HIV screening in emergency departments: Linkage works but what about retention?

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The Centers for Disease Control and Prevention (CDC) reported that in 2016, 42% of people living with diagnosed HIV were not retained in care (defined as ≥ 2 CD4 or viral load tests ≥ 3 months apart in 2016).[1] Estimates indicate that the 23% of persons living with HIV/ AIDS (PLWH) who have a known HIV status (hereafter, known status) and are not in HIV care account for 43% of all HIV transmissions.[2] Thus, retention in HIV care has become a national priority to fight the HIV epidemic.

Universal emergency department (ED) screening programs have been shown to be effective in improving rates of HIV diagnosis and linkage to care by testing individuals for HIV who are not tested otherwise.[3–6] Once automated, they have been shown to function successfully even during the current pandemic of coronavirus disease-19,[7] where most other HIV screening programs have been temporarily shut down. At our institution, the ED has implemented an opt-out HIV screening program that involves fulltime dedicated case managers working to link newly diagnosed PLWH into care and relink PLWH who have fallen out of care to various HIV care providers and clinics.[8] While the current literature unequivocally reports increasing retention in HIV care rates in settings with ED HIV screening programs, very few studies have evaluated predictors of retention, the third step in the HIV care continuum, after implementation of routine HIV testing in EDs.[9–11] The objective of this analysis was to determine predictors of linkage to care and retention in

care in newly HIV-diagnosed persons and known status PLWH who had fallen out of care identified in our ED HIV screening program.

Between July 2017 and September 2019, electronic medical record (EMR)–based universal opt-out HIV screening was performed at the University of California at San Diego EDs. Opt-out HIV testing was conducted for all persons aged 13 to 64 years considered eligible as described previously.[8] Known status PLWH out of care for greater than 12 months were also identified via the EMR algorithm, which automatically triggered a question asking whether the last HIV care visit was within the past 12 months. As previously described,[8] HIV testing was performed using a fourth-generation HIV p24 Ag/HIV Ab combination screening[12]–based testing algorithm.[13] Positive fourth-generation HIV test results and identified known HIV+ persons out of care were sent daily to the case managers.

Linkage and relinkage to care, defined as being seen by an HIV specialist, was performed by the case managers after HIV disclosure. The case managers assisted with navigating insurance, finding and choosing providers, and making appointments, until the individual had his or her first appointment scheduled.

Retention to care, defined as having at least one HIV care provider visit between months 1 and 6 after initial (re)linkage (for the 6-month analysis) and at least one HIV care provider visit between months 7 and 12 (for the 12-month analysis), was recorded by the HIV case managers, who followed up with (re)linked individuals and/ or providers by phone and also EMR. Thus, all individuals considered retained had been linked to care at least 6 months prior to case manager follow-up. Case managers confirmed that patients were out of care by either phone or lack of HIV care visits recorded via EMR as well as absence of notes that the patient switched providers, moved away, or died or had been arrested.

Substance use and unstable housing within 6 months prior to ED screening were assessed via EMR or by phone via case managers. Imprisonment was defined as being incarcerated within 6 months of ED screening.

Univariate and multivariable binary logistic regression models using SPSS, version 25 (SPSS Inc.), assessed medical and social independent variables as predictors of successful (re)linkage and retention in care (i.e., dependent variables) in a population consisting of both newly diagnosed and known out-of-care individuals. Variables with a p-value <0.2 in univariate analysis were included in the final stepwise forward multivariable model. Model discrimination was assessed by the goodness-of-fit Hosmer-Lemeshow statistics. Adjusted odds ratios (aOR) including 95% confidence intervals (CIs) were calculated and a p-value of <0.05 was considered statistically significant.

The project was sponsored by the FOCUS Program, which is a public health initiative that enables partners to develop and share best practices in routine blood-borne virus screening, diagnosis, and linkage to care in accordance with screening guidelines from the CDC, the U.S. Preventive Services Task Force (USPSTF), and state and local public health departments. All the project methods were carried out in accordance with relevant guidelines and regulations. The study was approved by the UCSD institutional review board.

Over a period of 26 months, 25,900 HIV tests were conducted (75.6% of the 34,271 individuals that would have been eligible for screening), and a total of 47 newly diagnosed and 92 known status and out-of-care PLWH were identified. Demographics are displayed in Table 1. White race was predominant among new HIV diagnoses (46.8%) and PLWH identified as out of care (30.4%), while Black race was reported by 23.4% of new HIV diagnoses and 17.4% of PLWH out of care. Forty of 47 (85%) newly diagnosed individuals were linked to care compared to only 48 of 92 (52%) known status PLWH relinked to care (Table 1). In the multivariable model, those imprisoned (44% of those incarcerated within 6 months before screening were not confirmed linked to care), and those who had been out of care for greater than 12 months (48% of known status PLWH were not linked to care) were significantly less likely to be (re)linked to care (aOR = 1.145, 95% CI = 1.029 to 1.275, p = 0.013; and aOR = 6.621, 95% CI = 2.515 to 17.431, p < 0.001, respectively).

At the time of analysis, 6-month follow-up was completed in 33 newly diagnosed individuals and 26 known positives out of care (the remaining individuals had been (re)linked <6 months before analysis). Retention in care at 6 months was not statistically significant different between the two groups (70%, 95% CI = 54% to 85% among newly diagnosed and 54%, 95% CI = 35% to 73% among known status and out-of-care PLWH, p = 0.28). Of those who had been linked to care, 23 of 33 (70%) of the newly diagnosed individuals were still in care after 6 months (i.e., had completed at least one HIV care provider visit after the initial linkage visit), five (15%) were confirmed to be out of care, and five (15%) were unable to be contacted and confirmed not in care with their initial linkage provider. Of the known status PLWH successfully (re)linked to care at least 6 months prior, 14 of 26 (54%) were retained in care, 11 (42%) were confirmed to be out of care, and one (4%) was unable to be contacted and confirmed not in care with the providers to whom they had initially been linked.

In the univariate model (Table 1), methamphetamine use and injection drug use were significantly associated with lower retention in care (OR = 0.822, 95% CI = 0.686 to 0.984, p = 0.033; and OR = 0.858, 95% CI = 0.737 to 0.999, p = 0.049, respectively), with trends also observed for other substance use, psychiatric illness, male sex with men, and younger age (all variables included into the multivariable model). In the multivariate model, methamphetamine use (38% of users confirmed out of care) was the only factor significantly associated with failure to remain in care (aOR for retention in care = 0.822; p = 0.033, $*\chi^2 =$ 1.937; p = 0.164 Hosmer–Lemeshow for the multivariate model).

We analyzed (re)linkage and 6-month retention in HIV care among individuals identified during opt-out ED HIV screening at an academic medical center in San Diego. Two major findings are evident. First, while our universal opt-out ED HIV screening program achieved modest rates of (re)linkage to care (85% of newly diagnosed and 52% of known positives out of care), failure to remain retained in care was demonstrated among 37% at 6 months. Second, while methamphetamine use within 6 months of (re)linkage was a significant predictor of failure to remain in care, unstable housing and mental health disorders were not.

Several studies suggest that drug use is linked to lower retention in HIV care[14] and higher rates of poor HIV-related outcomes and HIV disease progression.[15–17] Previous studies

from San Diego have shown that substance use was also the most important predictor of nonadequate adherence to HIV PrEP.[18]

Our study showed that among the subset of persons available for follow-up, methamphetamine users were more likely to fall out of HIV care. This phenomenon may be explained biologically, because methamphetamine use may lead to increased behavioral disturbance and cognitive impairment in PLWH as well as decreased executive function.[19–21] PLWH who use methamphetamine have notably worse HIV-related health outcomes, likely due to low retention as well as low medication adherence.[22] Although numerous interventions have been outlined with uncertain improvement in retention, the most important intervention is regular contact with the patient both before and after appointments.[23]

Our analysis had important limitations starting with the small sample size resulting in low power particularly for some of the subanalyses. Information regarding follow-up predictors was gathered prospectively through routine follow-up calls by case managers and physician documentation in the electronic health record system Electronic Privacy Information Center (EPIC). Data collected in the electronic health record may be subject to provider variability, and results may be skewed in favor of patient populations with more complete information on EPIC.

In conclusion, our universal opt-out ED HIV screening program achieved modest rates of (re)linkage to care. In particular, persons using methamphetamine may benefit from continuous case management that goes beyond initial linkage to achieve higher rates of retention in care and increase the impact of ED-based HIV screening programs.

Acknowledgments

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TABLE 1

Demographic characteristics of newly HIV diagnosed and known status and out-of-care PLWH univariate and multivariable binary logistic regression models for predicting retention in care after 6 months

Variable	New HIV diagnoses (n = 47)	Known HIV+ persons out-of-care (n = 92)	Descriptive statistics of population included in model (n = 55)	Univariate Model			Multivariate Model*		
				OR	95% CI	p-value	aOR	95% CI	p-value
Age (years)	41.04 ± 12.828	42.88 ± 10.870	40.45 ± 12.244	1.035	0.986–1.087	0.164	n.s.		
Female sex at birth	12 (25.5%)	15 (16.3%)	11 (20%)	1.000	0.253–3.949	n.s.			
Female gender identity	15 (31.9%)	17 (18.5%)	15 (27%)	0.808	0.238–2.737	n.s.			
Hispanic ethnicity	14 (29.8%)	24 (26.1%)	23 (42%)	1.046	0.782–1.399	n.s.			
If male, sex with men (MSM)	14 (29.8%)	36 (39.1%)	26 (47.3%)	0.865	0.772–1.038	0.119	n.s.		
Trans person who has sex with men	4 (8.6%)	3 (3.3%)	5 (9.1%)	0.932	0.742–1.171	n.s.			
Injection drug use	10 (21.3%)	27 (29.3%)	12 (21.8%)	0.858	0.737–0.999	**0.049**	n.s.		
Methamphetamine use	18 (38.3%)	45 (48.9%)	21 (47.2%)	0.822	0.686–0.984	**0.033**	0.822	0.686–0.984	**0.033**
Other substance use (excluding alcohol and marijuana)	17 (36.2%)	38 (41.3%)	19 (34.5%)	0.853	0.722–1.006	*0.060*	n.s.		
Psychiatric illness	24 (51.1%)	42 (45.7%)	29 (52.7%)	0.873	0.720–1.058	*0.165*	n.s.		
Unstable housing	24 (51.5%)	55 (59.8%)	35 (63.6%)	0.862	0.686–1.083	n.s.			
Imprisonment	5 (10.6%)	13 (14.1%)	7 (12.7%)	0.911	0.786–1.055	n.s.			

Note: p-values <0.2 are italic and those <0.05 bold.

Abbreviations: aOR, adjusted odds ratio; PLWH, persons living with HIV/AIDS.

*
χ^2 = 1.937; p = 0.164 Hosmer–Lemeshow; forward Wald binary logistic regression.