Location of HIV Diagnosis Impacts Linkage to Medical Care

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Abstract: We evaluated 1359 adults newly diagnosed with HIV in Philadelphia in 2010–2011 to determine if diagnosis site (medical clinic, inpatient setting, counseling and testing center (CTC), and correctional facility) impacted time to linkage to care (difference between date of diagnosis and first CD4/viral load). A total of 1093 patients (80%) linked to care: 86% diagnosed in medical clinics, 75% in inpatient settings, 62% in CTCs, and 44% in correctional facilities. Adjusting for other factors, diagnosis in inpatient settings, CTCs, and correctional facilities resulted in a 33% (adjusted hazard ratio = 0.77; 95% confidence interval: 0.64 to 0.92), 46% (0.56; 0.42–0.72), and 75% (0.25; 0.18–0.35) decrease in the probability of linkage compared with medical clinics, respectively.

Key Words: HIV, testing, linkage to care, diagnosis

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INTRODUCTION

Linkage to care is critical to achieving HIV viral suppression and is a key component of the test-and-treat approach to HIV prevention.[1] Accordingly, the US National HIV/AIDS Strategy calls for immediate linkage to care after HIV diagnosis and has set a goal of increasing the proportion of persons linked to care within 3 months of diagnosis from 65%–85%.[2] To meet this goal, a better understanding of factors impacting linkage to care is needed.

Previous research have focused on patient factors associated with linkage to care, noting that uninsured individuals, injection drugs users, and persons with lower household incomes had delayed linkage compared with their counterparts.[3–11] Few studies have examined how site of HIV diagnosis impacts linkage to care. Among 1928 New York City residents newly diagnosed with HIV in 2003, individuals diagnosed at community testing sites, correctional facilities, and department of health's sexually transmitted diseases clinics were less likely to link to care (define using laboratory data—CD4 cell count and HIV viral load) than those diagnosed at primary medical care clinics.[8] However, this study was limited in that it was unable to differentiate between laboratory tests conducted at medical care sites versus other locations and did not evaluate linkage rates for individuals diagnosed in inpatient facilities.

The current analysis extends previous research by (1) using more recent data from a different geographic region, (2) using an improved definition of linkage to care, and (3) examining linkage to care for persons diagnosed in inpatient facilities. In this way, we provide new information on how the site of HIV diagnosis influences linkage to care.

METHODS

Data Source and Study Population

Data were extracted from the City of Philadelphia's Enhanced HIV/AIDS Reporting System (eHARS), a database containing demographic laboratory, and health service utilization information on all HIV cases reported to the Philadelphia Department of Public Health. Philadelphia requires name-based case reporting of all new HIV infections in the City. In addition, local mandates require reporting of all CD4 cell counts <350 cell per cubic millimeter and all HIV-1 RNA results. In 2012, the city started collecting information on all CD4 cell counts (not only those <350 cell/mm^3) and retrospectively obtained data for 2009–2012.

All laboratory results, including reactive HIV Western blots, CD4 cell counts, and HIV-1 RNA levels, are assigned a unique identifier indicating the facility associated with the requesting provider. Death data from the Pennsylvania Bureau of Vital Statistics, Social Security Death Master Index, and the National Death Index are routinely matched with eHARS data to identify deceased persons. The eHARS data are routinely monitored to identify duplicate cases and

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undergo quality control and verification to ensure that abstracted data are correctly assigned to unique case records.

This analysis included all adults (≥18 years old) with a new HIV diagnosis (positive Western blot) in Philadelphia between 2010 and 2011. Cases were followed through 2012.

Predictor and Outcome Variables

For each person, we defined age, sex at birth, race/ethnicity, and HIV transmission risk at the time of HIV diagnosis. Age was divided into 4 groups: 18–29, 30–39, 40–49, and ≥50 years old. Race/ethnicity was categorized as non-Hispanic white, non-Hispanic black, Hispanic, and other/unknown. HIV transmission risk was grouped into heterosexual, men who have sex with men (MSM), injection drug use (IDU), and other/unknown. Patients who had IDU in combination with another risk factor (eg, MSM, heterosexual transmission [HET]) were classified as IDU. Site of HIV diagnosis was categorized as medical care clinic; inpatient facility, including the emergency department (ED); counseling and testing center (CTC), sites offering HIV counseling and testing but not outpatient medical care services; and correctional system.

We calculated the difference between date of HIV diagnosis (date of first positive Western blot) and date of entry into care (date of first CD4 cell count or HIV-1 RNA at a medical care clinic). CD4 cell count and HIV-1 RNA tests collected in inpatient and correctional facilities were excluded, as they did not represent linkage to outpatient primary HIV care. In exploratory analyses, we defined linkage as HIV laboratory testing at a medical care clinic or correctional facility. Timely linkage was classified as entering care within 3 months of diagnosis. For those linked to care, we calculated the median CD4 count at the time of entry into care.

Statistical Analyses

Comparisons of demographic characteristics of the sample across HIV diagnosis sites were made using the χ^2 test of independence. The proportion of cases linked to care (within 3 months, after 3 months, and not linked) was assessed for each demographic characteristic and diagnosis site. A time-to-event analysis was conducted using days between HIV diagnosis and entry into care as the dependent variable. Patients contributed observation time from the date of diagnosis to the date of entry into care or were censored at death or end of the study period (December 31, 2012). The Kaplan–Meier product–limit method was used to estimate the cumulative proportion entering care after HIV diagnosis, stratified by diagnosis site. In primary analyses, multivariate Cox proportional hazards regression was used to identify factors (age, sex, race/ethnicity, HIV transmission risk, year of diagnosis, site of HIV diagnosis) associated with time to entry into care and to calculate their adjusted hazard ratios. In secondary analyses, multivariable logistic regression was used to examine the association between HIV diagnosis site and timely linkage to care (within 3 months of diagnosis), adjusting for patient characteristics. Two-sided testing was used, with a P value of <0.05 considered significant. Analyses were conducted using STATA 12.1 (College Station, TX).

RESULTS

Between 2010 and 2011, 1359 individuals were newly diagnosed with HIV; 74% were male, 68% were black, and 60% were 18–39 years old. The majority of patients had HET (46%) or MSM (41%) as their HIV risk behavior. Seventy-three percent of the sample was diagnosed in a medical care clinic, 15% in an inpatient setting, 7% in a CTC, and 6% in a correctional facility (Table 1).

Young adults (18–29 years) and those with MSM risk were more likely to be diagnosed at a medical care clinic or CTC than older individuals and those with HET or IDU risk ($P < 0.05$). Men, 30–49 years old, and those with HET or IDU risk were diagnosed at higher proportions in correctional facilities than their counterparts ($P < 0.05$). While, older adults, women, and those with HET or IDU risk were more likely to be diagnosed in an inpatient setting compared with younger individuals, men, and persons with MSM risk, respectively ($P < 0.05$) (Table 1).

By the end of the study period, 1093 (80%) newly diagnosed individuals linked to care: 821 (60%) within 3 months and 272 (20%) after 3 months of diagnosis; 266 (20%) did not link to care. (Table 2) Median CD4 count at the time of entry into care was 351 cells per cubic millimeter for those who linked within 3 months and 382 cells per cubic millimeter for those who linked after 3 months. Kaplan–Meier results demonstrate that persons diagnosed in medical care clinics had the highest proportion linked to care (86%), followed by those diagnosed in inpatient settings (75%) and CTCs (62%); persons diagnosed in correctional facilities had the lowest proportion linked to care (44%) (see Figure, Supplemental Digital Content, http://links.lww.com/QAI/A602). In analyses defining linkage as completion of HIV laboratory tests in medical care clinics or correctional facilities, 87% of persons diagnosed in medical care clinics were linked to care, 77% from inpatient settings, 66% from CTCs, and 82% from correctional facilities; 67%, 54%, 53%, and 63% were linked to care within 3 months, respectively (see Table S1, Supplemental Digital Content, http://links.lww.com/QAI/A602).

In multivariate analyses, diagnosis in inpatient settings, CTCs, and correctional facilities resulted in a 23% (adjusted hazard ratios, 0.77, 95% confidence interval: 0.64 to 0.92), 46% (0.56, 0.42 to 0.72), and 75% (0.25, 0.18 to 0.35) decrease in the hazard of linkage to care compared with diagnosis in medical care clinics, respectively. Additionally, the hazard of not linking to care was greater for black patients (vs. white), persons with IDU as their HIV risk factor (vs. heterosexual), and those diagnosed in 2010 (vs. 2011) (Table 2). Secondary analyses examining factors associated with timely linkage to care, within 3 month of HIV diagnosis, yielded similar results (see Table S2, Supplemental Digital Content, http://links.lww.com/QAI/A602).

DISCUSSION

These data, from a large geographic sample of people newly diagnosed with HIV, demonstrate that diagnosis at sites without colocated outpatient care, black race/ethnicity, and IDU risk behavior are strongly associated with delayed linkage to care. Our findings support those of earlier studies,

TABLE 1. Characteristics of Persons Newly Diagnosed With HIV in Philadelphia (2010–2011), Overall and by Site of HIV Diagnosis

Characteristics	No. Cases, %	Medical Care Clinic, %	Inpatient Setting, %	Counseling and Testing Center, %	Correctional Facility, %	*P*
Total*†	1359 (100)	986 (73)	201 (15)	90 (7)	82 (6)	<0.01
Age, yrs†‡						<0.01
18–29	495 (36)	396 (40)	30 (15)	45 (50)	24 (29)	
30–39	324 (24)	222 (23)	52 (26)	22 (24)	28 (34)	
40–49	313 (23)	210 (21)	67 (33)	14 (16)	22 (27)	
≥50	227 (17)	158 (16)	52 (26)	9 (10)	8 (10)	
Sex‡§						0.033
Male	1010 (74)	730 (74)	139 (69)	76 (84)	65 (79)	
Female	349 (26)	256 (26)	62 (31)	14 (16)	17 (21)	
Race/ethnicity‡						0.219
White	202 (15)	157 (16)	23 (11)	11 (12)	11 (13)	
Black	921 (68)	668 (68)	142 (71)	56 (62)	55 (67)	
Hispanic	208 (15)	138 (14)	33 (16)	21 (23)	16 (20)	
Other/unknown	28 (2)	23 (2)	3 (1)	2 (2)	0 (0)	
HIV risk factor†‡						<0.01
HET	622 (46)	435 (44)	113 (56)	17 (19)	57 (70)	
MSM	563 (41)	449 (46)	53 (26)	53 (59)	8 (10)	
IDU	142 (10)	82 (8)	26 (13)	20 (22)	14 (17)	
Other/unknown	32 (2)	20 (2)	9 (4)	0 (0)	3 (4)	

*Data are given as number (row percent) of the total number of cases.
†$P < 0.01$.
‡Data are given as number (column percent) of the total number of cases in each column.
§$P < 0.05$.

noting higher linkage to care rates when HIV testing programs are colocated at medical care clinics.[8,12] Moreover, they highlight the need to develop and evaluate effective interventions to facilitate linkage to care for HIV-infected individuals newly diagnosed in correctional facilities, CTCs, and inpatient/ED settings.

Rates of HIV testing among inmates have been reported between 73% and 90%, in part due to the Centers for Disease Control and Prevention recommendation to screen for HIV infection upon entry into prison and state policies mandating HIV testing during incarceration.[13–15] However, linkage to care for ex-offenders is often challenging, reflecting both significant obligations individuals face after release from prison (eg, addressing basic needs, finding employment, and obtaining/renewing health care coverage) and limited support provided during this transition.[15–20] In addition, untreated mental illness and drug addition, which are conditions commonly associated with incarceration, may continue after release compounding the challenges of linking to care.[21] Despite these obstacles, programs such as Project Bridge, a federally funded demonstration project that provided intensive case management for HIV-infected ex-offenders being released from prison to the community have been shown to improve linkage to medical care for ex-offenders.[21,22] To improve linkage rates among prisoners, Philadelphia has implemented a prison to community linkage program using case management services. Similar multifaceted approaches to addressing barriers to care and improving care coordination need to be implemented and evaluated.

From a measurement standpoint, additional studies are needed to evaluate the appropriate definition of linkage to care for persons diagnosed in correctional facilities. Our results demonstrated a near doubling of the proportion linked to care when linkage was defined as completion of HIV laboratory testing at a correctional facility or medical care clinic compared with medical care clinic alone (82% vs. 44%). Although the proportion linked to care varies between the 2 methodologies, the central issue of ensuring a safe and effective transition from prison to the community for persons newly diagnosed during incarceration remains.[18]

Analogous to individuals newly diagnosed with HIV in prison, those diagnosed in hospital wards and EDs face multiple challenges to timely linkage to care. Previous data indicate that only half to two-thirds of patients fully understand their postdischarge treatment plan, and this lack of understanding impacts their ability to comply with discharge instructions, including follow-up appointments.[23–26] While these issues are not unique to HIV-infected patients, persons with HIV may be less likely to link to care given the high prevalence of poverty, mental illness, and substance abuse in this population and the fear of stigma associated with HIV infection.[27,28] Case management and patient navigation may be effective tools to improve the transition from inpatient to outpatient care.[29]

In contrast to inpatient and correctional facilities, persons diagnosed in medical care clinics had higher linkage rates. Integration of HIV testing and medical services may facilitate linkage to care, particularly for younger adults and MSMs, by decreasing appointment wait times, leveraging

TABLE 2. Factors Associated With Linkage to Care in Persons Newly Diagnosed With HIV in Philadelphia (2010–2011)

Characteristics	Linked to Care*		Not Linked, %*	AHR (95% CI)†
	Within 90 d of Diagnosis, %	After 90 d of Diagnosis, %		
Total (N = 1359)	821 (60)	272 (20)	266 (20)	—
Site of HIV diagnosis				
Medical care clinic	656 (67)	195 (20)	135 (14)	1 (reference)
Inpatient setting	108 (54)	42 (21)	51 (25)	0.77 (0.64 to 0.92)
CTC	47 (52)	9 (10)	34 (38)	0.56 (0.42 to 0.74)
Correctional facility	10 (12)	26 (32)	46 (56)	0.25 (0.18 to 0.35)
Age, yrs				
18–29	285 (58)	120 (24)	90 (18)	1 (reference)
30–39	199 (61)	50 (15)	75 (23)	1.02 (0.86 to 1.21)
40–49	188 (60)	67 (21)	58 (19)	1.09 (0.92 to 1.29)
≥50	149 (66)	35 (15)	43 (19)	1.14 (0.94 to 1.37)
Sex				
Male	596 (60)	209 (21)	205 (20)	1 (reference)
Female	225 (64)	63 (18)	61 (17)	1.04 (0.88 to 1.22)
Race/ethnicity				
White	138 (61)	40 (20)	24 (12)	1 (reference)
Black	538 (58)	192 (21)	191 (21)	0.76 (0.64 to 0.91)
Hispanic	129 (62)	36 (17)	43 (21)	0.89 (0.72 to 1.11)
Other/unknown	16 (57)	4 (14)	8 (29)	0.67 (0.42 to 1.06)
HIV risk factor				
HET	403 (65)	101 (16)	118 (19)	1 (reference)
MSM	341 (61)	128 (23)	94 (17)	0.89 (0.76 to 1.05)
IDU	62 (44)	33 (23)	47 (33)	0.65 (0.52 to 0.81)
Other/unknown	15 (47)	10 (31)	7 (22)	0.75 (0.50 to 1.13)
Year of diagnosis				
2010	402 (57)	163 (23)	138 (20)	1 (reference)
2011	419 (64)	109 (17)	128 (20)	1.32 (1.17 to 1.50)

*Data are given as number (row percent) of the total number of cases in each row.
†Results are from multivariate Cox proportional hazards regression model.
AHR, adjusted hazard ratio; CI, confidence interval.

patients' familiarity with the clinic environment and staff, and providing ancillary support services (eg, case management, social work).[8,30,31] Persons diagnosed at medical care clinics may also have fewer health care barriers, as demonstrated by their ability to navigate the health care system and access medical services.

Consistent with earlier studies, individuals with IDU transmission risk were less likely to link to care, both overall and within 3 months of diagnosis, than their counterparts.[3,8,11] Care coordination, case management, and colocation of medical and mental health/substance abuse treatment programs have been identified as effective strategies for improving linkage to care and may be particularly helpful in this population.[28,32] We did not observe any differences in linkage to care between men and women. However, previous studies note mixed findings, with some noting that women are more likely to link to care than men and the other demonstrating the opposite.[6,8] Additional research is warranted to determine the impact of gender on linkage to care.

Previous studies indicate that lower household income and lack of health insurance coverage are associated with lower rates of linkage to care, which may reflect prioritization of basic needs (eg, food and housing) over health care and challenges in navigating the health care system.[3,4,9] The Affordable Care Act, which expanded Medicaid coverage in some states to include all people with incomes up to 138% of the federal poverty level, may provide an opportunity to address some of these barriers and improve access to care.[33] Persons with MSM risk (vs. heterosexual) had similar linkage rates overall but were less likely to link to care within 3 month of diagnosis. Paz-Bailey et al[4] evaluated linkage to care among 8153 MSMs in 21 US cities, noting that lower income and testing positive at their first HIV test were associated with delayed linkage (>3 months after diagnosis) and age 18–29 years and not having insurance were associated with not linking to care at all. These findings demonstrate that differing factors impact timely linkage and nonlinkage to care. Additional studies are needed to identify these differences and develop interventions to improve linkage to care, particularly among adolescents and the uninsured who represent a significant and growing portion of new HIV infections in the United States.

Our study has several limitations. First, we relied on the use of laboratory data to define linkage to care. This may

underestimate timely linkage (within 3 months of diagnosis) if laboratory tests were not ordered at or were drawn after the first HIV care visit.

Second, we narrowly defined linkage to care as having evidence of laboratory testing at a medical care facility. Exclusion of laboratory tests collected outside these sites may explain why our linkage rates (particularly for those diagnosed in prison) were lower than reported elsewhere.[15,17] Third, we were unable to distinguish laboratory tests conducted in the ED from those conducted on hospital wards. Given the high patient volume and turnover in EDs,[34] additional studies evaluating the HIV testing and linkage processes in these settings are necessary. Fourth, information on the date of release from a correctional facility was not available, making inference on timely linkage to outpatient HIV care in the community difficult. Improving data sharing between correctional and surveillance systems may provide opportunities for future investigations in this area. Fifth, data from the Centers for Disease Control and Prevention Routine Interstate Duplicate Review file indicates that 82 individuals relocated from Philadelphia during the study period (exact dates were not available and thus could not be included in Cox regression models). However, only 14 persons moved out of the city before linking to care; this small number is unlikely to significantly alter our results. Sixth, surveillance data do not capture certain patient and structure factors that may impact linkage to care (eg, household income, insurance status, fear of stigma and discrimination, social supports, and comorbid conditions). Future studies should evaluate how these and other factors affect linkage to care. Finally, generalizability was limited as we only studied HIV-infected individuals in 1 US city with high proportions of racial/ethnic minorities and low-income individuals.[35]

Only 60% of our sample linked to care within 3 months of HIV diagnosis. Improving linkage to HIV care, particularly for individuals diagnosed at sites without colocated medical care, will be critical to realizing the treatment and prevention benefits of antiretroviral therapy and for achieving the targets set in the National HIV/AIDS Strategy.[2]

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REFERENCES

1. Vital signs: HIV prevention through care and treatment–United States. *MMWR Morb Mortal Wkly Rep.* 2011;60:1618–1623.
2. Yehia B, Frank I. Battling AIDS in America: an evaluation of the National HIV/AIDS Strategy. *Am J Public Health.* 2011;101:e4–e8.
3. Bamford LP, Ehrenkranz PD, Eberhart MG, et al. Factors associated with delayed entry into primary HIV medical care after HIV diagnosis. *AIDS.* 2010;24:928–930.
4. Paz-Bailey G, Pham H, Oster AM, et al. Engagement in HIV care among HIV-positive men who have sex with men from 21 cities in the United States. *AIDS Behav.* 2014;18:348–358.
5. Rothman RE, Kelen GD, Harvey L, et al. Factors associated with no or delayed linkage to care in newly diagnosed human immunodeficiency virus (HIV)-1-infected patients identified by emergency department-based rapid HIV screening programs in two urban EDs. *Acad Emerg Med.* 2012;19:497–503.
6. 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;23:765–773.
7. Ulett KB, Willig JH, Lin HY, et al. The therapeutic implications of timely linkage and early retention in HIV care. *AIDS Patient Care STDS.* 2009;23:41–49.
8. Torian LV, Wiewel EW, Liu KL, et al. Risk factors for delayed initiation of medical care after diagnosis of human immunodeficiency virus. *Arch Intern Med.* 2008;168:1181–1187.
9. 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;24:1240–1248.
10. Keller SC, Yehia BR, Eberhart MG, et al. Accuracy of definitions for linkage to care in persons living with HIV. *J Acquir Immune Defic Syndr.* 2013;63:622–630.
11. Fleishman JA, Yehia BR, Moore RD, et al. Establishment, retention, and loss to follow-up in outpatient HIV care. *J Acquir Immune Defic Syndr.* 2012;60:249–259.
12. Craw J, Gardner L, Rossman A, et al. Structural factors and best practices in implementing a linkage to HIV care program using the ARTAS model. *BMC Health Serv Res.* 2010;10:246.
13. Centers for Disease Control and Prevention. HIV in correctional settings. 2014. Available at: http://www.cdc.gov/hiv/risk/other/correctional.html. Accessed May 1, 2014.
14. Okie S. Sex, drugs, prisons, and HIV. *N Engl J Med.* 2007;356:105–108.
15. Spaulding A, Stephenson B, Macalino G, et al. Human immunodeficiency virus in correctional facilities: a review. *Clin Infect Dis.* 2002;35:305–312.
16. Springer SA, Spaulding AC, Meyer JP, et al. Public health implications for adequate transitional care for HIV-infected prisoners: five essential components. *Clin Infect Dis.* 2011;53:469–479.
17. Booker CA, Flygare CT, Solomon L, et al. Linkage to HIV care for jail detainees: findings from detention to the first 30 days after release. *AIDS Behav.* 2013;17(suppl 2):S128–S136.
18. Yehia BR, Kangovi S, Frank I. Patients in transition: avoiding detours on the road to HIV treatment success. *AIDS.* 2013;27:1529–1533.
19. Binswanger IA, Stern MF, Deyo RA, et al. Release from prison–a high risk of death for former inmates. *N Engl J Med.* 2007;356:157–165.
20. Social Security Administration. What prisoners need to Know. 2010. Available at: http://www.ssa.gov/pubs/EN-05-10133.pdf. Accessed May 22, 2014.
21. Rich JD, Holmes L, Salas C, et al. Successful linkage of medical care and community services for HIV-positive offenders being released from prison. *J Urban Health.* 2001;78:279–289.
22. Zaller ND, Holmes L, Dyl AC, et al. Linkage to treatment and supportive services among HIV-positive ex-offenders in Project Bridge. *J Health Care Poor Underserved.* 2008;19:522–531.
23. Calkins DR, Davis RB, Reiley P, et al. Patient-physician communication at hospital discharge and patients' understanding of the postdischarge treatment plan. *Arch Intern Med.* 1997;157:1026–1030.
24. Makaryus AN, Friedman EA. Patients' understanding of their treatment plans and diagnosis at discharge. *Mayo Clin Proc.* 2005;80:991–994.
25. Kripalani S, Jackson AT, Schnipper JL, et al. Promoting effective transitions of care at hospital discharge: a review of key issues for hospitalists. *J Hosp Med.* 2007;2:314–323.
26. Horwitz LI, Moriarty JP, Chen C, et al. Quality of discharge practices and patient understanding at an academic medical center. *JAMA Interal Med.* 2013;173:1715–1722.
27. Sayles JN, Ryan GW, Silver JS, et al. Experiences of social stigma and implications for healthcare among a diverse population of HIV positive adults. *J Urban Health.* 2007;84:814–828.
28. Bauman LJ, Braunstein S, Calderon Y, et al. Barriers and facilitators of linkage to HIV primary care in New York City. *J Acquir Immune Defic Syndr.* 2013;64(suppl 1):S20–S26.
29. Bradford JB, Coleman S, Cunningham W. HIV System Navigation: an emerging model to improve HIV care access. *AIDS Patient Care STDS.* 2007;21(suppl 1):S49–S58.
30. Craw JA, Gardner LI, Marks G, et al. Brief strengths-based case management promotes entry into HIV medical care: results of the

antiretroviral treatment access study-II. *J Acquir Immune Defic Syndr.* 2008;47:597–606.
31. Fortenberry JD, Martinez J, Rudy BJ, et al; Adolescent Trials Network for HIVAI. Linkage to care for HIV-positive adolescents: a multisite study of the adolescent medicine trials units of the adolescent trials network. *J Adolesc Health.* 2012;51:551–556.
32. Gardner LI, Metsch LR, Anderson-Mahoney P, et al. Efficacy of a brief case management intervention to link recently diagnosed HIV-infected persons to care. *AIDS.* 2005;19:423–431.
33. Yehia BR, Fleishman JA, Agwu AL, et al. Health insurance coverage for persons in HIV care, 2006-2012. *J Acquir Immune Defic Syndr.* 2014;67:102–106.
34. Haukoos JS, Hopkins E, Hull A, et al. HIV testing in emergency departments in the United States: a national survey. *Ann Emerg Med.* 2011;58(1 suppl 1):S10–S16. e11–18.
35. Yehia BR, Schranz AJ, Momplaisir F, et al. Outcomes of HIV-infected patients receiving care at multiple clinics. *AIDS Behav.* 2014;18:1511–1522.