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A Latent Class Analysis of Alcohol and Drug Use Immediately Before or During Sex Among Women

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Abstract

Background: Alcohol and drug use by women is related to high-risk sexual practices and protective behaviors.

Objectives: To determine sexual risk and protective behaviors using information about women's drug use immediately before or during sex.

Methods: Latent class analysis using PROC LCA in SAS software was used to determine classes of women using both past 30-day drug use and before or during sex. Participants were recruited from a community-based research site located in a low socio-economic area of Los Angeles County and completed the Risk Behavior Assessment which elicits information on drug and sex risk behaviors.

Results: The Risk Behavior Assessment, and HIV and sexually transmitted infections testing was obtained on 812 women. Five distinct groups were identified by PROC LCA: An Abstinent group comprised of 26% of participants; an Alcohol and Marijuana group (16%); an Amphetamine group (11%); a No Sex-with-Alcohol group (37%); and a Poly Drug group (11%). Multinomial logistic regression revealed that sexual behaviors and condom use were different across the five groups: The Alcohol and Marijuana group had a higher odds of vaginal intercourse, while the No Sex-with-Alcohol group was most likely to use condoms for vaginal intercourse. The Poly Drug group had the highest risk for anal intercourse while the Amphetamine and Poly Drug groups had high proportions of women with injection-drug using and men-who-have-sex-with-men sexual partners.

Conclusion: Identifying women based on drug use immediately before or during sex can help providers understand prevention and risk-reduction practices and interventions for drug-using women.

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Keywords

women; drug use; STI and HIV risk in women; condom use; alcohol use

Background

Women's risk for human immunodeficiency virus (HIV) and sexually transmitted infections (STIs) has been associated with sexual behaviors, such as multiple sexual partners and unprotected vaginal and anal intercourse (VI, AI), partners who are known to be HIV-positive, as well as having an injection-drug-using (IDU) partner. In a recent study of STIs comparing men and women across the U.S., women accounted for more cases of *Chlamydia*, gonorrhea, herpes simplex-2 and *Trichomonas*, while men accounted for higher numbers of cases of HIV, hepatitis B (HBV) and syphilis (1); however women still accounted for 19% of HIV cases (2). Heterosexual anal intercourse has been associated with increased risk of STIs and was more prevalent among women who used drugs, especially stimulants such as amphetamine and crack cocaine (3–7). Multiple sexual partners conferred additional risk of HIV and STI acquisition, especially among ethnic minority women, as did concurrent sexual partners and partners recently released from incarceration (8–10).

While much is known about sexual and drug use risks in women, there is still much to be understood about drug use in the context of women's sexual partnerships. Previous research has delineated high-risk subgroups of women who use drugs in the context of sex trading or sexual partnerships. Specifically, an early study of sex-trading women and HIV found that women who only traded for money were more likely to use condoms (11) and research has focused on reasons for sex-trading (12, 13) or whether sex trading occurred before or after IDU initiation (14).

One study of women and IDU found that women often did not have control over obtaining, preparing or injecting drugs and were reliant on sexual partners to assist them (15). Having a sexual partner who was an IDU has often been why some women transitioned from non-injection to IDU (16–18). Other studies have shown that women make themselves vulnerable to sharing of injection equipment and disease when they are unable to inject themselves (19).

Several studies have used latent class analysis (LCA) to explore drug use patterns, especially in men-who-have-sex-with-men (MSM) (20, 21) as well as non-IDUs in South Africa (22). A recent study from California used both type of drug use and route of administration to construct latent classes (23). The strength of LCA as an analytical approach is that it is person-centered and can help to identify subgroups of women using multiple measures, for example, drug use behaviors especially before or during sex. Our study is similar to others that have used alcohol and drug use variables to partition individuals into distinct subgroups, and then used those groups to investigate risky and other sexual behavior outcomes (24–26)

The current study sought to investigate the following research questions: (1) can partitioning women's drug use profiles into multiple distinct drug use groups help us understand patterns of drug use immediately before or during sex among these groups? (2) how does this help us

understand risk reduction practices among the women? To address these questions, we utilized latent class analysis (LCA) and multinomial logistic regression to explore data from women that were collected as part of a 4-year National Institute on Drug Abuse (NIDA)—funded project of point-of-care (POC) rapid testing for HIV and STIs.

Methods

Sample

The sample consisted of women who participated in a structured interview session and received rapid and confirmatory laboratory testing for HIV and STIs. All participants were recruited through the testing programs at the Center for Behavioral Research and Services (CBRS) in Long Beach, California, following a protocol approved by the California State University, Long Beach (CSULB) Institutional Review Board (IRB). CBRS is located in a low socioeconomic area of the South Bay of Los Angeles County with the majority of individuals recruited being at high risk for both non-injection and IDU, sexually transmitted infections and HIV. The informed-consent process included an overview of the study, including what was expected of participants in terms of instruments, blood and oral specimen collection. After the study was explained, participants could ask questions about any aspect of the study. Participants signed the written informed consent form, and were provided with a copy for their records. No data or specimen collection was initiated until the participant had all her questions answered and signed the informed consent form.

All participants were assessed for eligibility using a screening form developed for the study and based on behavioral risk groups as stipulated by the Office of AIDS Programs & Policy (OAPP) of the Los Angeles County Department of Public Health (LACDPH). For women, behavioral-risk groups (BRGs) were defined as: (1) IDU with verified track marks (e.g., visible signs of injection) (27), and (2) women who reported at least two male partners in the last two years or engaging in AI, sex trading, or sex with a man who has sex with men (MSM), an IDU, or an HIV positive man. The prevalence and correlates of heterosexual anal intercourse in women have been previously reported (5, 6, 28) as has women's use of lubricants (29). All participants were at least 15 years of age at the time of informed consent.

STI Testing

HIV and STI testing were performed by nationally certified phlebotomists with training in HIV pre- and post-test counseling and HIV and STI rapid testing. STI testing included blood and urine specimens for syphilis (both rapid plasma reagin [RPR] and *Treponema pallidum* particle agglutination assay [TPPA]), gonorrhea, *Chlamydia trachomatis*, and hepatitis B and C, and HIV. These laboratory test results were used as distal outcomes in our analysis. Methods of recruitment and outcomes for HCV and syphilis have been previous reported (30, 31).

Measures

The behavioral assessments included the following:

Risk Behavior Assessment.—The Risk Behavior Assessment (RBA; 1993) was designed by grantees of the National Institute on Drug Abuse and is a structured interviewer-administered instrument which measures HIV risk factors such as sexual behavior (oral, vaginal, anal, and whether a condom or other barrier was used), gender of sexual partners, and sexual preference and gender self-identification of the participant; drug use in the 30 days prior to interview, and time spent in jail; as well as other HIV risks. The reliability and validity of the RBA has been extensively studied (32, 33).

Lubricant Trailer (LT).—The LT elicits information on a wide variety of sexual practices, including use and type of lubricants and condoms (29).

Behavioral Science Aspects of Rapid Test Acceptance (BSARTA) Screener.—The BSARTA Screener was specifically developed for this study and elicited information on risk factors identified by OAPP to distinguish women at sexual risk and included items on whether a sexual partner was known to have previously had sex with another man, and other items not captured by the RBA.

Drug Use Variables

A total of 15 variables from the RBA were used as input into the latent class analysis; seven of the variables elicited information on 30 day (past month) use of alcohol, marijuana, crack, powder cocaine, heroin, opiates other than heroin, and amphetamine. An additional seven variables elicited information on the use of these same seven drugs immediately before or during sex in the past month. An additional variable was created to designate abstinence from use of all drugs, including before or during sex. Inclusion of an abstinent group has been found to be of value in other research of drug-using women (34). All variables were coded dichotomously for use in PROC LCA (ever/never past month) such that any non-zero number of days in the past month was coded to ever (35).

Sexual behaviors, both those that used condoms and those that were condomless, were captured based on information elicited for the past 30-day period for VI, AI, and giving oral sex. Sexually transmitted infections and HIV positivity were assessed by laboratory test results based on blood specimens, and as noted previously were used as distal outcomes in analysis.

For purposes of constructing the latent class model, the drug use variables, monthly use and drugs used immediately before or during sex, were the inputs to the model. The outcomes appraised using the latent classes were the sexual behaviors and the blood test results for STIs.

Analytical Approach

Analyses were conducted using SAS 9.4 to determine latent classes using PROC LCA (35). We used a three-step approach that includes 1) fitting the LCA model; 2) assigning each participant to the latent class with the modal posterior probability for that individual; and 3) estimating the relationship between the assigned class membership and outcomes of interest. Variables, coded dichotomously, entered into PROC LCA and several possible numbers of

latent classes were explored, including two, three, four and five class models. Models were evaluated using the techniques proposed in Collins and Lanza (36) using the G-squared, Bayesian Information Criterion (BIC) and Akaike Information Criterion (AIC) fit statistics, with the final model chosen to reflect both the objective fit criteria as well as interpretability of the latent classes. We modeled distal outcomes of laboratory results and self-report of STIs with latent class membership (37–41) and used multinomial logistic regression was used to model sexual behaviors and condom use across the latent classes.

To test the assumption of local independence of the latent class groups, we used the methods of Dziak and Lanza (42); in PROC LCA the local independence assumption is treated as fundamental to the definition of the classes.

Results

Table 1 provides the characteristics of the women ($N=812$) on demographic, sex and drug use risks, as well as laboratory and self-report on a variety of STI tests. Five groups were identified by the latent class analysis of our sample (Table 2). Any variable with an item response probability greater than or equal to .50 is bolded in the table in accordance with recommendations (36). Fit statistics for the 2, 3, 4 and 5 group models can be found in Table 3.

Group 1:

The first group, identified as the Abstainers group accounted for 26% of participants and was characterized by no use of any drugs in the past 30 days and no use of any drug or alcohol before or during sex. Abstinence refers to drug abstinence not sexual abstinence.

Group 2:

Identified as the Amphetamine group, these women were characterized by a very high probability of use of amphetamine in the past 30 days as well as amphetamine use immediately before or during sex. There was also a $>.50$ probability of use of alcohol and marijuana in this group, which was 10% of respondents.

Group 3:

This group is identified as the Alcohol and Marijuana group, and was characterized by a very high probability of both alcohol and marijuana use in the past 30 days and a very high probability of use of both alcohol and marijuana before or during sex. No drugs other than alcohol and marijuana, either on a past 30-day basis or before or during sex had a $>.50$ probability of use in this group. Approximately 16% of the respondents were classified into this group.

Group 4:

This group is identified as the No Sex-with-Alcohol group and was characterized by a high probability of 30-day use of alcohol only and it was not used immediately before or during sex. This group was comprised of 37% of the respondents. The No Sex-with-Alcohol group engaged in sexual activity without drugs or alcohol, so was not sexually abstinent.

Group 5:

The final group is identified as the Poly Drug group and was characterized by $> .50$ probabilities of use all drugs (marijuana, crack, cocaine, heroin, other opiates, amphetamine) and alcohol in the past 30 days, as well as $> .50$ probabilities of also using alcohol and almost all drugs before or after sex. This group represented 11% of the sample.

Table 4 shows bivariate differences in demographic variables across the five groups. For example, women in the Alcohol and Marijuana and Poly Drug groups were more likely to be Black or African American and more likely to report their relationship status as partnered or married compared to the other groups. The Alcohol and Marijuana group was more likely to report living with children under the age of 18. All groups reported high proportions of homelessness, but the highest proportion at 81% was in the Poly Drug group. Differences among the groups were found on self-reported sexual preferences, with the Poly Drug group having the highest proportion of women identifying as bisexual; the Abstinent group was predominantly heterosexual.

With respect to self-reported STIs (“Has a health care provider ever told you that you have the following?”) the Poly Drug and Alcohol and Marijuana groups were most likely to report they had ever been told they had syphilis (12% and 18%, respectively), and both groups were also more likely to report they had been told they had gonorrhea. The Alcohol and Marijuana and No Sex-with-Alcohol groups were more likely to have a positive laboratory test result for hepatitis B (core AB). Results of laboratory tests (not self-report) indicated that the Poly Drug and No Sex-with-Alcohol groups had the highest prevalence of positive test results on the treponemal test for syphilis. The Poly Drug group had the highest proportion testing positive for HIV and also had the highest proportion of HIV+ sexual partners compared to the other groups. Two of the five groups had high proportions of women with positive test results for anti-hepatitis C; the highest prevalence was in the Poly Drug group at 21%, followed by the Amphetamine group at 20%. The Poly Drug group had the highest proportion of injection drug-using partners at 72%, followed by the Amphetamine group at 60%.

Table 5 display the results of the multinomial logistic regression analyses. There were distinct sexual and risk and protective behaviors evidenced among the groups. Compared to the Abstinent reference group only the Alcohol and Marijuana group had a significantly greater odds of VI, while the Poly Drug group was significantly less likely to reported engaging in VI. The No Sex-with-Alcohol group was at significantly increased odds of using condoms for VI. The Poly Drug group had a greater odds of reporting AI compared to the reference group and none of the groups was more or less likely to report using condoms for AI. The Amphetamine group was the only one significantly more likely to report giving oral sex to a male partner compared to the reference group.

Table 6 provides the probabilities of the distal outcomes of laboratory results and self-reported STIs across the latent classes for which sufficient power existed.

Discussion

This study explored profiles of drug use behaviors in the context of sexual risk and suggests that it may be useful to assess the drug use profiles of women using the type of drug use before or during sex. Women in the Abstinent group were more likely to live with children under the age of 18, and a majority of them report their marital status as single. Women with substance abuse issues who also have minor children have fears that children will be removed from their custody if their drug use becomes known or they present for drug treatment (43). The women in the Abstinent group may be limiting drug and alcohol use to ensure they do not face criminal justice system involvement that could lead to loss of their children. A large proportion of women in the Alcohol and Marijuana group also reported living with children under the age of 18; like the abstinent group they may be avoiding illicit drug use in order to reduce potential loss of their children. These two groups also had the lowest proportions of known IDU sexual partners and HIV + sexual partners.

The Amphetamine and Poly Drug groups were more likely to report having known HIV+ sexual partners and IDU sexual partners; both groups had high proportions with hepatitis C, however the Poly Drug group had the highest proportion of HIV+ respondents. The high HIV prevalence in the Poly Drug group may also explain the significantly lower odds for this group in reporting VI. The No Sex-with-Alcohol group also had a relatively high proportion of HIV+ women, at 4%. This group also had the highest proportion of anti-HBV positive test results. For the women in this group, HIV and hepatitis B are more likely to have been sexually transmitted. The women in this group appear to have learned this, as reflected in both the lack of any drug or alcohol use immediately before or during sex, as well as the greater odds for use of condoms for VI. Previous studies have noted HBV and HIV are primarily sexually transmitted in non-IDUs (44, 45).

All groups had fairly high proportions of respondents who reported ever trading sex for drugs or money, with the No Sex-with-Alcohol and Abstinent groups having the lowest proportions. The Poly Drug group was the only group with a high proportion (55%) reporting trading sex for money in the past month; 55% of this group also reported trading sex for drugs in the past month.

The multinomial logistic regression model findings demonstrate that the Poly Drug group, the group with the highest proportion of HIV+ sexual partners, had a significantly lower odds of VI compared to the reference group, and a significantly higher odds of AI. For the women in this group, unprotected VI may still be a significant source of HIV risk, and they may believe they are mitigating that risk by engaging in AI.

Previous studies have shown that women underestimate the risk of receptive AI because it is not hetero-normative behavior. It is not clear whether AI occurs as a sex trading activity or as a “special” behavior reserved for long-term partners, and both are possible for the women in our study (4). The Amphetamine and Poly Drug groups had high proportions of women who have known IDU sex partners, and known MSM partners. Disclosure of HIV serostatus has been found to be correlated with perceptions of social support, and HIV+ individuals often disclose selectively to some partners but not to others (46). HIV+ men are more likely

to disclose their status to primary partners with bisexual men being more willing to disclose to male partners than female partners (47). Information about their male partners may explain, in part, the low odds of VI and high odds of AI among the Poly Drug group and the increased odds of giving oral sex in the Amphetamine group.

Limitations

We did not have information on the type of sexual partner at the time drugs were consumed before or during sex. Having this information could have helped clarify the context of the sexual encounter given that there were high proportions of women in four of the five groups who reported ever trading sex for money or drugs. Information on marital status only partly accounts for sexual partners. Our study did not collect information on non-partnered sex, so the drug use before or during sex variables assume partnered sex, but this may not be the case. Our study did not address drug use and sexual behaviors over time, so we are not able to address potential changes in either type of behaviors. Because drug use variables were measured as of the past 30 days, it is possible that some of the women in the Abstinent or No Sex-with-Alcohol groups have previously been members of one of the other groups; this is possible because high proportions of women in all groups reported ever (lifetime) trading sex for money or drugs. The Abstinent, No Sex-with-Alcohol, and Alcohol and Marijuana groups should not be wrongly identified as women who have never been involved in the use of drugs other than alcohol and marijuana. Past 30-day use of marijuana, for purposes of this study, did not distinguish between illicit marijuana use and medical marijuana use. During the recruitment period, marijuana in California was available on a medical basis according to state law, though not yet legally approved for recreational use. Finally, condom use for VI and AI may not be the only protective sexual behaviors practiced by the sample. The study did not collect information on sexual practices of non-penetrative sex, such as mutual masturbation. We also do not know how the women knew that their partners were either HIV + or an MSM; it is possible that partners self-disclosed to the women, or that the women made assumptions based on other indirect information.

Conclusion

One of the strengths of this study was the investigation of drug use before/during sex variables to construct the latent classes. Women's combined use of alcohol and drugs before or during sex has an impact on their overall risks for HIV and STIs. Latent class analysis has been widely used in studies of substance use (48–50). One such study found that substance use with steady partners was associated with increased sexual risk behaviors (22), which is consistent with a theoretical framework in which alcohol or drug use leads to cognitive impairment, which in turn leads to disinhibition with respect to sexual behavior and/or inability to perform protective behaviors (51). While we cannot infer causation, the women in our study have high-risk steady partners (HIV+, IDU, sex with known MSM), but also show evidence that they may be attempting to moderate or reduce sexual risks. Interventions that incorporate information about drug use immediately before or during sex would be especially relevant to this group of high-risk women, especially within a skills-building context (52).

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Table 1.Characteristics of Women in Sample ($N = 812$)

Variable	<i>n</i> (%)	Mean (<i>SD</i>)
Ethnicity		
Black	406 (51)	
White	187 (23)	
Hispanic	135 (17)	
Other/mixed	73 (9)	
Education		
Less than high school	304 (37)	
High school	291 (36)	
Greater than H.S.	217 (27)	
Self-reported homelessness, Past 30 days	379 (47)	
Lives in own house, apt.	231 (29)	
Lives in other house, apt.	282 (35)	
Other living place, (hotel, shelter, streets)	283 (35)	
Income, past month		
Less than \$500	430 (54)	
\$501-\$999	266 (34)	
\$1000-\$1999	75 (9)	
>\$2000	23 (3)	
Marital status		
Single	464 (59)	
Married/partnered	209 (27)	
Other	114 (14)	
Sexual orientation		
Heterosexual	498 (63)	
Lesbian	32 (4)	
Bisexual	255 (33)	
Ever been told by health care provider you have (self-report):		
Hepatitis B	49 (6)	
Gonorrhea	208 (26)	
Syphilis	87 (11)	
Genital Warts	69 (9)	
Chlamydia	241 (30)	
Traded sex for money, ever lifetime	75 (63)	
Traded sex for drugs, ever lifetime	396 (49)	
Traded sex for drugs, past month	97 (12)	
Traded sex for money, past month	183 (23)	
Sex with MSM [*]	193 (25)	
Sex with known HIV+ partner	46 (7)	
HIV Risk Perception		

Variable	<i>n</i> (%)	Mean (<i>SD</i>)
0% (no chance)	235 (30)	
25% (some chance)	261 (35)	
50% (half chance)	123 (16)	
75% (high chance)	123 (16)	
100% (sure chance)	36 (5)	
Currently Pregnant?		
Yes	28 (4)	
Positive Laboratory test results		
HIV 1 serum	18 (2)	
HCV	121 (15)	
HBV (Core AB)	166 (20)	
Syphilis (non treponemal)	17 (2)	
Syphilis (treponemal)	100 (12)	
Sources of income **		
Paid job, salary	115 (14)	
Welfare, food stamps	367 (46)	
Social security/disability	183 (23)	
Spouse, friends, family	196 (25)	
Sell, trading goods, barter	65 (8)	
Ever injected any drug	143 (18)	
Ever in drug treatment, any modality	450 (56)	
Age, in years		38.4 (11.92)
Times injected any drug, last 30 days		4.13 (18.38)
# sex partners, last 30 days		3.38 (7.09)
# drug injector sex partners, last 30 days		1.06 (2.49)
Past 30-day drug use, # days used		
Alcohol		6.58 (9.39)
Marijuana		5.06 (9.87)
Crack		2.92 (7.47)
Cocaine		1.00 (4.32)
Heroin		0.92 (4.05)
Speedball (heroin + cocaine)		0.23 (1.55)
Opiates other than heroin		1.31 (4.89)
Amphetamines		2.74 (7.06)
Drug use before/during sex, times used past 30 days		
Alcohol		4.05 (9.28)
Marijuana		2.80 (10.04)
Crack		1.28 (6.21)
Cocaine		0.56 (3.04)
Heroin		0.76 (4.94)
Speedball (heroin + cocaine)		0.15 (1.45)
Opiates other than heroin		0.37 (3.05)

Variable	<i>n</i> (%)	Mean (<i>SD</i>)
Amphetamines		1.93 (7.73)

Note:

* *MSM* man-who-has-sex-with-men.

** Sums to greater than 100% as there can be more than one source of income.

Numbers may not sum to *N*=812 due to missing data.

Table 2.
Latent Class Model of Monthly Drug Use Immediately Before or During Sex for Women

	Latent Class			
	Abstainers	Alcohol and Marijuana	Amphetamine	No Sex-with-Alcohol Poly Drug Use
Latent class prevalence	.26	.16	.10	.37
<i>N</i>	210	125	75	315
<i>Item response probabilities</i>				
	<i>Probability of a "Yes" Response</i>			
Monthly alcohol use	.00	.83	.57	.84
Monthly marijuana use	.00	.98	.53	.29
Monthly crack use	.00	.16	.03	.31
Monthly cocaine use	.00	.04	.00	.01
Monthly heroin use	.00	.00	.05	.05
Monthly opiate use	.00	.06	.15	.07
Monthly amphetamine use	.00	.02	.99	.08
Alcohol with sex	.00	.70	.39	.46
Marijuana with sex	.00	.98	.22	.00
Crack with sex	.00	.09	.00	.12
Cocaine with sex	.00	.00	.01	.00
Heroin with sex	.00	.00	.02	.00
Other opiates with sex	.00	.00	.07	.00
Amphetamine with sex	.00	.00	.88	.00
Abstinent	.98	.00	.00	.00

Notes: Item response probabilities > .50 in bold to facilitate interpretation. The probability of a "No" response can be calculated by subtracting the item-response probabilities shown above from 1.00.

Table 3.

Comparison of fit statistics for baseline latent class analysis model conducted on community-recruited women ($N = 812$)

Number of latent classes	2	3	4	5
Log-likelihood	-4401.46	-3978.30	-3795.85	-3669.87
G-squared	3049.64	2203.33	1838.43	1586.47
AIC	3111.64	2297.33	1969.43	1744.47
BIC	3257.32	2518.21	2260.49	2115.73
CAIC	3288.32	2565.21	2323.49	2194.73
aBIC	3158.88	2368.96	2060.43	1864.86

Note: *AIC* Akaike information criterion, *BIC* Bayesian information criterion, *CAIC* consistent

AIC, *aBIC* adjusted BIC; for all fit statistics, smaller is better.

Table 4.Latent Class Membership and Demographic Characteristics of Women ($N = 812$)

	Abstainers <i>n</i> (%)	Amphetamine <i>n</i> (%)	Alcohol-Marijuana <i>n</i> (%)	No Sex-with-Alcohol <i>n</i> (%)	Poly Drug <i>p</i>
Race/ethnicity					
African American	93 (44)	15 (20)	68 (54)	179 (58)	51 (59)
White	63 (30)	35 (47)	31 (25)	45 (15)	13 (15)
Hispanic	38 (18)	17 (23)	20 (16)	48 (16)	12 (14)
Other	16 (7)	8 (11)	6 (5)	32 (11)	11 (13)
Marital Status					.0001
Single	141 (67)	35 (49)	69 (56)	177 (59)	42 (49)
Partnered	49 (23)	11 (15)	43 (35)	77 (26)	29 (34)
Other (divorced, widowed)	19 (9)	25 (35)	11 (9)	44 (15)	15 (17)
Currently living with children <18					.0001
No	145 (69)	66 (88)	80 (64)	239 (76)	74 (85)
Yes	65 (31)	9 (12)	45 (36)	76 (24)	13 (15)
Currently homeless					.0001
No	135 (65)	42 (56)	69 (56)	157 (52)	16 (19)
Yes	74 (35)	33 (44)	53 (44)	147 (48)	70 (81)
Education					.01
< High School	68 (32)	22 (29)	40 (32)	136 (43)	38 (44)
High School Graduate	75 (36)	27 (36)	50 (40)	116 (37)	23 (37)
>High School	67 (32)	26 (35)	35 (28)	63 (20)	26 (20)
Sexual Preference					.0001
Heterosexual	143 (70)	42 (56)	84 (68)	208 (70)	21 (24)
Lesbian	9 (5)	2 (3)	5 (4)	9 (3)	7 (8)
Bisexual	51 (25)	31 (41)	34 (28)	80 (27)	59 (68)
Self-reported Hepatitis B					.0001
No	205 (98)	74 (99)	118 (94)	270 (89)	85 (98)
Yes	5 (2)	1 (1)	7 (6)	34 (11)	2 (2)
Self-reported Gonorrhea					.0001

	Abstainers n(%)	Amphetamine n(%)	Alcohol-Marijuana n(%)	No Sex-with-Alcohol n(%)	Poly Drug p
No	165 (79)	63 (84)	76 (61)	238 (78)	51 (59)
Yes	44 (21)	12 (16)	49 (39)	67 (23)	36 (41)
Self-reported Syphilis					.0001
No	185 (88)	73 (97)	102 (82)	279 (92)	72 (88)
Yes	25 (12)	2 (3)	22 (18)	26 (8)	12 (12)
Used condoms for Vaginal Intercourse					.0067
No	187 (89)	67 (89)	83 (78)	229 (73)	80 (92)
Yes	23 (11)	8 (11)	23 (22)	86 (27)	7 (8)
Ever Anal Intercourse					.0001
No	184 (88)	58 (77)	103 (82)	279 (89)	73 (84)
Yes	26 (12)	17 (23)	22 (18)	36 (11)	14 (16)
Used condoms for Anal Intercourse					.07
No	207 (99)	75 (100)	119 (95)	303 (96)	85 (96)
Yes	3 (1)	0 (0)	6 (5)	12 (4)	2 (4)
Known drug injecting sexual partner					.15
No	166 (79)	34 (45)	102 (82)	270 (86)	17 (20)
Yes	44 (21)	41 (55)	23 (18)	45 (14)	70 (80)
Injected in past month					.0001
No	210 (100)	36 (48)	124 (99)	286 (91)	26 (30)
Yes	0 (0)	39 (52)	11 (1)	29 (9)	61 (70)
Known HIV+ Sexual Partner					.0001
No	200 (95)	70 (93)	121 (96)	298 (95)	77 (88)
Yes	10 (5)	5 (7)	4 (4)	17 (5)	10 (12)
Ever traded sex for drugs					.11
No	139 (66)	47 (63)	88 (70)	212 (69)	24 (28)
Yes	71 (34)	28 (37)	37 (30)	93 (31)	63 (72)
Ever traded sex for money					.0001
No	126 (60)	29 (39)	59 (47)	168 (55)	24 (28)
Yes	84 (40)	46 (61)	66 (53)	137 (45)	63 (72)
Sex for drugs past month					.0001

	Abstainers n(%)	Amphetamine n(%)	Alcohol-Marijuana n(%)	No Sex-with-Alcohol n(%)	Poly Drug p
No	208 (100)	63 (84)	112 (90)	277 (91)	36 (45)
Yes	0 (0)	12 (16)	13 (10)	28 (9)	44 (55)
Sex for money past month					
No	196 (95)	52 (70)	89 (71)	236 (78)	38 (45)
Yes	11 (5)	23 (30)	36 (29)	66 (22)	47 (55)
Sex with known MSM partner					
No	142 (74)	33 (63)	80 (82)	210 (75)	34 (48)
Yes	49 (26)	19 (37)	18 (18)	71 (25)	37 (52)
Laboratory Test Results					
HIV					
Negative	210 (100)	75 (100)	124 (99)	302 (96)	83 (95)
Positive	0 (0)	0 (0)	1 (1)	13 (4)	4 (5)
HBV (Core AB)					
Negative	191 (92)	69 (92)	92 (74)	219 (70)	73 (84)
Positive	17 (8)	6 (8)	33 (26)	96 (30)	14 (16)
HCV					
Negative	195 (93)	60 (80)	109 (89)	255 (81)	68 (78)
Positive	15 (7)	15 (20)	14 (11)	58 (19)	19 (21)
Syphilis (treponemal)					
Negative	191 (91)	73 (97)	117 (94)	258 (82)	73 (84)
Positive	19 (9)	2 (3)	8 (6)	57 (18)	14 (16)
Syphilis (nontreponemal)					
Negative	208 (99)	69 (97)	120 (96)	307 (97)	87 (100)
Positive	2 (1)	2 (3)	5 (4)	8 (3)	0

Note. All totals may not sum to 812 due to missing data.

Adjusted multinomial logistic regression of sexual risk and protective factors associated with latent class membership (reference category = Abstinence)

Table 5.

	Abstinent	Amphetamine		Alcohol-Marijuana		No Sex Alcohol		Poly Drug	
		OR	95%	OR	95%	OR	95%	OR	95%
Vaginal intercourse***	Ref.	1.34	.57, 3.13	2.48	1.22, 5.05	.89	.55, 1.44	.12	.05, .32
Condoms for VI***		.59	.23, 1.50	1.46	.75, 2.87	2.54	1.42, 4.55	1.11	.35, 3.47
Anal intercourse*		1.04	.49, 2.20	.68	.33, 1.40	.72	.37, 1.42	4.18	1.49, 11.75
Condoms for AI		.02	.0002, 16.9	1.49	.30, 7.40	.41	.08, 2.03	.40	.04, 3.82
Gave oral sex**		3.27	1.48, 7.25	1.69	.94, 3.02	.76	.45, 1.27	1.36	.48, 3.82
Condoms for oral sex***		116.5	.28, 47142	36.57	.09, 14113	255.7	.70, 93120	144.7	.34, 61198

Adjusted multinomial logistic regression of HIV and STI laboratory test results associated with latent class membership (reference category = Abstinent)

Table 6.

	Abstinent	Amphetamine		Alcohol-Marijuana		No Sex Alcohol		Poly Drugs	
		OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI
HIV	Ref.	1.19	.35, 3.98	2.04	.51, 8.08	.06	.0003, 16.27	.04	.001, 1.19
HCV		2.27	1.14, 4.51	.61	.28, 1.35	1.89	.85, 4.17	.60	.30, 1.18
Syphilis, treponemal		.72	.35, 1.45	.05	.01, .20	.05	.01, .30	.54	.28, 1.01
Syphilis, non treponemal		.12	.0003, 50.49	58.16	9.81, 344.7	23.17	2.82, 190.48	2.35	.42, 13.02
HBV ***		.25	.13, .50	.53	.29, .94	.08	.02, .23	.16	.08, .29

Significance tests based on 2*log-likelihood

* <.05

** <.01

*** <.001