

Longitudinal patterns of methamphetamine, amyl nitrite, and cocaine use among a cohort of men who have sex with men

Grant Colfax^{1,2}, Thomas J. Coates³, Marla J. Husnik⁴, Yijian Huang⁴, Susan Buchbinder¹, Beryl Koblin⁵, Margaret Chesney⁶, Eric Vittinghoff², and the EXPLORE study team.

¹San Francisco Department of Public Health, San Francisco, CA; ²University of California, San Francisco, CA; ³University of California, Los Angeles, CA; ⁴Statistical Center for HIV/AIDS Research and Prevention, Fred Hutchinson Cancer Research Center, Seattle, WA; ⁵New York Blood Center, New York, NY; ⁶National Center of Complementary and Alternative Medicine, Bethesda, MD

Background

- Among men who have sex with men (MSM), sexual risk behavior and HIV infection rates remain high (Katz 2002, Catania, 2001).
- Drug use among MSM, especially use of methamphetamines, poppers, and sniffed cocaine, has been associated with high-risk sexual behavior (Crosby 2000, Diaz 1996, Woody 1999, Stall 1990, Purcell 2001).
- Most studies examining the relationship between drug use and sexual risk behavior are cross-sectional and retrospective.
 - Few data on longitudinal patterns of drug use among MSM.
 - Few data on whether changes in drug use are associated with increased sexual risk.
 - Such an association would support the need for greater efforts to reduce drug use as a means of reducing sexual risk.
 - Few studies compare within-person behavior, and are subject to between-person variation.

Objectives

- To describe longitudinal patterns of drug use among a cohort of high-risk HIV-negative men who have sex with men (MSM).
 - Did drug use increase over time among the cohort?
 - What are the predictors of increasing drug use?
- To determine, with each participant serving as his own control, whether periods of drug use are associated with increased sexual risk behavior compared with periods of no drug use.
 - Is there a dose-response correlation between drug use and sexual risk?

Methods

- Study population:** San Francisco EXPLORE study participants enrolled 1/99-2/01.
 - Inclusion criteria: Male, HIV-negative, 16 years or older, reported anal sex with one or more men in the prior 12 months.
 - Excluded if in monogamous relationship for 2 or more years with known HIV-negative partner or tested HIV+ at screening.
 - Recruited through outreach on the street, in clubs, bars, bathhouses, sex clubs, and health clubs; through printed advertisements, community agencies, and clinics.
- Data collection**
 - Sexual risk and drug use data measured at enrollment and 6-month follow-up visits.
 - Collected using audio computer-assisted self-interview (ACASI).
 - Interview assessed behaviors with all HIV+, HIV-, and unknown status partners, and substance use over prior 6 months; depression measured semiannually using a shortened Center for Epidemiologic Studies Depression Scale (CES-D).
- Statistical Analysis**
 - Composite drug-use variable defined as any use of methamphetamine, poppers, or sniffed cocaine in the prior 6 months.
 - Change in drug use defined by the following categories: 0, no use; 1, no more than one drug < weekly; 2, no more than 2 drugs < weekly; 3, no more than 3 drugs < weekly; 4, no more than one drug at least weekly; 5, no more than two drugs at least weekly; 6, three drugs at least weekly.
 - Proportional odds model used to examine change in 0-6 drug score from one visit to next.
 - Conditional logistic regression used to determine influence of drug-use patterns on sexual risk behavior.
 - Each participant serves as his own control.

Results

- 736 participants enrolled in San Francisco.
- Median follow-up time 3.25 years.
- 88% of participants retained.
- Primary EXPLORE analysis demonstrated no statistically significant effect of the intervention compared with the control condition (Koblin, 2004).

Characteristics of San Francisco EXPLORE participants

Age	N (%)
16-25	96 (13%)
26-35	308 (42%)
36-45	231 (31%)
46+	101 (14%)
Race/ethnicity	
White, non-Latino	505 (69%)
Black, non-Latino	51 (7%)
Latino	115 (16%)
Other race/ethnicity	65 (9%)

Demographic characteristics of San Francisco EXPLORE participants

Education	N (%)
High school or less	54 (7%)
Some college	175 (24%)
College degree	271 (37%)
Post college	236 (32%)
Annual Household income (\$)	
<12,000	67 (9%)
12,000-29,999	162 (22%)
30,000-59,999	274 (37%)
60,000+	233 (32%)
Depressed	327 (45%)

Baseline sexual behavior of San Francisco EXPLORE participants

Number of sexual partners in prior 6 months	N (%)
0	9 (1%)
1	45 (6%)
2-5	196 (27%)
6-9	123 (17%)
10 or more	327 (45%)
Unprotected anal sex with HIV+ or unknown partner	353 (48%)

Baseline drug use among San Francisco EXPLORE participants

Popper use	N (%)
Never	463 (63%)
< 1 week	219 (30%)
Weekly or more	51 (7%)
Sniffed cocaine	
Never	590 (80%)
< 1 time/week	219 (18%)
Weekly or more	10 (1%)
Methamphetamines	
Never	463 (63%)
< 1 week	219 (30%)
Weekly or more	51 (7%)

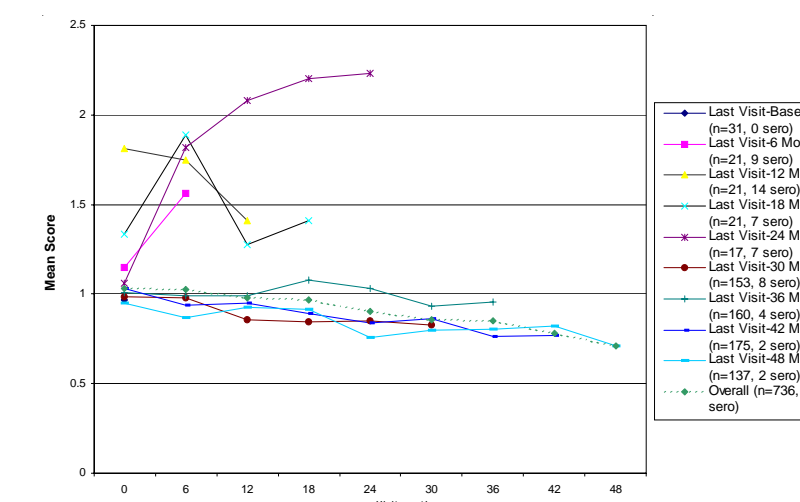
Longitudinal patterns of drug use

- Mean composite drug use score over completed visits = .99 (SD = 1.2, range 0-6).
- Mean absolute change in drug-use score from one visit to next = .47 (SD .57, range 0-4).
- Mean value of drug use score declined from 1 at baseline to .75 at 48-months follow-up.
- Sharp increases in drug-use scores among 38 men (5%) who were last seen at 6 or 24 month visit.
- No significant differences in mean number of drugs used by intervention vs. control arm.

Longitudinal patterns of drug use (cont'd.)

- Younger age independently predicted increase in composite drug score.
 - Compared to men >45 years, men 25 years or younger were more likely to report increased drug usage (OR 1.2, 95% CI 1.0-1.4, p = .05).

Figure: Mean drug use score (based on 0-6 score) of composite substance use variable for San Francisco EXPLORE participants, by last study visit, including participants terminated due to HIV seroconversion (sero)



Drug use as predictor of serodiscordant unprotected anal sex (SDUA), by conditional logistic regression analysis (n =386)

Composite drug score	Definition	OR for SDUA (95% CI)	P value
0	No drug use	Reference	
1	1 drug < weekly	1.5 (1.1-1.9)	.005
2	2 drugs < weekly	3.2 (2.2-4.7)	<.0001
3	3 drugs < weekly	2.8 (1.6-4.9)	.0002
4 or more	At least 1 drug weekly	2.2 (1.5-3.4)	.0002

Also adjusted for depression, which was not associated with SDUA (OR 1.2, 95% CI .95-1.5, p = .13)

Limitations

- Not population-based cohort.
 - Intervention study: all participants received HIV testing and counseling, which may have changed drug-use patterns.
 - Limited to San Francisco EXPLORE participants.
 - Did not include large numbers of heavy drug users.
- Self-reported substance use and sexual risk data.
 - Sexual risk and substance use may have been underreported.
- Temporal association between substance use and sexual risk does not necessarily imply causality.

Conclusions

- Overall, use of methamphetamine, poppers, and sniffed cocaine did not increase among EXPLORE participants over time.
 - Significant increases among persons <25 years of age.
- Within-person analysis demonstrates significant associations between periods of drug use and sexual risk behavior.
 - No evidence of dose-response for drug use scores above 2.
 - Suggest that to reduce and prevent HIV, no level of use of these drugs should be considered "safe."
- Findings reinforce the need for conducting trials to determine if reducing drug use among MSM results in corresponding reductions in HIV risk behavior.
 - Interventions should not be limited to heavy drug users.
 - Special need to target young MSM.

