiate care has been found in several others studies,[45,49] but not all.[18,19,46,50] Similarly, the finding of better care initiation among people with a reported mode of HIV transmission of men who have sex with men compared to people with other modes of HIV transmission was supported by one other population-based study[51] but not by several others. [19,46,50] The finding of poorer initiation among US born than foreign born is somewhat unexpected since one would assume that access to care is better among US born. Because there was no information in the dataset about how long foreign-born people had lived in the US, or if they had received care in their home country, this finding is difficult to interpret and merits further investigation. Additionally, this finding may not be generalizable outside of Florida because the distribution of immigrants from specific countries and other sociodemographic characteristics of immigrants vary throughout the United States.

In the current study, the type of HIV testing site type was the strongest factor associated with initiation of care. A higher proportion of people tested in outpatient clinic settings initiated care within 3 months than those tested in case management and HIV testing and counseling sites. These results are similar to those of studies in Philadelphia, New York, and San Francisco, which all reported higher care initiation among people tested in outpatient medical clinics than in HIV counseling and testing sites or other community sites.[18–19,21] Similar results were reported in a national study of publicly funded testing in 2013.[20] Follow up after abnormal results from non-clinic-based (i.e. mobile vans) relative to stationary clinic sites has also been observed in breast cancer screening programs.[52,53] These results as well as the results of the current study may be due to psychosocial differences (e.g. mental health status, social support) affecting the ability to follow up on abnormal tests between people tested at non-clinic-based sites and clinic sites that we and others could not control for. It could also be that people screened in non-clinic-based sites have more difficulty following up on their test results due to the inherent extra step in seeking a clinical provider that a person screened at a stationary clinic site would not likely have. Regardless, the results of the current study indicate that care initiation procedures at testing sites, in particular case management and HIV screening sites, should be assessed to identify ways to improve

outcomes. Furthermore, ongoing surveillance of care initiation results and feedback to individual sites have been recommended[54] and may be warranted in Florida.

We identified only one recent study in the United States that assessed initiation of care after blood bank/plasma center testing. It found that 78% of people surveyed who donated blood and had a confirmed positive test for hepatitis B, C, HTLV, or HIV contacted a provider.[55] However, only four of the 109 with a confirmed positive test had HIV infection, and the respondents to the survey (response rate 42%) were better educated than the non-responders. In the current study there were significant differences in characteristics between people who had a positive HIV test from a blood bank/plasma center compared to other sites, most notably, that they were much less likely to be diagnosed with AIDS within three months suggesting that these people may be more likely to be asymptomatic than people tested at other sites. This is supported by a study at two clinics in Texas which found that a CD4 count ≤200 cells/mm^3, indicating more advanced disease, was associated with shorter time to care initation.[14] Given that 400 HIV cases were identified through blood banks/plasma centers during 2014–2015 in Florida and that the majority were not linked to care suggests that procedures should be modified to enhance linkage in this group. Initiation of care among blood donors should also be examined in other geographic areas to determine the extent of this problem.

None of the neighborhood-level factors that were examined (i.e. SES, racial composition, and rural/urban status) was significantly associated with non-initiation of care. A study in Atlanta, Georgia and one in Philadelphia, Pennsylvania found clustering of delayed initiation of HIV care suggesting the importance of community-level variables.[17,46] It is possible that in the current study the key community-level factors for linkage were not measured. For example, the Atlanta study found that community-level vehicle ownership was associated with care initiation,[17] and another study in Philadelphia found that neighborhood social participation was associated with care initiation.[15] Additionally, there may be regional variations in the importance of neighborhood-level factors.

The principal study limitation is using administrative data to define initiation of care. We defined initiation of care as evidence of at least one laboratory test, clinic visit, or pick up of a prescription. Because one laboratory test alone could lead to the classification of initiation of care, the definition may result in an overestimate of care if a test is ordered prior to the actual visit.[43] The implication is that the estimate of those not linked to care is likely an underestimate of non-initiation. Another limitation is that only clinic visits and prescriptions obtained through the publically funded Ryan White and ADAP programs were ascertained. For people in the private system, only laboratory tests would have been ascertained. This means that initiation of care was likely underestimated for people in higher socioeconomic levels, which would have led to an underestimate of the racial/ethnic disparities given that African American and Latinos in the dataset were overrepresented in the low-SES neighborhoods. Additionally, although we have data on important demographic factors such as sex and age, we do not have individual-level data on socioeconomic status, insurance status, social support, education, current substance use, or distances from residence to HIV clinical care sites and resulting transportation barriers; these factors could vary by testing

site type and may explain some of the observed differences in care initiation results by testing site type.

In conclusion, we found racial/ethnic disparities in initiation of HIV care that persisted despite controlling for several demographic- and neighborhood-level variables. Significant improvements in the timeliness of initiation of care will be necessary in Florida and other states to meet the new national goal of at least 85% linked to care within one month of diagnosis. To achieve this overall goal, priority should be assigned to those groups that are having the most difficulty linking to care. An examination of perceived barriers to care is warranted to identify unique, modifiable barriers to initiation of HIV care among NHBs. Furthermore, an examination of the effectiveness of linkage in specific counseling and testing models is needed to determine how the system can be improved to meet the needs of populations not linking to HIV care. Finally, consideration should be given to provide HIV testing sites feedback about the success of their clients in obtaining timely initiation of care.

Abbreviations

AIDS	acquired immunodeficiency syndrome
ADAP	AIDS Drug Assistance Program
APR	adjusted prevalence ratio
CD4	cluster of differentiation 4
CI	confidence interval
DOH	Department of Health
eHARS	Enhanced HIV/AIDS Reporting System
HIV	human immunodeficiency virus
NHB	non-Hispanic Blacks
NHW	non-Hispanic Whites
RUCA	Rural-Urban Commuting Area
SES	socioeconomic status
US	United States
ZCTA	ZIP code tabulation areas
ZIP	zone improvement plan

References

1. Kochanek KD, Murphy SL, Xu J, et al. Table 15 in *Deaths: Final Data for 2014*; National Vital Statistics Reports, 65(4), 69 6 30, 2016 Available at: https://www.cdc.gov/nchs/data/nvsr/nvsr65/nvsr65_04.pdf.

2. Harrison KM, Song R, Zhang X. Life expectancy after HIV diagnosis based on national HIV surveillance data from 25 states, United States. J Acquir Immune Defic Syndr. 2010 1;53(1):124–30. [PubMed: 19730109]
3. Siddiqi A, Hu X, Hall HI. Mortality among blacks or African Americans with HIV infection--United States, 2008–2012. MMWR Morb Mortal Wkly Rep. 2015 2;64(4):81–86. [PubMed: 25654607]
4. Trepka MJ, Fennie KP, Sheehan DM, et al. Racial-ethnic differences in all-cause and HIV mortality, Florida 2000-2011. Ann Epidemiol. 2016 3;26(3):176–82. [PubMed: 26948103]
5. McManus H, O'Connor CC, Boyd M, et al. Long-term survival in HIV positive patients with up to 15 years of antiretroviral therapy. PLoS One. 2012;7(11):e48839–e48847. [PubMed: 23144991]
6. Nakagawa F, Lodwick RK, Smith CJ, et al. Projecting life expectancy of people with HIV according to timing of diagnosis. AIDS. 2012 1;26(3):335–43. [PubMed: 22089374]
7. Gardner EM, McLees MP, Steiner JF, et al. The spectrum of engagement in HIV care and its relevance to test-and-treat strategies for prevention of HIV infection. Clin Infect Dis. 2011 3;52(6):793–800. [PubMed: 21367734]
8. 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. 2015. HIV Surveillance Supplemental Report 2017; 22(No. 2). 7 2017 http://www.cdc.gov/hiv/library/reports/hiv-surveillance.html.
9. Baral S, Logie CH, Grosso A, et al. Modified social ecological model: a tool to guide the assessment of the risks and risk context of HIV epidemics. BMC Public Health. 2013 5 17;13:482–489. [PubMed: 23679953]
10. Poundstone KE, Strathdee SA, Celentano DD. The social epidemiology of human immunodeficiency virus/acquired immunodeficiency syndrome. Epidemiol Rev. 2004;26:22–35. [PubMed: 15234945]
11. Brewer TH, Zhao W, Pereyra M, et al. Initiating HIV care: attitudes and perceptions of HIV positive crack cocaine users. AIDS Behav. 2007 11;11(6):897–904. [PubMed: 17295070]
12. Jenness SM, Myers JE, Neaigus A, et al. Delayed entry into HIV medical care after HIV diagnosis: risk factors and research methods. AIDS Care. 2012 ;24(10):1240–1248. [PubMed: 22316090]
13. Mugavero MJ, Lin H, Allison JJ, et al. Failure to establish HIV care: characterizing the "No Show" phenomenon. Clin Infect Dis. 2007 7;45(1):127–130. [PubMed: 17554713]
14. Nijhawan AE, Liang Y, Vysyaraju K et al. Missed initial medical visits: predictors, timing, and implications for retention in HIV care. AIDS Patient Care STDs. 2017 5;31(5):213–221. [PubMed: 28488891]
15. Ransome Y, Kawachi I, Dean LT. Neighborhood social capital in relation to late HIV diagnosis, linkage to HIV care, and HIV care engagement. AIDS Behav. 2017 3;21(3):891–904. [PubMed: 27752875]
16. Centers for Disease Control and Prevention. Social determinants of health and selected HIV care outcomes among adults with diagnosed HIV infection in 32 states and the District of Columbia, 2014. HIV surveillance Supplemental Report. 2016;21(No. 7). 12 2016 Available at: http://www.cdc.gov/hiv/library/reports/hiv-surveillance.html.
17. Goswami ND, Schmitz MM, Sanchez T, et al. Understanding local spatial variation along the care continuum: the potential impact of transportation vulnerability on HIV linkage to care and viral suppression in high-poverty areas, Atlanta, Georgia. J Acquir Immune Defic Syndr. 2016 5;72(1):65–72. [PubMed: 26630673]
18. Torian LV, Wiewel WE, Lui K, et al. Risk factors for delayed initiation of medical care after diagnosis of human immunodeficiency virus. Arch Intern Med. 2008 6;168(11):1181–1187. [PubMed: 18541826]
19. Hsu LC, Chen M, Kali J, et al. Assessing receipt of medical care and disparity among persons with HIV/AIDS in San Francisco, 2006–2007. AIDS Care. 2011 3;23(3):383–92. [PubMed: 21347902]
20. Seth P, Wang G, Collins NT, et al. Identifying new positives and linkage to HIV Medical Care—23 Testing Site types, United States, 2013. MMWR Morb Mortal Wkly Rep. 2015 6 26;64(24):663–67. [PubMed: 26110836]

21. Yehia BR, Ketner E, Momplaisir F, et al. Location of HIV diagnosis impacts linkage to medical care. J Acquir Immune Defic Syndr. 2015 3 1;68(3):304–9. [PubMed: 25469529]
22. Centers for Disease Control and Prevention. Social determinants of health among adults with diagnosed HIV in 13 states, the District of Columbia and Puerto Rico, 2015. HIV Surveillance Supplemental Report, 2017;22(3): 1–39. Published August 2017. Available at: https://www.cdc.gov/hiv/library/reports/hiv-surveillance.html.
23. Fennie KP, Lutfi K, Maddox LM, et al. Influence of residential segregation on survival after AIDS diagnosis among non-Hispanics blacks. Ann Epidemiol. 2015 2;25(2):113–9. [PubMed: 25542342]
24. Trepka MJ, Niyonsenga T, Maddox L, et al. Community poverty and trends in racial/ethnic survival disparities among people diagnosed with AIDS in Florida, 1993–2004. Am J Public Health. 2013 4;103(4):717–26. [PubMed: 23409892]
25. Selik RM, Mokotoff ED, Branson B, et al. Revised surveillance case definition for HIV infection—United States, 2014. MMWR Recomm Rep. 2014 4 11;63(RR-03):1–10.
26. Florida Administrative Code 64D-3. Available at: https://www.flrules.org/gateway/chapterhome.asp?chapter=64D-3.
27. 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—2013. HIV Surveillance Supplemental Report. 2015; 20(2): 1–70. Available at: https://www.cdc.gov/hiv/library/reports/hiv-surveillance.html.
28. Office of National AIDS Policy. National HIV/AIDS Strategy Updated to 2020. 7 2015 1–65. Available at: https://www.hiv.gov/federal-response/national-hiv-aids-strategy/nhas-update.
29. US Census Bureau. American FactFinder. Washington, DC: Government Printing Office Available at: http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml.
30. US Census Bureau. ZIP Code™ tabulation areas (ZCTA™). Washington, DC: Government Printing Office Available at: http://www.census.gov/geo/reference/zctas.html.
31. Sheehan DM, Trepka MJ, Fennie KP, et al. Black-white Latino racial disparities in HIV survival, Florida, 2000-2011. Int J Environ Res Public Health. 2015 12 22;13(1):piii:E9. [PubMed: 26703656]
32. Borrell LN, Kiefe CI, Diez-Roux AV, et al. Racial discrimination, racial/ethnic segregation, and health behaviors in the CARDIA study. Ethn Health. 2013;18(3):227–43. [PubMed: 22913715]
33. Kirby JB, Liang L, Chen HJ, et al. Race, place, and obesity: the complex relationships among community racial/ethnic composition, individual race/ethnicity, and obesity in the United States. Am J Public Health. 2012 8;102(8):1572–8. [PubMed: 22698012]
34. Rodriguez RA, Sen S, Mehta K, et al. Geography matters: relationships among urban residential segregation, dialysis facilities, and patient outcomes. Ann Intern Med. 2007 4 3;146(7):493–501. [PubMed: 17404351]
35. Alvarez KJ, Levy BR. Health advantages of ethnic density for African American and Mexican American elderly individuals. Am J Public Health. 2012 12;102(12):2240–2. [PubMed: 23078490]
36. Hart LG, Larson EH, Lishner DM. Rural definitions for health policy and research. Am J Public Health. 2005 7;95(7):1149–55. [PubMed: 15983270]
37. WWAMI Rural Health Research Center. Rural Urban Commuting Areas (RUCA). Available at: http://depts.washington.edu/uwruca/ruca-uses.php.
38. Petersen MR, Deddens JA. A comparison of two methods for estimating prevalence ratios. BMC Medical Research Methodology. 2008 2 28;8:9. [PubMed: 18307814]
39. Sheehan DM, Fennie KP, Mauck DE, et al. Retention in HIV care and viral suppression: individual- and neighborhood-level predictors of racial/ethnic differences, Florida, 2015. AIDS Patient Care and STDs. 2017 4;31(4):167–175. [PubMed: 28414260]
40. SAS Software (Version 9.4) [Computer software]. Cary, NC: SAS Institute, 2012.
41. Moneyham L, McLeod J, Boehme A, et al. Perceived barriers to HIV care among HIV-infected women in the Deep South. J Assoc Nurses AIDS Care. 2010 Nov-Dec;21(6):467–77. [PubMed: 20430653]

42. Sprague C, Simon SE. Understanding HIV care delays in the US south and the role of the social-level in HIV care engagement/retention: A qualitative study. Int J Equity Health. 2014 4 8;13:28–42. [PubMed: 24708752]
43. Bertolli J, Garland PM, Valverde EE, et al. Missed connections: HIV-infected people never in care. Public Health Rep. 2013 Mar-Apr;128(2):117–26. [PubMed: 23450876]
44. Pollini RA, Blanco E, Crump C, et al. A community-based study of barriers to HIV care initiation. AIDS Patient Care STDs. 2011 10;25(10):601–9. [PubMed: 21955175]
45. Reed JB, Hanson D, McNaghten AD, et al. HIV testing factors associated with delayed entry into HIV medical care among HIV-infected persons from eighteen states, United States, 2000-2004. AIDS Patient Care STDs. 2009 9;23(9):765–73. [PubMed: 19694550]
46. Eberhart MG, Yehia BR, Hillier A et al. Behind the cascade: analyzing spatial patterns along the HIV care continuum. J Acquir Immune Defic Syndr. 2013;64(Suppl 1):S42–S51. [PubMed: 24126447]
47. Christopoulos KA, Das M, Colfax GN. Linkage and retention in HIV care among men who have sex with men in the United States. Clin Infect Dis. 2011 1 15;52(S2):S214–22. [PubMed: 21342910]
48. Zaller ND, Fu JJ, Nunn A, et al. Linkage to care for HIV-infected heterosexual men in the United States. Clin Infect Dis. 2011 1 15;52(S2):S223–30. [PubMed: 21342911]
49. Mahle Gray K, Tang T, Shouse L, et al. Using the HIV surveillance system to monitor the National HIV/AIDS Strategy. Am J Public Health. 2013 1;103(1):141–7. [PubMed: 23153150]
50. Bertolli J, Shouse RL, Beer L, et al. Using HIV surveillance data to monitor missed opportunities for linkage and engagement in HIV medical care. Open AIDS J. 2012;6:131–141. [PubMed: 23049661]
51. Bamford LP, Ehrenkranz PD, Eberhart MG, et al. Factors associated with delayed entry into primary HIV medical care after HIV diagnosis. AIDS. 2010 3 27;24(6):928–930. [PubMed: 20154577]
52. Stanley E, Lewis MC, Irshad A. Effectiveness of a mobile mammography program. AJR Am J Roentgenol. 2017 12;209(6):1426–1429. [PubMed: 28871806]
53. Is Vallée A. Is “mobile mammography” a relevant method in France? Sante Publique. 2016 11 25;28(5):599–602. [PubMed: 28155735]
54. Mugavero MJ, Norton WE, & Saag MS. Health care system and policy factors influencing engagement in HIV medical care: piecing together the fragments of a fractured health care delivery system. Clin Infect Dis. 2011 1 15;52(Suppl 2):s238–46. [PubMed: 21342913]
55. Kleinman S, Wang B, Wu Y, et al. The donor notification process from the donor’s perspective. Transfusion. 2004 5;44(5):658–666. [PubMed: 15104645]

Table 1.

Initiated HIV care within 3 months of HIV diagnosis[a] by individual and neighborhood level variables, Florida, 2014–2015

Characteristic	Total, n	Not in care within 3 months of HIV diagnosis, n (%)	In care within 3 months of HIV diagnosis, n (%)	p-value[b]
Total	8,913	1,628 (18.3)	7,285 (81.7)	
Individual-level variables				
Race/Ethnicity				<.0001
Hispanic	2,712	406 (15.0)	2,306 (85.0)	
Non-Hispanic Black	3,898	926 (23.8)	2,972 (76.2)	
Non-Hispanic White	2,303	296 (12.9)	2,007 (87.2)	
Sex at birth				0.0044
Female	1,913	337 (17.6)	1,576 (82.4)	
Male	7,000	1,291 (18.4)	5,709 (81.6)	
Age group at diagnosis				<.0001
13-19 years	345	92 (26.7)	253 (73.3)	
20-39 years	4,909	1,051 (21.4)	3,858 (78.6)	
40-59 years	3,102	411 (13.3)	2,691 (86.8)	
60 years or older	557	74 (13.3)	483 (86.7)	
US Birth				<.0001
Yes[c]	5,743	1,162 (20.2)	4,581 (79.8)	
No	3,170	466 (14.7)	2,704 (85.3)	
Mode of transmission				<.0001
Injection drug use[d]	465	92 (19.8)	373 (80.2)	
MSM	5,113	815 (15.9)	4,298 (84.1)	
Heterosexual	2,597	477 (18.4)	2,120 (81.6)	
Other/unknown	738	244 (33.1)	494 (66.9)	
AIDS diagnosis within 3 months of HIV diagnosis				<.0001
Yes	1,969	12 (0.6)	1,957 (99.4)	
No	6,944	1,616 (23.3)	5,328 (76.7)	
Year HIV diagnosed				.0051
2014	4,307	836 (19.4)	3,471 (80.6)	
2015	4,606	792 (17.2)	3,814 (82.8)	
Type of HIV test site				<.0001
Outpatient	4,305	623 (14.5)	3,682 (85.5)	
Hospital[e]	1,519	141 (9.3)	1,378 (90.7)	
Case management or HIV screening site	1,876	464 (24.7)	1,412 (75.3)	
Blood bank	411	239 (58.2)	172 (41.9)	
Other/unknown[f]	802	161 (20.1)	641 (79.9)	
ZCTA-level variables				
SES index, quartiles[g]				<.0001

Characteristic	Total, n	Not in care within 3 months of HIV diagnosis, n (%)	In care within 3 months of HIV diagnosis, n (%)	p-value[b]
1 (lowest SES)	3,588	787 (21.9)	2,801 (78.1)	
2	2,277	391 (17.2)	1,886 (82.8)	
3	1,922	281 (14.6)	1,641 (85.4)	
4 (highest SES)	1,126	169 (15.0)	957 (85.0)	
Non-Hispanic black density (% of total population)				<.0001
<25%	5,308	813 (15.3)	4,495 (84.7)	
25-49%	1,762	359 (20.4)	1,403 (79.6)	
≥ 50%	1,843	456 (24.7)	1,387 (75.3)	
RUCA classification				.6826
Urban	8,685	1,584 (18.2)	7,101 (81.8)	
Rural	228	44 (19.3)	184 (80.7)	

Abbreviations: AIDS: acquired immune deficiency syndrome; HIV: human immunodeficiency virus; MSM: male-to-male sexual contact; RUCA: rural-urban commuting area; SES: socioeconomic status; US: United States; ZCTA: ZIP code tabulation area.

Percentages may not add up to 100 due to rounding.

[a] Comprehensive linkage to care definition: within 3 months of HIV diagnosis a documented laboratory result (cluster of differentiation 4 immune cell [CD4] count or viral load), medical visit, or antiretroviral prescription as ascertained through the Enhanced HIV/AIDS Reporting System, AIDS Drug Assistance Program database, or in the Florida Department of Health HIV services databases.

[b] *p*-value for individual-level variables from Cochran-Mantel-Haenszel chi-square test controlling for ZCTA. *p*-value for neighborhood-level variables from chi-square test.

[c] Category includes cases born in any of the 50 US states, District of Columbia, or any US dependency.

[d] Includes cases with mode of transmission reported as injection drug use or injection drug use with male-to-male sexual contact.

[e] Hospital includes any hospital department (e.g. inpatient, emergency department)

[f] Other/unknown screening site includes laboratory, drug treatment center, other, and missing.

[g] Quartiles of standardized SES scores among Florida ZCTAs.

Table 2

Demographic characteristics of people diagnosed with HIV infection by HIV test site

Characteristic	Total, n	Outpatient, n (%)	Hospital,[a] n (%)	Case management and screening, n (%)	Blood bank, n (%)	Other/unknown,[b] n (%)
Total	8,913	4305 (48.3)	1519 (17.0)	1876 (21.1)	411 (4.6)	802 (9.0)
Individual-level variables						
Race/Ethnicity						
Hispanic	2,712	1,241 (45.8)	299 (11.0)	839 (30.9)	82 (3.0)	251 (9.3)
Non-Hispanic Black	3,898	1,842 (47.3)	786 (20.2)	668 (17.1)	256 (6.6)	346 (8.9)
Non-Hispanic White	2,303	1,222 (53.1)	434 (18.8)	369 (16.0)	73 (3.2)	205 (8.9)
Sex at birth						
Female	1,913	993 (51.9)	434 (22.7)	256 (13.4)	79 (4.1)	151 (7.9)
Male	7,000	3,312 (47.3)	1,085 (15.5)	1,620 (23.1)	332 (4.7)	651 (9.3)
Age group at diagnosis						
13-19 years	345	162 (47.0)	43 (12.5)	79 (22.9)	42 (12.2)	19 (5.5)
20-39 years	4,909	2,287 (46.6)	637 (13.0)	1,258 (25.6)	263 (5.4)	464 (9.5)
40-59 years	3,102	1,552 (50.0)	672 (21.7)	492 (15.9)	101 (3.3)	285 (9.2)
60 years or older	557	304 (54.6)	167 (30.0)	47 (8.4)	5 (0.9)	34 (6.1)
US Birth						
Yes[c]	5,743	2,831 (49.3)	1,020 (17.8)	1,049 (18.3)	330 (5.8)	513 (8.9)
No	3,170	1,474 (46.5)	499 (15.7)	827 (26.1)	81 (2.6)	289 (9.1)
Mode of transmission						
Injection drug use[d]	465	173 (37.2)	127 (27.3)	93 (20.0)	12 (2.6)	60 (12.9)
MSM	5,113	2,547 (49.8)	603 (11.8)	1,352 (26.4)	164 (3.2)	447 (8.7)
Heterosexual	2,597	1,292 (49.8)	563 (21.7)	379 (14.6)	133 (5.1)	230 (8.9)
Other/unknown	738	293 (39.7)	226 (30.6)	52 (7.1)	102 (13.8)	65 (8.8)
AIDS diagnosis within 3 months of HIV diagnosis						
Yes	1,969	750 (38.1)	856 (43.5)	185 (9.4)	12 (0.6)	166 (8.4)
No	6,944	3,555 (51.2)	663 (9.6)	1,691 (24.4)	399 (5.8)	636 (9.2)
Year HIV diagnosed						
2014	4,307	2,042 (47.4)	734 (17.0)	932 (21.6)	200 (4.6)	399 (9.3)

Characteristic	Total, n	Outpatient, n (%)	Hospital,[a] n (%)	Case management and screening, n (%)	Blood bank, n (%)	Other/unknown,[b] n (%)
2015	4,606	2,263 (49.1)	785 (17.0)	944 (20.5)	211 (4.6)	403 (8.8)
ZCTA-level variables						
SES index, quartiles[f]						
1 (lowest SES)	3,588	1,579 (44.0)	638 (17.8)	826 (23.0)	214 (6.0)	331 (9.2)
2	2,277	1,137 (49.9)	409 (18.0)	431 (18.9)	101 (4.4)	199 (8.7)
3	1,922	1,002 (52.1)	285 (14.8)	399 (20.8)	58 (3.0)	178 (9.3)
4 (highest SES)	1,126	587 (52.1)	187 (16.6)	220 (19.5)	38 (3.4)	94 (8.4)
Non-Hispanic black density (% of total population)						
<25%	5,308	2,660 (50.1)	862 (16.2)	1,148 (21.6)	180 (3.4)	458 (8.6)
25-49%	1,762	858 (48.7)	300 (17.0)	324 (18.4)	102 (5.8)	178 (10.1)
≥ 50%	1,843	787 (42.7)	357 (19.4)	404 (21.9)	129 (7.0)	166 (9.0)
RUCA classification						
Urban	8,685	4,182 (48.2)	1,468 (16.9)	1,852 (21.3)	400 (4.6)	783 (9.0)
Rural	228	123 (54.0)	51 (22.4)	24 (10.5)	11 (4.8)	19 (8.3)

Abbreviations: AIDS: acquired immune deficiency syndrome; HIV: human immunodeficiency virus; MSM: male-to-male sexual contact; RUCA: rural-urban commuting area; SES: socioeconomic status; US: United States; ZCTA: ZIP code tabulation area.

Note: All p-values were < 0.001 except for year HIV diagnosed ($p = .1068$) and RUCA classification ($p = .0013$). *P*-value for individual-level variables calculated with Cochran-Mantel-Haenszel chi-square test controlling for ZCTA. *p*-value for neighborhood-level variables calculated with chi-square test.

[a] Hospital includes any hospital department (e.g. inpatient, emergency department)

[b] Other/unknown screening site includes laboratory, drug treatment center, other, and missing.

[c] Category includes cases born in any of the 50 US states, District of Columbia, or any US dependency.

[d] Includes cases with mode of transmission reported as injection drug use or injection drug use with male-to-male sexual contact.

[e] Quartiles of standardized SES scores among Florida ZCTAs.

Table 3.

Prevalence ratios and 95% confidence intervals for not initiating HIV care within 3 months[a], Florida, 2014–2015

Characteristic	Model 1[b] (Race/ethnicity only) Crude PR (95% CI)	Model 2[b] (Individual-level variables but not HIV testing site) Adjusted PR (95% CI)	Model 3[b] (Individual-level variables and HIV testing site type) Adjusted PR (95% CI)	Model 4[b] (Individual- and ZCTA-level variables and testing site type) Adjusted PR (95% CI)
Individual-level variables				
Race/ethnicity				
Non-Hispanic black	1.75 (1.55–1.97)	1.72 (1.52–1.94)	1.66 (1.47–1.88)	1.57 (1.38–1.78)
Hispanic	1.16 (1.00–1.33)	1.24 (1.06–1.44)	1.17 (1.00–1.36)	1.14 (0.98–1.33)
Non-Hispanic white	Referent	Referent	Referent	Referent
Sex at birth				
Male		1.44 (1.27–1.64)	1.30 (1.14–1.47)	1.31 (1.15–1.48)
Female		Referent	Referent	Referent
Age group at diagnosis				
13–19 years		Referent	Referent	Referent
20–39 years		0.97 (0.82–1.16)	1.01 (0.85–1.20)	1.00 (0.85–1.19)
40–59 years		0.71 (0.59–0.87)	0.80 (0.66–0.97)	0.79 (0.65–0.96)
60 years or older		0.70 (0.55–0.90)	0.87 (0.68–1.11)	0.86 (0.67–1.09)
US- vs. foreign-born				
US born[c]		1.23 (1.10–1.37)	1.21 (1.09–1.35)	1.21 (1.08–1.34)
Foreign born		Referent	Referent	Referent
Mode of HIV transmission				
Heterosexual contact		Referent	Referent	Referent
Male-to-male sexual contact (MSM)		0.68 (0.60–0.77)	0.72 (0.64–0.81)	0.73 (0.65–0.82)
Injection drug use (IDU)[d]		1.12 (0.93–1.35)	1.14 (0.94–1.38)	1.14 (0.94–1.37)
Other/unknown		1.70 (1.51–1.91)	1.57 (1.40–1.76)	1.58 (1.41–1.77)
AIDS diagnosis within 3 months of HIV diagnosis				
Yes		Referent	Referent	Referent
No		38.16 (21.76–66.91)	33.10 (19.00–57.66)	33.05 (18.98–57.54)
Year HIV diagnosed				
2014		Referent	Referent	Referent
2015		0.86 (0.79–0.94)	0.87 (0.80–0.95)	0.87 (0.80–0.95)
Type of HIV test site				
Outpatient			Referent	Referent
Hospital[e]			1.04 (0.87–1.23)	1.04 (0.87–1.23)
Case management and counseling and testing site			1.63 (1.45–1.83)	1.62 (1.44–1.81)
Blood bank/plasma center			2.49 (2.23–2.79)	2.45 (2.19–2.74)

Characteristic	Model 1[b] (Race/ethnicity only) Crude PR (95% CI)	Model 2[b] (Individual-level variables but not HIV testing site) Adjusted PR (95% CI)	Model 3[b] (Individual-level variables and HIV testing site type) Adjusted PR (95% CI)	Model 4[b] (Individual- and ZCTA-level variables and testing site type) Adjusted PR (95% CI)
Other[f]			1.37 (1.17–1.61)	1.36 (1.16–1.60)
ZCTA-level variables				
SES index, quartiles[g]				
1 (lowest SES)				Referent
2				0.91 (0.81–1.03)
3				0.88 (0.76–1.02)
4 (highest SES)				0.90 (0.77–1.05)
Non-Hispanic black density (% of total population)				
<25%				Referent
25-49%				1.06 (0.93–1.20)
≥50%				1.08 (0.95–1.23)
RUCA classification				
Rural				1.20 (0.92–1.56)
Urban				Referent

Abbreviations: AIDS: acquired immune deficiency syndrome; C & T: counseling and testing; HIV: human immunodeficiency virus; RUCA: Rural-Urban Commuting Area; SES: socioeconomic status; US: United States; ZCTA: ZIP code tabulation area.

Note:

[a]Did not meet care initiation definition: within 3 months of HIV diagnosis a documented laboratory result (cluster of differentiation4 immune cell [CD4] count or viral load), medical visit, or antiretroviral prescription as ascertained through the Enhanced HIV/AIDS Reporting System, AIDS Drug Assistance Program database, or in the Florida Department of Health HIV services databases.

[b]The Quasilikelihood under the Independence Model Criterion (QIC) was 10,576.77 for model 1; 9,702.52 for model 2, 9,524.39 for model 3 and 9,531.12 for model 4.

[c]Category includes cases born in any of the 50 US states, District of Columbia, or any US dependency.

[d]Includes cases with mode of transmission reported as injection drug use or injection drug use with male-to-male sexual contact.

[e]Hospital includes any hospital department (e.g. inpatient, emergency department)

[f]Other/unknown screening site includes laboratory, drug treatment center, other, and missing.

[g]Quartiles of standardized SES scores for Florida ZCTAs.