

Associations between Crystal Methamphetamine Use and Potentially Unsafe Sexual Activity among Gay Men in Australia

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Received: 23 November 2004 / Revised: 4 April 2007 / Accepted: 4 April 2007 / Published online: 10 August 2007
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Abstract It has been suggested that crystal methamphetamine may have disinhibiting or aphrodisiac effects, which may lead to unsafe sexual behavior and increase the risk of HIV transmission. Using data from two Australian studies, the Sydney Gay Community Periodic Survey study and the Positive Health (PH) cohort study, we examined changes over time in use of crystal, other recreational drugs, and Viagra, and in a range of sex-related behaviors. Compared to non-users, crystal users reported having more sex partners, looking for sex in more types of venues, and being more likely to engage in unprotected anal intercourse with casual partners (UAIC) and in esoteric sex. Crystal users were also more likely to be using other recreational drugs and Viagra than non-users. Crystal use remained significantly associated with UAIC after adjustment for other relevant variables in a log-binomial regression analysis (adjusted prevalence rate ratio = 1.26; 95% CI: 1.19–1.34). The other variables (HIV status, number of sex partners, number of types of venue where men looked for sex, Viagra use, other drug use) were independently associated with UAIC, and did not show confounding or mediating effects on the crystal–UAIC association. Nevertheless, these data did not allow reliable attribution of higher levels of these sex-related behaviors among crystal users specifically to the effects of crystal. The prevalence of crystal use among Australian men who have sex with men (MSM) increased between 2002 and 2005 (e.g., from 26% to 39% among HIV+ MSM). However, the prevalence of UAIC remained stable or decreased over time in

various study subgroups, as did the prevalence of other sex-related behaviors, suggesting that crystal use does not necessarily drive unsafe sexual behavior. Crystal use and unsafe sexual behavior can, and should, be considered and addressed separately in health promotion and community education campaigns.

Keywords Methamphetamine · Crystal · HIV · Unsafe sex

Introduction

“Crystal” methamphetamine is a synthetic central nervous stimulant drug which can enhance the pleasure involved in many activities, increase energy and endurance, increase alertness, help a person to stay awake for long periods of time, and can produce a euphoric effect that is sustained for many hours. Recent surveys of the general community have recorded low prevalence of crystal use by adults: 0.6% in the U.S. (Substance Abuse and Mental Health Services Administration, 2005), 0.9% in New Zealand (Wilkins, Pledger, Bhatta, & Casswell, 2004), and 1.2% in Australia (Australian Institute of Health and Welfare, 2005). However, there is increasing concern in many countries about the increasing rates of recreational crystal use among gay men.

Crystal is commonly believed to have “disinhibiting” effects, particularly with regard to sexual activity, sexual risk-taking, and adventurous sexual practices that may carry risk of HIV transmission, such as those that involve blood. Semple, Patterson, and Grant (2004) found that 86% of HIV-heterosexual crystal users who participated in a sexual risk reduction intervention reported having engaged in marathon sex while using crystal. Several studies have

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found statistically significant associations between crystal use and risky sexual behavior in community samples. Farabee, Prendergast, and Cartier (2002) surveyed 807 prison inmates and found that those who had been using crystal prior to being jailed were more likely to report having had unprotected sex with a casual partner and unprotected sex with an injecting drug user. Bogart et al. (2005) studied 698 injecting drug users and found that those who injected amphetamines were less likely to consistently use condoms. Wohl et al. (2002) carried out a case-control study of HIV-infected and uninfected heterosexual males and found that a history of injecting crystal was associated with HIV infection.

In contrast to the relatively low rates of crystal use in the general population, surveys of men who have sex with men (MSM) have recorded markedly higher prevalence: 6% in a national online survey in the U.S. (Hirshfield, Remien, Humberstone, Walavalkar, & Chiasson, 2004) and 10–16% among samples recruited in gay community venues and clinics (Fernandez et al., 2005; Hull et al., 2004, 2005; Purcell, Moss, Remien, Woods, & Parsons, 2005). Van de Ven, Rawstorne, Crawford, and Kippax (2002) reported an increasing incidence among Australian gay men of using crystal to enhance sexual pleasure and a concurrent increase in unprotected anal intercourse with casual partners (UAIC). These increases, which have also been observed in other jurisdictions, have prompted research regarding the possible association between crystal use and unsafe sexual behavior and thereby with transmission of HIV. Semple, Patterson, and Grant (2002) interviewed 25 HIV+ MSM and found that 84% reported engaging in high risk sexual behavior, such as unprotected anal sex or sex with anonymous partners, when using crystal. Several large surveys of MSM have found that crystal users were more likely than non-users to engage in unsafe sexual activities that carried a risk of transmitting HIV (e.g., Hirshfield et al., 2004; Morin et al., 2005; Urbina & Jones, 2004).

Indeed, there has been an increase in the annual number of new HIV diagnoses among gay men in several countries over the past few years. Annual incidence rates of new HIV diagnosis among gay men in the U.S. were stable from 2001 to 2003, but increased 8% in 2004 (Centers for Disease Control, 2006); in Britain, there has been a small but steady increase in HIV diagnoses among gay men since 1999 (Macdonald et al., 2004); in New Zealand, there has been an upward trend in new diagnoses among MSM since 2000 (Johnston, Fernando, & MacBride-Stewart, 2005); sero-surveillance in Australia has indicated a recent increase in the incidence of newly-acquired HIV infection amongst MSM (National Centre in HIV Epidemiological and Clinical Research, 2004).

In this article, we report recent Australian data regarding crystal use, unsafe sexual behavior, and the association

between them, using data from two ongoing studies of gay men: the repeated cross-sectional Sydney Gay Community Periodic Survey (SGCPS) and the prospective longitudinal cohort Positive Health (PH) study of HIV+ gay men. Specifically, we report data regarding whether crystal-using MSM engage in more sex, more adventurous sex, have more sexual partners, more unsafe sex, and look for sex in more types of locations, and whether changes in crystal use over time have been accompanied by similar changes in potentially unsafe sexual behavior.

Method

Participants

Data extracted from two studies are presented in this article: the SGCPS and the PH study. For this article, SGCPS data from 7,354 men who were recruited in 2002–2005 were analyzed. In the 2005 sample, the median age of men in the study, 95% of whom identified as gay or homosexual, was 36 years, with 65% aged under 40 years. The majority of participants were employed (75% full-time, 10% part-time) and 55% held a university degree. Most participants lived in metropolitan Sydney (82%) or elsewhere in the state of New South Wales (5%), but 13% were visitors to Sydney. PH data from 448 participants who contributed 804 observations in 2002–2005 were used in the analyses reported in this article. The median age of PH participants was 43, 44, and 46 years in 2002–2003, 2004, and 2005, respectively. In the 2005 sample, 27% of participants were aged less than 40 years, most were employed (54% full-time, 25% part-time), 41% held a university degree, and their median time since being diagnosed with HIV was 14 years (range, 1–24 years).

Measures and Procedure

Both the SGCPS and the PH study were approved by the University of New South Wales Human Research Ethics Committee. The SGCPS started in 1996 and is a twice-yearly, cross-sectional survey of MSM who are recruited at a range of sites in Sydney, including gay social venues, gay sex-on-premises venues, gay men's health clinics, and the Annual Gay and Lesbian Mardi Gras Fair Day (Van de Ven, Prestage, French, Knox, & Kippax, 1998). The SGCPS uses a self-administered questionnaire to collect data regarding sexual behaviors, unprotected anal intercourse (UAI), HIV status, recreational drug use, and demographic characteristics. Recruiters visit the venues at scheduled times and invite each person who arrives to participate; participation rates in 2002–2005 were 67, 67, 72, and 76%, respectively. It is possible that some individuals participated on more than one

of the cross-sectional survey occasions. PH is an open longitudinal cohort of gay-identified, HIV+ MSM which started in 1999. PH enrolls people who volunteer through HIV+ organisations and events, general gay community organisations and events, HIV treatment clinics, advertisements, websites, and word-of-mouth in urban and rural locations in New South Wales and Victoria (two Australian states). Participants completed annual interviewer-administered questionnaires which collected information about their knowledge of HIV/AIDS treatments, treatment uptake and cessation, difficulties with adherence to treatment drug regimens, treatment side effects, and sexual practices (Rawstone et al., 2005). It was not possible to specify a participation rate for PH; however, the participant retention rates ranged from 75% to 79% for the interview phases between 2002 and 2005.

Data Analysis

Data from the SGCPs and PH studies were used to examine the associations between use of drugs (Viagra, crystal, other illicit drugs) and sex-related behavior (UAI, number of sex partners, engaging in adventurous/esoteric sex, number of types of venues where men looked for sex). We also compared behaviors of HIV+ versus HIV– men.

UAIC (No versus Yes) as a marker of potentially unsafe sex was based on reported occurrence of any such activity in the past 6 months in SGCPs and was based on the reported number of episodes in the PH study (the relevant questions that were asked in the two surveys were different). Participants' level of sexual activity was measured in terms of their number of sex partners (less than 10 vs. 10 or more in a 6-month period; the dichotomy was based on the distribution of the variable). SGCPs collected information about the total number of casual and regular partners, whereas the PH cohort reported specifically on their numbers of casual partners.

The SGCPs also collected data regarding use of drugs other than crystal, including marijuana, ecstasy, amyl nitrite ("poppers"), ketamine ("special K"), cocaine, GHB, and Viagra. The variable "other drug use" (No versus Yes) indicated use of any of those drugs apart from crystal or Viagra. Recent studies have indicated an increasing trend in concurrent use of crystal and Viagra, and have suggested a possibility that both drugs may be involved in the increasing HIV incidence (Elford, 2006; Purcell et al., 2005), so we constructed a separate binary variable for Viagra use (No versus Yes). Finally, SGCPs participants' self-reported serostatus (HIV+ versus HIV–) was used to compare the behaviors of those two participant subgroups.

The concept of gay adventurous sex was suggested by Kalichman, Heckman, and Kelly (1996), and its association

with UAIC and seroconversion was reported in Australian studies of gay men (Kippax et al., 1998). Using PH data, a variable with three categories (0, 1–2, and 3 or more relevant types of sexual activity) was created, based on that variable's distribution, to summarize the number of the following activities that men had engaged in with casual sex partners during the previous 6 months: fisting (receiving, giving), use of toys/dildos (receiving, giving), engaging in sadomasochistic activities (with blood, without blood), engaging in "water sports," and engaging in group sex (with men only, with both men and women). The number of types of venues where men reported looking for sex may be also indicative of their sexual adventurousism. Thus, we summarized the number of types of different venues where men reported looking for sex (including venues such as social functions for HIV+ men, dance parties, gay community scenes, gay non-scenes, leather, bear, drug, gym, trainee/drag and other scenes, sexual venues, and internet chat rooms) and generated a binary variable (0–1 vs. 2 or more venues).

We examined trends over time (i.e., study years) in crystal use, other drug use, UAIC, and other sex-related behaviors in the 6 months prior to each interview, analyzed separately by study and HIV status of participants. We also examined differences between crystal users versus non-users in terms of sexual behavior and other drug use in each study year. Associations between pairs of binary variables were assessed with χ^2 tests, and trends over time were assessed with χ^2 tests for linear trend. We examined the association between crystal use (No versus Yes) and UAIC (None versus Any) among SGCPs participants using multivariate log-binomial regression and estimated prevalence rate ratios (PRRs). The effects of variables measuring behaviors such as number of partners, number of venues where men looked for sex, Viagra use, other drug use, and self-reported HIV status on the relationship between crystal use and UAIC were examined in bivariate analyses and in multivariate regression models. All significance testing was carried out on a two-tailed, decision-wise basis with alpha level of .05.

Results

Table 1 shows that crystal use among MSM increased significantly from 2002 to 2005, among both HIV+ men ($\chi^2 = 4.19, p < .001$), and HIV– men ($\chi^2 = 6.25, p < .001$) in the SGCPs, and among participants in the PH study ($\chi^2 = 4.62, p < .001$). In contrast, as shown in Table 2, there was a marginally significant downward trend in UAIC prevalence over time among SGCPs HIV– participants ($\chi^2 = -1.94, p = .05$), and no significant change over time among the other two participant groups.

Table 1 Prevalence (%) of any crystal use in the 6 months prior to interview, by survey year, study, and HIV status

	2002		2003		2004		2005		χ^2 value for linear trend across years
	Non-users N (%)	Users N (%)	Non-users N (%)	Users N (%)	Non-users N (%)	Users N (%)	Non-users N (%)	Users N (%)	
	SGCPS HIV+ men	236 (73.8%)	84 (26.2%)	184 (70.0%)	79 (30.0%)	158 (55.8%)	125 (44.2%)	197 (61.4%)	
SGCPS HIV- men	1239 (86.4%)	195 (13.6%)	1007 (81.7%)	225 (18.3%)	1007 (76.3%)	313 (23.7%)	1169 (77.8%)	334 (22.2%)	6.25***
PH HIV+ men ^a			293 (84.9%)	52 (15.1%)	175 (74.5%)	60 (25.5%)	154 (68.8%)	70 (31.3%)	4.62***

*** $p < .001$ ^a The data shown for PH HIV+ men in 2003 were collected in 2002–2003

Table 3 shows that there was a significant association between crystal use and UAIC prevalence in the SGCPs; 47–54% of crystal users reported having engaged in UAIC in each of the four study years compared with 28–33% of non-users (all $ps < .001$). Table 4 shows PH data regarding the relationship between crystal use and the number of casual sex partners, the number of different types of venues where men looked for sex partners, and the extent to which HIV+ men engaged in esoteric sex. There was a non-significant decrease across survey years in crystal users' having had 10 or more casual sex partners, and a significant increase over time in the prevalence of non-users having had 10 or more partners. Crystal users were significantly more likely than non-users to have had 10 or more partners in 2002–2003, but the differences were no longer significant in 2004 or 2005. There were significant associations in all three PH study years, between crystal use and both the number of different types of venues where men looked for sex partners and the number of different types of esoteric sex that men engaged in; the prevalence of high levels of both variables among crystal users was 1.6–2.6 times the prevalence among non-users (all $ps < .01$). The trends across time in both variables among both participant groups were non-significant, except that the prevalence among crystal users of having looked for sex in two or more types of venues decreased significantly over time ($p < .05$).

Table 5 shows the prevalence during each of 2002 to 2005 of five behavioral variables among HIV+ and HIV- men in the SGCPs who reported either using or not using crystal. The five variables were: having had more than 10 regular or casual partners, use of Viagra, use of other drugs, having looked for sex in three or more different types of venues, and having had any UAIC in the previous 6 months. In 36 of the 38 comparisons between groups, a larger proportion of crystal users than of non-users reported having engaged in the investigated behaviors; two-thirds of the 38 comparisons were significant at $p < .001$. Examination of behavioral trends over time showed that, among HIV+ participants, Viagra use increased significantly among crystal non-users, and the prevalence of having had 10 or more sex partners decreased significantly among both crystal users and non-users. Among HIV- participants, the prevalence of Viagra use and other drug use increased significantly over time among crystal users, and the prevalence of other drug use and of UAIC decreased significantly among crystal non-users. All of the other trends were not statistically significant.

A multivariate regression analysis was conducted in order to examine the possibility that other behaviors may have influenced the relationship between crystal use and UAIC (Table 6). The regression model was constructed using data from the SGCPs and included six variables: crystal use, Viagra use, other drug use (excluding Viagra), number of sex partners, number of different types of venues where men

Table 2 Prevalence (%) of any unprotected anal intercourse with casual partners (UAIC) in the 6 months prior to interview, by survey year, study, and HIV status

	2002 <i>N</i> (%)	2003 <i>N</i> (%)	2004 <i>N</i> (%)	2005 <i>N</i> (%)	χ^2 value for linear trend across years
SGCPS HIV+ men	320 (63.1%)	263 (61.6%)	283 (60.8%)	321 (59.2%)	-1.04
SGCPS HIV- men	1,434 (31.4%)	1,232 (30.1%)	1,320 (30.4%)	1,503 (27.7%)	-1.94*
PH HIV+ men ^a		345 (68.7%)	235 (49.8%)	224 (62.9%)	-1.88

* $p = .05$ ^a The data shown for PH HIV+ men in 2003 were collected in 2002–2003.**Table 3** Relationship between crystal use and unprotected anal intercourse with casual partners (UAIC): SGCPS study, 2002–2005

Was crystal used in the past 6 months?	<i>N</i>	No UAIC	Some UAIC	χ^2
2002				
No	1,658	1,105 (66.7%)	553 (33.4%)	44.8***
Yes	294	136 (46.3%)	158 (53.7%)	
2003				
No	1,351	919 (68.0%)	432 (32.0%)	36.9***
Yes	322	161 (50.0%)	161 (50.0%)	
2004				
No	1,296	911 (70.3%)	385 (29.7%)	61.6***
Yes	455	227 (49.9%)	228 (50.1%)	
2005				
No	1,498	1,077 (71.9%)	421 (28.1%)	57.0***
Yes	480	256 (53.3%)	224 (46.7%)	

*** $p < .001$ **Table 4** Prevalence (%) of behaviors by survey year and crystal use: PH study, 2002–2005

	2002/03		2004		2005		χ^2 value for linear trend across years	
	Non-users	Users	Non-users	Users	Non-users	Users	Non-users	Users
Sample size	293 (85%)	52 (15%)	175 (74%)	60 (26%)	154 (69%)	70 (31%)		
Number of casual partners								
<10	65.8	30.8	47.7	36.7	50.3	46.4		
10 or more	34.3	69.2	52.3	63.3	49.7	53.6		
χ^2 for users versus non-users	22.6**		2.19		0.30		3.57**	-1.77
Number of different venue types where men looked for sex								
0–1	55.0	15.4	56.0	17.0	56.9	32.9		
2 or more	45.0	84.6	44.0	83.0	43.1	67.1		
χ^2 for users versus non-users	27.7**		27.1**		11.1**		-0.40	-2.37*
Number of different types of esoteric sex								
0	29.5	8.0	30.6	5.0	25.5	14.3		
1–2	39.0	30.0	41.6	23.3	41.8	25.7		
3 or more	31.5	62.0	27.8	71.7	32.7	60.0		
χ^2 for users versus non-users	18.1**		38.2**		14.8**		0.54	-0.60

* $p < .05$, ** $p < .01$

looked for sex, and participants' HIV status. There was a significant association between crystal use and UAIC (unadjusted PRR = 1.64; 95% CI: 1.59–1.68). After the inclu-

sion of the other variables in the model, the magnitude of this association decreased but remained significant (adjusted PRR = 1.26; 95% CI: 1.19–1.34). Each of the other vari-

Table 5 Prevalence (%) of risky behaviors by year, HIV status and crystal use: SGCPs study, 2002–2005

	2002		2003		2004		2005		χ^2 value for linear trend	
	Non-users (N = 1,658)	Users (N = 294)	Non-users (N = 1,351)	Users (N = 322)	Non-Users (N = 1,296)	Users (N = 455)	Non-Users (N = 1,498)	Users (N = 480)	Non-users	Users
HIV-positive respondents										
Number of partners (regular + casual)										
<10	46.0	28.6	54.1	24.4	58.9	46.0	55.8	41.1		
10 or more	54.0	71.4	45.9	75.6	41.1	54.0	44.2	58.9		
χ^2	7.7**		19.5***		4.6*		6.6*		-2.25*	-2.80**
Other drug use										
No	15.3	2.4	23.4	–	21.5	0.8	20.8	–		
Yes	84.8	97.6	76.6	100.0	78.5	99.2	79.2	100.0	-1.31	1.60
χ^2	9.8**		22.1***		27.6***		29.4***			
Viagra use										
No	76.7	36.9	70.1	35.4	72.2	33.1	66.7	24.3		
Yes	23.3	63.1	29.9	64.6	27.9	67.0	33.3	75.7	2.22*	1.83
χ^2	43.9***		27.6***		41.8***		50.8***			
Number of different venue types where men looked for sex										
0–2	ND ^a	ND	23.3	12.2	38.2	22.6	26.4	9.5		
3 or more	ND	ND	76.7	87.8	61.8	77.4	73.6	90.5	-0.58	0.41
χ^2			2.2		7.2**		4.7*			
UAIC										
No	41.1	25.0	47.8	16.5	51.3	24.0	47.2	30.6		
Yes	58.9	75.0	52.2	83.5	48.7	76.0	52.8	69.4	-1.44	-1.44
χ^2	6.9**		23.0***		21.8***		8.6**			
HIV-negative respondents										
Number of partners (regular + casual)										
<10	57.5	51.8	59.4	46.2	60.8	43.9	61.0	48.2		
10 or more	42.5	48.2	40.6	53.8	39.2	56.1	39.0	51.8	-1.89	0.67
χ^2	2.2		12.9***		27.5***		17.5***			
Other drug use										
No	29.6	1.0	29.6	0.9	33.7	0.0	35.2	0.0		
Yes	70.4	99.0	70.4	99.1	66.3	100	64.8	100	-3.46**	2.25*
χ^2	72.1***		82.3***		141.8***		161.2***			
Viagra use										
No	85.9	59.0	85.1	51.6	86.0	51.0	85.2	45.5		
Yes	14.1	41.0	14.9	48.4	14.0	49.0	14.8	54.6	0.31	2.77**
χ^2	83.4***		124.7***		163.3***		215.1***			
Number of different venue types where men looked for sex										
0–2	ND	ND	30.0	18.2	37.2	19.5	27.9	14.9		
3 or more	ND	ND	70.0	81.8	62.8	80.5	72.1	85.1	0.92	0.82
χ^2			6.9**		31.1***		4.8*			
UAIC										
No	70.6	55.9	71.4	63.1	72.8	59.4	75.5	61.4		
Yes	29.4	44.1	28.6	36.9	27.2	40.6	24.6	38.6	2.81**	-0.81
χ^2	17.0***		6.0*		20.2***		25.7***			

* $p < .05$, ** $p < .01$, *** $p < .001$ ^a ND = No data available. Information on the types of venues where men looked for sex was not collected in 2002

Table 6 Relationship between crystal use and unprotected anal intercourse with casual partners (UAIC) in the 6 months before interview: SGCPs study, 2002–2005^a

	% reporting UAIC (<i>N</i> = 7,354)	Unadj. PRR ² (95% CI)	Adj. PRR ^b (95% CI)
Overall sample	34.8		
Crystal use			
No	30.9	1.00	1.00
Yes	49.7	1.64 (1.59–1.68)	1.26 (1.19–1.34)
Other drug use			
No	24.2	1.00	1.00
Yes	38.4	1.50 (1.38–1.63)	1.17 (1.15–1.20)
Viagra use			
No	30.7	1.00	1.00
Yes	48.0	1.57 (1.46–1.70)	1.09 (1.04–1.14)
Number of partners (regular and casual)			
<10	26.3	1.00	1.00
10 or more	46.0	1.71 (1.54–1.90)	1.37 (1.33–1.40)
Number of different types of venues where men looked for sex			
0–2	25.6	1.00	1.00
3 or more	36.8	1.37 (1.31–1.44)	1.19 (1.06–1.30)
HIV status			
HIV positive	61.2	1.00	1.00
HIV negative	29.8	2.25 (2.21–2.29)	2.07 (2.03–2.11)

^a All regression models were adjusted for clustering by year

^b PRR = prevalence rate ratio

ables that were examined remained independently significant predictors of UAIC in the final regression model. Specifically, the likelihood of having engaged in UAIC was increased among participants who: used Viagra, used other drugs, had more than 10 sex partners, looked for sex in three or more types of venue, and were HIV negative.

Discussion

We found that crystal users were more likely to engage in a range of potentially risky sex-related behaviors than non-users. The SGCPs study found that crystal users reported having had significantly more sex partners than non-users in each of the four study years, but the PH study found a significant relationship between number of sex partners and crystal use only in 2002–2003. PH found that crystal users looked for sex in more types of venues than non-users in all three study years; SGCPs found such a difference in three of the four study years among HIV– respondents, and in two study years among HIV+ respondents. SGCPs found that crystal users were more likely to engage in UAIC than non-users in all four study years. Finally, PH found that crystal users engaged in more esoteric sex than non-users in all three study years. Our regression analysis of SGCPs

data found that a set of relevant behavioral variables (number of sex partners, number of venues where men looked for sex, use of Viagra, and use of other drugs), were independently associated with UAIC, and did not indicate a confounding or mediating effect on the association between crystal use and UAIC.

These findings were consistent with those of other published studies which have found associations between crystal use and risky sexual behavior (Halkitis, Parsons, & Stirratt, 2001; Kalichman et al., 1996; McKirnan, Valnable, Ostrow, & Hope, 2001; Molitor, Truax, Ruiz, & Sun, 1998; Urbina & Jones, 2004). Taken at face value, such findings appear to support the idea that crystal use may be a cause of unsafe sexual behavior, thereby contributing to the increasing HIV incidence that has been observed among gay men in recent years in several Western countries.

If crystal use was causing a significant proportion of UAIC, one would expect to see any changes in the prevalence of crystal use over time reflected in proportional changes in the same direction in the prevalence of UAIC. Our data demonstrated an increasing prevalence of crystal use in the MSM community in Australia in recent years. For example, the SGCPs found that, between 2002 and 2005, the reported prevalence of crystal use in the past 6 months increased from 26% to 39% among HIV+ MSM,

and from 14% to 22% among HIV– men. These levels of use of a very addictive and potentially quite dangerous illicit drug are higher than have been reported in recent U.S. studies of MSM (Fernandez et al., 2005; Hirshfield et al. 2004; Purcell et al., 2005).

However, the increasing use of crystal in our studies was not accompanied by an overall increasing prevalence of UAIC, which, in fact, decreased significantly over time among SGCPS HIV– participants, and which showed no significant change among SGCPS HIV+ participants, or among PH participants. Generally similar trends were observed in terms of other sex-related behaviors. PH found no change over time in the number of types of esoteric sex that were engaged in by either crystal users or non-users; the prevalence of having looked for sex in two or more types of venues decreased among crystal users, and did not change among non-users; there was no change over time in the prevalence of having had 10 or more casual sex partners among crystal users, but a significant increase over time in this variable among non-users. SGCPS found that the number of different types of venues where men looked for sex did not change over time among either crystal users or non-users; the prevalence of having had 10 or more sex partners decreased significantly among HIV+ crystal users and non-users, and did not change among either group of HIV– participants.

SGCPS found that crystal users were more likely than non-users to have used other recreational drugs and Viagra in all four study years; 63–76% of the HIV+ and 41–55% of the HIV– crystal users had used Viagra, and more than 97% of crystal users in both of the HIV-status subgroups had used other recreational drugs in each study year. Among crystal users, the prevalence of Viagra and other drug use in each year was two to three times higher than the corresponding prevalence among non-users. The prevalence of Viagra and other drug use increased over time among HIV– crystal users, but did not change among HIV+ users. In these circumstances it would be impossible to reliably attribute any type of behavior among crystal users specifically to crystal.

In summary, crystal users in our PH and SGCPS studies were clearly engaging in more potentially risky and more “adventurous” sexual and drug using behaviors. However, our analyses were not able to test or confirm causality in the relationship between crystal use and UAIC or other sexual behaviors; the findings presented herein provide evidence only of correlational associations. Halkitis et al. (2001) reported similar findings and interpreted them as indicating that crystal may attract a hypersexual group of risk-takers who are already predisposed to engaging in unsafe sex regardless of their crystal use.

We propose a more sociological explanation of the relationships between UAIC, other sex-related behaviors

and crystal (and other recreational drug) use. As Kippax and Stephenson (2005) have suggested, “sexual practice (safe or unsafe) is a social and cultural practice embedded within a particular historical time and place and embedded in specific locations and formations” (p. 363). Drug use has been a part of gay sexual culture since at least the 1960s, but the particular drug of choice has changed over time. The relationship between unsafe sex, drug use, and esoteric sex is complex. For some gay men, UAIC may occur while using crystal and in environments where adventurous or esoteric sex is taking place. However, we do not have any conclusive evidence about the proportion of unsafe sex practice that is directly caused by crystal use per se. The statistical associations that have been observed between crystal use and unsafe sex may actually be due to other variables that they are both correlated with, including relationship status, personality factors, mental health, community norms in gay sub-cultures, exposure to situations and environments in which both drug use and adventurous sex occur, and socially-mediated expectations about the effects of crystal and other drugs (Colfax et al., 2004; Purcell et al., 2005; Rhodes, 1996). The increasing prevalence of crystal use observed in our studies was associated with either a decrease or no change over time in the prevalence of UAIC, illustrating the fact that these two problems are at least somewhat independent, and can, and should be considered and addressed separately. We should take care not to misdirect health promotion and community education resources that are aimed at reducing potentially unsafe sexual behavior by focusing too narrowly on crystal itself or on crystal users.

Acknowledgments The New South Wales Health Department, Australia, provided funding for the Positive Health Cohort (RMT2798) and the Sydney Gay Community Periodic Survey (RMT2799). We gratefully acknowledge the sustained involvement and contribution of Peter Hull, Garrett Prestage, Andrea Fogarty, and Susan Kippax in the studies that generated the data that are reported herein.

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SOURCE: Arch Sex Behav 36 no5 O 2007

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