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Clinical Comorbidities among Cocaine Users Screened in the Community through HealthStreet

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Abstract

Objectives—We investigated the differences in clinical characteristics and musculoskeletal (MSK) conditions by cocaine use.

Methods—HealthStreet, a community engagement program assessed 7936 adults for medical conditions.

Results—Among 6145 African Americans (77%) and 1791 (23%) Caucasians, 15.5 % and 25% reported cocaine use, respectively. African-American cocaine users were older ($p < .001$) and more likely to report hypertension ($p < .001$) and HIV ($p < .001$) than Caucasian users. Compared to non-users, back pain was reported by 42% of African Americans ($p < .001$) and 48% of Caucasian cocaine users ($p < .003$). African-American cocaine users had significantly higher odds of back pain, 1.60 (95% CI 1.27, 2.04) and arthritis, 1.40 (95% CI 1.19, 1.64) than Caucasians.

Conclusions—Cocaine users are more likely to endorse MSK conditions than non-users. Racial disparities among users existed; however, how race affects health among users requires further research.

Keywords

: cocaine; health disparities; African Americans; musculoskeletal; arthritis; back pain

Addiction is a chronic relapsing disorder characterized by repetitive and compulsive drug-seeking behavior despite negative health or social consequences. Cocaine addiction is a significant worldwide public health problem that has somatic, psychological, psychiatric,

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Human Subject Approval Statement: HealthStreet at University of Florida (UF) was approved by the UF Institutional Review Board (IRB); HealthStreet at Washington University St. Louis (WUSTL) was approved by the WUSTL IRB. Community health workers administer informed consent forms with each community member to ensure that protected health information is collected and stored confidentially.

socio-economic, and judicial complications.^{1,2} Cocaine remains the second most commonly used and trafficked illicit drug in the world after cannabis.³ Prevalence of cocaine use (lifetime-LT, past 12 months, and past 30 days) in the US is particularly high among males 15 to 34 years of age.⁴ Some of the most frequent complications associated with cocaine use are cardiovascular (acute coronary syndrome, cardiac arrhythmias, increased blood pressure); respiratory (fibrosis, interstitial pneumonitis, pulmonary hypertension, alveolar hemorrhage, asthma exacerbation, emphysema); neurological (strokes, aneurysms, seizures, headaches); and communicable diseases such as HIV/AIDS, hepatitis B and C, and sexual transmitted diseases (STDs).^{5,6} However, the association of musculoskeletal (MSK) complications including any kind of arthritis and back pain with cocaine use rarely have been studied and reported. Furthermore, many health conditions that are increased among cocaine users may result in joint pain, including hepatitis C virus (HCV) and HIV infections. Whereas HCV is common in cocaine users and has been linked to MSK conditions (peripheral neuropathies, arthritis, etc), support for this association has been limited by a lack of controls and/or adjustment for important confounders, most notably substance abuse.⁶ In the current study using data from a community engagement program in 3 geographic areas throughout the United States, we investigated the differences in clinical characteristics in general and MSK conditions in particular by cocaine versus non-cocaine use to understand the clinical risk factors among cocaine users. In addition, as a secondary objective, we also did a sensitivity analysis looking at racial differences by MSK.

Because of increased burden of diseases among African Americans, we hypothesized that LT cocaine users would report more chronic and infectious health conditions than non-cocaine users, and that more African-American users would report such conditions than Caucasian users.

Methods

HealthStreet

Details on the HealthStreet community engagement model have been published previously.^{7,8} Briefly, this effort strives to reduce disparities in healthcare and research participation. HealthStreet was established at Washington University, St. Louis (WUSTL) in 1989, and scaled up for use in the Clinical and Translation Science Award (CTSA) there in 2007. In 2011, HealthStreet was initiated at the University of Florida (UF) by Drs Cottler and Striley and is funded partially through the UF CTSA. Utilizing a community health worker (CHW) model, HealthStreet: (1) assesses the community's health needs and health concerns; (2) links people, based on their needs and concerns, to medical and social services and opportunities to participate in research; (3) engages in bidirectional, health-promoting communication with and for the community; and (4) increases the community's trust in health research through meaningful collaborations.^{8,9}

Data Collection

Data for HealthStreet at UF were collected and entered using REDCap (Research Electronic Data Capture) software—a secure, Web-based data capture tool.¹⁰ Data collected at WUSTL were entered into a secure Access database, as well.

Study Sample

The HealthStreet sample for this analysis was comprised of African-American and Caucasian respondents from St. Louis, MO, Gainesville, FL, and Jacksonville, FL, who were administered a Health Intake assessment between September 2008 and February 2014 (Figure 1). As of February 2014, HealthStreet reached a total of 11,448 community members in Missouri and Florida, with over 10,000 respondents providing informed consent (Figure 1). Among these, 9640 (87.8%) completed the Health Intake form with CHWs. There was no significant difference between those who completed and those who did not complete the Health Intake form. The Health Intake includes demographic and family characteristics, health conditions, prioritized health concerns, medication and drug use, and healthcare access. It is an extensive intake form that includes major questions related to health containing both multiple-choice items as well as open-ended questions, eg, “Have you ever been told or have you ever had problem with X.”

Data Analyses

All analyses were stratified by reported race (African-American vs Caucasian) and completed using SAS version 9-4 software.¹⁰ Fisher's exact statistics were used to examine the differences in proportions among categorical demographic characteristics, chronic diseases, and other medical conditions between those reporting LT cocaine use compared to non-users, and 2-tailed Student's t-test statistics were used for continuous variables.¹¹ Both univariate and multivariate logistic regression analyses were used to predict LT cocaine use. Confidence intervals (95% CI) are reported for all odds ratios (OR) generated through logistic regression analyses.

Results

Overall, the sample consisted of 7936 respondents, among whom 3753 (47.3%) lived in Florida and 4183 (52.7%) from Missouri. Over three-fourths (77.4%) were African Americans and 22.6% were Caucasians. Furthermore, 951 African-American respondents (15.5%) reported LT cocaine use compared to 453 Caucasian respondents (25.3%), as measured by the question, “Have you ever used cocaine or crack?” (Table 1).

Regardless of race, cocaine users compared to non-users were less likely to be female and educated, more likely to be unemployed, veterans, and medically uninsured. LT cocaine users also reported more risk factors than non-users, including past 30-day opioid and cigarette use. In terms of health problems, LT cocaine users endorsed all symptoms and conditions except for hypertension, diabetes, and HIV.

Among African Americans, we found differences between users and non-users for all factors except Hispanic ethnicity and diabetes, applying Bonferroni checks. Among Caucasians, there were no differences with respect to Hispanic ethnicity, age, veteran status, arthritis, hypertension, diabetes, and past 30-day opioid use. Other substance use was non-significant, and therefore, was not included in the analysis.

We next examined predictors of LT cocaine use stratified by race when controlled for other health risk and demographic factors of interest (Table 2). For both races, those with arthritis,

LT hepatitis, back pain and history of STD were more likely to report cocaine use than their counterpart. HIV was not predictive of cocaine use among Caucasian users, and past 30-day opioid use was not predictive of cocaine use among African-American users. African-American users had significantly higher odds of reporting back pain compared to non-cocaine users [OR=1.60 (95% CI 1.27, 2.04)].

With respect to race differences, the presence of any reported back pain or any kind of arthritis was further analyzed in LT cocaine and non-cocaine users after adjusting for age, STDs, and use of other illicit drugs (Table 3). The presence of LT hepatitis or past 30-day use of opioids increased the odds of reporting back pain/arthritis among cocaine users. Reporting any hepatitis, STD, past 30-day opioid use, and illicit substance use increased the odds of reporting back pain/arthritis among African Americans (Table 3).

Discussion

Cocaine use in the United States continues to be a health problem.¹³ Despite the many successes that have resulted in combating cocaine use and other substance use disorders, published data suggest that African Americans continue to experience a disproportionate burden of cocaine abuse.¹⁴⁻¹⁶ This study compared health outcomes for African-American and Caucasian community LT cocaine users among community recruited persons from 3 geographic areas and 2 states of the United States in a cross-sectional study design. Based on conservative estimates, national studies have shown that peak drug use occurs between the ages of 18 and 20, with a steady decline with increasing age.¹⁷ The participants in the current study belonged to wide age range age, from the age of highest risk (younger group) into older ages considered as lower risk age; this makes the high prevalence of cocaine use among these participants all the more striking ie, 15.5% in African Americans and 25.3% in Caucasian LT cocaine users.

Considering the relationship of social factors with cocaine use, previous studies suggest a negative relationship between drug use and productivity.^{13,14} Our study supported the results of previous studies and as expected, found that drug users were more likely to be male and unemployed than non-users.

Based on the published data related to cardiovascular diseases (CVDs), African Americans are at high risk for hypertension, cardiovascular disease (CVD), and end-stage kidney disease.^{18,19} In the current study, though hypertension was a major health condition reported in African Americans, LT cocaine use was not found to be an independent predictor for hypertension for African Americans only. This further supports the existing literature and confirms that chronic cocaine use may be associated with acute but not chronic hypertension among African Americans.

MSK conditions in general and arthritis, and back pain in particular in adults is the leading cause of disability and is among the leading conditions causing work related disability.^{20,21} Over the next 25 years, the number of people affected and the social impact of diagnosed arthritis are projected to increase by 40% in the United States.²² In this study, cocaine use was associated with MSK conditions among study participants. We found increased odds of

reporting back pain among African-American and Caucasian cocaine users after adjusting for other risk factors of interest. There may be many possible reasons for this association such as the presence of HIV or LT hepatitis related to cocaine use (among African Americans). Levamisole is now felt to contaminate the majority of the cocaine supply in the United States. The growing research on the use of levamisole has been associated with vasculopathy associated with positive perinuclear anti-neutrophil antibodies (p-ANCA) increasing the risk of MSK conditions, an area for further research.²³⁻²⁵

Similarly, in addition to arthritis, more LT cocaine users versus non-users reported back pain in our study regardless of race. Possible explanations could include chronic pain following trauma, mechanical back pain, or inflammatory back pain. Pain also may be referred from the aorta or renal organs. Furthermore, opioid and cigarette use within the past 30 days was greater among patients who reported LT cocaine use (Tables 1 and 2). We observed that those reporting LT cocaine use were twice as likely to report smoking cigarettes within the past 30 days compared to non-users (2.3; 1.9 – 2.8 in African Americans; 1.9; 1.4 – 2.6 in Caucasians).

The use of opioids for chronic non-malignant pain has accelerated in the United States. There is an increased incidence of opioid abuse, alcohol abuse/dependence among those with chronic pain as well as illicit substance abuse reported by some authors.²⁵ In addition, Ives et al²⁶ report that patients with cocaine or alcohol abuse are most likely to misuse opioids. In contrast, Mertens et al²⁷ report higher prevalence of back pain and arthritis among patients dependent on narcotic analgesic agents but not in the cocaine group. Because of the cross-sectional study design, we could not show the temporal association; future longitudinal studies are needed to ascertain the cause-effect relationship between cocaine use and MSK conditions.

This study has several limitations. First, though a community-based population sample, this is a cross-section design and all findings are associational, and not necessarily causal. Future longitudinal studies are warranted. Second, LT cocaine use was defined on the basis of self-reported history; therefore, the prevalence of cocaine use in both African Americans and Caucasians may underestimate the true prevalence. This is also true for information regarding hepatitis, HIV, STDs and other medical conditions. Third, whereas LT cocaine users in this study were more likely to report a variety of medical conditions, we were unable to test whether the cocaine use or health problem came first. Again, longitudinal research with repeated measures is required to improve understanding of these relationships. Finally, further research is required to gain more understanding of the health disparities between African-American and Caucasian users and whether there are unique factors among drug users that contribute to these disparities.

Implications for Health Behavior or Policy

In this study, large community-based populations were used which represent diverse ethnic groups from 3 geographical areas and 2 states of the US. Notwithstanding study limitations, the findings have important health behavior and policy implications. LT cocaine use is a pervasive social problem associated with chronic medical conditions which may not be

easily recognized. The impact of the consequences of cocaine use on health is underestimated. LT cocaine users are more likely to report a variety of medical conditions, although the current study does not allow for testing which came first. In addition, the likelihood of reporting these health consequences varies by race.

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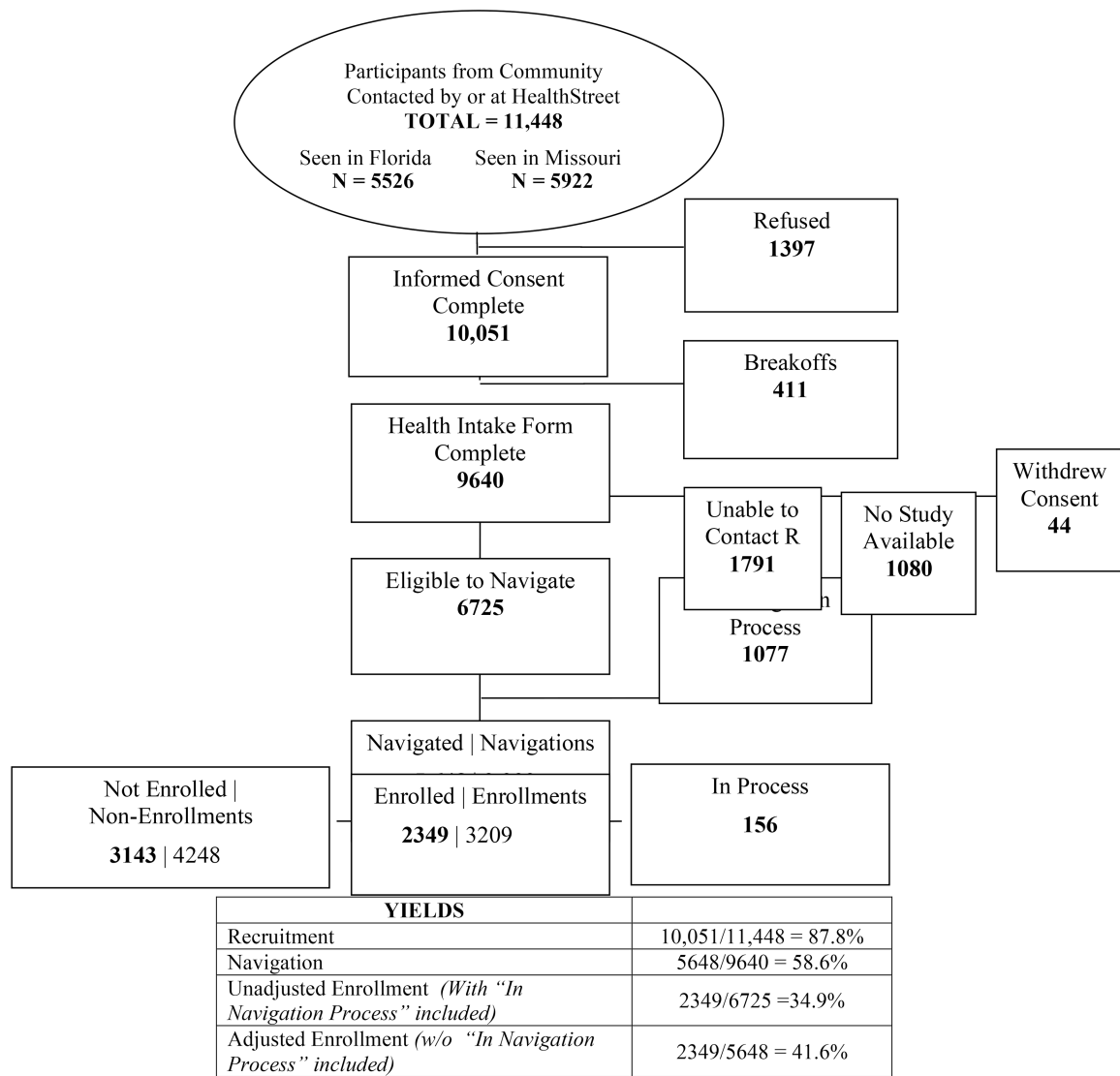


Figure 1. HealthStreet Flowchart, St. Louis, Missouri and Gainesville/Jacksonville, Florida, September 2008 - February 2014^a

Note. a Numbers in BOLD represent PEOPLE, not events.

Table 1
HealthStreet Participant Demographics and Musculoskeletal Comorbidities by Race and Self-Reported Lifetime Cocaine Use, Gainesville, Florida and St. Louis, Missouri (N = 7936)

Demographics	African-American (N = 6145)				Caucasian (N = 1791)			
	LT Cocaine Use (N = 951)		No LT Cocaine Use (N = 5194)		LT Cocaine Use (N = 453)		No LT Cocaine Use (N = 1338)	
	N (%)	N (%)	N (%)	p-value	N (%)	N (%)	p-value	
Site								
Florida	339 (35.7%)	2196 (42.3%)	291 (64.2%)	<.001	927 (69.3)		.047	
Missouri	612 (64.4%)	2998 (57.7%)	162 (35.8%)		411 (30.7)			
Female	397 (41.8%)	3005 (57.9%)	190 (42.0%)	<.001	760 (56.8)		<.001	
Hispanic/Latino	6 (0.6%)	41 (0.8%)	7 (1.6%)	NS	39 (2.9%)		NS	
Mean Age (±SD), years	47.9 (±9.2)	37.9 (±14.5)	42.8 (±12.2)	<.001	42.0 (±15.9)		NS	
Mean Years of Education (±SD)	11.9 (±1.8)	12.3 (±2.1)	12.6 (±2.4)	<.001	13.3 (±2.7)		<.001	
Marital Status				<.001			<.001	
Never Married	522 (54.9%)	3455 (66.5%)	201 (44.4%)		608 (45.4%)			
Married	116 (12.2%)	1003	62 (13.7%)		333 (24.9%)			
Separated/Divorce/Widowed	304 (32.0%)	(19.3%)	189 (41.7%)		395 (29.5%)			
Unemployed	702 (73.8%)	3077 (59.2%)	316 (69.8%)	<.001	768 (57.4%)		<.001	
Veteran	165 (17.4%)	314 (6.1%)	61 (13.5%)	<.001	138 (10.3%)		NS	
Medically Uninsured	506 (53.2)	2143 (41.3%)	279 (61.6%)	<.001	533 (39.8%)		<.001	
Chronic Diseases, Infections, and Musculoskeletal Symptoms								
Back Pain (BP)	398 (41.9%)	1456 (28.0%)	215 (47.5%)	<.001	498 (37.2%)		<.001	
Arthritis	320 (33.7%)	939 (18.1%)	153 (33.8%)	<.001	371 (27.7%)		.04	
Hypertension	405 (42.6%)	1433 (27.6%)	108 (23.8%)	<.001	341 (25.5%)		NS	

Demographics	African-American (N = 6145)			Caucasian (N = 1791)		
	LT Cocaine Use (N = 951)	No LT Cocaine Use (N = 5194)	p-value	LT Cocaine Use (N = 453)	No LT Cocaine Use (N = 1338)	p-value
Type II Diabetes	N (%) 89 (9.4%)	N (%) 418 (8.1%)	0.048	N (%) 28 (6.2%)	N (%) 103 (7.7%)	NS
Any Lifetime Hepatitis	N (%) 87 (9.2%)	N (%) 67 (1.3%)	<.001	N (%) 63 (13.9%)	N (%) 36 (2.7%)	<.001
HIV	N (%) 44(4.6%)	N (%) 99 (1.9%)	<.001	N (%) 7 (1.6%)	N (%) 17 (1.3%)	NS
Any STDs ^a	N (%) 181 (19.0%)	N (%) 436 (8.4%)	<.001	N (%) 72 (15.9%)	N (%) 64 (4.8%)	<.001
Past 30-day Opioid Use	N (%) 115 (12.1%)	N (%) 432 (8.3%)	<.001	N (%) 78 (17.2%)	N (%) 166 (12.4%)	.027
Past 30-day Cigarette Use	N (%) 671 (70.6%)	N (%) 2150 (41.4%)	<.001	N (%) 313 (69.1%)	N (%) 510 (38.1%)	<.001

Note.

^a = chlamydia, gonorrhea, herpes, syphilis

NS = non-significant

Table 2
Age-adjusted ORs Predicting Comorbidities of LT Cocaine Users among African-American and Caucasian HealthStreet Members, HealthStreet Gainesville, Florida and St. Louis, Missouri

African Americans (N = 6145)	Age-adjusted OR (95% CI)
Hypertension	1.15 (0.99, 1.34)
Type II Diabetes	0.77 (0.61, 0.99)
Arthritis	1.40 (1.19, 1.64)
Any LT Hepatitis	5.60 (4.02, 7.78)
HIV	2.50 (1.70, 3.67)
Back Pain	1.60 (1.27, 2.04)
Any STDs ^a	3.06 (2.49, 3.75)
Past 30-day Opioid Use	1.25 (0.99, 1.56)
Caucasians (N = 1791)	Age-adjusted OR (95% CI)
Hypertension	0.92 (0.71, 1.20)
Type II Diabetes	0.87 (0.56, 1.35)
Arthritis	1.38 (1.08, 1.76)
Any LT Hepatitis	6.46 (4.16, 10.04)
HIV	1.24 (0.51, 3.02)
Back Pain	1.65 (1.27, 2.16)
Any STDs ^a	3.74 (2.62, 5.34)
Past 30-day Opioid Use	1.46 (1.09, 1.96)

Note.

^a = Includes chlamydia, gonorrhea, herpes, and syphilis

Table 3
Adjusted Prevalence of Musculoskeletal Conditions (Back Pain/Arthritis) in Cocaine versus Non-cocaine Users (N = 7936)^a

	Caucasian LT Cocaine Users (N = 452)			
	Back Pain or Arthritis (N = 255)		No Back Pain or Arthritis (N = 197)	
	N (%)	N (%)	p-value	Adjusted OR
HIV/AIDS	4 (1.6%)	3 (1.5%)	NS	0.85 (0.18, 4.01)
Any Hepatitis	48 (18.8%)	15 (7.6%)	.003	2.09 (1.11, 3.96)
STDs ^b	43 (16.9%)	29 (14.7%)	NS	1.21 (0.71, 2.05)
Past 30-day Opioid Use	56 (22.0%)	22 (11.2%)	.003	2.50 (1.44, 4.35)
LT Illicit Substance Use ^c	232 (91.0%)	184 (93.4%)	.015	0.54 (0.24, 1.21)
	Caucasian Non-LT Cocaine Users (N = 1332)			
	Back Pain or Arthritis (N = 255)		No Back Pain or Arthritis (N = 197)	
	N (%)	N (%)	p-value	Adjusted OR
HIV/AIDS	7 (1.1%)	10 (1.4%)	NS	0.53 (0.20, 1.44)
Any Hepatitis	24 (3.8%)	12 (1.7%)	NS	1.61 (0.78, 3.32)
STDs ^b	44 (6.9%)	20 (2.9%)	.003	2.43 (1.39, 4.25)
Past 30-day Opioid Use	124 (19.5%)	42 (6.0%)	<.001	3.44 (2.35, 5.03)
LT Illicit Substance Use ^c	298 (46.9%)	288 (41.3%)	<.001	1.21 (0.96, 1.53)
	African-American LT Cocaine Users (N = 948)			
	Back Pain or Arthritis (N = 255)		No Back Pain or Arthritis (N = 197)	
	N (%)	N (%)	p-value	Adjusted OR
HIV/AIDS	27 (5.1%)	17 (4.0%)	NS	0.70 (0.70, 2.46)
Any Hepatitis	62 (11.8%)	25 (5.9%)	.006	1.80 (1.09, 2.99)
STDs ^b	113 (21.5%)	68 (16.1%)	NS	1.49 (1.06, 2.09)
Past 30-day Opioid Use	96 (18.3%)	19 (4.5%)	<.001	4.63 (2.76, 7.76)
LT Illicit Substance Use ^c	438 (83.4%)	325 (76.8%)	.019	1.50 (1.06, 2.13)
	African-American Non-LT Cocaine Users (N = 5177)			
	Back Pain or Arthritis (N = 255)		No Back Pain or Arthritis (N = 197)	
	N (%)	N (%)	p-value	Adjusted OR
HIV/AIDS	36 (1.9%)	63 (1.9%)	NS	0.97 (0.63, 1.49)
Any Hepatitis	45 (2.3%)	22 (0.7%)	<.001	2.29 (1.35, 3.91)
STDs ^b	207 (10.8%)	228 (7.0%)	<.001	1.95 (1.58, 2.40)
Past 30-day Opioid Use	280 (14.6%)	150 (4.6%)	<.001	3.24 (2.61, 4.02)
LT Illicit Substance Use ^c	807 (42.0%)	1234 (37.9%)	<.001	1.43 (1.26, 1.63)

Note.

^a = Adjusted for age and past 30-day cigarette use

^b = Includes chlamydia, gonorrhea, herpes, syphilis

^c = Includes club drugs, marijuana, heroin, speed/amphetamines, inhalants, and hallucinogens, and excludes cocaine use.

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