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Short communication

Indicators of use of methamphetamine and other substances among men who have sex with men, San Francisco, 2003–2006

Jason Vaudrey [a], H. Fisher Raymond [a], Sanny Chen [a], Jennifer Hecht [b], Katherine Ahrens [a], Willi McFarland [a,*]

[a] San Francisco Department of Public Health, 25 Van Ness Avenue, Suite 500, San Francisco, CA 94102, USA
[b] The STOP AIDS Project, 2128 15th Street, San Francisco, CA 94114, USA

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Abstract

Background: Substance use has been associated with high-risk sexual behavior among men who have sex with men (MSM) both in the U.S. and around the world. Recent efforts by local organizations in San Francisco have specifically targeted methamphetamine use in this population.
Methods: We tracked methamphetamine and other substance use among men who have sex with men (MSM) in San Francisco from 2003 to 2006 using an indicator available in community outreach surveys of a prevention education program targeting MSM ($n = 4602$).
Results: Overall, use of diverse substances tended to decrease from 2003 to 2006, many significantly so. Reported use of methamphetamine significantly decreased among HIV-negative MSM. However, methamphetamine and alcohol use during sex was associated with unprotected potentially HIV serodiscordant sex.
Conclusion: Intensified prevention efforts to reduce methamphetamine use in San Francisco may be having some impact; however, strong associations of substance use and high-risk sex persist.

Keywords: Methamphetamine; HIV risk; Men who have sex with men; San Francisco

1. Introduction

The use of alcohol and illicit substances has been associated with high-risk sexual behavior in many populations, especially men who have sex with men worldwide (MSM) (Bautista et al., 2004; Centers for Disease Control and Prevention, 2005; Colfax et al., 2005; Folch et al., 2006; Hidaka et al., 2006; Stall et al., 2001). Methamphetamine use was associated with a recent increase in HIV prevalence among MSM in Bangkok, Thailand (Centers for Disease Control and Prevention, 2005). In a survey of MSM in six South American countries, HIV prevalence was highest among MSM in Bolivia (20.6%) and was associated with cocaine use (Bautista et al., 2004). Methamphetamine use in particular has been found to be associated with HIV seroconversion and is thought to account for a large proportion of infections among MSM in San Francisco (Colfax et al., 2005; Buchacz et al., 2005).

Recently intensified HIV prevention programs in San Francisco have targeted methamphetamine use among MSM. For example, specific programs were either intensified or launched in the last few years. The University of California, San Francisco began operating the Stimulant Treatment Outpatient Program (STOP) in Spring 1990 for individual and group counseling and the Stonewall Project launched in May 1998 and started providing an online resource (tweaker.org) in 2002 for MSM who use methamphetamine (University of California, San Francisco, 2005). The STOP AIDS Project's Crystal Clear started campaign and community forums in January 2005 (STOP AIDS Project, 2005). Moreover, the Mayor of San Francisco initiated the "Crystal Methamphetamine Task Force" in April 2005 operating several committees to address the issue (Office of the Mayor, 2005). The question arises as to whether these efforts are having an impact on methamphetamine use and its role in high-risk sexual behavior.

2. Methods

Beginning in the second half of 2003 through the first half of 2006, the STOP AIDS Project measured substance use in their community-based surveys of

* Corresponding author. Tel.: +1 415 554 9016; fax: +1 415 431 0353.
E-mail address: willi.mcfarland@sfdph.org (W. McFarland).

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MSM, including methamphetamine, ecstasy, Gamma hydroxy butyrate (GHB), Ketamine, heroin, marijuana, poppers, alcohol, cocaine, and crack use in the last 6 months. Street names for each drug were used when interviewers administered the survey to participants (for example, methamphetamine was asked as "crystal meth"). In addition, the survey asks whether methamphetamine, GHB, and alcohol were used "just before and during sex." As described elsewhere (Chen et al., 2002; Katz et al., 2002), the STOP AIDS Project conducts serial cross-sectional surveys of MSM in a variety of community venues in the course of health education outreach. The street-based intercept surveys ask questions about sexual behavior in the preceding 6 months. In this paper, we examine the temporal trends in substance use over the 3 year period from the second half of 2003 to the first half of 2006 using chi square test for trend. Because, questions were framed for the last 6 months, we examined trends in 6-month intervals. We also examine the association between reported substance use and "high-risk sex," defined as unprotected anal sex with a person of opposite or unknown HIV serostatus (i.e., unprotected potentially HIV serodiscordant anal sex). Finally, we also examined data on drug-related visits to the San Francisco General Hospital Emergency Department (San Francisco Department of Public Health, 2006) from 2004 to 2006 for comparison to the trends observed in the STOP AIDS Project data.

3. Results

During the study period, a total of 4602 surveys were completed by MSM. Table 1 shows the proportion of MSM by HIV serostatus reporting substance use by 6-month periods from 2003 to 2006. Overall, the use of methamphetamine was lower in early 2006 compared to late 2003. Methamphetamine use decreased among HIV-negative MSM, from 14.7 to 9.0% ($p < 0.01$) and methamphetamine use with sex, from 11.8 to 6.6% ($p < 0.01$). Among HIV-positive MSM, there was no significant decrease in methamphetamine use (from 28.0% in late 2003 to 19.9% in early 2006, $p = 0.20$) and methamphetamine use with sex (from 24.8% in late 2003 to 17.4% in early 2006, $p = 0.45$).

Use of most other substances decreased overall. For HIV-negative MSM, decreases were noted for use of GHB, GHB with sex, special K, heroin, and Viagra (all p-values < 0.05). The use of alcohol with sex among HIV-negative MSM also decreased from 62.2% in late 2003 to 52.9% in early 2006 ($p < 0.01$); however, the overall use of alcohol (with or without sex) remained high. The use of marijuana, poppers, cocaine, crack, and ecstasy showed no statistically significant temporal trends among HIV-negative MSM. Few trends in substance use were significant among HIV-positive MSM. One exception was ketamine, with use decreasing significantly from 8.0% in late 2003 to 2.6% in early 2006 ($p < 0.01$). Overall alcohol use among HIV-positive MSM remained level ($p = 0.32$), ending at 80.0% in early 2006.

From 2004 to 2006, drug-related visits to San Francisco General Hospital Emergency Department increased for marijuana,

Table 1
Trends in substance use among MSM by HIV serostatus, San Francisco, 2003–2006

HIV serostatus	Substance	2nd Half 2003	1st Half 2004	2nd Half 2004	1st Half 2005	2nd Half 2005	1st Half 2006	p-Value trend
HIV Negative								
Total N		764	647	649	468	531	855	
	Methamphetamine	112 (14.7)	87 (13.5)	76 (11.7)	42 (9.0)	45 (8.5)	77 (9.0)	<0.01
	Methamphetamine with sex	90 (11.8)	64 (9.9)	48 (7.4)	28 (6.0)	23 (4.3)	56 (6.6)	<0.01
	GHB	66 (8.6)	23 (3.6)	32 (4.9)	15 (3.2)	30 (5.7)	29 (3.4)	<0.01
	GHB with sex	51 (6.7)	15 (2.3)	15 (2.3)	10 (2.1)	17 (3.2)	20 (2.3)	<0.01
	Ketamine	43 (5.6)	12 (1.9)	24 (3.7)	11 (2.4)	23 (4.3)	17 (2.0)	0.01
	Heroin	8 (1.1)	3 (0.5)	1 (0.2)	2 (0.43)	1 (0.2)	2 (0.2)	0.03
	Marijuana	350 (45.8)	269 (41.6)	240 (37.0)	115 (37.4)	227 (42.8)	N/A	0.06
	Poppers	149 (19.5)	113 (17.5)	120 (18.5)	16 (14.7)	86 (16.2)	146 (17.1)	0.12
	Viagra	126 (16.5)	86 (13.3)	80 (12.3)	48 (10.3)	63 (11.9)	80 (9.4)	<0.01
	Alcohol	661 (86.5)	585 (90.4)	575 (88.6)	407 (87.0)	456 (85.9)	774 (90.5)	0.30
	Alcohol with sex	475 (62.2)	383 (59.2)	353 (54.4)	273 (58.3)	300 (56.5)	452 (52.9)	<0.01
	Cocaine	104 (13.6)	78 (12.1)	82 (12.6)	54 (11.5)	76 (14.3)	124 (14.5)	0.33
	Crack	11 (1.4)	9 (1.4)	7 (1.1)	2 (0.4)	3 (3.2)	8 (0.9)	0.14
	Ecstasy	135 (17.7)	74 (11.4)	90 (13.9)	49 (10.5)	85 (16.0)	104 (12.2)	0.22
HIV Positive								
Total N		125	100	106	74	87	196	
	Methamphetamine	35 (28.0)	17 (17.0)	21 (19.8)	14 (18.9)	15 (17.2)	39 (19.9)	0.20
	Methamphetamine with sex	31 (24.8)	11 (11.0)	15 (14.8)	11 (14.4)	14 (16.1)	34 (17.4)	0.45
	GHB	11 (8.8)	7 (7.0)	7 (6.6)	5 (6.8)	6 (6.9)	16 (8.2)	0.96
	GHB with sex	11 (8.8)	6 (6.0)	6 (5.7)	6 (8.1)	4 (4.6)	12 (6.1)	0.42
	Ketamine	10 (8.0)	4 (4.0)	9 (8.5)	1 (1.4)	1 (1.2)	5 (2.6)	0.01
	Heroin	1 (0.8)	1 (1.0)	0 (0.0)	1 (1.4)	1 (1.2)	0 (0.0)	0.46
	Marijuana	57 (45.6)	47 (47.0)	60 (56.6)	37 (50.0)	48 (55.2)	N/A	0.13
	Poppers	40 (32.0)	23 (23.0)	35 (33.0)	22 (29.7)	36 (41.4)	49 (25.0)	0.76
	Viagra	46 (36.8)	21 (21.0)	27 (25.5)	20 (27.0)	24 (24.1)	51 (26.0)	0.18
	Alcohol	97 (77.6)	73 (73.0)	76 (71.7)	58 (78.4)	67 (77.0)	156 (80.0)	0.32
	Alcohol with sex	49 (39.2)	38 (38.0)	44 (41.5)	32 (43.2)	44 (50.1)	77 (39.3)	0.55
	Cocaine	16 (12.8)	14 (14.0)	10 (9.4)	8 (10.8)	13 (14.9)	24 (12.2)	1.00
	Crack	2 (1.6)	1 (1.0)	3 (2.8)	2 (2.7)	2 (2.3)	3 (1.5)	0.90
	Ecstasy	13 (10.4)	12 (12.0)	19 (17.9)	9 (12.2)	16 (18.4)	20 (10.2)	0.99

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alcohol, cocaine, and ecstasy. Methamphetamine showed a slight decrease from the first half of 2004 (371 ED mentions) through the first half of 2006 (299 ED mentions; $p = 0.112$).

High-risk sex (i.e., unprotected potentially HIV serodiscordant sex) was reported by 9.7% of HIV-negative MSM and 24.9% of HIV-positive MSM overall ($p < 0.01$). Among HIV-negative MSM, 19.3% who used methamphetamine during sex also reported high-risk sex compared to 6.7% who did not use methamphetamine during sex ($p < 0.01$). Of HIV-positive MSM, 24.5% who used methamphetamine during sex also reported high-risk sex compared to 14.3% of those who did not use methamphetamine during sex ($p < 0.01$). With respect to alcohol use, 62.8% of HIV-negative MSM who used alcohol during sex had high-risk sex compared to 56.5% of those who did not use alcohol during sex ($p = 0.02$). High-risk sex was reported by 47.4% of HIV-positive MSM who used alcohol during sex compared to 39.3% of those who did not use alcohol during sex (borderline difference, $p = 0.06$). Among HIV-positive MSM, high-risk sex was also associated with overall use of methamphetamine ($p < 0.01$), cocaine ($p < 0.01$), and poppers ($p < 0.01$).

4. Discussion

Our study should be interpreted in the context of needing on-going, consistently collected indicator data to track trends in drug use in high-risk populations over time. The STOP AIDS Project data present an opportunity to track the use of several substances and their relation to sexual risk among MSM. While our study is not definitive in answering a specific research questions on methamphetamine or other substance use, it does provide a consistent indicator to track progress in a timely manner and signal potential changes over time.

Data from these community outreach surveys are suggestive of a downward trend in the use of several drugs among MSM in San Francisco in recent years. Significant downward trends are observed with methamphetamine, GHB, ketamine, heroin, and Viagra among HIV-negative men. The downward trend of methamphetamine use among HIV-negative MSM is particularly noteworthy given the attention that has focused on this issue over the last few years. This finding appears to be partially corroborated by SFGH ED mentions, but does warrant verification through independent and rigorous studies. Of note, methamphetamine use is still associated with high-risk sexual behavior and we did not observe a significant trend in use among HIV-positive MSM.

We recognize the major limitation that our data cannot directly link the launch of specific programs or the intensification of specific activities to the observed trends. In particular, the launch of several programs precedes the study period. The study was not specifically designed as an evaluation of the impact of any particular program or even of the aggregate impact. Moreover, exposure to specific programs was not asked. Other limitations of the STOP AIDS Project data have been previously described (Chen et al., 2002; Katz et al., 2002). The sample is by convenience, data are collected in the course of prevention activities, and persons may be included more than once without the ability to un-duplicate respondents. It is possible that the decreasing trend in methamphetamine use is the result of increasing stigma and unwillingness to divulge this information due to the recent increased attention on the issue. It is also possible that the trends observed might have resulted from fewer risk- and drug-taking men attending the sampling venues, or shifts in the sampling venues over the study period. However, we did not find evidence of the latter bias.

Nonetheless, trends in the STOP AIDS Project data have been corroborated in the past by parallel trends in sexually transmitted diseases, HIV incidence, and other behavioral surveys (Chen et al., 2002; Katz et al., 2002). The STOP AIDS Project risk behavioral data, for example, was the first indication of a rise in HIV risk behavior among MSM in the mid-1990s. Moreover, the data includes a large sample of MSM recruited in diverse settings, with data collected in a consistent manner from year to year. A major limitation in other behavioral research surveys is they are not repeated on a frequent enough basis to track trends over time. Largely for this reason, the California State Office of AIDS uses the STOP AIDS Project data as one of 32 HIV prevention indicators (Universitywide AIDS Research Program, 2005).

While our data do not prove that the intensified prevention efforts are causing a decrease in methamphetamine use, they are encouraging and merit confirmation in other data. Unfortunately, our data also show that strong associations of substance use and high-risk sex persist and we find no statistical evidence of a decrease in methamphetamine use in HIV-positive MSM. The high use of alcohol may also be under-appreciated, particularly in light of its high overall level and its association with serodiscordant unprotected anal sex. Therefore, the results reported here should be no cause for complacency.

References

Bautista, C.T., Sanchez, J.L., Montano, S.M., Laguna-Torres, V.A., Lama, J.R., Sanchez, J.L., Kusunoki, L., Manrique, H., Acosta, J., Montoya, O., Tambare, A.M., Avila, M.M., Vinoles, J., Aguayo, N., Olson, J.G., Carr, J.K., 2004. Seroprevalence of and risk factors for HIV-1 infection among South American men who have sex with men. Sex Transm. Infect. 80, 498–504.

Buchacz, K., McFarland, W., Kellogg, T., Loeb, L., Holmberg, S.D., Dilley, J., Klausner, J., 2005. Amphetamine use is associated with increased HIV incidence among men who have sex with men (MSM) in San Francisco. AIDS 19, 1423–1424.

California HIV Prevention Indicators, 2005. Universitywide AIDS Research Program, 3rd ed., Oakland, CA, USA.

Centers for Disease Control and Prevention, 2005. HIV prevalence among populations of men who have sex with men—Thailand, 2003 and 2005. MMWR 55, 844–848.

Chen, S.Y., Gibson, S., Katz, M.H., Klausner, J.D., Dilley, J., Schwarcz, S.K., Kellogg, T.A., McFarland, W., 2002. Continuing increases in sexual risk behavior and sexually transmitted diseases among men who have sex with men, San Francisco, 1999–2001. Am. J. Public Health 92, 1387–1388.

Colfax, G., Coates, T.J., Husnik, M.J., Huang, Y., Buchbinder, S., Koblin, B., Chesney, M., Vittinghoff, E., the EXPLORE Study Team, 2005. Longitudinal patterns of methamphetamine, popper (amyl nitrite), and cocaine use and high-risk sexual behavior among a cohort of San Francisco men who have sex with men. J. Urban Health 82, i62–i70.

Folch, C., Marks, G., Esteve, A., Zaragoza, K., Munoz, R., Casabona, J., 2006. Factors associated with unprotected sexual intercourse with steady male, casual male, and female partners among men who have sex with men in Barcelona, Spain. AIDS Educ. Prev. 18, 227–242.

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Hidaka, Y., Ichikawa, S., Koyano, J., Urao, M., Uasuo, T., Kimura, H., Ono-Kihara, M., Kihara, M., 2006. Substance use and sexual behaviours of Japanese men who have sex with men: a nationwide internet survey conducted in Japan. BMC Public Health 6, 239–247.

HIV stops with me. Stimulant Treatment Outpatient Program Screenings. University of California, San Francisco, Available at: http://www.hivstopswithme.org/calendar.aspx%3Ft=EN%26l=sanfrancisco (accessed on 13.12.05).

Katz, M.H., Schwarcz, S.K., Kellogg, T.A., Klausner, J., Dilley, J.W., Gibson, S., McFarland, W., 2002. Impact of highly active antiretroviral treatment on HIV seroincidence among men who have sex with men in San Francisco. Am. J. Public Health 92, 388–394.

San Francisco Department of Public Health, 2006. Drug Abuse Warning Network (DAWN), San Francisco General Hospital.

SFGov: Office of the mayor: Crystal meth task force, 2005. City and County of San Francisco. San Francisco, California, Available at: http://www.ci.sf.ca.us/site/mayor_page.asp%3Fid=31477 (accessed on 13.12.05).

Shining a light on HIV: Crystal Clear, 2005 Stop AIDS Project, Available at: http://www.stopaids.org/programs/crystalclearsf/index.html (accessed on 13.12.05).

Stall, R., Paul, J.P., Greenwood, G., Pollack, L.M., Bein, E., Crosby, G.M., Mills, T.C., Binson, D., Coates, T.J., Catania, J.A., 2001. Alcohol use, drug use and alcohol-related problems among men who have sex with men: the urban men's health study. Addiction 96, 1589–1601.

Welcome to Tweaker.org, 2005. University of California, San Francisco—Stonewall Project. San Francisco, California, Available at: http://www.tweaker.org/html/home.html (accessed on 13.12.05).

Please cite this article in press as: Vaudrey, J. et al., Indicators of use of methamphetamine and other substances among men who have sex with men, San Francisco, 2003–2006, Drug Alcohol Dependence (2007), doi:10.1016/j.drugalcdep.2007.02.020