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Distance to testing sites and its association with timing of HIV diagnosis

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Abstract

Early HIV diagnosis enables prompt treatment initiation, thereby contributing to decreased morbidity, mortality, and transmission. We aimed to describe the association between distance from residence to testing sites and HIV disease stage at diagnosis. Using HIV surveillance data, we identified all new HIV diagnoses made at publicly-funded testing sites in central North Carolina during 2005-2013. Early-stage HIV was defined as acute HIV (antibody-negative test with a positive HIV RNA) or recent HIV (normalized optical density <0.8 on the BED assay for non-AIDS cases); remaining diagnoses were considered post-early-stage HIV. Street distance between residence at diagnosis and 1) the closest testing site and 2) the diagnosis site was dichotomized at 5 miles. We fit log-binomial models using generalized estimating equations to estimate prevalence ratios (PR) and robust 95% CI for post-early-stage diagnoses by distance. Models were adjusted for race/ethnicity and testing period. Most of the 3028 new diagnoses were black (N=2144; 70.8%), men who have sex with men (N=1685; 55.7%), and post-early-stage HIV diagnoses (N=2010; 66.4%). Overall, 1145 (37.8%) cases traveled <5 miles for a diagnosis. Among cases traveling ≥5 miles for a diagnosis, 1273 (67.6%) lived <5 miles from a different site. Residing ≥5 miles from a testing site was not associated with post-early-stage HIV (adjusted PR, 95% CI: 0.98, 0.92-1.04), but traveling ≥5 miles for a diagnosis was associated with higher post-

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early HIV prevalence (1.07, 1.02-1.13). Most of the elevated prevalence observed in cases traveling ≥5 miles for a diagnosis occurred among those living <5 miles from a different site (1.09, 1.03-1.16). Modest increases in post-early-stage HIV diagnosis were apparent among persons living near a site, but choosing to travel longer distances to test. Understanding reasons for increased travel distances could improve accessibility and acceptability of HIV services and increase early diagnosis rates.

Keywords

recent HIV infection; surveillance; HIV testing; geographic distance; barriers to testing; late diagnosis

Introduction

Diagnosis and presentation to care during early stages of HIV contribute to decreased disease-related morbidity, mortality and transmission risk (Cohen et al., 2011; Marks, Crepaz, Senterfitt, and Janssen (2005); Metsch et al., 2008; “Life expectancy,” 2008). However, approximately 25% of newly HIV-diagnosed persons in the United States are simultaneously diagnosed with AIDS, representing diagnoses late in the course of disease (“HIV Surveillance Supplemental Report”, 2015).

A lack of accessible HIV services and living in rural areas contribute to testing delays (Leibowitz & Taylor, 2007; Ohl & Perencevich, 2011). In the American South, many HIV-infected persons live in rural areas (Whetten & Reif, 2006), and poverty, distrust in the medical system and perceived stigma toward HIV-infected persons result in additional barriers to HIV services (Konkle-Parker, Erlen, & Dubbert, 2008; Krawczyk, Funkhouser, Kilby, & Vermund, 2006). Our primary goals were to determine if HIV diagnosis more than approximately 6 months after infection (post-early-stage) was associated with 1) distance from residence to the closest testing site, 2) distance from residence to the diagnosis site and/or 3) being diagnosed farther away than geographically necessary among those living near a testing site.

Methods

We used data reported in the North Carolina (NC) electronic HIV/AIDS reporting system (eHARS) between July 2005 and June 2013. Cases were identified as persons newly diagnosed with HIV at publicly-funded testing sites who were 1) ≥16 years of age (to protect confidentiality of adolescent cases), 2) not living in correctional facilities and 3) residing within a 52-county study area in central NC. The 48 excluded counties contained <20% of new HIV diagnoses; spatial analyses in areas of very low prevalence are problematic and associated with privacy concerns.

For all new diagnoses reported in eHARS, we assigned a disease stage at diagnosis using a three-step process. First, we identified all acute HIV infection (AHI) as antibody-negative tests with reproducibly positive HIV RNA (Pilcher et al., 2002; Pilcher et al., 2004). Next, we identified cases diagnosed with AIDS ≤6 months after an HIV diagnosis. For the

remaining cases, the CDC-administered serologic testing algorithm for recent HIV seroconversion (STARHS) results were used to distinguish recent (≤ approximately 6 months) from chronic (> approximately 6 months) infection, based on a normalized optical density cut-point of <0.8 on the BED assay (Hall et al., 2008). All non-AHI and non-AIDS cases without STARHS testing results were excluded from analysis. We considered AHI and recent diagnoses as “early-stage” disease and chronic and AIDS diagnoses as “post-early-stage” disease.

Residential addresses of new HIV cases were geocoded to an ESRI-supplied NC street basemap using ArcGIS (version 10.1, Redlands, CA). Persons with incomplete addresses were geocoded to a population-weighted, random point in the provided zip code. Census tract at diagnosis was assigned based on this geocoded address. The addresses of 326 publicly-funded HIV testing sites in NC providing samples to the state lab for processing (“Epidemiologic Profile,” 2013; “NC HIV/STD Testing”) were also geocoded. The street distance (miles) between each case's residential address and both 1) the diagnosis site and 2) the closest publicly-funded testing site was calculated using the ArcGIS Network Analyst extension. We dichotomized each distance variable at 5 miles.

We fit log-binomial regression models using generalized estimating equations to estimate prevalence ratios (PR) and robust 95% confidence intervals (CI) of post-early-stage diagnoses by dichotomized distance (<5 miles versus ≥5 miles) between residence and the closest testing site. We repeated this analysis twice, first using distance to diagnosis site as the explanatory variable and then using a composite distance measure (closest site and diagnosis site <5 miles; diagnosed ≥5 miles, but closest testing site <5 miles; closest site and diagnosis site ≥5 miles). The latter analysis evaluated whether the prevalence of post-early stage diagnosis was associated with being diagnosed somewhere other than the most proximate site among those living <5 miles of a testing site. We accounted for clustering of the outcome at the census tract, which served as a proxy for neighborhood-level characteristics, with an exchangeable correlation matrix. Models were adjusted for race/ethnicity and time period based on a directed acyclic graph. Effect measure modification by race/ethnicity and sexual risk status was also assessed.

All statistical analyses were conducted in SAS version 9.3 (Cary, NC). This research was deemed exempt by the University of North Carolina Institutional Review Board.

Results

Among 4023 persons diagnosed with HIV at publicly-funded testing sites in central NC during 2005-2013, we could classify disease stage at diagnosis for 3242 (80.6%) persons. We excluded an additional 214 cases without a geocodable address, resulting in a study population comprised of 3028 people (1018 early-stage; 2010 post-early-stage). Most were black (N=2144; 70.8%) and men who have sex with men (MSM) (N=1685; 55.7%, including MSM who also injected drugs). The median age was 29 years (IQR 23-40) [Table 1].

Approximately 35% of black and white persons were diagnosed during early-stage disease, compared to 21.5% of Hispanics. Early-stage diagnoses had a lower median age (25 versus 32 years) and were most common from 2011-2013 (38.2%). [Table 1].

All new diagnoses lived within 30 miles and 80% lived <5 miles from a publicly-funded testing facility. The median distance traveled for a diagnosis was greater than that to the closest site [6.6 (IQR 3.6-12.3) versus 2.1 miles (IQR 1.1-4.1)]. Overall, 1145 (37.8%) cases were diagnosed <5 miles from their residence [Table 2]. Of the remaining 1883 cases who traveled ≥5 miles for their diagnosis, 1273 (67.6%) lived <5 miles from a different publicly-funded testing site.

Living ≥5 miles from the closest testing site compared to <5 miles had no association with post-early stage diagnosis (adjusted (a)PR=0.97, 95% CI 0.91-1.03). The prevalence of post-early-stage diagnosis among persons traveling ≥5 miles for a diagnosis was slightly greater than those traveling <5 miles (aPR=1.08, 95% CI 1.02-1.14) [Table 2].

The increase in prevalence of post-early-stage diagnoses among cases who traveled ≥5 miles for a diagnosis occurred primarily among persons who lived <5 miles from a different publicly-funded testing site (aPR=1.09, 95% CI 1.03-1.16). This translated to a six-percentage-point absolute difference in post-early-stage disease prevalence compared to those who tested at sites <5 miles from their residence. Upon further stratification, this relationship was statistically significant only among black (aPR=1.13, 95% CI 1.05-1.21) and MSM cases (aPR=1.10, 95% CI 1.02-1.20) [Table 2].

Discussion

An increase in post-early-stage HIV diagnosis was apparent among NC residents living near a testing site, but testing farther away than geographically necessary. The association between testing distance and infection stage was modest, with only small increases in post-early-stage diagnosis among persons traveling ≥5 miles to test but living <5 miles from another facility.

In NC, few new HIV cases tested at the facility closest to them. Among those living <5 miles from a testing site but diagnosed at a less proximate site, the increased prevalence of post-early-stage diagnoses occurred primarily among black and MSM cases, groups traditionally HIV-burdened in the South. Limited awareness of available nearby HIV services, or perceptions about disease-related stigma, inadequate HIV services, and confidentiality may influence people living in the South to seek HIV testing from less proximate facilities (Krawczyk et al., 2006; Leibowitz & Taylor, 2007; Reif, Geonnotti, & Whetten, 2006; “Southern AIDS Coalition,” 2012).

Distance is an easy-to-derive measure, but may not fully explain geographical accessibility to HIV services. The type and efficiency of available transportation systems differ across communities (Guagliardo, 2004), impacting the cost and time required to travel from location to location. Moreover, decisions about where to access medical services are sometimes made based on the location of friends, family or daily activities rather than residence (Eberhart, Share, Shpaner, & Brady, 2014).

Although a substantial proportion of HIV testing in the South is conducted in health departments (Sutton, Anthony, Vila, McLellan-Lemal, & Weidle, 2010), approximately 40% of diagnoses in NC are made at public sites. Test-seeking patterns, demographics, and transmission risk behaviors among people testing at public sites may differ from those diagnosed by private providers, possibly limiting the generalizability of our results.

The use of STARHS data to assess recent HIV infection has limitations. The BED assay may misclassify late-stage disease (Barnighausen, McWalter, Rosner, Newell, & Welte, 2010). We attempted to minimize this phenomenon by identifying and removing AIDS cases prior to assessing STARHS results. Furthermore, approximately 20% of HIV diagnoses were missing STARHS results and were excluded. These cases were more often older and black (data not shown), which may bias our results.

Distance to diagnosis site appears to have a small, yet nontrivial, impact on the prevalence of post-early-stage HIV diagnoses in NC. The approximately 120 people diagnosed during post-early stages living near a testing site, yet choosing to travel farther to test, did not have the opportunity to benefit from early care and treatment. Reasons for traveling farther and receiving a diagnosis later in the course of infection are likely varied and may cause delays in linking to HIV care and initiating treatment (Sutton et al., 2010). Interventions increasing accessibility of HIV services (e.g., providing transportation, reducing stigma) could improve infection awareness, disease management and transmission prevention.

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References

Barnighausen T, McWalter TA, Rosner Z, Newell ML, Welte A. HIV incidence estimation using the BED capture enzyme immunoassay: systematic review and sensitivity analysis. Epidemiology. 2010; 21(5):685–697. doi: 10.1097/EDE.0b013e3181e9e978 00001648-201009000-00023 [pii]. [PubMed: 20699682]

Cohen MS, Chen YQ, McCauley M, Gamble T, Hosseinipour MC, Kumarasamy N, Fleming TR. Prevention of HIV-1 infection with early antiretroviral therapy. N Engl J Med. 2011; 365(6):493–505. doi: 10.1056/NEJMoa1105243. [PubMed: 21767103]

Eberhart MG, Share AM, Shpaner M, Brady KA. Comparison of geographic methods to assess travel patterns of persons diagnosed with HIV in Philadelphia: How close is close enough? J Biomed Inform. 2014 doi: 10.1016/j.jbi.2014.09.005.

Epidemiologic Profile for HIV/STD Prevention and Care Planning. Division of Public Health Epidemiology Section: Communicable Disease Surveillance Unit. State of North Carolina Department of Health and Human Services; Raleigh, NC: 2013.

Guagliardo MF. Spatial accessibility of primary care: concepts, methods and challenges. Int J Health Geogr. 2004; 3(1):3. doi: 10.1186/1476-072X-3-3. [PubMed: 14987337]

Hall HI, Song R, Rhodes P, Prejean J, An Q, Lee LM, Janssen RS. Estimation of HIV incidence in the United States. JAMA. 2008; 300(5):520–529. doi: 300/5/520 [pii] 10.1001/jama.300.5.520. [PubMed: 18677024]

HIV/STD Testing: Programs and Services. [July 25, 2014] North Carolina Department of Health and Human Services: Communicable Disease Branch. from http://epi.publichealth.nc.gov/cd/stds/programs/testing.html

HIV Surveillance Supplemental Report 2015. Monitoring selected national HIV prevention and care objectives by using HIV surveillance data – United States and 6 dependent areas – 2013. Vol. 20. CDC; Published July 2015. from http://www.cdc.gov/hiv/library/reports/surveillance/ [March 17, 2016]

Konkle-Parker DJ, Erlen JA, Dubbert PM. Barriers and facilitators to medication adherence in a southern minority population with HIV disease. J Assoc Nurses AIDS Care. 2008; 19(2):98–104. doi: S1055-3290(08)00007-1 [pii] 10.1016/j.jana.2007.09.005. [PubMed: 18328960]

Krawczyk CS, Funkhouser E, Kilby JM, Vermund SH. Delayed access to HIV diagnosis and care: Special concerns for the Southern United States. AIDS Care. 2006; 18(Suppl 1):S35–44. doi: T3852712012G070Q [pii] 10.1080/09540120600839280. [PubMed: 16938673]

Leibowitz AA, Taylor SL. Distance to public test sites and HIV testing. Med Care Res Rev. 2007; 64(5):568–584. doi: 10.1177/1077558707304634. [PubMed: 17728197]

Life expectancy of individuals on combination antiretroviral therapy in high-income countries: a collaborative analysis of 14 cohort studies. Lancet. 2008; 372(9635):293–299. doi: 10.1016/S0140-6736(08)61113-7. [PubMed: 18657708]

Marks G, Crepaz N, Senterfitt JW, Janssen RS. Meta-analysis of high-risk sexual behavior in persons aware and unaware they are infected with HIV in the United States: implications for HIV prevention programs. J Acquir Immune Defic Syndr. 2005; 39(4):446–453. [PubMed: 16010168]

Metsch LR, Pereyra M, Messinger S, Del Rio C, Strathdee SA, Anderson-Mahoney P, Gardner L. HIV transmission risk behaviors among HIV-infected persons who are successfully linked to care. Clin Infect Dis. 2008; 47(4):577–584. doi: 10.1086/590153. [PubMed: 18624629]

Ohl ME, Perencevich E. Frequency of human immunodeficiency virus (HIV) testing in urban vs. rural areas of the United States: results from a nationally-representative sample. BMC Public Health. 2011; 11:681. doi: 1471-2458-11-681 [pii] 10.1186/1471-2458-11-681. [PubMed: 21884599]

Pilcher CD, McPherson JT, Leone PA, Smurzynski M, Owen-O'Dowd J, Peace-Brewer AL, Fiscus SA. Real-time, universal screening for acute HIV infection in a routine HIV counseling and testing population. JAMA. 2002; 288(2):216–221. doi: jto20003 [pii]. [PubMed: 12095386]

Pilcher CD, Tien HC, Eron JJ Jr. Vernazza PL, Leu SY, Stewart PW, Cohen MS. Brief but efficient: acute HIV infection and the sexual transmission of HIV. J Infect Dis. 2004; 189(10):1785–1792. doi: 10.1086/386333. [PubMed: 15122514]

Reif S, Geonnotti KL, Whetten K. HIV Infection and AIDS in the Deep South. Am J Public Health. 2006; 96(6):970–973. doi: AJPH.2005.063149 [pii] 10.2105/AJPH.2005.063149. [PubMed: 16670228]

Southern AIDS Coalition. [3/27/2016] Southern States Manifesto: Update 2012 Policy Brief and Recommendations. 2012. from http://southernaidscoalition.org/wp-content/uploads/2013/11/Southern-States-Manifesto-Update-2012.pdf

Sutton M, Anthony MN, Vila C, McLellan-Lemal E, Weidle PJ. HIV testing and HIV/AIDS treatment services in rural counties in 10 southern states: service provider perspectives. J Rural Health. 2010; 26(3):240–247. doi: JRH284 [pii] 10.1111/j.1748-0361.2010.00284.x. [PubMed: 20633092]

University of Washington. [July, 7, 2015] RUCA: Rural Health Research Center. from http://depts.washington.edu/uwruca/ruca-data.php

Whetten K, Reif S. Overview: HIV/AIDS in the deep south region of the United States. AIDS Care. 2006; 18(Suppl 1):S1–5. doi: H652Q17M47583557 [pii] 10.1080/09540120600838480. [PubMed: 16938668]

Table 1

Demographics of persons newly-diagnosed with HIV at publicly-funded testing sites in a 52-county region in central North Carolina, 2005-2013

	Total N=3028	Early Stage Cases N=1018		Post-Early Stage Cases N=2010	
	Median (IQR)	Median	IQR	Median	IQR
Age	**29 (23-40)**	**25**	**(21-35)**	**32**	**(24-42)**
	N	N	%*	N	%*
Stage of Diagnosis					
AHI	156	156	(100.0)	--	--
RHI	904	904	(100.0)	--	--
CHI	1659	--	--	1659	(100.0)
AIDS	497	--	--	497	(100.0)
Gender					
Female	717	57	(33.2)	479	(66.8)
Male	2311	780	(33.8)	1531	(66.2)
Race					
Black	2144	758	(35.4)	1386	(64.6)
White NH	472	161	(34.1)	311	(65.9)
Hispanic	302	65	(21.5)	237	(78.5)
Other	110	34	(30.9)	76	(69.1)
Risk Group					
MSM	1668	641	(38.4)	1027	(61.6)
Injection Drug User (IDU)	69	24	(34.8)	45	(65.2)
MSM/IDU	17	6	(35.3)	11	(64.7)
Other	444	125	(28.2)	319	(71.8)
Period of Diagnosis					
2005-2007	970	308	(31.8)	662	(68.2)
2008-2010	1305	422	(32.3)	883	(67.7)
2011-2013	753	288	(38.2)	465	(61.8)
Testing Site					
HIV Counselling and Testing Agency	2265	771	(34.0)	1494	(66.0)
STD Clinic	212	79	(37.3)	133	(62.7)
Outpatient Facility	294	94	(32.0)	200	(68.0)
Other	257	74	(28.8)	183	(71.2)
Rural/Urban†					
Urban	2812	949	(33.7)	1863	(66.3)
Rural	216	69	(31.9)	147	(68.1)

*Row Percentages

†As defined by the Rural Urban Commuting Area Codes ("University of Washington,")

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Table 2

Prevalence ratios and robust 95% of post-early-stage HIV by distance for persons newly-diagnosed with HIV at a publicly-funded testing site in a 52-county region in central North Carolina, 2005-2013

	Total N=3028	Early Stage N=1018		Post-Early Stage N=2010					
	N	N	%*	N	%*	Unadjusted Model		Adjusted Model†	
						PR	95% CI	PR	95% CI
Distance to closest testing site									
<5 miles	2418	803	(33.2)	1615	(66.8)	1.00		1.00	
≥5 miles	610	215	(35.3)	395	(64.8)	0.97	(0.91-1.03)	0.98	(0.92-1.04)
Distance to testing site of diagnosis									
<5 miles	1145	419	(36.6)	726	(63.4)	1.00		1.00	
≥5 miles	1883	599	(31.8)	1284	(68.2)	1.08	(1.02-1.04)	1.07	(1.02-1.13)
Distance to testing site of diagnosis by distance to closest site									
<5 miles *and* closest testing site <5 miles	1145	419	(36.6)	726	(63.4)	1.00		1.00	
≥5 miles, but closest testing site <5 miles	1273	384	(37.7)	889	(69.8)	1.10	(1.05-1.17)	1.09	(1.03-1.16)
≥5 miles *and* closest testing site ≥5 miles	610	215	(35.3)	395	(64.8)	1.02	(0.95-1.10)	1.02	(0.95-1.10)
Distance to testing site of diagnosis by distance to closest site and Race/ Ethnicity									
Black									
<5 miles *and* closest testing site <5 miles	869	336	(38.7)	533	(61.3)	1.00		1.00	
≥5 miles, but closest testing site <5 miles	893	277	(31.0)	616	(69.0)	1.13	(1.05-1.20)	1.13	(1.05-1.21)
≥5 miles *and* closest testing site ≥5 miles	382	145	(38.0)	237	(62.0)	1.01	(0.92-1.11)	1.01	(0.92-1.11)
White, Non-Hispanic									
<5 miles *and* closest testing site <5 miles	135	48	(35.6)	87	(64.4)	1.00		1.00	
≥5 miles, but closest testing site <5 miles	193	61	(31.6)	132	(68.4)	1.06	(0.91-1.24)	1.07	(0.92-1.25)
≥5 miles *and* closest testing site ≥5 miles	144	52	(36.1)	92	(63.9)	0.99	(0.83-1.18)	1.00	(0.84-1.19)
White, Hispanic									
<5 miles *and* closest testing site <5 miles	107	23	(21.5)	84	(78.5)	1.00		1.00	
≥5 miles, but closest testing site <5 miles	133	32	(24.1)	101	(75.9)	0.97	(0.85-1.11)	0.96	(0.84-1.10)
≥5 miles *and* closest testing site ≥5 miles	62	10	(16.1)	52	(83.9)	1.07	(0.91-1.25)	1.07	(0.92-1.23)
Other Race									

	Total N=3028	Early Stage N=1018		Post-Early Stage N=2010					
	N	N	%*	N	%*	Unadjusted Model		Adjusted Model†	
						PR	95% CI	PR	95% CI
<5 miles *and* closest testing site <5 miles	34	12	(35.3)	22	(64.7)	1.00		1.00	
≥5 miles, but closest testing site <5 miles	54	14	(25.9)	40	(74.1)	1.15	(0.85-1.55)	1.16	(0.87-1.54)
≥5 miles *and* closest testing site ≥5 miles	22	8	(23.5)	14	(63.6)	0.98	(0.65-1.48)	0.95	(0.63-1.44)
Distance to testing site of diagnosis by distance to closest site and MSM status									
***MSM*‡**									
<5 miles *and* closest testing site <5 miles	568	237	(41.7)	331	(58.3)	1.00		1.00	
≥5 miles, but closest testing site <5 miles	788	275	(34.9)	513	(65.1)	1.12	(1.03-1.21)	1.10	(1.02-1.20)
≥5 miles *and* closest testing site ≥5 miles	329	135	(42.5)	194	(59.0)	1.01	(0.90-1.13)	1.00	(0.90-1.12)
***Non-MSM*‡**									
<5 miles *and* closest testing site <5 miles	226	69	(30.5)	157	(69.5)	1.00		1.00	
≥5 miles, but closest testing site <5 miles	167	46	(27.5)	121	(72.5)	1.05	(0.92-1.19)	1.03	(0.90-1.18)
≥5 miles *and* closest testing site ≥5 miles	120	34	(22.8)	86	(71.7)	1.03	(0.88-1.21)	1.05	(0.90-1.22)

*Row Percentages

†All models adjusted for race/ethnicity and time period except models testing distance to testing site of diagnosis by distance to closest site and Race/Ethnicity which was only adjusted for time period.

‡MSM risk status includes cases with a joint MSM/IDU risk and Non-MSM risk includes cases reporting “IDU only” and “Other” risk.