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Role of HIV testing site type in timely linkage to HIV care, Florida, 2014-2015

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Background

- Early diagnosis and treatment with antiretroviral therapy among people living with HIV infection results in
  - Decreased morbidity and mortality among people living with HIV infection
  - Decreased number of people with high HIV viral loads in the community, decreasing risk of HIV transmission
- Successful therapy contingent on timely linkage to HIV care
- Among adults in the US in 32 states and the District of Columbia during 2014
  - 28.5% not linked to care within 1 month
  - 18.2% not linked to care within 3 months.
- Florida
  - Third highest rate of HIV diagnoses in 2015 (24.0 per 100,000) after District of Columbia and Louisiana
  - Highest number of HIV diagnosis in 2015 with 4864 diagnosis

Sources: Thompson MA, et al. JAMA 2012;308:387-402, CDC. Morb Mortal Wkly Recomm Rep 2009;58(RR4):1-207. McManus H et al. PLoS One 2012;7(11)., Nakagawa et al. AIDS2012;26(3):335-43. Attia S et a. AIDS 2009;23:1397-1404, Cohen MS, et al. N Engl J Med 2011;365:493-505, Donnell D, et al. Lancet 2010;375:2092-2098, Das M, et al. PLoS One 2010;5:e11068, Montaner JS, et al. Lancet 2010;376:532-539. CDC. HIV Surveillance Supplemental Report 2016;21(No. 7). httP://www.cdc.gov/hiv/library/reports/hiv-surveillance.html.; CDC. HIV Surveillance Report, 2015;. 2016; 27. http://www.cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-report-2015-vol-27.pdf.

Objective of current study

Determine role of HIV testing site type in delayed linkage to HIV care among people aged 13 years and older without AIDS at time of HIV diagnosis

Methods

- De-identified records of Florida residents who were diagnosed with HIV and reported to the Florida Department of Health Enhanced HIV/AIDS Reporting System (eHARS) during 2014-2015 (n=9469)
- Linked to American Community Survey neighborhood-level variables at residential zip code level
- Exclusion criteria:
  - Diagnosed with AIDS within 3 months of HIV diagnosis (n=1526)
  - Death within 3 months (n=554)
  - Diagnosis in correctional facility (n=183)
  - Missing zip code of residence or diagnosis date(n=139)
  - Age < 13 years (n=23)
  - Not in 3 largest racial/ethnic groups (Hispanic, non-Hispanic white or non-Hispanic black)(n=144)
- Final sample (n=6900)

Methods

Linkage to care definition

- Documentation of lab (viral load or CD4 count), medical visit, or prescription in eHARS, Ryan White Program or the Florida AIDS Drug Assistance Program databases within 3 months of HIV diagnosis
- also looked at lab documentation alone

Methods

- Neighborhood-level variables (zip code at time of HIV diagnosis)
  - Socioeconomic status (SES) Index
    - Reliability analysis and principal component analysis with 13 SES factors from American Community Survey.
    - Final index created using 7 factors (scored so higher scores higher SES and standardized):
      - Median household income
      - % population living below poverty line
      - % households with income <$15,000
      - % households with income >$150,000 (reverse coded)
      - Income disparity
      - % population age 25 and older with <12th grade education
      - High class work (reverse coded)
  - Racial/ethnic composition: % non-Hispanic black (used as a proxy for segregation)
  - Rural/urban status of zip code was based on categorization C of version 2.0 Rural-Urban Categorization (RUCA) data codes
- Multilevel analysis conducted to consider spatial clustering at zip code level using Proc Glimmix, SAS version 9.4

Characteristics by HIV testing site, Florida, 2014-2015, (n=6,900)

Individual characteristics	Blood bank/ plasma center n (%)	HIV case manage-ment n(%)	HIV testing n (%)	In-Patient n (%)	Out-patient general n (%)	Out-patient ID n (%)	TB/STD/ family planning n (%)	Other/ Unknown n (%)
Total	399 (5.8)	399 (5.8)	1291 (18.7)	618 (9.0)	2035 (29.5)	1308 (19.0)	203 (2.9)	647 (9.4)
Birth sex*								
Female	79 (19.8)	49 (12.3)	174 (13.5)	184 (29.8)	527 (25.9)	250 (19.1)	39 (19.2)	118 (18.2)
Male	320 (80.2)	350 (87.7)	1117 (86.5)	434 (70.2)	1508 (74.1)	1058 (80.9)	164 (80.8)	529 (81.8)
Race/ethnicity*								
Non-Hispanic Black	248 (62.2)	146 (36.6)	444 (34.4)	318 (51.5)	837 (41.1)	555 (42.4)	104 (51.2)	285 (44.0)
Non-Hispanic White	71 (17.8)	131 (32.8)	206 (16.0)	190 (30.7)	616 (30.3)	338 (25.8)	61 (30.1)	163 (25.2)
Hispanic	80 (20.0)	122 (30.6)	641 (49.6)	110 (17.8)	582 (28.6)	415 (31.7)	38 (18.7)	199 (30.8)
Age group (years)*								
13-19	41 (10.3)	20 (5.0)	55 (4.3)	31 (5.0)	88 (4.3)	47 (3.6)	11 (5.4)	20 (3.1)
20-39	254 (63.7)	280 (70.2)	881 (68.2)	311 (50.3)	1034 (50.8)	802 (61.3)	147 (72.4)	398 (61.5)
40-59	99 (24.8))	87 (21.8)	328 (25.4)	224 (36.2)	738 (36.3)	404 (30.9)	43 (21.2)	211 (32.6)
60 years or older	5 (1.2)	12 (3.0)	27 (2.1)	52 (8.4)	175 (8.6)	55 (4.2)	2 (1.0)	18 (2.8)
US birth*								
Yes	318 (79.7)	312 (78.2)	637 (49.3)	439 (71.0)	1318 (64.8)	872 (66.7)	158 (77.8)	422 (65.2)
No	81 (20.3)	87 (21.8)	654 (50.7)	179 (29.0)	717 (35.2)	436 (33.3)	45 (22.2)	225 (34.8)

*P<0.05

Characteristics of people's neighborhood and mode of HIV transmission by testing site, Florida, 2014-2015, (n=6,900)

Neighborhood characteristics and mode of HIV transmission	Blood bank/ plasma center	HIV case manage-ment	HIV testing	In-patient	Outpatient general	Outpatient infectious disease	TB/STD/ family planning	Other/ unknown
Socioeconomic index of neighborhood quartiles*								
1 (lowest SES)	210 (52.6)	145 (36.3)	597 (46.2)	260 (42.1)	730 (35.9)	489 (37.4)	71 (35.0)	275 (42.5)
2	96 (24.1)	109 (27.3)	275 (21.3)	158 (25.6)	513 (25.2)	365 (27.9)	64 (31.5)	150 (23.2)
3	57 (14.3)	84 (21.0)	277 (21.5)	114 (18.4)	473 (23.2)	312 (23.8)	50 (24.6)	144 (22.3)
4 (highest SES)	36 (9.0)	61 (15.3)	142 (11.0)	86 (13.9)	319 (15.7)	142 (10.9)	18 (8.9)	78 (12.0)
Percent non-Hispanic black density*								
<25%	174 (43.6)	249 (62.4)	786 (60.9)	346 (56.0)	1295 (63.6)	782 (59.8)	114 (56.2)	360 (55.6)
25-49%	99 (24.8)	76 (19.1)	212 (16.4)	119 (19.2)	387 (19.0)	277 (21.2)	37 (18.2)	143 (22.1)
50% or more	126 (31.6)	74 (18.5)	293 (22.7)	153 (24.8)	353 (17.3)	249 (19.0)	52 (25.6)	144 (22.3)
Rural/urban status *								
Urban	388 (97.2)	393 (98.5)	1276 (98.8)	608 (98.4)	1982 (97.4)	1269 (97.0)	192 (94.6)	634 (98.0)
Rural	11 (2.8)	6 (1.5)	15 (1.2)	10 (1.6)	53 (2.6)	39 (3.0)	11 (5.4)	13 (2.0)
HIV transmission mode*								
Injection drug use	12 (3.0)	26 (6.5)	60 (4.6)	62 (10.0)	82 (4.0)	47 (3.6)	13 (6.4)	47 (7.3)
Men who have sex with men	157 (39.3)	288 (72.2)	945 (73.2)	259 (41.9)	1164 (57.2)	857 (65.5)	134 (66.0)	380 (58.7)
Heterosexual	128 (32.1)	67 (16.8)	258 (20.0)	211 (34.1)	614 (30.2)	348 (26.6)	47 (23.2)	170 (26.3)
Other	102 (25.6)	18 (4.5)	28 (2.2)	86 (13.9)	175 (8.6)	56 (4.3)	9 (4.4)	50 (7.7)

*P<0.05

Linkage results

- 6,900 diagnosed with HIV without concurrent AIDS
  - 1,594 (23.1%) not linked to care within 3 months (definition including lab, pharmacy and clinical data)
  - 1,803 (26.1%) not linked to care within 3 months (definition with lab results only)

Linkage by HIV testing site, Florida, 2014-2015 (n=6900)

Site	Not in care within 3 months of HIV diagnosis, n (%)	In care within 3 months of HIV diagnosis, n (%)
Outpatient HIV/ID specialist	184 (14.1)	1124 (85.9)
Other outpatient site	371 (18.2)	1664 (81.8)
Inpatient	118 (19.1)	500 (80.9)
Other/unknown	160 (24.7)	487 (75.3)
HIV counseling and testing site	328 (25.4)	963 (74.6)
STD/family planning/TB clinic	58 (28.6)	145 (71.4)
HIV case management	136 (34.1)	263 (65.9)
Blood bank/plasma center	239 (59.9)	160 (40.1)

Odds ratios for non-linkage to HIV care within 3 months among people without concurrent AIDS, Florida 2014

	Odds ratio (95% confidence interval) adjusted for individual and zip code level factors
Site of HIV test	
Outpatient HIV/infectious disease specialist	Referent
Inpatient	1.21 (0.93 – 1.57)
Other outpatient site	1.37 (1.13 – 1.68)
HIV counseling and testing site	2.25 (1.83 – 2.77)
STD/family planning/TB clinic	2.29 (1.61 – 3.25)
HIV case management	3.23 (2.47 – 4.22)
Blood bank/plasma center	6.38 (4.89 – 8.33)
Other/unknown	1.89 (1.48 – 2.41)
Mode of HIV transmission	
Heterosexual	Referent
Men who have sex with men	0.61 (0.51 – 0.73)
Injection drug use	1.19 (0.89 – 1.59)
Other/unknown	2.05 (1.64 – 2.57)

Odds ratios and 95% confidence intervals for non-linkage to HIV care within 3 months among people without concurrent AIDS, Florida 2014-2015

	Odds ratio (95% confidence interval) adjusted for individual and zip code level factors
Birth sex	
Female	Referent
Male	1.56 (1.30 – 1.88)
Race/ethnicity	
Non-Hispanic White	Referent
Non-Hispanic Black	1.88 (1.57 – 2.24)
Hispanic	1.22 (1.00 – 1.48)
Age group (years)	
13-19	Referent
20-39	1.04 (0.79 – 1.36)
40-59	0.73 (0.54 – 0.97)
60 years or older	1.83 (0.57 – 1.23)
US birth	
Yes	1.25 (1.08 – 1.45)
No	Referent

Odds ratios and 95% confidence intervals for non-linkage to HIV care within 3 months among people without concurrent AIDS, Florida 2014-2015

	Odds ratio adjusted for individual and zip code level factors
Socioeconomic index of neighborhood quartiles	
1 (lowest SES)	1.67 (0.93 – 1.47)
2	1.00 (0.79 – 1.26)
3	0.96 (0.76 – 1.21)
4 (highest SES)	Referent
Percent non-Hispanic black density for neighborhood	
<25%	Referent
25-49%	1.08 (0.90 – 1.36)
50% or more	1.12 (0.92 – 1.36)
Rural/urban status of neighborhood	
Urban	1.14 (0.77 – 1.68)
Rural	Referent

Discussion

- Overall 26.1% among people without concurrent AIDS not linked to care
- After controlling for measured demographic and neighborhood factors, type of HIV testing site strongly associated with non linkage
- Studies in Philadelphia, New York, San Francisco, and nationally publically funded sites report higher linkage rates in outpatient medical clinics than HIV counseling and testing sites
- Not clear why case management sites linkage lower than HIV testing and counseling sites

Sources: Hsu LC, Chen M, Kali J, et al. *AIDS Care*. 2011 Mar;23(3):383-92; Seth P, Wang G, Collins NT, et al. MMWR *Morb Mortal Wkly Rep*. 2015 Jun 26;64(24):663-67; Torian LV, Wiewel EW, Liu KL, et al. *Arch Intern Med*. 2008 Jun 9;168(11):1181-87; Yehia BR, Ketner E, Momplaisir F, et al. *J Acquir Immune Defic Syndr*. 2015 Mar 1;68(3):304-9.

Discussion

- Linkage to care in blood banks understudied. One study surveyed people tested at a blood bank response rate low (42%) and only 4 had a HIV infection.
- 399 (5.8%) HIV infections identified in blood banks/plasma centers
- Reasons for poor linkage could be lack of preparation for HIV test result, denial, or lack of contact with pre-test counseling or clinician

Source: Kleinman S, Wang B, Wu Y, et al. *Transfusion*. 2004 May;44(5):658-666.

Limitations

- Use of administrative data to define linkage to care
  - One test alone may overestimate care if ordered before visit
- Bias in ascertainment of linkage
  - Private - lab test only
  - Public - lab test, physician visit, or receipt of prescription
  - Lead to underestimate of disparities

Recommendations

- Examine blood bank linkage rates in other geographic areas needed to assess extent of problem and identify best practices
- Examine linkage processes in specific HIV testing site types
- Consider providing HIV testing sites feedback about their linkage rates

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