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Antiretroviral Medication Diversion Among HIV-Positive Substance Abusers in South Florida

Hilary L. Surratt, PhD, Steven P. Kurtz, PhD, Theodore J. Cicero, PhD, Catherine O'Grady, MPH, and Maria A. Levi-Minzi, MA

The high cost of life-saving antiretroviral (ARV) therapy for HIV represents an expense that impedes accessibility and affordability by patients. This price structure also appears to motivate the diversion of ARVs and the targeting of HIV-positive patients by pill brokers in the illicit market. Our field research with indigent, HIV-positive substance abusers links ARV diversion to high levels of competing needs, including psychiatric disorders, HIV stigma, and homelessness. Interventions to reduce diversion must address the needs of highly vulnerable patients. (*Am J Public Health*. 2013;103:1026–1028. doi:10.2105/AJPH.2012.301092)

Medication adherence is critical in the management of many chronic illnesses, including HIV.¹ Antiretroviral (ARV) nonadherence increases the risk of treatment failure, drug resistance, and disease transmission.² Our recently completed field research among HIV-positive patients in urban south Florida documented modest levels of ARV adherence and a related, yet understudied, phenomenon: the diversion of ARV medications. Diversion—the unlawful channeling of regulated pharmaceuticals from legal sources to illicit markets³—has typically been studied in relation to prescription opioids and other medications with significant abuse potential.⁴ Nevertheless, the diversion of ARVs by patients is apparent in south Florida⁵ and has direct implications for nonadherence, making it a critical issue for patient care and public health. We examined factors that affect vulnerability to ARV diversion

among highly marginalized HIV-positive individuals.

METHODS

Guided by targeted sampling in geographic areas with high HIV prevalence and poverty indices,⁶ we used direct outreach to recruit indigent HIV-positive substance abusers in south Florida between 2010 and 2012. Research staff distributed study cards and flyers in street venues and HIV service organizations. We enrolled approximately equal numbers of users diverting their personal ARVs ($n = 251$) and of those not doing so ($n = 252$); because diverters had a lower average recruitment rate, recruitment of the full sample of diverters took 24% longer than recruitment of the comparable sample of nondiversers. Eligibility criteria were as follows: age 18 years or older, cocaine or heroin use 12 or more times in the prior 3 months, documented HIV-positive status, and current ARV prescription. In addition, diverters reported that they had diverted ARVs at least once in the prior 3 months. Research staff conducted systematic screening to verify eligibility; 2112 individuals were screened, 599 met study eligibility criteria, and 503 were enrolled. The primary reason for nonenrollment (84%) was repeated failure to present for the interview. Following informed consent, participants completed a single face-to-face interview based on the Global Appraisal of Individual Needs (GAIN)⁷ instrument, which assessed demographics, substance use, substance dependence as measured by the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Revised Edition (DSM-IV-R)*, and mental health status. Standardized instruments assessed HIV diagnosis and treatment history,⁸ attitudes toward HIV care providers,⁹ health literacy,¹⁰ HIV-related stigma,¹¹ ARV knowledge and attitudes,^{12,13} and ARV adherence¹⁴; a new instrument assessed ARV diversion. Participants received a \$30 stipend upon interview completion. Bivariate logistic regression models examined the factors associated with ARV diversion in this sample; we included significant predictors from the bivariate analyses in the multivariate model.

RESULTS

Median age of participants was 46 years; 59.4% were male. Of the participants, 55.3%

met *DSM-IV-R* criteria for past-year substance dependence, 81.4% reported monthly income below \$1000, and 39.2% were homeless in the prior 3 months. Diverters reported a median of 7 lifetime episodes of ARV diversion. Self-reported ARV adherence in the past week was 95% or better among 54.1% of participants; compared with nondiversers, diverters had significantly lower odds of achieving 95% adherence (odds ratio = 0.26; 95% confidence interval = 0.18, 0.37; $P \leq .001$). Table 1 displays the bivariate and multivariate predictors of ARV diversion. Male gender, severe depression, severe anxiety, substance dependence, recent homelessness, and high HIV-related stigma were each associated with increased odds of diverting prescribed ARV medications. The odds of diversion were lower among participants reporting higher HIV-related treatment knowledge and higher health literacy, and among those achieving 95% ARV adherence. In the multivariate model, recent homelessness and male gender were associated with increased odds of ARV diversion; higher HIV-related treatment knowledge, better adherence, and higher health literacy remained as significant protective factors.

DISCUSSION

The diversion of noncontrolled prescription drugs garners less attention and resources from law enforcement, the health practitioner and scientific communities, policymakers, educators, and industry than the diversion of controlled substances. Nevertheless, diversion of noncontrolled substances, such as ARVs, has clear implications for the integrity of the medication supply chain, for patient safety, and for public health.¹⁵ Our data show that indigent substance-abusing patients face challenges with ARV adherence and, moreover, that nonadherence is linked to the diversion of ARVs. The targeting of indigent, street-based, HIV-positive patients by pill brokers or “collectors” who offer small sums for patients’ monthly supplies of ARV medications appears to be common in south Florida^{5,16}; even 37.4% of nondiversers reported being approached for this purpose (H. L. S., unpublished data, 2011). The pricing structure of ARV medications makes them highly profitable in the illicit market,¹⁷ in

TABLE 1—Bivariate and Multivariate Logistic Regression Models Predicting Past-90-Day Antiretroviral (ARV) Diversion Among HIV-Positive Substance Abusers: South Florida, 2010–2012

	Diverters (n = 251), Mean \pm SD or No. %	Nondiverters (n = 252), Mean \pm SD or No. %	OR (95% CI)
Bivariate models			
Demographics			
Age, y	45.9 \pm 7.9	46.2 \pm 7.6	1.00 (0.97, 1.02)
Male gender ^a	166 (66.1)	133 (52.8)	1.75** (1.22, 2.50)
Years since HIV diagnosis	13.0 \pm 7.4	13.5 \pm 7.2	0.99 (0.97, 1.02)
High school education ^a	132 (52.6)	152 (60.3)	1.37 (0.96, 1.95)
Health status			
Good self-reported health ^b	124 (49.4)	125 (49.6)	1.01 (0.71, 1.43)
95% ARV adherence ^a	95 (37.8)	177 (70.2)	0.26*** (0.18, 0.37)
Risk factors			
Homeless in past 90 d ^a	120 (47.8)	77 (30.6)	2.08*** (1.45, 3.00)
Substance dependence ^a	155 (61.8)	123 (48.8)	1.69** (1.19, 2.41)
Severe depression ^a	155 (61.8)	120 (47.6)	1.78** (1.25, 2.53)
Severe anxiety ^a	93 (37.1)	65 (25.8)	1.69** (1.16, 2.48)
HIV-related stigma score ^c	24.6 \pm 7.7	23.1 \pm 7.5	1.03* (1.00, 1.05)
Protective factors			
HIV treatment knowledge ^d	5.6 \pm 1.5	6.0 \pm 1.0	0.76*** (0.66, 0.88)
ARV medication attitudes ^e	8.3 \pm 2.3	8.6 \pm 1.4	0.94 (0.85, 1.03)
Health literacy ^f	8.5 \pm 3.6	9.6 \pm 2.9	0.91*** (0.86, 0.96)
Attitudes toward HIV providers ^g	43.4 \pm 5.7	44.2 \pm 4.9	0.97 (0.94, 1.00)
Multivariate model			
Male gender ^a			1.99*** (1.34, 2.96)
95% ARV adherence ^a			0.29*** (0.20, 0.43)
Homeless in past 90 d ^a			1.64* (1.09, 2.47)
Substance dependence ^a			1.30 (0.85, 1.98)
Severe depression ^a			1.23 (0.76, 1.99)
Severe anxiety ^a			1.08 (0.65, 1.79)
HIV-related stigma score			0.99 (0.96, 1.02)
HIV treatment knowledge			0.85* (0.72, 0.99)
Health literacy			0.92** (0.86, 0.98)

Note. CI = confidence interval; OR = odds ratio. The total sample size was n = 503. The multivariate model includes significant predictors from the bivariate analyses.

^aReference category is “no.”

^bReference category is poor or fair.

^cFor HIV-related stigma, scale range = 11–44; higher scores represent higher stigma.

^dFor HIV treatment knowledge, scale range = 0–7; higher scores represent higher knowledge.

^eFor ARV medication attitudes, scale range = 0–10; higher scores represent more positive attitudes.

^fFor health literacy, scale range = 0–12; higher scores represent better health literacy.

^gFor attitudes toward HIV providers, scale range = 12–48; higher scores represent more positive attitudes.

* $P \leq .05$; ** $P \leq .01$; *** $P \leq .001$.

effect incentivizing diversion and the targeting of HIV-positive individuals with high levels of competing needs. In our sample, men appeared to be especially vulnerable to ARV diversion. Although the reason is unclear,

males were more likely to report recent homelessness, which may increase their exposure to street-level pill brokers and dealers. Interventions to enhance medication adherence and reduce diversion should be tailored for

the most vulnerable, homeless HIV-positive individuals. Individual-level, practitioner-based interventions should aim at instilling knowledge of ARV treatment regimens and health literacy factors; HIV treatment specialists and other health practitioners should be aware of the potential for ARV diversion to better support their patients. Housing insecurity requires increased attention at a structural level to reduce the exploitation of vulnerable HIV-positive individuals. ■

About the Authors

At the time of the study, Hilary L. Surratt, Steven P. Kurtz, Catherine O'Grady, and Maria A. Levi-Minzi were with the Center for Applied Research on Substance Use and Health Disparities, Nova Southeastern University, Fort Lauderdale, FL, and the Center for Drug and Alcohol Studies, University of Delaware, Newark. Theodore J. Cicero was with the Department of Psychiatry, Washington University School of Medicine, St Louis, MO.

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Contributors

H. L. Surratt conceptualized the study, analyzed data, wrote the first draft of the brief, and led the revisions. S. P. Kurtz, T. J. Cicero, and M. A. Levi-Minzi reviewed and edited the brief. C. O'Grady participated in data analyses. All authors contributed to the conceptualization and design of the brief, read each version, and approved it.

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Note. The contents of this brief are solely the responsibility of the authors and do not necessarily represent the official views of the National Institute on Drug Abuse or the National Institutes of Health.

Human Participant Protection

The study was approved by the institutional review boards of the University of Delaware and Nova Southeastern University.

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Missed Opportunities for Hepatitis C Testing in Opioid Treatment Programs

Jemima A. Frimpong, PhD, MPH

HCV has surpassed HIV as a cause of death in the United States and is particularly prevalent among injection drug users. I examined the availability of on-site HCV testing in a nationally representative sample of opioid treatment programs. Nearly 68% of these programs had the staff required for HCV testing, but only 34% offered on-site testing. Availability of on-site testing increased only slightly with the proportion of injection drug users among clients. The limited HCV testing services in opioid treatment programs is a key challenge to reducing HCV in the US population. (*Am J Public Health*. 2013;103:1028–1030. doi:10.2105/AJPH.2012.301129)

HCV recently surpassed HIV as a cause of death in the United States.^{1,2} Approximately 3.2 million people nationwide are living with chronic hepatitis, but most are unaware of their status because of limited opportunities for testing.^{3–6} Persons who inject drugs are particularly at risk for HCV infection as a result of sharing and reusing of needles.^{4,7} The estimated prevalence of antibodies to HCV (anti-HCV) among injection drug users ranges from 35% to 65%.⁸ The Centers for Disease Control and Prevention (CDC) thus recommends routine HCV testing for all current or former injection drug users.^{1,9} Offering HCV testing services in drug abuse treatment programs could help increase HCV case finding and reduce transmission.^{10,11} It could also help foster the adoption of preventive behaviors: knowledge of one's anti-HCV status may indeed lead to safer injection practices (or other protective behaviors).^{12,13}

I examined the availability of on-site HCV testing services in opioid treatment programs (i.e., physical facilities with resources dedicated specifically to treating opiate dependence with methadone, buprenorphine, or both).^{14,15} Opioid treatment programs treat both persons who inject drugs and people who have opiate addiction but do not inject drugs. The current recommended HCV testing protocol requires the collection of venous blood, performed by qualified staff (i.e., phlebotomists).¹⁶ However, the availability of (1) human resources required to offer HCV testing services and (2) on-site HCV testing services at opioid treatment programs nationwide is not known. I examined relations among the availability of on-site HCV testing services, human resources for HCV testing, and the proportion of injection drug users among opioid treatment program clients.

METHODS

I analyzed data from the 2011 National Drug Abuse Treatment System Survey (NDATSS).^{14,17,18} In total, a nationally representative sample of 200 opioid treatment programs completed the survey. Twenty-two opioid treatment programs refused to participate, and 90 initially screened were unable to complete interviews. A response rate of 87% was calculated with the Council of American Survey Research Organization method.¹⁹ I found no significant differences between responders and nonresponders.

I used 3 data elements from the 2011 NDATSS: (1) the proportion of injection drug users among clients of an opioid treatment program, (2) the presence of staff who perform blood collection, and (3) the availability of HCV testing services on site. I calculated the proportion of opioid treatment programs with human resources capacity and on-site HCV testing. I categorized opioid treatment programs by the prevalence of injection drug users among their clients (0%–24%, 25%–49%, 50%–74%, or 75%–100%). I used logistic regression with controls for opioid treatment program size (i.e., total number of clients in past year) to examine the association between human resources capacity and on-site HCV testing and the proportion of injection drug users among clients. I report predicted probabilities from these regressions. I used the simple Wald

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