

Recreational Viagra Use and Sexual Risk among Drug Abusing Men

¹Dennis G. Fisher, ²Robert Malow, ²Rhonda Rosenberg, ¹Grace L. Reynolds,
²Nisha Farrell and ¹Adi Jaffe

¹Center for Behavioral Research and Services, California State University, Long Beach

²Robert Stempel School of Public Health/ AIDS Prevention Program, Florida International University

Abstract: Until recently, the Viagra connection to HIV was anchored in older adults. However, CDC investigation showed stability in 50+ HIV diagnoses on the heels of upward trends in risk indicators among men who have sex with men (MSM) and substance abusing populations. Signs have increasingly pointed to recreational drug use among younger populations, to which Viagra is being added to the mix. Currently, the field is still locating the substance abuse, sexual risk and age-related dimensions of Viagra misuse. Recent studies identify it primarily as substance abuse, but the majority reports a combination of risky sex and risky drug use. At the very least, Viagra appears related to the enhancement of sexual experience or performance, even when it is used to compensate for erectile dysfunction caused by other drugs—either illicit or prescribed (e.g., antidepressants and highly active antiretroviral therapy or HAART). The populations studied, however, frequently have limited the generalizability of findings. This report analyzes the relationship among Viagra, Club Drugs and HIV sexual risk behavior in drug using men with a sample diverse in sexual orientation and demographic scope. Participants were 640 males recruited from three HIV prevention programs in Los Angeles County. Mean age was 43.97 years, ranging from 18.7 to 70.3 with almost 25% over 50. Sexual orientation was 79% heterosexual, 8% bisexual and 12% gay. Racial composition was 45% white, 35% black and 19% Hispanic. NIDA's Risk Behavior Assessment and a Club Drug/Viagra addendum were used to collect socio-demographic, substance use and sexual risk data. Multiple logistic regression models were constructed along with chi-square tests of association and some t-tests. White race was a major risk factor. No age effect was found. MSM were more likely to use Viagra. Insertive anal sex was a significant co-factor among heterosexual Viagra users involved in transactional sex with women. In the overall sample and the subsets of heterosexual, MSM, younger and older men, predictive models all identified club or designer drugs as significant co-factors in the use of Viagra. Different patterns of drug co-factors were observed for each subset. We detected consistent positive associations between the use of Viagra and the use of amphetamines immediately before or during sex. Viagra use has moved into a new generational context and now complicates the sexual risk and intervention equations for all men, particularly MSM as well as more hidden subgroups.

Key words: Viagra, drug abuse, sexual risk, sexual behaviour

INTRODUCTION

The Viagra connection to HIV in the first half of the third decade of the epidemic was dominated by concern over older adults using sildenafil (manufactured by Pfizer) and related prescriptions for erectile dysfunction (such as tadalafil sold as Cialis by Lilly and vardenafil sold as Levitra by GlaxoSmithKline). Indications are that the second half of the decade will emphasize unprescribed and recreational use by younger populations^[1]. In particular, highly burdened groups fatigued by the continued vigilance required by the epidemic, most notably men who have sex with men (MSM), may be extremely vulnerable to the misuse of Viagra and the apparent complacency that has accompanied improved HIV/AIDS treatment^[2]. Moreover, HIV+ individuals

may face special challenges in managing the use of Viagra as well as illicit sexual enhancing drugs because of sexual dysfunction stemming from HIV infection, antiretroviral regimens, or antidepressants^[3,4].

Research and news reports frequently cited the January 23, 1998 *MMWR (Morbidity and Mortality Weekly Report)* by the CDC, making reference to AIDS cases rising twice as fast among the population aged 50 and over compared to those 13-49 years of age^[5]. However, the CDC intended these numbers to track the incidence of AIDS-opportunistic illnesses. These trends might have signaled treatment delays and disparities for older adults or the influence of antiretrovirals on disease progression rather than an explosion of the virus in this age group. At the 15th International AIDS Conference in Thailand, the CDC reported new research on HIV diagnosis rates showing that the

Corresponding Author: Dennis G. Fisher, Center for Behavioral Research and Services, California State University, Long Beach

epidemic was stable among older adults and significantly overshadowed by rates among both males and females born after 1950^[6]. The highest rates among younger cohorts were associated with male-to-male transmission and heterosexual transmission for women.

Although older adults warrant special attention, it is increasingly clear that the real resurgence of the epidemic is occurring among MSM as well as high-risk subgroups involved in the recreational/club drug/internet-chat room sexual scenes and in transactional and survival sex^[7-13]. In 2003, the CDC analyzed increases in HIV diagnoses from 1999-2002^[14]. While the rate for females remained stable, that for MSM increased 17 percent. In addition, significant increases in syphilis cases occurred among men, 2000-2003, but declined among women^[14]. Local surveillance published in the *MMWR* during the same time period, pointed to a doubling of reported cases for MSM in New York City and in Southern California^[15,16]. These statistics suggested that sexual risk behavior may be increasing or changing in its dynamics among men, acutely in MSM, such that established prevention strategies were no longer working.

Viagra is the most-well known conveyor of change in male sexual experience since the Food and Drug Administration (FDA) approved it in 1998. Apart from older cohorts, most research has congregated around spikes in MSM HIV/STD rates and the role of Viagra in the interplay between risky sexual behavior and substance abuse. For example, in a study of MSM attendees of a sex resort in Georgia, Crosby and DiClemente^[17] reported that Viagra was more implicated in substance abuse rather than sexual risk behavior. But in a community-based convenience sample of MSM in San Francisco, Chu *et al.*,^[18] found a strong relationship between Viagra use and risky sexual behavior as well as a significant association with combined and illicit drug use. This dual result is the more common finding among studies to date. But an important limitation, as most researchers note, is the narrowness of the sample or venue investigated.

An added delineation that may prefigure approaches to the Viagra-HIV risk equation is that use may be part of substance use patterns that are more episodic and variable than would be typical in substance use behavior, at least among MSM^[19]. Stall and Purcell^[20] presaged this dynamic in their seminal review article as the third decade of the epidemic began. Specifically, they honed in on two salient distinctions of HIV risk-related behavior among MSM, which may be shared, though not as perceptibly, with heterosexual men: polydrug use and the attribution of sexual meaning to particular drugs. They called the risk situation facing MSM "intertwining epidemics" and summoned researchers to accumulate evidence that would disentangle high-risk sexual patterns and substance use.

The state of research on how Viagra is configured in risky sex and substance use is summed up in a keystone review by Swearingen and Klausner^[1]. The prevalence of Viagra use can be high, with a majority of studies with MSM samples reporting rates greater than 10% and ranging to 32% (and 42% among HIV+ MSM). All of the studies that looked for combined or associated use with illicit drugs, found it. All of the studies that asked about the source of the Viagra used, found that it was unprescribed in a majority of cases. This kind of pattern is currently being described as recreational. Further, all of the studies from 1999 to July 2004 that measured behavioral outcomes, found increased odds for high-risk sexual practices, ranging 2.0 to 5.7 times for Viagra users versus nonusers in the case of "barebacking" or unprotected anal sex with a partner who was serodiscordant (i.e., having opposite or mixed serostatus as when one partner is HIV+ and the other partner is HIV-) or of unknown HIV status.

Polydrug use and HIV risk, particularly the mixing of Viagra with club or designer drugs, sometimes called "trail mix" when it contains ecstasy^[21], is increasingly prompting concern among HIV/AIDS researchers. These substances are popularly known as "party drugs," and their effect on the user (even when used in private) is best summed up by the original terms describing the venue or event of use: raves or trance scenes. They include methamphetamine, LSD, GHB or gamma-hydroxybutyrate, MDMA or ecstasy, Rohypnol, ketamine (a dissociative anesthetic) and others and their use has moved out of the party scene (social/public venues where sexual and drug activities are anticipated) into cruising (typically a reference to where gay men go to connect with other gay men for sex) and private venues (private clubs or homes). Descriptions of these drugs are available at the NIDA website www.clubdrugs.org and in their *Community Drug Alert Bulletin* on Club Drugs [<http://www.drugabuse.gov/ClubAlert/Clubdrugalert.html>], introduced by Nora Volkow, NIDA's director. Viagra may be used to counteract the tendency of these drugs to produce impotency and to extend the period and range of sexual activity^[22].

As noted by Swearingen and Klausner^[23], the current research picture of Viagra use is limited by studies that are possibly idiosyncratic in terms of population and subculture, homogeneous in the sexual orientation of their participants and reliant on convenience samples. The intent of our study was to assess Viagra use with a sample that was diverse in age, race, education and sexual orientation, in association with sexual risk practices and illicit drug co-factors, particularly designer drug use. Data were collected through structured interviews using the NIDA-developed Risk Behavior Assessment (RBA) and Designer Drug Trailer (DDT) with participants enrolled in HIV/AIDS-related and drug abuse prevention interventions being conducted in Long Beach and the

wider Los Angeles County area of Southern California. We develop models that both predict and discriminate Viagra use within the sample, with attention to the generational or age-related factor and the comparative risks of MSM and heterosexual men. This is a first report of the analyses to date.

MATERIALS AND METHODS

Participants: Participants were 640 drug using men from three HIV/AIDS-related intervention programs operated by the Center for Behavioral Research and Services (CBRS) at the California State University, Long Beach.

The Intervention for HIV Negative and HIV Positive Drug Users (IHNHP) used a three-session intervention with current, out-of-treatment drug users, focused on risk reduction goals and social support for HIV risk reduction. This program was funded by the City of Long Beach. Eligibility for the IHNHP program resulted in enrollees who were current drug users (i.e. within the past 30 days) at the time of enrollment and at least 18 years of age.

The *Hepatitis Demonstration Project* (HDP) was a study of the prevalence of hepatitis A, B, C and HIV in current and former injection drug users^[23,24]. Eligibility required visible signs of injection (track marks)^[25] at the time of study enrollment and being at least 18 years of age.

The *Ready for Action* (RFA) program was an HIV risk reduction intervention for men who have sex with men (MSM) and men who have sex with men and women (MSMW). Although not advertised as a drug abuse program, the majority of enrollees reported using alcohol, marijuana, cocaine and amphetamines. The RFA employed both targeted outreach and individual and group-level intervention approaches. Eligibility included self-identification as gay or bisexual MSM/MSMW and being at least 18 years of age. The HDP and the RFA were both funded through Los Angeles County's Office of AIDS Programs and Policy.

CBRS operates a field station central to several neighborhoods with a high prevalence of drug use. Interviews with participants from all three programs primarily took place at this field station. Data from male participants from the three programs were pooled because each program used both the Risk Behavior Assessment (RBA) and the Designer Drug Trailer (DDT) in their study protocols.

Procedures: Informed consent was obtained at the beginning of each session, following protocols approved by the California State University Long Beach Institutional Review Board (IRB). Signed informed consent forms were obtained from each client prior to starting the interview and locator information was updated. Each participant completed several structured interviewer-administered questionnaires and

a number of self-administered questionnaires. After questionnaire administration, session content varied depending on the program (IHNHP, HDP, RFA). Sessions lasted for approximately an hour and a half, at the conclusion of which participants were given their incentive and reminded of their follow-up date. All participants were offered the opportunity to be tested for HIV. They were also given appropriate referrals to other services as needed. Data from all three of the programs are protected under Certificates of Confidentiality issued by the federal government.

Instruments

The risk behavior assessment (RBA): The RBA was developed by the Community Research Branch of the National Institute on Drug Abuse (NIDA) in collaboration with grantees of the AIDS Community-Based Outreach/Intervention Research Cooperative Agreement Program. Aimed at assessing risk for HIV infection, the RBA is a structured 20-45 minute interview covering demographics, level and sources of income, drug use, incarceration, sexual risk behaviors and history of HIV testing. The reliability of most of the questions and the 48-hour validity of the drug use variables have been published and found to meet the .70 criterion suggested by Dowling-Guyer *et al.*^[26], Fisher *et al.*,^[27] Fisher *et al.*^[23,24], Johnson^[28] and Needle *et al.*^[29]. Drug use data collected using the RBA include lifetime use or nonuse, age of first use, as well as frequency of use in the last 30 days (i.e. both in days and times used) for alcohol, marijuana, crack, cocaine, heroin, heroin and cocaine mixed together (i.e. speedball), nonprescription methadone, other opiates and amphetamines. Sexual risk behavior data include frequency and type of sexual practice in the last 30 days, use of condom or barrier protection, use and type of drugs proximate to sex and descriptors of transactional sex involving drugs or money. All counselors administering the RBA at CBRS undergo training that includes three observations and three supervised administrations. The RBA is also available in Spanish. Bilingual interviewers were used for Spanish-speaking participants in all three programs.

The designer drug trailer (DDT): An addendum to the RBA, the DDT follows a similar format of asking participants about their lifetime use/nonuse as well as age of first use and frequency of use in the last 30 days of designer drugs^[30]. The drugs assessed by the DDT are MDMA, ketamine, GHB/GHL, 2C-T-7, 2C-B, Foxy, 4-MTA, Rohypnol and Viagra. Assessment includes use proximate to sex and as currency in transactional sex. The DDT is also available in Spanish.

RESULTS

All of the data used for this analysis were from male participants because female participants so

Table 1: Overall analysis predicting use of viagra (N = 558)

Variable	B	SE B	OR	95%CI
Ever use Rohypnol	1.90	0.70	6.66	1.70, 26.09
White vs. nonwhite	1.26	0.34	3.54	1.83, 6.85
Ever use ketamine	1.24	0.45	3.44	1.43, 8.27
Ever use ecstasy	0.90	0.37	2.46	1.20, 5.07
Ever given drugs to have sex	0.83	0.32	2.29	1.21, 4.32
Ever told had HIV	0.78	0.39	2.17	1.006, 4.69
Ever had STD	0.71	0.30	2.03	1.13, 3.65
Number of sex partners in 30	0.12	0.53	1.13	1.02, 1.25
Days used speed in last 30	0.058	0.020	1.06	1.02, 1.10
Days used crack in last 30	0.052	0.020	1.05	1.01, 1.10
Consider yourself homeless	-0.90	0.37	0.41	0.22, 0.76

Note. Hosmer-Lemeshow goodness of fit $\chi^2(8) = 4.16, p = .843$.

Table 2: Logistic regression analysis predicting use of viagra older men only (n = 362)

Variable	B	SE B	OR	95%CI
Ever use ecstasy	1.81	0.43	6.09	2.64, 14.05
White vs. nonwhite	0.89	0.39	2.43	1.13, 5.20
Income in last 30 days	0.33	0.15	1.40	1.05, 1.86
Days used crack in last 30	0.06	0.02	1.07	1.02, 1.11

Note. Deviance $\chi^2(74) = 61.81, p = .8432$.

Table 3: Logistic regression analysis predicting use of viagra younger men only (n = 242)

Variable	B	SE B	OR	95%CI
Ever use Rohypnol	3.53	1.01	34.09	4.71, 246.99
Ever use ketamine	2.34	0.55	10.01	3.39, 29.61
Ever told had HIV	1.44	0.54	4.21	1.46, 12.15
Ever given drugs to have sex	1.26	0.53	3.52	1.23, 9.90
White vs. nonwhite	1.13	0.52	3.11	1.12, 8.63
Number sex partners in 30 d	0.17	0.068	1.20	1.05, 1.37
Days used amphet. in last 30	0.10	0.29	1.11	1.05, 1.17

Note. Hosmer-Lemeshow $\chi^2(8) = 10.8924, p = .2079$.

infrequently reported Viagra use. The data on the 640 male participants were collected from March 21, 2001 to December 21, 2004. Mean age was 43.97 years ($SD = 9.49y$), range 18.7 to 70.3 years. Nearly a quarter were over age 50. The racial composition of the sample was 44.8% White, 34.5 % Black, 18.6% Hispanic, 1.3% Asian/Pacific Islander, 1.3% Native American and 2% other. Educationally, 33.3% of the sample had less than a high school education, 32.75% had a GED (high school equivalent) or high school graduation and 34.17% had at least some education beyond high school. Only 6.4% of the sample were married and 51.73% considered themselves to be homeless.

Table 1 is the multiple logistic regression model predicting use of Viagra for the overall sample. The numbers used in each of the tables is indicated because PROC LOGISTIC in SAS utilizes casewise deletion, in which any observation that has a missing value on any variable in the model is completely deleted from the analysis. Each logistic regression table is arranged by order of decreasing odds ratios. There is a note at the bottom of each table indicating the statistic used for assessing goodness of fit. In Table 1 we used the Hosmer-Lemeshow goodness of fit test because the model resulted in 8 degrees of freedom for the test. Hosmer does not recommend using the test for less than 8 degrees of freedom (D. Hosmer, personal

communication, March 1, 2005). Our obtained value shows good fit of our model ($\chi^2(8)=4.16, p=.843$).

The overall analysis yields a predictive model of ten risk factors and one protective factor in the use of Viagra. The major risk factors are use of Rohypnol, ketamine, ecstasy, amphetamine and crack. White race is also a major risk factor. The single protective factor is self-perception of homelessness. This is indicated by a negative coefficient and an odds ratio less than 1. Even though the days used crack in the last 30 days and the days used speed (amphetamine) in the last 30 days appear to be small risk factors, the coefficient and the related odds ratio refer to the risk for each day, thus making these conservative estimates. If we had made the variable each five days or each 10 days, then the coefficient and the odds ratio would have been larger. Sex-related variables such as ever having been told that one is HIV positive, ever had a sexually transmitted disease and number of different sex partners in the previous 30 days also emerged as predictive variables in this model. Ever given drugs to have sex was the only transactional sex variable that was predictive (others included in the RBA are ever given sex to get drugs as well as sex/drug transactions involving money). There was a significant association between using Viagra and using amphetamines immediately before or during sex $\chi^2(1, N = 328) = 12.2, p = .0005$.

Table 4: Logistic regression analysis predicting use of viagra heterosexual men only (n = 507)

Variable	B	SE B	OR	95%CI
Ever use Rohypnol	3.24	0.95	25.59	3.99, 163.92
Lifetime drug treatment	2.49	1.04	12.08	1.57, 93.26
Insertive anal sex with women	1.27	0.49	3.58	1.37, 9.31
White vs. nonwhite	1.18	0.43	3.25	1.40, 7.52
Days used crack in last 30	0.082	0.023	1.08	1.04, 1.13

Note. Deviance $\chi^2(66) = 44.17, p = .9933$.

Table 5: Logistic Regression Analysis Predicting Use of Viagra Gay Men Only (N = 129)

Variable	B	SE B	OR	95%CI
Ever use ecstasy	1.44	0.50	4.23	1.60, 11.22
Ever use ketamine	1.33	0.61	3.80	1.15, 12.55
Days used amphet. in last 30	0.068	0.029	1.07	1.01, 1.13

Note. Deviance $\chi^2(26) = 31.5783, p = .2074$.

This association was significant in the overall sample and in each of the different subsets of Viagra users except for heterosexual men.

Table 2 and 3 denote separate predictive models for older and younger Viagra users, respectively. Older is defined as being greater than or equal to 43 years of age which was a median split for this sample. Older men who used Viagra were more likely to be White. Viagra use by older men was strongly associated with using ecstasy. Income and crack use were also important predictors. The deviance chi-square indicates good model fit. There was a significant bivariate association between the use of Viagra and the use of amphetamines immediately before or during sex $\chi^2(1, N = 182) = 5.6, p = .0185$.

For younger men, it was Rohypnol and ketamine that were predictive, as indicated by Table 3. Rohypnol has been known as the “date rape drug.” The odds ratio for Rohypnol use is large but the confidence interval is also large because the number of men reporting use was small. Its predictive value here may be related to the practice of giving drugs to have sex to increase the number of sex partners. Younger men’s use of Viagra was strongly associated with ever having been told that they were HIV positive. Again, there was a significant bivariate association between the use of Viagra and the use of amphetamines immediately before or during sex $\chi^2(1, N = 146) = 8.6, p = .0034$. Like the older men, the younger men who used Viagra were more likely to be White.

Table 4 and 5 show the multiple logistic regression models for participants self-identifying as heterosexual and gay, respectively. The data from the men who self-reported that they were bisexual was collapsed into the gay group for analytical purposes because there were too few male bisexual participants to analyze their data separately. These categories were the answer to the question “Do you consider yourself to be...” from the RBA. On a bivariate level, gay men were significantly more likely to use Viagra than heterosexual men $\chi^2(1, N = 640) = 75.2, p = .0001$. In addition, there was a

significant bivariate association between the use of Viagra and the use of amphetamines immediately before or during sex $\chi^2(1, N = 77) = 9.2, p = .0025$. Table 4 for the heterosexual men shows Rohypnol to be a major risk factor, but the confidence interval is very large because use was infrequent. Heterosexual men also seem to be more likely to be drug abusers as they also had a history of drug treatment and recent use of crack.

Insertive anal sex was a major risk factor for heterosexual men’s use of Viagra, which had definite associations with transactional sex activity. Among the heterosexual men, those engaging in insertive anal sex were more likely to have ever given sex to get money $\chi^2(1, N = 536) = 10.4, p = .0013$; given sex to get drugs $\chi^2(1, N = 536) = 25.0, p = .0001$; and given drugs to have sex $\chi^2(1, N = 536) = 12.9, p = .0003$. There were 42 men reporting that they had engaged in insertive anal sex with a woman in the last 30 days.

This behavior has been reported for drug using men by others^[31]. Of the 42 men, 7 used condoms (17%). There were 165 total acts reported, of which 36 were performed using a condom (22%).

Table 6 shows the *t*-tests for continuous variables in the multivariate models. The number of days used crack in the last the o 30 days and the number of days used amphetamine in the last 30 days are both significantly different between those who used Viagra and those who did not use Viagra in verall sample, but on further examination it is apparent that the days used crack is an important discriminator between the users and the nonusers of Viagra for the heterosexual and older men only. The days used amphetamine is an important discriminator for the gay men—older and younger—but not the heterosexual men. The number of different sex partners in the 30 days before interview is significantly different between those who used Viagra and those who did not use Viagra for both older and younger men; however, younger men typically reported many more sex partners than older men.

Table 6: Mean differences by men who used and men who have not used viagra

OVERALL		Used Viagra				Not Used Viagra							
Variable		Mean	SD	Mean	SD	t	df	Mean	SD	t	df		
Days used crack in last 30		4.80	8.47	2.91	6.63	2.34*	636						
Days used speed in last 30		4.71	9.12	1.64	4.97	4.62**	634						
By age group													
		Older				Younger							
		Used Viagra	Not Used Viagra	Used Viagra	Not Used Viagra			Used Viagra	Not Used Viagra				
Number of Sex Partners in 30 days		Mean	SD	Mean	SD	t	df	Mean	SD	t	df		
Days Used Crack in last 30		1.74	1.97	0.82	1.50	3.61**	363	3.54	8.36	1.15	2.01	3.8**	272
Days Used Speed in last 30		5.63	8.66	3.29	7.13	1.97*	363	3.93	8.28	2.39	5.84	1.45	271
Days Used Speed in last 30		2.93	7.18	1.12	4.21	2.42*	364	6.61	10.59	2.37	5.81	3.71	268
By sexual orientation													
		Straight				Gay							
		Used Viagra	Not Used Viagra	Used Viagra	Not Used Viagra			Used Viagra	Not Used Viagra				
Variable		Mean	SD	Mean	SD	t	df	Mean	SD	Mean	SD	t	df
Days Used Crack in last 30		6.16	9.51	2.86	6.54	2.85**	507	3.72	7.48	3.20	7.14	0.40	127
Days Used Speed in Last 30		2.21	5.05	1.58	4.97	0.75	505	6.72	11.05	1.98	4.96	3.35**	127

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

DISCUSSION

This study's major findings indicate that Viagra is being used most frequently by White men of all ages who may also use Rohypnol, ecstasy, ketamine, amphetamine and crack and who are not homeless. Thus, no age effect is apparent, though different drugs are predictive of Viagra use in older men compared to younger men in this sample. Ecstasy is most associated with use in older men, whereas younger Viagra users more often use Rohypnol followed by ketamine. Secondary findings are that Viagra use is associated with having been told that one is HIV positive, the number of sex partners, higher income for older men and trading drugs for sex in younger men. The only drug taking variable proximate to sex that was significantly associated with Viagra use was amphetamine use either before or during sex. However, consistent positive associations with Viagra use were found for this variable in all the examined subsets of the sample except for heterosexual men.

Also, based on our sample, there are different drugs associated with Viagra use depending on whether men self-identify as heterosexual or MSM. We found that the MSM Viagra user is most likely to use ecstasy, ketamine and amphetamine and the heterosexual Viagra user is most likely to use Rohypnol and crack. Heterosexual men who use Viagra are also more likely to report a history of drug treatment. Because this factor did not emerge for MSM in the sample, our analyses would seem consistent with the Stall and Purcell^[20] thesis regarding more variable and less classically dependent polydrug use by MSM.

Although MSM were more likely to use Viagra on a bivariate analytical level, the only instance of sexual

risk practice emerging as a factor occurred in the predictive model for heterosexual users. They were more than three times as likely to engage in insertive anal sex. While this result is preliminary and requires replication, it suggests that it would be valuable for future work to examine whether heterosexual men are using Viagra as a performance enhancer in order to better enable insertive anal sex, most likely for drugs or money. Preliminary findings indicate that in our sample this sexual practice is associated with transactional sex. Three out of four sex trading variables among the heterosexual men were significantly associated with having insertive anal sex with women. The qualitative study by Myers *et al.*^[32] illustrates the use of substances by MSM in order to "turn a trick." Less is known about heterosexual men in this context as well as male sex workers in general. Our result is indicative of hidden subgroups of men facing compounded and interwoven sex and drug risks because of the Viagra revolution. This may require more focus on mixed research designs, integrating qualitative and quantitative analyses, in order to more fully identify risk situations and guide intervention development^[33].

Our study points to the urgent need to address Viagra use outside the generational issue of age and more firmly within the generational context of the post-HAART and polydrug era of the HIV/AIDS epidemic. Men who use drugs are more likely to use Viagra and key warning signals of recreational Viagra use may be designer or club drugs and amphetamines proximate to sex. The risk situation may be particularly acute among communities, such as MSM, that have been burdened by protracted vigilance and perhaps desensitized to current prevention messages. This study confirms Viagra as an emergent complicating factor in

HIV/AIDS prevention with MSM and should encourage intervention researchers to move on to the next step of identifying psychological and structural correlates that may prove critical to the design of effective prevention interventions. Accumulating evidence suggests that, at the very least, the emergent risk is in unprescribed use, particularly as part of a sex repertoire of illicit polydrug use and may be a signal for a *cordoning off* type of risk behavior, which researchers have preliminarily described as recreational.

Some limitations of this study are the absence of any biological markers of drug use, the unknown psychometric properties of the designer drug trailer (although the format is based on the RBA which has very good properties^[26] and the lack of a randomized sampling plan. We also did not obtain official verification of date of birth so that age is based on self report as is sexual preference and homelessness. The homeless variables on the RBA, however, have good test-retest reliability. Further, although the finding on white race is reinforced by other studies that examined Viagra use with a sample in San Diego, Halkitis *et al.*^[34], for example, found strong evidence of club drug use with respect to methamphetamine among lower-income MSM men of color in New York City. This reinforces the point made about the heterogeneity of MSM at the March 2004 NIDA Conference on “New Dynamics of HIV Risk among Drug-Using Men Who Have Sex with Men.” This conference emphasized targeted, tailored intervention research because of the multiple combinations of risks now prevalent because of four agents of change in the trajectory of the epidemic: HAART, the internet, increasing transactional sex and Viagra^[35].

It is evident from our study and others that this will require more research using mixed methods and much deeper attention to the psychological co-factors and situational specificity of recreational Viagra use, particularly with illicit drugs. The Substance Use Risk Exploration (SURE) study is an example of what can be gained by such an approach^[36]. We concur with Halkitis *et al.*^[33] when they state in their implications that “it is not enough to simply address either the drug use behavior or the sexual risk behavior, rather an in-depth exploration of individual’s psychological makeup and associated behaviors is the most effective way of disentangling the destructive implications of methamphetamine use and sexual risk behaviors” (p. 715). It would seem that the same can now be said of Viagra.

REFERENCES

1. Swearingen, S.G. and J.D. Klausner, 2005. Sildenafil use, sexual risk behavior and risk for sexually transmitted diseases, including HIV infection. *The Am. J. Med.*, 118: 571-577.

2. Valdiserri, R.O., 2004. Mapping the roots of HIV/AIDS complacency: Implications for program and policy development. *AIDS Education and Prevention*, 16: 426-439.
3. Hijazi, L., R. Nandwani and P. Kell, 2002. Medical management of sexual difficulties in HIV-positive individuals. Editorial review. *Intl. J. STD & AIDS*, 13: 587-592.
4. Purcell, D.W., R.J. Wolitski, C.C. Hoff, J.T. Parsons, W.J. Woods and P.N. Halkitis, 2005. Predictors of the use of viagra, testosterone and antidepressants among HIV-seropositive gay and bisexual men. *AIDS*, 19 (suppl. 1): S57-S66.
5. Centers for Disease Control and Prevention. AIDS among persons aged ≥ 50 years: United States, 1991-1996. *Morbidity and Mortality Weekly Report* 1998; 47: 21-27. Available at: <ftp://ftp.cdc.gov/pub/Publications/mmwr/wk/mm4702.pdf>.
6. Daniels, D., A.B. Curtis, R.M. Klevens and L.M. Lee, 2004. Status report on HIV diagnosis rates in older adults in the United States - rates decline or remain stable. *Medscape Gen. Med.*, 6(3). July 11, 2004: WePeD6513 [eJIAS. 2004 July 11; 1(1)]. Available at: http://www.iasociety.org/ejias/show.asp?abstract_id=2174866.
7. Benotsch, E.G., S. Kalichman and M. Cage, 2002. Men who have met sex partners via the Internet: Prevalence, predictors and implications for HIV prevention. *Arch. Sex. Behavior*, 31: 177-83.
8. Coates, T.J. and G. Szekeres, 2004. A plan for the next generation of HIV prevention research: Seven key policy investigative challenges. *American Psychologist*, 59: 747-757.
9. Dunkle, K.L., R.K. Jewkes, H.C. Brown, G.E. Gray, J.A. McIntyre and I.D. Harlow, 2004. Transactional sex among women in Soweto, South Africa: Prevalence, risk factors and association with HIV infection. *Soc. Sci. Med.*, 59: 1581-1592.
10. Halkitis, P.N. and J.T. Parsons, 2003. Intentional unsafe sex (barebacking) among HIV-positive gay men who seek sexual partners on the Internet. *AIDS Care*, 15: 367-378.
11. Halkitis, P.M., J.T. Parsons and L. Wilton, 2003. Barebacking among gay and bisexual men in New York City: Explanations for the emergence of intentional unsafe behavior. *Arch. Sex. Behavior*, 32: 351-357.
12. Kurtz, S.P., 2005. Post-circuit blues: Motivations and consequences of crystal meth use among gay men in Miami. *AIDS and Behavior*, 9: 63-72.
13. Wolitski, R.J., J.T. Parsons and C.A. Gomez, 2004. Prevention with HIV-seropositive men who have sex with men Lessons from the Seropositive Urban Men’s Study (SUMS) and the Seropositive Urban Men’s Intervention Trial (SUMIT). *J. Acqui. Immune. Defic. Syndr.*, 37 (Suppl. 2): S101-S109.

14. Centers for Disease Control and Prevention. Increases in HIV diagnoses - 29 states, 1999-2002. *Morbidity and Mortality Weekly Report* 2003; 52: 1145-1148. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5247a2.htm>.
15. Centers for Disease Control and Prevention. Outbreak of syphilis among men who have sex with men---Southern California, 2000. *Morbidity and Mortality Weekly Report* 2001; 50: 117-120.
16. Centers for Disease Control and Prevention. Primary and secondary syphilis among men who have sex with men---New York City, 2001. *Morbidity and Mortality Weekly Report* 2002; 51: 853-856.
17. Crosby, R. and R.J. DiClemente, 2004. Use of recreational Viagra among men having sex with men. *Sexually Transmitted Infections*, 80: 466-468.
18. Chu, P.L., W. McFarland, S. Gibson, D. Weide, J. Henne, P. Miller, T. Partridge and S. Schwarcz, 2003. Viagra use in a community-recruited sample of men who have sex with men, San Francisco. *J. Acqui. Immune. Defic. Syndr.*, 33: 191-193.
19. Colfax, G., E. Vittinghoff, M.J. Husnik, D. McKirnan, S. Buchbinder, B. Koblin, C. Celum, M. Chesney, Y. Huang, K. Mayer, S. Bozeman, F.N. Judson, K.J. Bryant, T.J. Coates and the Explore Study Team, 2004. Substance use and sexual risk: A participant- and episode-level analysis among a cohort of men who have sex with men. *Am. J. Epidemiol.*, 159: 1002-1012.
20. Stall, R. and D.W. Purcell, 2000. Intertwining epidemics: A Review of research on substance use among men who have sex with men and its connection to the AIDS epidemic. *AIDS and Behavior*, 4: 181-192.
21. Levine, J., 2001. New drug phenom: Ecstasy + Viagra = 'Trail Mix.' *WebMD Medical News*. Available at: http://my.webmd.com/content/article/33/1728_84361#.
22. Romanelli, F. and K.M. Smith, 2004. Recreational use of sildenafil by HIV-positive and -negative homosexual/bisexual males. *Ann. Pharmacother.*, 38: 1024-30.
23. Fisher, D.G., G.L. Reynolds, M.M. Wood and M.E. Johnson, 2004. Reliability of arrest and incarceration questions on the Risk Behavior Assessment. *Crime and Delinquency*, 50: 24-31.
24. Fisher, D.G., G.L. Reynolds-Fisher, C.M. Branson and C.A. Itatani, 2004. Multiple blood-borne infections in injection drug users. Paper presented at the XV International Conference on AIDS, Bangkok, Thailand.
25. Cagle, H.H., D.G. Fisher, T.P. Senter, R.D. Thurmond and A.J. Kastar, 2002. Classifying skin lesions of injection drug users: A method for corroborating disease risk. Rockville, MD: Substance Abuse and Mental Health Services Administration, National Clearinghouse for Alcohol and Drug Information. (Inventory Number AVD154)
26. Dowling-Guyer, S., M.E. Johnson, D.G. Fisher, R. Needle, J. Watters, M. Anderson, M. Williams, L. Kotranski, R. Booth, F. Rhodes, N. Weatherby, A.L. Estrada, D. Fleming, S. Deren and S. Tortu, 1994. Reliability of drug users' self-reported HIV risk behaviors and validity of self-reported recent drug use. *Assessment*, 1: 383-392.
27. Fisher, D.G., R. Needle, N. Weatherby, B. Brown, R. Booth and M. Williams *et al.*, 1993. Reliability of drug user self-report [Abstract], IXth International Conference on AIDS. Berlin, Germany (PO - C35 - 3355).
28. Johnson, M.E., D.G. Fisher and G.L. Reynolds, 1999. Reliability of drug users' self-report of economic variables. *Addiction Research*, 7: 227-238.
29. Needle, R., N. Weatherby, D. Chitwood, R. Booth, J. Watters, D.G. Fisher, B. Brown, H. Cesari, M.L. Williams, M. Andersen and M. Braunstein, 1995. Reliability of self-reported HIV risk behaviors of drug users. *Psychology of Addictive Behaviors*, 9: 242-250.
30. Jaffe, A., D.G. Fisher, G.L. Reynolds-Fisher and C.M. Branson, 2004. Designer drug use and HIV risk behavior in Los Angeles County, California. Paper presented at the XV Intl. Conf. AIDS, Bangkok, Thailand.
31. Bogart, L.M., A.H. Kral, A. Scott, R. Anderson, N. Flynn, M.L. Gilbert and R.N. Bluthenthal, 2005. Sexual risk among injection drug users recruited from syringe exchange programs in California. *Sexually Transmitted Diseases*, 32: 27-34.
32. Myers, T., J.P. Aguinaldo, D. Dakers, B. Fischer, S. Bullock, P. Millson and L. Calzavara, 2004. How drug using men who have sex with men account for substance use during sexual behaviours: Questioning assumptions of HIV prevention and research. *Addiction Research and Theory*, 12: 213-229.
33. Kinn, S. and J. Curzio, 2005. Integrating qualitative and quantitative research methods. *J. Research in Nursing*, 10: 317-336.
34. Halkitis, P.N., M.T. Shrem and F.W. Martin, 2005. Sexual behavior patterns of methamphetamine-using gay and bisexual men. *Substance Use & Misuse*, 40: 703-719.
35. Lambert, E., J. Normand, R. Stall, S. Aral and D. Vlahov, 2005. Introduction: New dynamics of HIV risk among drug-using men who have sex with men. *J. Urban Health*, 82 (Suppl. 1): 1-8.
36. Gorman, E.M., K.R. Nelson, T. Applegate and A. Scrol, 2004. Club drug and poly-substance abuse and HIV among gay/bisexual men: Lessons gleaned from a community study. *J. Gay & Lesbian Social Services*, 16: 1-17.